Strategic Management of Innovation within SMEs

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List of Abbreviations

AVE    Average Variances Extracted
CRC    Composite Reliability Coefficients
GLM    General Linear Model
IP     Intellectual Property
NPD    New Product Development
OECD   Organisational for Economic and Cooperation Development
PLS    Partial Least Square
R&D    Research and Development
RBV    Resource-Based View
SEM    Structural Equation Modelling
SME    Small and Medium-sized Enterprise
VIF    Variance Inflation Factor
Zusammenfassung

Also Motor wirtschaftlichen Wachstums ist Innovation zu einem wichtigen Thema für Wissenschaft und Praxis geworden. Trotz zahlreicher Studien in diesem Themenfeld gibt es kaum Forschung über Innovationsmanagement in kleinen und mittleren Unternehmen (KMU). Die vorliegende Dissertation untersucht die Einflussfaktoren von systematischem Innovationsmanagement in KMU. Die besonderen Charakteristika der zu untersuchenden Unternehmen sowie deren Verhalten in Bezug auf die Innovationsmanagement-Strategie werden aus organisatorischer Perspektive betrachtet.

Die Untersuchungsergebnisse deuten daraufhin, dass das formelle Innovationsmanagement der Unternehmen, einschließlich der Innovationsstrategie, des Portfoliomanagements, die Organisationskultur sowie der Vermarktung sich positiv auf die Erwartung der Geschäftsführer bezüglich potentieller Renditen auswirken. Bei der Analyse der Unternehmenseigenschaften kann festgestellt werden, dass junge Firmen grösseres Engagement in radikale Innovationen aufzeigen. Demzufolge weisen diese Firmen einen grösseren Investitionsanteil im Bereich Forschung und Entwicklung auf und dementsprechend höhere Renditen erwarten. Im Gegenteil dazu investieren ältere Firmen mehr in inkrementelle Innovationen und sind weniger optimistisch in Bezug auf zu erwartenden Renditen. Daneben zeigt sich, dass für Unternehmen, vor allem das formale Vorgehen des Firma bezüglich Innovationen wie beispielsweise die Marktanalyse, Produktentwicklung und Schutz von geistigem Eigentum eine grosse Wirkung auf die Verkaufszahlen hat.

Summary

As the engine of the economic growth, innovation has become a popular topic for researchers and practitioners. Despite numerous studies on this theme, there is still a paucity of research on the innovation management of Small and Medium-sized Enterprises (SMEs). This dissertation aims to investigate the SMEs’ systematic management of innovation and critical factors determining their anticipated returns. These firms’ characteristics and behaviour in innovation management are examined from the organisational perspective.

The empirical findings suggest that the formal innovation management including the innovation strategy, portfolio management, organisational culture and commercialisation, strengthens the owner-managers’ confidence over their potential returns. Regarding firm characteristics, young and small firms tend to engage more actively into radical innovation, thus having a higher proportion of Research and Development (R&D) investment and anticipating higher returns. By contrast, mature firms are more likely to invest into incremental innovations, thus having much lower optimism toward the returns. Larger firms tend to approach a more formal innovation commercialisation despite their lower anticipated returns. In addition, the SMEs’ strategic orientation in innovation such as market assessment and formal NPD process are perceived to determine the anticipated volume of innovation sales.

In brief, the dissertation contributes to deepen the theory of the entrepreneurial rent, the resource-based view (RBV) and elaborates the linkage between the model of rent assessment and the organisational framework. Additionally, the exploration into SME clusters enhances the understanding of the firm’s characteristics and orientation in managing the commercialisation process. Such analysis provides new insights into the typology study of SMEs in innovation management and sheds some lights on the entrepreneurial optimism towards innovation returns.
1 Introduction

1.1 Main topic

Since the twentieth century, innovation management has been considered to play a contributive role in sustaining the firms’ competitive advantages as well as stipulating the global economic growth (OECD, 2010; Mazzarol and Reboud, 2011). In a similar vein, Westland (2008) describes innovation as the industrial religion of the 21\textsuperscript{st} century as it acts as a critical generator for the firms’ sustainable profits and market shares. Additionally, the substantial role of innovation on firm performance has been widely acknowledged by both scholars and practitioners (Tidd, 2001; Van der Panne et al., 2003; Teece, 2006; Rosenbusch et al., 2011).

As noted by Shepherd and Wiklund (2005) and OECD (2005), the economic activities in many countries have now been moved from large to small and medium-sized SMEs, which are known as the key source of dynamism, innovation and flexibility. SMEs constitute the dominant form of business organisation in all countries worldwide, accounting for up to 99 per cent of the business population in most economies (OECD, 2010). However, most SMEs deal with challenges in innovation management due to their limited resources (Vermeulen, 2005). Additionally, the innovation may involve a risk of failure due to the investment for an uncertain expected result. Statistical evidences showed that only one-third of the new products launched in the market were successfully commercialised (Urban and Hauser, 1993). Hence, considerable scholarly efforts have been made to analyse the nature of innovation management in Small and Medium-sized Enterprises (SMEs) (Rosenbusch et al., 2011).

The existing literature on this topic has described the innovation management of small firms from three distinctive complementary perspectives: i) the task environment in which the firm seeks to operate; ii) the organisational configuration;
iii) the firm’s managerial characteristics (D’Amboise and Muldowney, 1988). Following this three-fold distinction, Tan et al. (2009) emphasise the significance of these three levels of analysis: the system, organisational, and individual view. The system view describes the external environment, comprising two elements of the National Innovation System (NIS): the common innovation infrastructure (i.e. the access ability into technological sophistication of the national economy, the human, financial resources and government policies that enhance innovation activities), and cluster-specific environment for innovation (i.e. the interplay between factor conditions, demand conditions, climate for innovation-based local rivalry, and clusters of related and supporting industries)(Mazzarol and Reboud, 2011; Porter and Stern, 2001). The organisational view, as mentioned by Adams et al. (2006), encompasses seven categories including: i) inputs management, knowledge management, organisational culture, innovation strategy, portfolio management, project management, and commercialisation. Each category reflects the firm’s different combination of resources and capabilities in developing and commercialising innovation. Finally, the individual level focuses on the leadership styles, entrepreneurial orientation or managerial competence (Tan et al., 2009; Mazzarol and Reboud, 2009).

1.2 Addressed research gap

In the context of innovation management, SMEs often encounter the challenges of anticipating the trade-off between risks and returns of such investments due to their limited capabilities (Mazzarol and Reboud, 2011). This can be attributed to the firms’ over-emphasis on the absolute anticipated value of the innovation while neglecting other potential related risks (Martin and Scott, 2000). Besides, the owner-managers’ intuitive knowledge in management and the complex nature of innovation such as radical innovation also impose a tough challenge on SMEs in anticipating the outcomes (Mazzarol and Reboud, 2005). Hence, insights gained through the analy-
sis of the potential returns prior to any investment will provide owner-managers with valuable tools to evaluate the trade-off before engaging into an innovation. However, such analysis remains under-developed in the existing literature, which imposes a burden on small business owner-managers in estimating the future returns from innovation (Mazzarol and Reboud, 2005). Therefore, this dissertation focuses on analysing the SMEs’ strategic management of innovation from the organisational view.

Prior literature has acknowledged the role of the Resource-Based View (RBV) theory in shaping the strategic management of firms (Wernerfelt, 1984; Barney, 1991; Verona, 1999; Kor and Mahoney, 2004; Crook et al., 2008). The efficient allocation and combination of the firm’s resources enhances its competitive advantages, which enables entrepreneurs to capture an innovation rent (Alvarez and Barney, 2004). As noted by Milgrom and Roberts (1992), innovation rent is “a return received in an activity that is in excess of the minimum needed to attract the resources to that activity”. Alvarez (2007) described the concept of “entrepreneurial rents” as the outcomes of an innovation generated by the entrepreneurs’ creative combination of resources under uncertainty. Santi et al. (2003) suggested an innovation assessment framework comprising the potential volume of sales (the estimated annual sales), the rate of margin (i.e. profitability rate of the innovation) and the length or the duration that an innovation can be exploited.

Despite a number of research on innovation and entrepreneurial rents, there is still a paucity of empirical studies investigating the interplay between SMEs’s innovation management and their effects on the commercialisation success in the organisational context. In view of this discrepancy in the existing literature, the dissertation aims to explore the relationship between the firm-related factors and the anticipated returns, based on the organisational view.

The first paper examines the interplay between the seven interconnected elements of the Adams et al.’s (2006) framework and the potential rent. This study is the
extended version of the International Council for Small Business Conference paper (Do et al., 2011). This paper aims to address the research question:

1. \textit{How do the organisational factors relate to the anticipated innovation rent?}

The second paper explores the effects of firm characteristics on the firms’ commercialisation management and estimation of the returns. The earlier version of this paper (Do et al., 2012), was reported at the world annual meeting of the International Council for Small Business in New Zealand. This discriminant study focuses on answering the following questions:

1. \textit{How do firm characteristics influence the SMEs’ management of the commercialisation process and the anticipated innovation rent?}

2. \textit{How is the systematic management of the commercialisation process related to the anticipated returns?}

The third paper investigates the comprehensive interaction between the small business manager-owners’ estimated sales volume, rate of profitability, length of innovation, and the SMEs’ organisational factors for innovation management. This paper addresses the following questions:

1. \textit{What are the effects of the organisational factors on the anticipated volume of innovation sales?}

2. \textit{What are the effects of the organisational factors on the anticipated rate of margin?}

3. \textit{What are the effects of the organisational factors on the length or life cycle of innovation?}
1.3 Methodology

The fourth paper analyses the relationship between the firms’ commercialisation management practices, their potential innovation sales, and the life cycle of innovation. This paper aims at clarifying the questions below.

1. What are the determinants of the estimated volume of sales of firms targeting short life cycle innovations?

2. What are the determinants of the estimated volume of sales of firms targeting long life cycle innovations?

1.3 Methodology

In conducting the investigation, all the four papers utilised quantitative analysis of SMEs in the Organisational for Economic and Cooperation Development (OECD) area. The sample selection targeted those firms with fewer than 250 employees and the annual turnover of less than 50 million euros, based on the definition of SMEs in (OECD, 2004). These firms were recruited mainly from manufacturing, services and retailing, and other sectors. These firms were diverse in terms of the age, size and R&D intensity. Data collection was a part of an international research project of innovation management of 567 firms within the total of 11 OECD countries from 2006 to 2008 (Mazzarol and Reboud, 2011).

The survey was conducted face-to-face with owner-mangers or CEOs of these SMEs. Most questions were developed in a 5-Likert scale to assess the the firm’s innovation management practices. Each interview typically took one hour which reported the owner-managers’ assessment of their innovation management practices, perception towards a successful commercialisation, as well as their judgement over the external environment and their past experience of commercialisation.

Drawing on the sample of 477 SMEs within 9 OECD countries, the first paper examines the cause-effect relationship between organisational factors in Adams et al.
1.3 Methodology

(2006) and the anticipated rent. The analysis utilises tools of the software program SPSS, version 20, such as Factor Analysis and General Linear Model (GLM). The reliability tests including Composite Reliability and Average Variances Extracted (AVE) of all the constructs are undertaken in the Partial Least Square (PLS) software. In addition, the multi-collinearity tests are conducted by Variance Inflation Factor (VIF) and Durbin-Watson statistics to ensure the reliability for the further regression analysis.

The second paper explores the effects of firm characteristics on the systematic management of innovation and the anticipated rent. Furthermore, the cause-effect relationship of the commercialisation process is reflected through the discriminant analysis of a SME typology. As suggested by Tan et al. (2009), developing a systematic typology of firms can make a great contribution to the theory of entrepreneurship. Employing a typology of 525 SMEs within 10 OECD countries, the discriminant analysis is conducted with the SPSS software version 20. Its objective is to identify critical factors that distinguish firm clusters’ characteristics and behaviour in the commercialisation management. The Wilk’s Lambda indicator is used to judge the significance of the models. In a further analysis, the impacts of firm characteristics on the systematic commercialisation and the anticipated returns are verified by the Multivariate Linear Regression test. In this case, the p value determines the significance of the models.

The third paper elaborates the Structural Equation Modelling (SEM) of the interplay between the seven interconnected elements in Adams et al.’s (2006) framework and the three components of the rent, using the Partial Least Square software program WarpPLS, version 3.0. The SEM depicts the comprehensive interaction between organisational factors and the anticipated rent. The reliability of all the SEM constructs is verified by the AVE and Composite Reliability and VIF tests. The fit of the models is based on the $R^2$ and the p value.

The fourth paper develops another typology of SMEs which differentiates their
innovation management practices and oriented rent profiles. Similar to the second paper, the discriminant analysis and factor analysis are applied to classify the different firm groups, based on the software program SPSS, version 20. The significance of the models relies on the p value, Wilk’s Lambda indicator and the rotated standardised discriminant coefficients of the variables.

1.4 Structure of the dissertation

This dissertation is structured as follows. Firstly, Chapter 1 describes an overview of the topic, the research gaps that need to be addressed and the research methodology of the dissertation. Then, Chapter 2 focuses on examining the predictors of the owner-managers’ anticipated rent from the organisational perspective. Chapter 3 clarifies the relationship between the firm characteristics, the systematic management of commercialisation and the estimated returns. Chapter 4 provides the structural equation modelling (SEM) analysis of the interaction between the organisational factors and the volume of sales, the rate of profitability and the duration of innovation. Chapter 5 explores the critical factors that determine the owner-managers’ estimated sales volume of firms targeting either short or long life cycle innovation. Finally, Chapter 6 summarises the theoretical and practical contributions of all the four papers, then discussing the limitations and prospective aspects for further research.
2 Predicting Anticipated Rent from Innovation Commercialisation in SMEs

Abstract

Purpose This study examines the relationship between the expectations that small business entrepreneurs hold in relation to the future returns from the commercialisation of innovations, and key organisational elements including inputs, knowledge, culture, strategy, portfolio, project management and commercialisation. More specifically, this research aims to deepen the knowledge of how SMEs manage their innovation and identify critical factors determining the potential innovation outcomes.

Design/methodology/approach This study draws on a large sample of innovative SMEs from multiple OECD countries. Data were collected using a questionnaire administered face-to-face with owners-managers or executives of SMEs who made critical decisions for the innovation management of the firm. Firstly, a factor analysis is conducted to identify the most appropriate measures for each variable. Secondly, we test for multicollinearity among independent variables. The final step integrates results from the GLM analysis that measures the relationship between organisational factors and the anticipated returns.

Findings Our findings suggest that positive expectations over future investment in innovation- as measured by the anticipated rent- are influenced by organisational

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1 By Thuy Hang Do, Tim Mazzarol, Thierry Volery and Sophie Reboud. This article has been accepted for publication at European Journal of Innovation Management, forthcoming. An earlier version (Do et al., 2011) was presented at the World Conference of the International Council of Small Business in Stockholm, June 2011, and awarded the best theoretical paper, sponsored by Journal of Small Business Management)
factors, including innovation strategy, portfolio management, project management, and organisational culture and commercialisation process. Conversely, the resource endowment is not perceived as a barrier to innovation and to the development of a competitive advantage. In addition, industrial knowledge management has an indirect effect on the anticipated returns.

**Originality/value**  Despite extensive research in innovation management, the role of organisational factors on anticipated returns in SMEs has not been investigated to date. The study provides researchers with new insights into the resource-based view and the theory of entrepreneurial rent from the perspective of innovation management. The findings offer guidance to managers as to potential success factors in enhancing the rent, but also reflect entrepreneurial optimism in the management of innovation.

**Keywords**  Innovation management, organisational factors, rent, SMEs.

### 2.1 Introduction

Innovation is an important driver of the economic and social development, and a critical element in the future success of industries (OECD, 2010). As a process within organisations, innovation is about new products or processes leading to the enhancement of value for customers and shareholders (Adams et al., 2006; Bessant, 2003). However, innovation requires change, both to the customers and the suppliers, as well as to the firm. Such change can be incremental in nature or highly radical and disruptive (Tushman and O’Reilly, 1997). Due to the potentially disruptive nature of innovation, it is an activity containing inherent risk, with uncertainty in future technical, commercial and financial returns to the initial investment required (Dziura, 2001). Because of the high failure rate of innovation commercialisation in small
firms, it is essential for entrepreneurs to estimate the potential returns before they commit to a particular investment (Wong and Tong, 2012). However, SMEs have traditionally had difficulties in commercialising innovation because of their limited resources and ability to cope with the investment risk (Mazzarol and Reboud, 2011).

The challenge for many small firms that seek to commercialise an innovation is their ability to use conventional financial models (e.g. net present value) to assess the attractiveness of their innovation (Beaudoin and St Pierre, 1999). As a result, innovative small firms are likely to place greater emphasis on the anticipated absolute value of their innovation without considering the potential difficulties associated with its launch (Martin and Scott, 2000). An important consideration in the decision to invest in future innovations is therefore the trade-off between risk and return. Moreover, knowing in advance the difficulties the small firm may encounter when trying to commercialise an innovation can help to improve aspects of this innovation before it is too late (Naidoo, 2010). These factors strengthen the need for more research into the strategic management of innovation (Tidd, 2001), which remains a field of study that has become compartmentalised and fragmented despite its multidisciplinary nature (Shafique, 2013).

This research focuses on examining the strategic innovation management within SMEs seeking to commercialisation new products and services, and thereby securing economic rents from their investments. The study takes an organisational perspective, investigating the factors that have significant effects on the anticipated returns, to understand how these SMEs manage innovation and what drives their optimism over such investment returns. More specifically, the study explores the impacts of organisational factors on the potential volume of innovation sales, the expected rate of margin and the duration of exploiting an innovation.

Based on a large-scale study of innovator SMEs drawn from a cross-section of developed economies within OECD group of countries (Mazzarol and Reboud, 2011), the principal units of analysis are the owner-managers’ perception of their an-
2.2 Theoretical Background

The concept of innovation rent

The concept of “economic rent” emerged in the nineteenth century in relation to resources that are limited in supply and can therefore command premium prices. A scarcity of any resource, either tangible or intangible, allows above average rents to be charged by those who own such resources (Schoemaker, 1990). Economic rent is an important point of focus within the resource-based view (RBV) of strategic management because it helps to explain why some firms are able to secure long-run rent streams through their ability to control unique and valuable resources that cannot be easily replicated or substituted (Barney, 1991; Mosakowski, 1998).

At least two distinct types of economic rent have been identified with specific relevance to the strategic management of the firm. The first of these is “Ricardian rent”, which focuses on bundles of tangible and intangible resources over which the
2.2 Theoretical Background

firm has ownership or control. The second is “Schumpeterian rent”, which focuses on the firm’s ability to develop unique capabilities (Makadok, 2001). Ricardian rent is consistent with the RBV of strategy where the firm’s ability to control unique and valuable resources permits it to secure above average rents (Penrose, 1959; Wernerfelt, 1984; Barney, 2001). However, Schumpeterian rent is more consistent with the dynamic capabilities concept of strategy that sees the firm’s ability to deploy and exploit resources as critical to its competitiveness (Amit and Schoemaker, 1993; Teece et al., 1997). For firms engaged in innovation commercialisation within fast-changing task environments Schumpeterian rent creation is likely to be more important, while firms in more stable task environments will potentially find Ricardian rent of greater importance (Lim et al., 2013).

Systematic or formal approaches to the management of innovation commercialisation usually involve the protection of intellectual property via procedures such as patents, copyright, design registration and trademarks (Bertolotti, 1995). Yet, the ability of a firm to create isolating mechanisms that can form strategic foundations for rent enhancement can also take the form of information and resource asymmetries, culture, processes and competencies (Dierickx and Cool, 1989; Schoemaker, 1990). These resources and capabilities form “strategic assets” that provide the firm with the ability to engage within its chosen industry and deal with customers, suppliers, competitors, substitution threats and the forces of regulatory and environmental change (Amit and Schoemaker, 1993).

Small entrepreneurial firms engaged in the commercialisation of innovation are likely to suffer from resource constraints and may deal with risk and uncertainty through different forms of organisational response (Alvarez and Barney, 2005). When faced with making decisions over future investments, such as with innovation, it is suggested that entrepreneurial leadership will focus on a predetermined level of affordable loss or acceptable risk rather than a predetermined return on investment (Sarasvathy, 2001). The absence of clearly established market price signals
also forces the firm’s management to develop strategies for future commercialisation without these navigation markers (Lippman and Rumelt, 2003). Further, the ability of small entrepreneurial firms to exploit potential economic rents from market opportunities has been associated with their capacity to convert tacit knowledge into explicit knowledge and generate isolating mechanisms that allow them to secure sufficient control to enable effective arbitrage (Alvarez and Barney, 2004).

By drawing on an RBV strategic management perspective, Alvarez and Barney (2004) suggested that one of the fundamental objectives that entrepreneurs pursue is to combine resources in such a way that this process will result in a competitive advantage. This advantage will typically allow entrepreneurs to appropriate a rent from their (monopolistic) situation as innovator. Innovations give rise to rents, defined as “a return received in an activity that is in excess of the minimum needed to attract the resources to that activity” (Milgrom and Roberts, 1992, p.621). Along these lines, Miles et al. (2003, p. 394) defined the innovation rent as “returns that arise from the existence, discovery, and successful commercial exploitation of entrepreneurial opportunities”. Alvarez (2007) has identified what she refers to as “entrepreneurial rents”, which are created when economic actors such as entrepreneurs combine resources into new and different configurations to create innovations that are generated under conditions of uncertainty. The value of these entrepreneurial rents is difficult to predict prior to their being adopted within the market. Once they are transacted in the market they become “quasi-rents”, which are created under conditions of risk.

Since entrepreneurial activities are closely associated with rent-seeking behaviour (Dejardin, 2011), it is important for owner-managers to understand the nature of economic rent and how it is estimated to develop an appropriate strategy towards a particular innovation investment. In this study, the initial assessment of the innovation rent involves the analysis of three different levels of rent (Mazzarol and Reboud, 2005).
2.2 Theoretical Background

1. **Anticipated rent**: the potential returns that could be generated from a particular innovation investment. This arises from the kind of innovation (e.g. creating a substitution in existing markets or generating a new market), the characteristics of innovation (e.g. standing alone or integrating into a new system) and size of the potential using markets (e.g. the annual volume of worldwide market for an innovation). It conforms to the “entrepreneurial rent” concept proposed by Alvarez (2007).

2. **Residual rent**: the analysis of the competitive strengths the innovation will have to face, considering characteristics of the environment of the potential using market, and the related erosion effects. This is closer to the “quasi-rent” concept of Alvarez (2007).

3. **Appropriable rent**: the real appropriated returns from innovation, considering the analysis of competitive situation of the SME and its capability to launch the innovation. This is the actual rent extracted from the innovation and can be generated via control over assets (e.g. Ricardian rent), or capabilities (e.g. Schumpetarian rent).

The estimation of the anticipated rent indicates the firm’s capacity in assessing the risk and returns from investment in the innovation. However, as noted many SMEs have difficulty in estimating the potential rent due to limited resources, a lack of reliable or comparative data on financial costs and benefits, plus the uncertainty surrounding the outcome of the investment. The limited ability of SMEs to estimate future rent returns stems from three reasons. First, SME innovators often focus on more the anticipated absolute value while neglecting the erosion of the rent, the bargaining of customers and suppliers and the competition effects (Martin and Scott, 2000). Second, the SME innovator may have an unstructured way of reasoning, and thus may act on an intuition rather than on a rational reasoning (Moeckler, 2003).
2.2 Theoretical Background

This is a high probability in small firms where the entrepreneur is relatively isolated and lacks the support of an evaluation team with the skills to conduct appropriate feasibility analysis. Third, the innovation frequently involves a complex, non-linear process in which feedback is difficult to anticipate. Hence, our study aims to investigate the anticipated rent so as to provide entrepreneurs an overall view of the estimated returns that could be generated from their innovation. This in turn determines their decisions in relation to such investment.

As proposed by Santi et al. (2003), the anticipated rent is measured by three elements: i) the estimated volume of sales; ii) the rate of profit margin; and iii) the length of the life cycle of an innovation. Figure 1 illustrates this framework which was developed further by Mazzarol and Reboud (2005, 2006). The estimated volume of sales is determined by three indicators. The first of these is the potential geographic diffusion of the innovation within a given sector. The second is the owner-manager’s estimation as to the potential annual sales that might be made on a worldwide basis after three years. The third indicator is their estimation of the potential diffusion of the innovation within one or more market segments (Hahn et al., 1994). The rate of profit margin is related to the value and size of the competitive advantage created by the innovation. Three main factors influence the rate of margin. These include the process of generation of the innovation, the types of innovation and the kind of prior protection. Finally, the length of the innovation’s life cycle depends on the technology used and the ease of copying the product or service (Teece, 1986). If the technological basis of the innovation rests upon fundamental research requiring extensive research efforts, the innovation will tend to have a long life cycle. By contrast, if the innovation is based on applied research and does not require major research work, its length of life cycle may be limited. The technical ease to copy will also determine the probability and speed of competitive imitation (Reed and DeFillippi, 1990). The less transparent the innovation (because of technological complexity and specific know-how), the more difficult it is to access the
knowledge inherent in the innovation (Tang and Murphy, 2012). The ability to patent the technology and to enforce the patent effectively will further increase the life cycle of the innovation (Hanel, 2006). Based on the aforementioned measurement of the anticipated rent, our objective was to identify factors critical to determining the entrepreneur’s assessment of the potential innovation returns from an organisational perspective.

Figure 1: The Model of Estimating Anticipated Rent

(Santi et al., 2003)

Length: duration of innovation exploitation

Rate: profit generated by the innovation

Annual Volume: sales made over one year

The surface below the curve can be approximated by

\[ \sum \text{annual volume} \times (\text{price} - \text{cost}) / \text{cost} \]

Thus the total amount of Rent = Volume \times Rate \times Length
2.2 Theoretical Background

2.2.2 Organisational View

It has been suggested that the strategic management behaviour of SMEs can be analysed by examining three distinct yet complementary perspectives: i) the task environment in which the firm seeks to operate; ii) the organisational configuration of the firm; and iii) the firm’s managerial characteristics (D’Amboise and Muldowney, 1988). This view has been endorsed by other writers (Tan et al., 2009; Uhlaner et al., 2012). In this analysis, we focus on the organisational configuration and how it impacts on the perceptions of the firm’s top management team. This is consistent with the conceptual approach taken by Alvarez and Barney (2004, 2005) who point to the role played by entrepreneurs in the allocation of resources within their control, and/or via alliance seeking to enable them to generate economic rents (Alvarez and Barney, 2001).

To provide a coherent framework for examining the process of managing innovation within a firm, we adopted a conceptual model proposed by Adams et al. (2006). Their review of the academic literature identified at least seven key units of analysis considered important when seeking to measure the process of innovation management within organisations. These seven measurement areas were: i) inputs management (e.g. people, physical and financial resources); ii) knowledge management (e.g. idea generation, knowledge repository); iii) innovation strategy (e.g. the strategic orientation and leadership); iv) organisation and culture (e.g. structure and culture); v) portfolio management (e.g. balancing risk/return); vi) project management; and vii) commercialisation (e.g. market testing, research, marketing and sales). These seven elements provide a useful framework for examining the way in which the resource of an innovator SME may be organisationally configured in the management of innovation (Do et al., 2011). The following section develops testable hypotheses for examining the interplay between these seven units of analysis and the dependent variable anticipated rent.
2.3 Hypothesis Development

2.3.1 Inputs

Inputs or resources are defined as the firm’s financial, physical, human, commercial, technological, and organisational assets that are used for developing, manufacturing and distributing products and services to customers (Barney, 1991; Wernerfelt, 1984). According to Barney (1991, p.101), “firm resources include all assets controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness”. Not all resources, however, are strategically relevant for the entrepreneur. Only strategic resources which are valuable, rare and imperfectly imitable create competitive advantage because they are the basis of the firm’s competitive advantage, which in turn determines its ability to earn a profit.

Technical resources such as engineering and production equipment, manufacturing facilities and information technology systems have been found to have a positively impact on innovation (Song and Parry, 1997; Mitchell and Zmud, 1999). With regard to human resources, firms which have a pool of qualified human capital with advanced technical skills, know-how in R&D projects, and risk-taking propensity have a higher probability of implementing innovative activities (Hitt et al., 2001; Canto and Gonzales, 1999).

Financial resources are considered as the most important measure of inputs, which allows firms to allocate funds to innovation investments. Those firms, which have available financial resources, will have greater capacity to support its innovative activities (Lee et al., 2001; Canto and Gonzales, 1999). Facilities or physical resources such as the firm’s plant and equipment, its geographic location and access to raw materials are also important resources influencing the implementation of the innovation (Adams et al., 2006).

According to Rogers (2004), firms with larger pools of resources have stronger cash flows for developing innovation. This advantage is predominant if the external
capital market is inaccessible due to high risks of innovation. In addition, these firms have a higher capability to tap into human capital skills and knowledge. In other words, there is often a positive and significant relationship between the stocks of resource inputs available to SMEs and their ability to successfully commercialise an innovation. This view is supported by Gans and Stern (2003) enriching the “Profit from Innovation” (PFI) model PFI (Teece, 1986; Maine and Garnsey, 2006).

Garnsey (2006) also emphasised the importance of resources and access to complementary assets. Hence, we posit that firms which have a larger pool of resources are better positioned to detect and exploit the potential associated to a specific innovation over time and have potentials of generating higher rent.

- **Hypothesis 1**: There is a positive relationship between the firm’s stocks of resource inputs that facilitate the development of innovation and the anticipated rent.

### 2.3.2 Industry Knowledge

According to the RBV approach to strategy, organisational knowledge is one of the most important intangible resources that can help to build a sustainable competitive advantage (Barney, 1991; Argote and Ingram, 2001) and underline new product success (Hoopes and Postrel, 1999). Additionally, Thornhill (2006, p.692) suggests that “knowledge can possess the properties of value, rarity, inimitability and organisational engagement”, which are “central to enabling superior firm performance”. Knowledge management relates to a firm’s ability in obtaining and communicating ideas and information both explicitly and implicitly. Whittington et al. (1999) suggest that firms with superior industry knowledge often have high levels of systemic change and innovation. Uhlner et al. (2007, p.5) propose that tacit knowledge is “most effectively shared directly between individuals, either through conversation or direct observation” and is found to have positive effects on a firm’s innovative
ability (Damanpour, 1991). In addition, organisations that are able to stimulate and improve the knowledge of their human capital are better to cope with changes (Nonaka, 1994). Past research also suggests that the greater part of knowledge that SMEs acquire comes from outside the firm and is essential to their success (Zahra and G., 2002). Thus, knowledge management and more specifically, industry insights, can be assumed to play an important role in the development of potential innovation rent.

• **Hypothesis 2**: There is a positive relationship between the firm’s industry knowledge management and the anticipated rent.

### 2.3.3 Organisational Culture

Schmidt (1990) observed that culture and cultural fit are more important in SMEs than other organisations. Organisational culture and structure can create environments in which innovation can be encouraged or hampered (Adams et al., 2006). An open culture is often seen in many innovative firms because it stimulates the exchange of ideas with both the internal and external environment (De Jong and Brouwer, 1999). Open cultures are characterized by mutual trust and respect, and, as such, they provide a conductive environment for the exchange of ideas. Similarly, McFadzean (1998) found that a flexible and open environment promotes the creativity within the organisation and facilitates idea generation for the commercialisation purposes. An openness towards external stakeholders matters. Some of the greatest ideas often come from amongst creative throngs of experts, consumers, engineers, students, or current users. For example, crowdsourcing can represent an effective way to harness the wisdom of crowds (Lichtenthaler and Ernst, 2009). Numerous studies testify to the importance of firms extensively “networking” in order to improve innovation potential (Vanhaverbeke and West, 2006). This leads to our fourth hypothesis:
• Hypothesis 3: The more the firm involves internal and external stakeholders in the management of the innovation, the higher the anticipated rent will be.

2.3.4 Innovation Strategy

Innovation strategy plays a significant role in determining the firm’s innovative ability and commitment on innovation investments (Tushman and O’Reilly, 1997). De Jong and Brouwer (1999, p.30) remarked that the innovation strategy is “a major directional and motivating instrument for developing innovative decisiveness”. As such, the innovation strategy is an integrative part of the mission, objectives, and budgets for innovation and has a positive impact on corporate financial performance (Zahra and Das, 1993; Markham, 1998). Several scholars confirmed the positive effects of innovation strategy on innovation (Li and Atuahene-Gima, 2001; Verhees and Meulenberg, 2004; De Jong and Vermeulen, 2006). As a result, the planning and implementing of an innovation strategy is a key factor in determining the level of innovativeness, which then drives the firm’s financial performance (Crespell and Hansen, 2008). Thus we posit that firms which have a stronger focus on innovation in their strategy will expect a higher anticipated rent.

• Hypothesis 4: There is a positive relationship between the firm’s commitment to innovation as a major future strategy and the anticipated rent.

2.3.5 Portfolio Management

In the context of innovation management, portfolio management is the process of managing a variety of innovation projects; including choosing and monitoring appropriate investments and allocating funds accordingly. The management of the innovation portfolio has been found to be an essential issue in developing innovations because this is the phase where new projects are evaluated, selected, and prioritized.
Additionally, the management is considered to be “an organisational capability and attempt to determine a level of proficiency” (Adams et al., 2006, p.35) as it helps firms to allocate resources efficiently and diversify the risks. According to Mikkola (2001, p.42), portfolio management is a powerful tool that allows “products and R&D projects to be analysed in a systematic manner, providing the opportunity for the optimisation of a long term company’s growth and profitability”. Therefore, a systematic process guided by clear selection criteria could help optimise the use of limited resources and enhance an organisation’s competitive position (Adams et al., 2006). Other scholars (e.g. Capon et al. (1992)) have suggested that most successful firms are found to develop both product and process innovation simultaneously. In addition, Athey and Schmutzler (1995) found that complementary and process innovation helps a firm improve its net revenue in the short term. Therefore, we formulate the following hypothesis:

- **Hypothesis 5**: Firms which manage to combine both product and process innovation in the innovation portfolio will achieve higher anticipated innovation rent.

### 2.3.6 Project Management

Project management refers to the evaluation of the efficiency of the project, tools used, communications and collaboration within the team members. According to Naughton and Kavanagh (2009, p.4), project management is “a set of techniques to effectively manage change and change is a synonym of innovation”. The efficiency of the project management can be measured by different tools of evaluation procedures and instruments (Adams et al., 2006). Kerzner (2006, p.5) defined a successful project management as “having achieved the project’s objectives within time, within cost, at the desired performance or technology level, utilising the assigned resources effectively and efficiently and accepted by the customers”. The role of team project
management is a critical issue. Therefore, the ability to collaborate and the quality and efficiency of team working should be emphasised. In addition, an efficient process that helps to manage the ambiguity of the innovation is critical to innovation. Hence, project management is considered to play an important role in contributing to the innovation success. We can thus make the following hypothesis:

- **Hypothesis 6**: There is a positive relationship between a firm’s efficiency in project management of innovation and its anticipated rent.

### 2.3.7 Commercialisation

Innovation commercialisation was identified by Adams et al. (2006) as the implementation phase to achieve commercially viable outcome for the firm. Herdman (1995) remarked that commercialisation is driven by firms’ expectations that they can gain a competitive advantage in the marketplace for a particular product, process, or service. Several scholars, for example, Helfat and Raubitscek (2000); Huang et al. (2002) found that customer knowledge enhances the success of new product development and commercialisation. Marketing capabilities such as market investigation, market testing and promotion play an important role in commercialisation processes (Verhaeghe and Kfir, 2002; Adams et al., 2006). As a result, the communication with the customers and suppliers make a significant contribution to innovation processes (Bessant, 2003; Slatter and Mohr, 2006). In managing the commercialisation process, the protection of intellectual property is regarded as a significant tool for SMEs to promote the sustainability of innovation and strengthen the firm’s competitive advantage (Candelin-Palmpvist et al., 2012; Burrone, 2005; Gans and Stern, 2003). Hence, a formalised management process of commercialisation is likely to generate a higher anticipated rent over time, which leads to our final hypothesis:

- **Hypothesis 7**: There is a positive relationship between a formal commercialisation management process and the anticipated rent.
2.4 Methodology

2.4.1 Sampling

A sample of 477 SMEs was drawn from 7 countries within the OECD. This included: Australia (78 firms), Austria (78 firms), Belgium (51 firms), Canada (47 firms), France (68 firms), New Zealand (92 firms), and Switzerland (63 firms). The data collection was part of an international research project on innovation management of SMEs conducted from 2006 until 2008 which drew a slightly larger sample of 567 cases from 11 countries (Mazzarol and Reboud, 2011). The sampling process used in the original study was purposive rather than random in nature and involved identifying firms that were engaged in the commercialisation of at least one innovation.

In this analysis, the original database from the above mentioned study was used and several firms and countries were removed due to missing or incomplete data, outliers or size (e.g. firms with over 250 employees). Despite the sample comprising firms from several countries, tests of country of origin in relation to the variables used in this analysis found no statistically significant differences. Any minor differences that were found appear to have arisen as a result of factors unique to the country sample rather than the country of origin. For example, most of the firms selected for the Belgium sample were micro-enterprises engaged within the Flemish creative industries sector. Their innovation management behaviour was typical of similar firms found in other countries, but a-typical of the entire sample when examined from a country perspective.

The firms selected for the final sample were from a range of industry sectors, among which manufacturing accounted for approximately 31.2 per cent of the total. The other major group comprised service firms, including retailing. The average age of firms was 22 years and the average level of investment on innovation was 22.8 per cent. We defined SMEs as a business with less than 250 employees and with the
annual turnover of less than 50 million Euros (OECD, 2004). The data used in this study had been collected via face-to-face interviews with the entrepreneurs or senior executives of the SMEs.

These interviews collected both qualitative and quantitative data with the latter gathered via use of a questionnaire deployed within an EXCEL spread sheet. This was a diagnostic assessment tool that enabled data to be collected and a report generated, which helped the respondents assess their own approach to both the estimation of the potential rent, and the innovation management processes employed. This also assisted in validating the responses and enhancing reliability of the data collected. Each interview typically took around one hour and involved broader discussions of the respondent’s views on the external environment and their past experience of commercialisation (Mazzarol and Reboud, 2011). For the purposes of this study only the quantitative data was used.

2.4.2 Variable measurement

Dependent variables

In measuring the anticipated rent, we considered both its separate components (i.e. volume, rate, length) and the sum of these three elements. The measurement was based on the owner-manager’s assessment of the anticipated rent and the items were measured on a 5-point Likert scale. The volume of potential sales was measured as the mean value of the estimated potential geographic diffusion of innovation within the firm’s sector, the potential annual sales for such innovation on a worldwide basis over three years and the potential diffusion of innovation within segments of the firm’s market. The rate of anticipated profit margin was measured as the mean value of the estimated gross profitability, the net profitability and the ability of the innovation to generate potential new market. The anticipated length of the innovation’s life cycle was measured by the perceived level of the innovation’s technical
2.4 Methodology

complexity, the imitability of the innovation in terms of technical and legal aspects. The final dependent variable, the rent index, was formulated as a synthesis of all these components.

Independent variables

The seven units of analysis as identified by Adams et al. (2006) were measured using 21 items selected from the diagnostic assessment questionnaire deployed in the original international study (Mazzarol and Reboud, 2011). These are listed in the Appendix. The first of these independents was “inputs”, consisting of four items that assessed the firm’s possession of key technological, human, financial and physical resources, as suggested by (Song and Parry, 1997; Mitchell and Zmud, 1999; Hitt et al., 2001; Canto and Gonzales, 1999; Lee et al., 2001). The second independent variable, “industry knowledge” was measured by four items referring to the firm’s systematic assessments of bargaining powers of customers, suppliers and competitor reaction. These measures are consistent with other measures of formality and market awareness used in earlier studies (Lyles et al., 1993; Oden, 1997; Hoopes and Postrel, 1999).

The third independent variable, “organisational culture”. was estimated with five items measuring the extent to which the firm engaged the internal and external consultation in developing innovations, based on (Vanhaverbeke and West, 2006; De Jong and Brouwer, 1999). The fourth independent variable, “innovation strategy”, was a single item based on Adams et al. (2006); De Jong and Brouwer (1999) assessing if a key focus of the firm was the generation of new innovations. The fifth independent variable, “portfolio management”, was also estimated with a single item that comprised four categories: product innovation, process innovation, both product and process, or other types (such as marketing and administrative innovations), based on Capon et al. (1992); Athey and Schmutzler (1995).

The sixth independent variable “project management” was estimated with three
items relating to the firm’s possession of experienced project management team, the access to external expertise and government supporting programs. As the commercialisation process relates to the introduction and launching of innovations into the market (Miller, 2001; Adams et al., 2006), measures for the variable “commercialisation” was estimated using four items referring to the innovation testing and the formal access to the intellectual properties protection (Candelin-Palmpvist et al., 2012; Burrone, 2005; Gans and Stern, 2003)

Control variables

We included four control variables: firm size, firm age, R&D intensity and industry. Firm size has been found to have a positive relationship with the innovation commercialisation (Forsman and Rantanen, 2011) and the firm innovativeness (Dibrell et al., 2011). In this study, the size of firms was measured by the number of employees. Drawing on the definition of SMEs (OECD, 2004), we distinguished between micro (fewer than 10 employees), small (from 10 to 49 employees) and medium-sized (from 50 to 249 employees) enterprises. In the selected sample, there were 34.6 per cent micro enterprises, 31.9 per cent small enterprises, and 33.5 per cent medium-sized enterprises.

In relation to firm age, several studies suggested that, as firms grow older, their capacity to innovate and their profitability decline (Huergo and Jaumandreu, 2004a). Older firms are typically characterized by a “burden” of age. Balasubramanian and Lee (2008) found that the economic implication of this effect is substantial: each additional year reduces the impact of a 10 per cent increase in R&D intensity and the firm’s market value by over 3 per cent. In this study, we measured the age by the number of years in activity. We distinguished between young firms (for example, < 7 years old); adolescent firms (for example, 7 to 21 years old); and mature firms (for example, > 21 years old), based on (Mazzarol et al., 2010). There were 23.8 per cent of young firms, 41.9 per cent of adolescent firms and 34.3 per cent of mature firms
2.5 Data Analysis

in the sample.

R&D intensity, which is often measured as the ratio of R&D on annual sales, has traditionally been used as a proxy for SME’s capacity to innovate (Baldwin and Hanel, 2003; Adams et al., 2006). Firms with greater than 5 per cent of annual turnover invested in R&D are viewed as high-tech, those with 3-5 per cent as mid-tech and those with less than 3 per cent as low-tech (Hirsch-Kreinsen et al., 2008). In our study R&D intensity was measured on a scale ranging from 1 (bottom 20 per cent) to 5 (top 20 per cent).

The industry was the fourth control variable. This variable may have an effect on organisational characteristics and structures, which affects the firms’ capability in exploiting innovation opportunities (Porter, 1980; Donate and Guadamillas, 2011). Hence, SMEs in our database were classified into three groups including manufacturing, services and retailing, and other industries.

2.5 Data Analysis

A GLM was chosen to examine the impacts of the organisational factors on both the innovation rent as a whole and on its three components (volume, rate and length). A series of independent ordinal variables are the seven elements of the organisational view derived from the Adams et al. (2006). Before conducting the regression analysis, the reliability of all the constructs are confirmed by undertaking the PLS software tool. All constructs had the Composite Reliability Coefficients (CRC) higher than 0.7 and the Average Variances Extracted (AVE) higher than 0.5, which indicates strong reliability (Fornell and Larcker, 1981). Tests for multicollinearity among the variables were also undertaken by running the Variance Inflation Factor (VIF) and Durbin-Watson statistics. The VIF scores are well below 4.0 and the Durbin-Watson score are approximately 2, suggesting that multicollinearity was not a problem (Montgomery et al., 2012).
In the first phase, the direct effects of organisational factors on the rent as well as on the volume, the rate and the length are examined, using GLM statistics. The second phase integrates both independent and control variables including firm size, firm age, R&D intensity and industry differences. All the GLM analyses are conducted at the 95 per cent of interval confidence. Significance is estimated at the 0.01 and 0.05 levels.

2.6 Results

The results shown in Table 1 indicate the overview of the descriptive analysis, the reliability coefficients and the correlation matrix between variables. The strong values of the composite reliability coefficients (CRC) and the Average Variance Extracted (AVE) of all multiple item constructs confirmed the reliability of the variables. All dependent variables were significantly correlated with all the independent variables. The higher standard deviation of variable rent index indicated its wide dispersion in the sample.
Table 1: Descriptive Analysis of Variables

<table>
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<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>CRC</th>
<th>AVE</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>Knowledge</td>
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<td>0.52</td>
<td>0.21*</td>
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<tr>
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<td>0.80</td>
<td>0.51</td>
<td>0.1*</td>
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<td></td>
<td>0.73**</td>
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<tr>
<td>Length</td>
<td>2.87</td>
<td>0.82</td>
<td>0.77</td>
<td>0.53</td>
<td></td>
<td></td>
<td>0.13**</td>
<td>0.2**</td>
<td></td>
<td></td>
<td>0.25**</td>
<td>0.22**</td>
<td>0.32**</td>
<td>0.5**</td>
</tr>
</tbody>
</table>

*p ≤ 0.05, **p ≤ 0.01
2.6 Results

Table 2 shows the results of the 8 linear general models with controls for firm age, size, R&D intensity and industry. The Beta coefficients, $R^2$ and Adjusted $R^2$ statistics, F- value are also shown. As depicted in Table 2, $R^2$ and adjusted $R^2$ indication of all the models improve when integrating control variables. For example, there is an increase of 4 per cent in the adjusted $R^2$ in comparison between model 1 and model 2, indicating the role of control variables in enhancing the higher percentage of significant variance. In addition, the results are significantly different when we examine the overall anticipated rent and each of its components (volume, rate and length of innovation).

In the first phase, direct relationships between the 7 organisational factors and the anticipated rent, volume, rate, length were tested and illustrated in models 1, 3, 5 and 7. The results indicated a significant impact of organisational factors on these dependent variables. More specifically, the first factor (inputs) was found to have a negative effect on the volume of sales ($\beta = -3.76$) and the rent index ($\beta = -0.18$) as a whole. This suggests that the resource endowment is not seen as a barrier for these SMEs in innovation management, which rejects hypothesis 1. The second factor industry knowledge was found to have insignificant relationship with the rent as well as its components, indicating its indirect effect on any of the anticipated rent measurement. This in turn rejects hypothesis 2. The third factor, organisational culture, positively influences the rent index, the volume and the rate of margin. It means that firms which have an open culture and system in innovation management are more likely to generate higher volume of sales and higher rate of margin from innovation investments. Variable portfolio management and commercialisation are found to have positive significant impacts on all the volume, the rate and the length. This result indicates their stronger impacts on the anticipated rent as a whole. This shows that firms which have a diversified portfolio of innovations and approach a systematic management of the commercialisation process are likely to expect a higher volume of sales, profitability and longer life cycle of innovation.
Table 2: Coefficients of General Linear Models

<table>
<thead>
<tr>
<th>Variables</th>
<th>RENT</th>
<th>VOLUME</th>
<th>RATE</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td>Model 4</td>
</tr>
<tr>
<td>Direct Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>−27.64***</td>
<td>−21.71</td>
<td>0.76*</td>
<td>1.09</td>
</tr>
<tr>
<td>Inputs</td>
<td>−3.76***</td>
<td>−3.6***</td>
<td>−0.18**</td>
<td>−0.19**</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.10</td>
<td>0.16</td>
<td>0.10</td>
<td>0.09</td>
</tr>
<tr>
<td>Culture</td>
<td>5.57***</td>
<td>5.2***</td>
<td>0.26***</td>
<td>0.24**</td>
</tr>
<tr>
<td>Strategy</td>
<td>3.12***</td>
<td>2.45***</td>
<td>0.08</td>
<td>0.05</td>
</tr>
<tr>
<td>Portfolio</td>
<td>3.56***</td>
<td>3.18***</td>
<td>0.12**</td>
<td>0.10*</td>
</tr>
<tr>
<td>Project</td>
<td>2.6**</td>
<td>2.44*</td>
<td>0.16**</td>
<td>0.14*</td>
</tr>
<tr>
<td>Commercialisation</td>
<td>4.78***</td>
<td>4.22***</td>
<td>0.12**</td>
<td>0.10**</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industries</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services/Retailing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.32</td>
<td>0.36</td>
<td>0.18</td>
<td>0.22</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.30</td>
<td>0.34</td>
<td>0.16</td>
<td>0.19</td>
</tr>
<tr>
<td>F-Value</td>
<td>28.68</td>
<td>18.67</td>
<td>13.5</td>
<td>9.15</td>
</tr>
</tbody>
</table>

0a reference group Confidence interval 95%
* p ≤ 0.05, ** p ≤ 0.01, *** p ≤ 0.001
2.6 Results

In the second stage, four additional control variables including firm size, firm age, R&D intensity and industry were included and presented in models 2, 4, 6 and 8. The Adjusted $R^2$ among these models ranged from 19 per cent to 34 per cent, indicating a much stronger predictive power, in comparison with the first test with only independent variable variables. Among these control variables, the industry difference among these SMEs has no effect on the anticipated rent. While firm size has a positive influence on the estimated volume of sales, firm age imposes a negative impact on both the volume and rate of margin. By contrast, R&D was positively associated with the estimated volume of sales and the rate of margin. All these control variables had no effect on the length of innovation.

Surprisingly, the firms’ resource endowments were not perceived as the main restriction for entrepreneurs to boost the anticipated volume of sales or the length of the innovation’s life cycle. The negative coefficient of the variable “inputs” rejects our first hypothesis once more and suggests that a large resource endowment may actually have a negative impact on entrepreneurs or senior managers’ optimism over anticipated rent returns to investment in the innovation’s commercialisation.

Similar to the first test, variable industry knowledge had no direct impact on the rent index as well as its components. These results again reject the second hypothesis. Project management was positively associated with the anticipated volume of sales and the length of innovation life cycle, but imposed none effect on the rate. Hence, this provides partial support for the sixth hypothesis. Variable organisational culture was positively associated with the volume and the rate; it had no influence on length. Similarly, innovation strategy was perceived as a key determinant of the anticipated rate of profit, but it had no effect on the anticipated volume of sales or the length of the innovation life cycle. Hence, hypothesis 3 and 4 were only partly supported. Overall, the variables portfolio management and commercialisation were the most influential organisational factors in determining the anticipated rent. This can be seen in their significant coefficients across all the dependent variables. Hy-
2.7 Discussion

Our findings show that two of our seven hypotheses were rejected, two were fully supported and three were partially supported. The rejection of hypotheses 1 and 2 suggest that the firm’s possession of stocks of resource inputs and industry knowledge are not significant influencers on the owner-manager’s perception of anticipated rent. While this seems at variance with conventional management thinking, it is consistent with theories associated with the behaviour of entrepreneurial firms. As noted in the review of the literature, entrepreneurs tend to work less from their possession or control of resources (both tangible and intangible), and more from their optimism that they can build alliances and develop competencies to generate what Alvarez (2007) labels as “entrepreneurial rents”. This approach is more consistent with the employment of Schumpeterian rent than Ricardian rent (Makadok, 2001), and supports the extant theory of the entrepreneurial firm (Alvarez and Barney, 2004).

The partial support for hypotheses 3 and 4 demonstrates this trend with culture and strategy found to be influential on the anticipated rent via expectations for future sales and profit margins. These are areas that typically allow entrepreneurs of SMEs to make assessments based on direct interaction with customers or their past market experience. This has been found in services firms where market orientation (e.g. service quality, customer and employee satisfaction and engagement, plus market share analysis) serves to stimulate innovation (Agarwal et al., 2003). Innovation within SMEs has also been found to benefit from enhanced social capital building (Cooke and Wills, 1999), which is consistent with the process of developing culture. However, the ability to forecast future product life cycles is less likely to be influenced by such factors. Here the emphasis is upon technical and legal issues able to create isolating mechanisms that can enhance the firm’s ability to convert an entrepreneurial
rent into a quasi-rent when competing in competitive markets (Alvarez, 2007).

The partial support for hypothesis 6 highlights a similar trend. As shown in Table 2, even though there was a significant overall relationship between project management and anticipated rent, only volume and length were found significant in subsequent analyses. However, the lack of significant relationship between project management and the anticipated rate of profit should not be surprising. By its nature, project management is about the process of new product development and is concerned with the presence of an experienced project management team, the ability to access external expertise if required, and the ability to secure additional resources such as government grants or venture capital financing. It is therefore concerned with the speed of market diffusion as driven by the firm’s technical competencies and third party funding, and the ability to generate isolating mechanisms via technical complexity that can offer enhanced life cycles. Profit margins as measured by the rate variable are less likely to be influenced by this process.

The support for hypotheses 5 and 7 support both Makadok (2001)’s concept of Schumpeterian rents and Alvarez (2007)’s concept of entrepreneurial rents. In both cases there is an assumption that the entrepreneurial firm can engage actively within a chosen market without the pre-existing ownership or control of unique and specialised resources. Its basis for competitiveness is its ability to configure its limited resources and those of its strategic alliance partners into new products and processes that can be commercialised. Knowing its customers and generating new value propositions for them is a fundamental in entrepreneurial business models (Zott and Amit, 2010). The need for an entrepreneurial SME to focus on not only product and process innovation but also the market oriented commercialisation process in order to feel confident about future economic rent streams found here is broadly consistent with earlier research. For example, the need for SMEs to maintain flexibility in matching new products to customer needs (Lindman, 2002). Also the interplay between collection of customer or market related information (e.g. as part of the com-
mercialisation process), and the development of innovative new products (Varis and Littunen, 2010).

These findings also suggest that the optimism entrepreneurs may have while considering future investments in the commercialisation of an innovation is likely to be influenced in part by the firm’s size and level of R&D intensity. The greater the level of investment in R&D (e.g. R&D Intensity) the more optimistic the firm’s senior management were found to be. This is not surprising given that a significant investment in R&D would suggest that the firm was seeking to get an abnormal rent from whatever innovation it was developing. However, increasing firm size and age appear to lead to less optimism in relation to the anticipated rent. This may reflect either a process of diminishing returns to such investment, or the impact of a path dependency whereby the firm’s leadership is less likely to expect significant change from innovation. Larger or more mature firms can be expected to have more established market environments and a greater level of knowledge over what their customers will be willing to buy, the prices they can secure and their capacity maintain their products or services within the market over time. These findings are broadly in line with the findings from earlier studies (Lindman, 2002; Loderer and Waelchli, 2010).

The industry differences between firms were found to have no effect on the perception of the anticipated rent that could be generated from investment in the innovation. This suggests that the anticipation of future rent returns to investment in the development of new products or services are not significantly different across industries. While there are undoubtedly some differences between manufacturers, retailers and biotechnology SMEs in relation to how they physically generate new products and services, there seems to be no difference between such firms as to how their senior management assesses the anticipated rent return.

To sum up, the GLM analysis indicates that organisational factors such as the firm’s culture, innovation strategy, portfolio and project management, and formal commercialisation (all of which reflect a systematic process of innovation manage-
ment) have a significant positive relationship with either the anticipated volume of sales, rate of margin or the duration of innovation life cycle. These results demonstrate a potential application of the conceptual framework outlined by Adams et al. (2006), although within small entrepreneurial firms the importance of these seven units of analysis are likely to be variable. This research also provides supporting evidence of the theory of entrepreneurial rents as suggested by Alvarez (2007), and illustrates some of the potential dynamics that might take place within the decision making of entrepreneurial leaders of SMEs engaged in evaluating the future rental streams from innovation.

Our results also suggest that small firms that have an open organisational culture that includes both employees and external stakeholders in developing innovations systematically may perceive higher returns on innovation. Even though open organisational culture imposes a positive effect on the anticipated volume of sales and rate of margin, it appears to have no influence on the length of innovations. This need for a more open approach to culture and stakeholder engagement in new product development has been previously identified by (Lindman, 2002).

Regarding the innovation strategy, the commitment of small firms in making innovation a key goal also seems to be positively associated with such optimism, which is not surprising. In other words, firms which are innovation oriented enhance the entrepreneurs’ optimism over the potential rate of margin. However, such firms may also need to possess good portfolio skills, as well as the expertise to support this work. Additionally, a comprehensive project management is perceived as a significant determinant on the estimated volume of sales and the length of innovations. A comprehensive communication and coordination within the project management team helps to lengthen the life cycle of innovations. These findings are consistent with previous studies (Capon et al., 1992; Athey and Schmutzler, 1995; Humphreys et al., 2005).

Finally, their approach to the final stage of commercialisation also seems impor-
tant. In addition, the ability of the firm in testing and protecting intellectual property rights appears to build the confidence of the entrepreneurs that the outcome of their commercialisation will be positive. Surprisingly, the inputs are found not to be a restriction in stipulating the volume of sales, thus motivating small firms to engage in the commercialisation process of innovations.

The efficient allocation and configuration of resources can be a key to competitive advantage (Barney and Clark, 2007), and the propensity to seek the appropriation of above an average rent through the configuration of limited resources is the foundation of the entrepreneurial firm (Alvarez and Barney, 2004). However, the ability of many SMEs to successfully engage in innovation and commercialisation is often restricted by their lack of resources, weak or unsystematic marketing and management competencies, and inadequate use of appropriate third party advisors (Vermeulen, 2005). Yet our findings demonstrate that small firms can be active innovators in spite of their limited scale and resources. These companies have often better results with the limited resources at hand and they have to “make do” with what they have. Despite their limited resources SMEs can actively pursue innovation opportunities and their motivation to do so is likely to be influenced less by their access to resources than by their sense that they have the capacity and systems to achieve positive outcomes.

## 2.8 Conclusion, limitations and implications

In conclusion, the study provides an aggregate analysis of the relationship between the management of innovation within an SME and the anticipated returns to investment in the commercialisation of an innovation as perceived by the entrepreneur or senior managers running the company. More specifically, this study provides some empirical support to the conceptual framework of innovation management proposed by Adams et al. (2006). It also contributes towards a better understanding
of the theory of the entrepreneurial firm through its focus on how the dynamics of entrepreneurial rent creation might take place as postulated by (Alvarez and Barney, 2004, 2005; Alvarez, 2007). The original rent framework proposed by Santi et al. (2003) aimed to address the problem of how SMEs approach their assessment of whether or not to invest in future innovations when they cannot undertake conventional financial analysis. Their solution was a strategic analysis involving three stages generating an “anticipated”, “residual” and “appropriable” rent forecast. These equate broadly with the “entrepreneurial” and “quasi-rents” concept proposed by (Alvarez, 2007); and the “Ricardian” and “Schumpetarian” rents that are derived from either tangible assets or capabilities (Makadok, 2001). This study, focusing on the “anticipated rent” provides new insights into the way such “entrepreneurial” rents might be assessed by entrepreneurs seeking to commercialise innovations.

Our finding that there was a negative impact of the “inputs” factor on the anticipated rent offers further insight into the innovation management behaviour of small innovator firms from a resource-based view. It suggests that such firms, led by entrepreneurial managers, may anticipate superior returns to investment in innovation regardless of their resource constraints. This raises some concern over how SMEs allocate and manage resources within innovation projects and the potential risk of over estimation of return in the initial assessment. It is why Santi et al. (2003) recommended a three-step process of validating the rent returns prior to investment.

The study also sheds additional light on the optimism of entrepreneurs over the potential returns from the commercialisation process. It suggests that the more structured or systematic the SMEs’ management of innovation and commercialisation, the greater the optimism that the entrepreneur will have in relation to future returns to investment in innovation. This may seem self-evident, but the findings also indicate that varying combinations of the seven organisational factors originally identified by Adams et al. (2006) may influence management’s perception of the anticipated rent, in particular whether they anticipate above average profit or length of life cycle.
suggests a greater level of complexity may exist within the innovation management process and practice of small firms. A structured or systematic approach to management of innovation and commercialisation, even within small firms, appears to influence how the entrepreneur views the commercial benefits of an innovation, and specifically the anticipated rate of profit or length of life cycle that such an innovation might achieve. Such perceptions can either encourage or discourage SMEs from engaging in innovation. The future growth and survival of SMEs is likely to depend on how actively they engage in innovation. Any evidence that can help entrepreneurs to make better assessments of the benefits of innovation, or to explain the organisational factors that might foster a more positive view of innovation by entrepreneurs, is potentially helpful in fostering higher levels of SME engagement with innovation projects.

However, our study has several limitations. First, the sample was quite diverse in terms of size, age, and industry. Although the influence of these factors were examined and reported, their impact on the perceptions of the firm’s senior managers cannot be discounted. The sample also drew from a wide cross-section of countries and was purposive in nature due to the desire to select firms that were active innovators. Although we found no statistically significant differences between firms over these effects in relation to country of origin, our sample is not sufficiently comprehensive to totally discount country effect. While most OECD countries tend to have comparable national innovative systems, other external factors such as competition, market and business customs may significantly influence SMEs’ innovation management. Therefore, caution is needed when generalising the results in other contexts.

2.8.1 Implications for research

Future research should investigate the interaction between the types of innovation undertaken by these firms, their innovation management and anticipated rent. In ad-
dition, different characteristics among sectors and sub-sectors in the sample should also be taken into account, instead of general industries. This is likely to require a further analysis drawing on case studies for example to provide a more comprehensive knowledge about these interactions as well as the nature of innovation management within particular sector. As our study focuses mainly on the organisational perspective, it is recommended to enlarge the scope of study to have a deeper insight into the innovation management of SMEs, considering external effects from the environment. In addition, a prospective longitudinal study should consider to examine both the “residual rent” and the “appropriable rent” to measure comprehensively the real rent generated and the erosion factors behind that drive the commercialisation performance.

Although we do not specifically examine the psychological characteristics of the entrepreneurs who responded to this study, the findings provide some insights into entrepreneurial optimism. As noted by Dushnitsky (2010), the concept of entrepreneurial optimism has begun to emerge within the literature. It is a separate concept to the notion of entrepreneurial opportunism and can have significant impact on the ability for an entrepreneur to accurately assess the risk and return of an invention. The optimism displayed by our respondents from the younger firms suggests that experience may temper their expectations over future returns to investment in innovation. It suggests that more research is needed in this area to determine the nature of this inverse relationship between optimism and age of firm.

### 2.8.2 Implications for policy and practice

The practical implications of our study are to provide entrepreneurs with insights into the key organisational factors that might determine their anticipated rent streams from investment in innovation. It is essential for entrepreneurs of SMEs to recognise that their future rent returns from innovation will require consideration of factors
influencing the volume of sales, the rate of profit and the length of the innovation’s life cycle. Many entrepreneurs will approach the commercialisation of an innovation using the process of effectuation (e.g. assessing affordable loss rather than anticipated returns), and seeking to co-create the future with strategic partner (Sarasvathy, 2001). However, the ability to convert entrepreneurial rents into quasi-rents, as noted by Alvarez (2007) is conditional upon the entrepreneur’s capacity to replace the uncertainty of decision making inherent in the former with the risk inherent in the latter.

This can be achieved through a more formal or systematic approach to the management of innovation. A cause-effect relationship is at work within small firms that sees better innovation management inputs and structure assisting with the achievement of enhanced anticipated returns to investment in innovation. As most SMEs are led by a single entrepreneur or owner-manager with the power to proceed or abandon the innovation, this study highlights the importance of getting the managerial process and organisational configuration right if more innovation is to be encouraged within the small firm sector.

The systematic screening of an innovation with this rent analysis technique can help small innovative firms to monitor the design of their innovation and improve it before their commercialisation. This is a virtuous circle that small business entrepreneurs need to enter. For those who already have experience of success in commercialisation these lessons are well known. For others who have yet to embark on the innovation journey, getting organised and systematically evaluating the way in which an innovation is to be managed through the commercialisation process is important. For policy makers and especially government agencies assisting SMEs in their innovation commercialisation, such analysis can also foster the dialog between experts and the SME managers by giving facts and figures and providing a common language to both parties.
3  Determinants of Innovation Commercialisation Management and Anticipated Returns: An Exploratory Typology Study of SMEs

Abstract

This paper explores the effects of firm characteristics on the commercialisation management and anticipated innovation returns within SMEs. Our results suggest that young and small firms tend to be more innovative and have higher expectation for anticipated returns despite their less systematic management. By contrast, medium-sized firms are more likely to formalise their management, yet they have lower anticipated returns. Small equity-financed firms tend to approach a more systematic management of commercialisation and anticipate high returns. Mature firms pursue a less systematic approach and anticipate lower returns. Overall, our findings show that firm characteristics such as size, age, R&D level, type of financing, innovation novelty and protection of intellectual properties play a significant role in the commercialisation process. Employing an updated typology, this study provides additional insights into the firms’ commercialisation management and sheds some light on the owner-managers’ anticipated returns from innovation.

Keywords innovation, commercialisation management, rent, SMEs.

By Thuy Hang Do. This article is under review at International Journal of Innovation and Technological Management. An earlier version (Do et al., 2012) was presented at the World Conference of the International Council of Small Business, Wellington, New Zealand, June 2012.
3.1 Introduction

Innovation management is widely regarded as a key driver for the growth of firms (Geroski and Machin, 1992). However, despite numerous studies in this field, there is a relative paucity of research on the underlying commercialisation process within small and medium-sized enterprises (SMEs). SMEs are often described as the backbone in many economies, yet they have limited resources at their disposal to develop innovation. Hence, most of them pursue a less systematic approach to innovation management (Mazzarol and Reboud, 2011), often adopting a more intuitive approach, and relying on their knowledge of the local market and creativity (Lindman, 2002). This lack of formal processes presents one of the potential reasons causing high failure rate of innovation commercialisation in small firms (Urban and Hauser, 1993). In a similar vein, Adams et al. (2006) and Tidd (2001) suggested that weak innovation management practice imposes a challenge on SMEs in utilising their scarce resources for the commercialisation process. The assessment of the potential innovation returns is regarded as one of the keys for entrepreneurs to predict the success or failure of new innovations (Mansfield et al., 1977; Astebro and Michela, 2005).

Past research examined the determinants of the project success (Montoya-Weiss and Calantone, 1994), key success factors for New Product Development (NPD) (Balachandra and Friar, 1997; Henard and Szymanski, 2001; Lilien and Yoon, 1989; Linton et al., 2002) or predictors of the innovation survival (Astebro and Michela, 2005). Despite extensive studies on the NPD success, scarce research investigates the anticipated returns which in turn influence owner-managers’ strategic decision making in relation to a particular investment. Hence, it is significant to clarify how the anticipated returns is related to the commercialisation management and how owner-managers’ behaviour could be predicated from their firm characteristics.

This paper aims to deepen the knowledge of the commercialisation management
process within SMEs and enhance its linkage with the concept of rent. Firm characteristics are seen as influencing factors of the commercialisation management as well as the anticipated returns. Our empirical research was conducted on a sample of 525 SMEs from 10 OECD countries. By exploring a typology of innovative SMEs, firm characteristics such as the size and age of firms, resource endowments, the novelty, the protection of Intellectual Property (IP) are seen as potential discriminating factors among firm clusters in the commercialisation process. Hence, our paper addresses the following questions:

1. How do firm characteristics influence the systematic management of the commercialisation process?

2. How do firm characteristics influence the anticipated returns?

3. How is the systematic management of the commercialisation process related to the anticipated returns?

This paper is structured as follows. The first part provides a theoretical background of the rent concept, the commercialisation management and potential impacts of firm characteristics on innovation, followed by the hypotheses development. The second part presents our research methodology including sample selection, variable measurement and analysis tool. Finally the results are interpreted, analysed and discussed before substantiating theoretical and practical implications

3.2 Theoretical background

3.2.1 The concept of innovation rent

Although the concept of economic rent has been tackled in the literature since the nineteenth century, it has been defined in different ways depending on specific circumstances. An economic rent is defined as “the residual left for the fixed resources
3.2 Theoretical background

of a firm after the variable resources have been paid amounts equal to their alternative costs” (Leftwich, 1976, p.431). According to Milgrom and Roberts (1992, p.269), a rent is described as the portion of earnings in excess of the minimum amount needed to enter a particular industry. In the context of innovation management, the innovation rent is defined as “returns that arise from the existence, discovery and successful commercial exploitation of entrepreneurial opportunities” and “are excess of the opportunity costs of all resources used” (Miles et al., 2003, p.394). This rent is often achieved under uncertain task environment due to the unknown value of the resource combinations (Schumpeter, 1934; Mahoney and Pandian, 1992; Alvarez, 2007).

Alvarez and Barney (2004) remarked that exploiting innovation opportunities and capturing appropriate rents are the two most important activities that facilitate a firm’s competitive advantages. Accordingly, the estimation of the rent indicates the firm’s capability to assess the risks and returns from innovation investments. The assessment framework provided by Santi et al. (2003) suggests that the anticipated rent is determined by the volume of sales (anticipated annual sales of innovation), the rate of margin and the length of the innovation (duration of exploitation). The rent model is further extended by Mazzarol and Reboud (2005), distinguishing three different levels of the innovation rent:

1. **Anticipated rent**: the potential returns relating to types of innovation, number and size of the potential market.

2. **Residual rent**: the analysis of erosion factors from the environment and competitive strengths of innovations.

3. **Appropriable rent**: the final rent captured by SMEs, considering firms’ capability and competitive strengths.

Our paper focuses on investigating the anticipated rent, which is the first and most common potential return that needs to be assessed. The knowledge of anticipated
3.2 Theoretical background

rent is essential as it gives entrepreneurs or owner-managers an initial estimation of the outcomes to consider if a particular innovation is likely to be commercialised.

3.2.2 Systematic management of innovation commercialisation

The commercialisation phase refers to actions based upon a market assessment of the value of a firm’s linkage with its customers and suppliers. Herdman (1995, p.2) defined the commercialisation process as “the attempt to profit from innovation through the sale or use of new products, processes, and services. More than invention or innovation, commercialisation is driven by the firm’s expectation that it can gain a competitive advantage in the marketplace for a particular product, process, or service”. According to (Rosa and Rose, 2007), the commercialisation process involves the interaction between firms with markets, research and development (R&D) and elements influencing the commercialisation outcomes (i.e., financial, skills and human resources, IP, the global perspective, regulatory environment, partnering and collaboration). Therefore, the cooperation with customers and suppliers plays a significant role through all stages of the commercialisation process.

In Adams et al. (2006)’s review of innovation management, the commercialisation process is related to a firm’s marketing capabilities such as market research, promotion, market planning and monitoring in order to launch the products or services. Similarly, Moore (2002) emphasised the significance of market orientation and the firm’s difficulties in identifying the initial market segment and marketing approach to adopt in commercialising innovations. Harabi (1998) suggested the existence of vertical relations between firms, suppliers and customers. His empirical study showed that about 84 per cent of innovators cooperated with either suppliers or customers in managing innovation, indicating a significant link among them. In examining strategic management of innovation within SMEs, high R&D-intensive firms were found to have a better assessment of the market, having a more strategic
and formal NPD planning for innovation than low R&D-intensive firms (Mazzarol and Reboud, 2011). Based on the aforementioned descriptions, the systematic commercialisation management could be understood as the firm’s sufficient capability of assessing the market and resources possessed that then drives strategies and formal planning for innovation.

3.3 Hypotheses development

Firm characteristics have been recognised to have critical effects on the innovation management process (Wernerfelt, 1984; Barney, 1991; Sundbo and Fuglsang, 2002; Withers et al., 2011). Despite increasing scholarly attention, the investigation into such relationships in the context of the commercialisation process within SMEs remains scarce (Mazzarol et al., 2010). Therefore, our study aims to address these research gaps by clarifying impacts of firm characteristics such as firm’s size, age, intellectual property protection, R&D intensity, project-financing and innovation novelty on the commercialisation of innovation.

3.3.1 Firm size

Several authors identified firm size as a critical factor influencing its innovation capability and commercialisation management (Withers et al., 2011; Mazzarol et al., 2010). According to the resource-based view, a firm’s performance could be enhanced thanks to its available high stocks of valuable resources or inputs (Wernerfelt, 1984; Barney, 1991; Sundbo and Fuglsang, 2002). Hence, larger firms are often known to have an advantage in accessing financial, human, and knowledge resources, compared to smaller firms (Rogers, 2004). As proposed by (Cohen and Klepper, 1996), such capability could be originated from the economies of scales utilised by larger firms to spread the costs of innovation management. By contrast, despite the lack of resources, smaller firms are more innovative and dynamic in recognising
opportunities. Yet they are often more flexible in managing innovation due to lots of constraints such as knowledge and finance (Rogers, 2004). Based on the aforementioned literature, larger firms can be hypothesised to have more capabilities to manage their commercialisation systematically than smaller firms.

- **Hypothesis 1**: Firm size is positively associated with systematic commercialisation management.

### 3.3.2 Protection of intellectual property

As a market protection tool for innovative firms, the issue of intellectual property rights (IPR) is widely considered to be an essential element to enhance the firms’ sustainable competitive advantages (Candelin-Palmpvist et al., 2012). Similarly, Levin et al. (1987) identified patents as a key factor in protecting products and processes. With regard to the context of SMEs, Burrone (2005) claimed that the role of IPR is increasingly important in OECD countries due to the growth of knowledge-intensive sectors in the economy. Although SMEs vary in innovative capacity (i.e., across sectors, size, resources and the task environment), patenting activities are regarded as an important protection tool in high-tech sectors. Despite the significance of the IPR, not many SMEs follow a systematic procedure to protect their innovation because of their limited capabilities (Burrone, 2005). Hence, the protection of intellectual property (IP) can be assumed to be more developed in firms which tend to manage the commercialisation systematically. This reasoning leads to the following hypothesis.

- **Hypothesis 2**: The protection of intellectual property is positively associated with systematic commercialisation management.
3.3 Hypotheses development

3.3.3 Firm age

Earlier studies provided some evidence for the relationship between firm age and innovation (Dibrell et al., 2011; Warusawitharana, 2011). More specifically, mature firms are more reluctant to invest in a high level of innovation novelty so as not to lower the profits from their current innovations (Loderer and Waelchli, 2010; Dibrell et al., 2011; Warusawitharana, 2011). In addition, firm age is shown to have a negative effect on innovation output as measured by the number of new products and the percentage of innovation sales (Hansen, 1992). Furthermore, more innovation activities are found in young or adolescent firms rather than in old firms (Huergo and Jaumandreu, 2004b). It appears that mature firms are likely to be more cautious in their innovation activities, as such they tend to expect less profitability from innovation. Hence, the following hypothesis can be formulated:

- **Hypothesis 3**: Mature firms tend to expect lower anticipated rent than young and adolescent firms.

3.3.4 Resource endowments

The investment into R&D is considered to be one of the significant resource endowments of innovation (Greeve, 2003; Parthasarthy and Hammond, 2002; Baldwin and Hanel, 2003; Becheikh et al., 2006; De Jong and Vermeulen, 2006; Raymond and St Pierre, 2010). For example, Romijn and Albaladejo (2002) found a correlation between R&D investment, the number of patents and the innovation index. Deeds (2001) proposed a positive relationship between the R&D and the amount of entrepreneurial wealth as measured by the market value added. Such interaction in the past research results in our reasoning for a potential link between the R&D intensity and the expected returns from the commercialisation process.

- **Hypothesis 4**: The R&D intensity is positively associated with the anticipated rent.
3.3 Hypotheses development

In innovation development, financial resource is often known as one of the key factors that influence owner-managers’ decision making into a particular investment. Baldwin et al. (2002) commented that SMEs are often known to have much more constraints with regard to allocating their limited financial resources for developing innovations. With regard to the project-financing, “shortages of equity (retained earnings and share capital) are more important impediments to innovative activity than imperfect debt markets” (Baldwin et al., 2002, p.9). The reliance on equity-financing in R&D-intensive firms could be explained due to the nature of uncertain task environment known in innovation management. While equity markets offer small firms opportunities to enhance the flexibility in managing innovation, loan-financing imposes much more constraints on these firms due to their engagement into uncertain investments.

Consequently, most debt-financed SMEs are found to engage in low-knowledge intensive industries (Baldwin et al., 2002). As equity-financed firms are more likely to be innovative, they are assumed to expect higher potential returns than their counterparts.

- **Hypothesis 5**: Equity-financed firms are more likely to expect high anticipated rent.

3.3.5 Innovation novelty

Much of the literature reveals different views regarding the relationship between the product innovativeness and profitability. For instant, Kleinschmidt and J. (1991) described a U-shaped relationship between product innovativeness and the returns on investment (ROI). Even though the success rate of new products is higher in highly innovative firms, their ROI is estimated to be lower than their counterparts due to the potential high risks involved in such investments (Kleinschmidt and J., 1991). By contrast, Chaney et al. (1991) indicated that original new products (or radical inno-
Methodology

3.4 Methodology

3.4.1 Sampling

The analysis was conducted on a sample of 525 SMEs from 10 countries from the Organisation of Economic and Cooperation Development (OECD). The countries included Australia (78 firms), Austria (78 firms), Belgium (51 firms), Canada (47 firms), France (68 firms), Italy (12 firms), New Zealand (92 firms), Spain (10 firms), Switzerland (63 firms) and United States (26 firms).

Data collection was part of an international project on innovation management in SMEs from 2006 until 2008 (Mazzarol and Reboud, 2011). The surveyed firms covered a wide range of were industry sectors, including manufacturing, services and retailing, and other. The age of firms varies from 4 months to 167 years, with an average of 22 years. In accordance with the definition of SMEs from the (OECD, 2004), our sample selection targeted firms that had less than 250 employees and an annual turnover of less than 50 million euros.

These SMEs were actively engaged into the innovation commercialisation process. The average level of innovation investment of these SMEs was 23 per cent. Based on the definition of high and low technology firms by Hirsch-Kreinsen et al.
3.4 Methodology

(2008), 73.5 per cent of the SMEs in our sample were high-tech firms (with R&D intensity higher than 5 per cent of annual turnover), while 26.5 per cent were low to mid-tech firms (with below 5 per cent of annual turnover invested into R&D).

The questionnaire examined strategic decision making of owner-managers in innovation management and their evaluation of the anticipated returns from investments (Mazzarol and Reboud, 2006). The interviews were conducted face-to-face with owner-managers or CEOs of these firms.

3.4.2 Variables and measures

Variable measurement of both the anticipated rent and the systematic commercialisation management is controlled by Composite Reliability (CR) test, utilising the statistical program Warp Partial Least Square version 3.0 (WarpPLS). As the Composite Reliability Coefficients (CRC) of our constructs are higher than 0.7, the reliability of our measurement is strongly confirmed (Fornell and Larcker, 1981)

Dependent variables

Anticipated rent: The rent index measures the owner-managers’ assessment of the potential returns from innovation. As proposed by Santi et al. (2003), an anticipated rent is formulated as follows: \( \text{Rent} = \text{Volume} \times \text{Rate} \times \text{Length} \). The volume, of which the CRC is equivalent to 0.806, measures the potential geographic diffusion of the innovation within the sector, the diffusion within segments of the market and the potential annual sales for the innovation on a worldwide basis after three years. The rate of margin, of which the CRC is equivalent 0.84, measures their potential gross, net profitability and the impact of the innovation on the market. The length of innovation, of which the CRC is equivalent to 0.82, measures owner-managers’ evaluation of the complexity as well as the imitability of the innovation legally and technically.
**3.4 Methodology**

**Systematic commercialisation:** The systematic management of the commercialisation process is measured by the owner-managers’ assessment of their market, resource, innovation development and strategies, based on the diagnostic tool developed in Mazzarol and Reboud (2006). The level of systematic management is calculated as the average score of the four indexes above. Each index comprises ten Likert-scale items measuring the owner-managers’ assessment. The CRC of these indexes indicate strong scale reliability, ranging from Resource (CRC = 0.852), Innovation (CRC = 0.85) and Strategy (CRC = 0.89), to Market (CRC = 0.9).

1. **Market index:** a measure of the firm’s focus on customer needs and how the new innovation offers customers value for money.

2. **Innovation index:** a measure of the firm’s systematic approach to the process of new product development (NPD), and its management of intellectual property.

3. **Resources index:** a measure of the firm’s technological, human, financial and managerial resources.

4. **Strategy index:** a measure of the firm’s strategic planning in relation to its commercialisation process.

**Group variable:** The matrix of the firms is generated by splitting the mean value of the anticipated rent (or the rent index) and the systematic management of the commercialisation process. Firms which score above/below the mean values are grouped into potential high/low rent generators as well as systematic/unsystematic commercialisation management respectively. This group variable is used to examine the discriminant analysis of the SME typology.

As illustrated in Figure 2, cluster 1 composes of 57 SMEs (13.3 per cent) anticipating a high rent despite their unsystematic approach. Cluster 2 gathers 139 SMEs (32.5 per cent) following a systematic commercialisation process and also expecting
3.4 Methodology

a high potential rent return from their innovations. Cluster 3 comprises 105 SMEs (24.5 per cent) pursuing a more systematic approach to commercialisation, yet anticipating a low rent return. Finally, cluster 4 comprises 127 firms (29.6 per cent) anticipating a potential low rent while managing their commercialisation process unsystematically.

Figure 2: Clusters of Innovative SMEs

Independent variables Independent variables are the predictors used to clarify the discrimination between the four clusters of SMEs and verify its direct relationship with the anticipated rent and the systematic commercialisation management. The list of items used to measure the independent variables is provided in Appendix A.
3.4 Methodology

Firm Age: The measure for the firms’ age is based on the number of years since their establishment. Three groups are created as follows: young firms (less than 7 years old); adolescent firms (from 7 to 21 years old); and mature firms (more than 21 years old), based on Mazzarol et al. (2010). The young, adolescent and mature firms account for 26 per cent, 40 per cent and 34 per cent of the sample respectively.

Firm Size: The size of a firm is measured by the number of employees in the organisation. Accordingly, 3 categories are employed to classify firms into micro (fewer than 9 employees), small (from 10 to 49 employees) and medium (from 50 to 249 employees). The classification is based on the definition of SMEs by the OECD (2004). In our sample, micro, small and medium size firms account for 35.24 per cent, 31.24 per cent, and 33.52 per cent respectively.

Research and Development (R&D): The R&D is measured as a percentage of the annual sales or turnover on innovation. It is categorised into five levels ranging from 1 (bottom 20 per cent) to 5 (top 20 per cent), as suggested by Dibrell et al. (2011).

Protection of intellectual property: This variable is a single item capturing the firm’s perception of the IP protection role in a successful innovation commercialisation. It is constructed as a 5 point-Likert scale to measure owner-managers’ assessment of the IP protection in the commercialisation process.

Project-financing types: The examined financial sources that SMEs utilised for the development of innovations comprise bank loans, retained profits and equity financing. Each variable is formulated into the 5 point-Likert scale to measure how important each type of financing is to the firm’s successful commercialisation.

Innovation novelty: The level of novelty is constructed on a single item which distinguishes between incremental innovation and radical innovation (Dewar and Dutton, 1986). The lower level, incremental innovation, measures the new knowledge which is compatible with the existing products. By contrast, radical innovation indicates revolutionary changes in technology, which encompasses an absolute new design or system.
3.4.3 Analysis methodology

In the first phase, we conducted a discriminant analysis using SPSS 20 to examine the effects of discriminating factors on the four firm clusters. In other words, the discriminant analysis explores the discriminating effects of firm characteristics (i.e. firm age, size, protection of IP, R&D intensity, financing types, novelty of innovation) on the group variable. We used Wilks’ Lambda statistics to determine the significance of the models. The selection of variables was based on the Rao’s V index, which is also known as Lawley-Hotelling Trace which measures the differences between group means (Everitt and Dunn, 1991). Hence, only variables that maximises the increase of Rao’s V were selected.

In the second phase, we conducted a multivariate regression analysis to confirm the direct effects of firm characteristics (i.e., R&D intensity, equity-financing, firm age and novelty) on the anticipated rent, as well as the influence of the IP protection and firm size on the systematic commercialisation management. Lastly, the relationship between the anticipated rent and the systematic commercialisation management are clarified by comparing the mean values of these dimensions among four clusters.

3.5 Results

Our discriminant analysis shows that 81.5 per cent of firms in the sample have valid values for conducting the analysis. Function 1 describes the most discriminating factors among the four clusters, with the percentage of explained variances of 66.7 per cent. Function 2 presents the second most significant impacts of discriminating factors, with the percentage of explained variances of 33.3 per cent. Each function is created as a linear combination of independent variables. As shown in Table 3, variables that are most significantly correlated with these functions include firm size, firm age, protection of IP, equity-financing, R&D intensity and innovation novelty. In discriminant function 1, variables with highest coefficients (for example, firm size...
(\(\beta = 0.691\)), IP protection (\(\beta = 0.666\)), firm age (\(\beta = -0.463\)), equity financing (\(\beta = 0.456\)) indicate strong discriminant effects among four clusters. Whereas in function 2, the highest discriminant coefficients are related to variable novelty (\(\beta = -0.573\)), firm size (\(\beta = 0.516\)) and R&D intensity (\(\beta = -0.426\)). In both functions, variable firm size turns out to be the most influential factor that discriminates the four clusters of SMEs in the commercialisation process.

Table 3: Rotated Standardised Canonical Discriminant Function Coefficients

<table>
<thead>
<tr>
<th>Discriminant variables</th>
<th>Function 1</th>
<th>Function 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm size</td>
<td>0.691</td>
<td>0.516</td>
</tr>
<tr>
<td>IP protection</td>
<td>0.666</td>
<td>0.165</td>
</tr>
<tr>
<td>Firm age</td>
<td>-0.463</td>
<td>0.174</td>
</tr>
<tr>
<td>Equity financing</td>
<td>0.456</td>
<td>-0.011</td>
</tr>
<tr>
<td>Novelty of innovation</td>
<td>0.160</td>
<td>-0.573</td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td>0.180</td>
<td>-0.426</td>
</tr>
<tr>
<td>Wilk’s Lambda</td>
<td>0.709</td>
<td>0.903</td>
</tr>
<tr>
<td>Canonical Correlation</td>
<td>0.464</td>
<td>0.308</td>
</tr>
<tr>
<td>% of variance</td>
<td>66.7</td>
<td>33.3</td>
</tr>
</tbody>
</table>

As illustrated in Figure 3, the plot of discriminant factors is based on the rotated standardised canonical discriminant function coefficients, which corresponds to the coefficients of the significant variables in Function 1 and Function 2. The coefficients of the group centroid functions (or group mean values) are used to allocate the four clusters. The direction of the six discriminant factors represents the coefficient scores across the two functions. The length of each arrow indicates the strength of the coefficients. Each cluster is named after its distinctive characteristics that are
3.5 Results

Figure 3: Plot of Discriminant Factors by Innovator Typology

Radical innovators: These young small firms strongly focus on R&D (34 per cent on average) and high novelty. Approximately half of the total successful innovations were radical in nature, and 62 per cent of these innovations were launched to create a new market. This reflects their priorities in targeting radical innovation and seeking high rent. However, as the majority of firms within this cluster are start-ups or
young business ventures, they tend to commercialise innovation in a less systematic management due to their lack of resources and capacity.

**Investment-ready innovators:** These adolescent bigger firms strongly focus on the protection of IP. This cluster encompasses 139 firms, 56 per cent of which are equity-financed. Among three types of financial resources (equities, loans and retained-profits), equity-financing turns out to be the most significant source for SMEs who seek high anticipated innovation rent, which supports Hypothesis 5. As shown in Figure 3, this cluster is also highly innovative and R&D-intensive.

**Larger self-financed innovators:** These larger older firms, encompassing of 105 cases, are allocated closely to the IP protection but far from the R&D intensity and innovation novelty arrows. Eighty-five per cent of all firms rely on retained profits to spur innovation. Their average R&D intensity is 6 per cent below the sample’s mean R&D value. In addition, more than 71 per cent of innovations developed are incremental. Their larger stocks of resources enable them to self-finance for innovation and manage their commercialisation process in a more systematic approach, which supports Hypothesis 1.

**Mature Innovators:** These old small firms are the least active innovators, as evidenced by their low R&D intensity and low IP protection. Our statistical results indicate that 75 per cent of the innovations launched by these SMEs are incremental. In addition, 61 per cent of these firms launched fewer than five innovations over the last three years. These firms’ lower level of engagement into innovation activities possibly influences the firms’ tendency of implementing an unsystematic commercialisation management and having low confidence in the potential returns.

In the second phase of our empirical analysis, multivariate linear regression is used to confirm the direct impacts of the above discriminating factors on the anticipated rent, as well as on the systematic commercialisation management. As shown in Table 4, both regression models are significant at two tailed. Results from the first regression model show positive effects of firm size \( \beta = 0.25 \) and the protection
of IP ($\beta = 0.32$) on the systematic management of the commercialisation process. This, in turn, confirms Hypothesis 1 and Hypothesis 2.

Table 4: Standardised Coefficients of Multivariate Linear Regression

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Systematic</td>
<td>RENT</td>
</tr>
<tr>
<td></td>
<td>Commercialisation</td>
<td></td>
</tr>
<tr>
<td>Firm Size</td>
<td>0.25***</td>
<td>−0.18***</td>
</tr>
<tr>
<td>IP protection</td>
<td>0.32***</td>
<td>0.14***</td>
</tr>
<tr>
<td>Firm age</td>
<td></td>
<td>0.23***</td>
</tr>
<tr>
<td>Equity financing</td>
<td></td>
<td>0.26***</td>
</tr>
<tr>
<td>Novelty of innovation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>0.38</td>
<td>0.48</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.14</td>
<td>0.27</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.14</td>
<td>0.22</td>
</tr>
<tr>
<td>Standard Errors</td>
<td>1.2</td>
<td>17.2</td>
</tr>
</tbody>
</table>

Sig. ** $p < 0.01$ , *** $p < 0.001$

The second regression model clarifies the relationship between the rent index and the novelty of innovation, R&D intensity, firm age as well as the equity-financing type. The adjusted $R^2$ is equivalent to 0.22, indicating that 22 per cent of the variance is significantly explained in this model. Among these independent variables, firm age is the only variable that has negative coefficient ($\beta = −0.18$), which supports Hy-
3.5 Results

Hypothesis 3. By contrast, variable R&D intensity has the highest positive coefficient ($\beta = 0.26$), which confirms Hypothesis 4. The next factor, variable equity-financing, has the lowest coefficient ($\beta = 0.14$), partly confirming Hypothesis 5. Lastly, variable novelty is found to be positively associated with the rent index ($\beta = 0.23$), which supports Hypothesis 6.

With the aim to clarify the interaction between the level of systematic management of the commercialisation process and the anticipated returns, the mean values of these indexes among four clusters are compared. As illustrated in Figure 4, the right vertical axis demonstrates the scale for the means of the rent index. The left vertical axis presents the 10 point-scale of the systematic commercialisation management, of which means vary from 6 to 8.2 within these four clusters. The result shows that the level of systematic commercialisation tends to be positively associated with the an-
3.6 Discussion

This paper has examined the effects of firm characteristics on the systematic management of the commercialisation process and the anticipated within a typology of innovative SMEs. While the systematic commercialisation management is determined by firm size and the focus on IP protection, the anticipated rent is significantly influenced by the firms’ R&D intensity, equity-financing, firm age and novelty of innovation.

The exploration of the four firm clusters shows that young and small firms tend to expect higher anticipated rent despite their less systematic management of the commercialisation. These firms may either have greater optimism over their anticipated rent, which reflects the inexperience or naivety on the part of these owner-managers, or potentially generate high profitability because of their substantial engagement into radical innovation. By contrast, the lower anticipated rent within “larger self-financed innovators” and “mature innovators” reflects their lower optimism over the returns, not only because of their less engagement into the R&D activities but also may be due to their higher realism gained from past commercialisation experience. Hence, this finding not only supports the diminishing effect of firm age on the in-
novation returns as pointed out in several existing literature (Loderer and Waelchli, 2010; Warusawitharana, 2011; Dibrell et al., 2011) but also deepens insights into the entrepreneurial optimism aspect. In addition, as illustrated in Figure 4, firm age may impose a certain effect on the commercialisation management. For example, up to a certain firm age (e.g. adolescent firm), there is an increase of systematic management of the commercialisation process (e.g. “large self- financed innovators” and “investment- ready innovators”). This trend is likely to decrease when firms grow older (e.g. “mature innovators”).

As firms grow in size, these SMEs become more systematic in managing commercialisation and develop a stronger focus on IP protection. This result not only supports the fact that bigger firms have more capacity and experience in developing innovations as noted in Cohen and Klepper (1996); Rogers (2004) but also clarifies the relationship between firm size and the systematic management of commercialisation. Regarding project-financing, equity-financed firms that focus on the protection of IP tend to expect higher anticipated rent. This finding clarifies the role of equity-financing, one of the project-financing types described in Baldwin et al. (2002)’s study, in the commercialisation process.

As illustrated in Figure 3, the R&D proxy significantly differentiates clusters that focus on radical and incremental innovation as well as between young and old firms. This is likely to reveal potential effects of the R&D on both the novelty of innovation and firm age. As shown by the regression analysis, R&D-intensive firms are more likely to anticipate higher returns. This finding strengthens the understanding of the relationship between R&D and innovation that was partly mentioned by past scholars such as (Romijn and Albaladejo, 2002; Baldwin and Hanel, 2003; Becheikh et al., 2006; De Jong and Vermeulen, 2006), but not yet investigated from the commercialisation perspective.

The discriminant results also suggest that investments in radical innovations may enhance entrepreneurs’ expectation of innovation returns despite differences in firm
size and age. Hence, it is more likely to reflect the optimism of entrepreneurs or owner-manager while investing in the high novelty level of innovation. The firm’s attitude towards IP protection also seems to depend on the types of innovation, the novelty and nature of its high or low knowledge-intensive sector.

3.7 Conclusion

This paper has investigated the SME typology to measure effects of firm characteristics on two dimensions: systematic management of the commercialisation process and anticipated rent. To sum up, empirical findings confirm that in general systematic commercialisation management is likely to result in high anticipated rent, which engenders entrepreneurial optimism over the investment returns. Additionally, this above relationship is also controlled by firm characteristics in the commercialisation process. Specifically, firm size and IP protection issues are found to have positive effects on the level of systematic commercialisation. Project-financing types (i.e., equity financing), R&D intensity, novelty of innovation have positive influence on the anticipated rent. By contrast, firm age is found to have a negative impact on the anticipated rent.

Overall, the examined typology of SMEs showed that young small firms tend to be more R&D-intensive and associated with high technical novelty. As a result, they seem to have more confidence in generating high returns despite their less systematic management. By contrast, old small firms are more likely to hesitate to invest into R&D, hence expecting lower rent. As firms expand, they have more capacity to approach a systematic management but their optimism for the potential returns seem to decline due to their stronger focus on incremental innovation. Young equity-financed firms which pursue a formal new product development and focus on IP protection for their innovation are likely to generate the highest potential returns.

Limitations of this study are related to our focuses on the organisational perspec-
tive only, hence leaving out the analysis of competitive forces and external factors in the environment. In addition, the sample data is cross-cultural and from various industries, which may have a potential impact on the nature of innovation management within SMEs to some extent.

### 3.7.1 Implications for further research

This paper substantiates the theory of innovation management by exploring firm characteristics as determinants of firms’ tendency in implementing the commercialisation management and anticipating the returns. In addition, this typology study of innovative SMEs reveals a potential interaction between systematic commercialisation and anticipated returns. Future research should conduct a longitudinal study to clarify the effects of entrepreneurial optimism on the commercialisation management and assessment of anticipated returns. The comparison between the firms’ anticipated and appropriable rent will strengthen the reasoning for differences in their entrepreneurial optimism and commercialisation approach. Additionally, a follow-up investigation into owner-managers’ personality will provide a more comprehensive explanation for their decision making in innovation management. The findings in our typology study also suggest an investigation into the relationship between firms’ life cycle and entrepreneurial optimism as described by Fraser and Greene (2006); Dushnitsky (2010), which may have effects on the commercialisation practice within SMEs.

### 3.7.2 Implications for practice

This study not only provides entrepreneurs or owner-managers new insights into the systematic management of the commercialisation but also clarify different firm characteristics and behaviour in anticipating the returns. In addition, the exploration into an innovative typology deepens policy-makers’ knowledge on innovation man-
agement within SMEs, which may help to strengthen the cooperative network with the industry and enhance government-sponsored programs on the commercialisation process.
4 Small Business Owner-managers’ Assessment of Innovation Returns: The Effect of Organisational Factors

Abstract

This paper examines the interplay between organisational factors and the anticipated innovation rent based on Structural Equation Modelling (SEM) analysis. Drawing on a sample of 525 SMEs within 10 OECD countries, our results reveal that innovation strategy and formal commercialisation are the two most critical factors determining the small owner-managers’ assessment of the innovation rent. The firm’s culture, portfolio and project management skills impose a slighter effect on the potential returns. Overall, SMEs’ organisational factors have stronger positive impact on the anticipated volume of sales and the duration of exploiting an innovation than the rate of profitability.

Keywords Innovation management, rent, owner-managers, organisational factors, SMEs.

4.1 Introduction

As the key source of dynamism and innovation in most countries, SMEs have been acknowledged as the backbone of the national economies (OECD, 2004). With regard to the Organisation of Economic and Cooperation Development (OECD), SMEs account for 99 per cent of the whole business population in most country members, indicating its significant role in stipulating the economic growth (OECD, 2010).

3 By Thuy Hang Do, Thierry Volery, Tim Mazzarol and Geoff Soutar. This article is to be submitted to International Small Business Journal.
Even though small business owner-managers’ ability to identify potential opportunities has been recognised within the research literature as critical determinants of the firm’s success (Kirzner, 1997), their decision-making in innovation is often based on personal intuitive knowledge (Lindman, 2002). Consequently, in spite of SMEs’ stronger commitments on innovation to boost their growth rate, their commercialisation success rate is lower than that of large firms due to their informal planning and management (Wheelen and Hunger, 1999). Hence, much scholarly attention is drawn into the small firms’ innovation management in recent studies (e.g. (Mazzarol and Reboud, 2011; Reise and Baier, 2011; Terziiovsky, 2010).

Different perspectives of innovation management have been explored from the macro-level that examines national innovation system (Lundvall, 2007), to the micro-level that focuses on what occurs at the organisational and individual levels (Vermeulen, 2005; Yahaya and Nooh, 2007; Tang and Murphy, 2012; Plambeck, 2012). From the micro-level perspective, the organisation of the firm and how it allocates resources are known as determinants of the overall success of innovation management (Teece, 2006; Cordero, 1990). Hence, organisational factors are seen to be associated with the firm’s innovative capabilities, which is vital to build core competences to outperform its competitors (Prahalad and Hamel, 1990).

In an innovation management review Adams et al. (2006) demonstrated an organisational framework that comprises seven interconnected elements: inputs, knowledge management, innovation strategy, organisational culture and structure, portfolio management, project management and commercialisation. Each element represents the firm’s combination of its resource bundles that can be utilised to enhance innovation activities. In addition, the commercialisation success of new products is also viewed as a process of systematic management of the firm’s inherent stocks of resources (Akgun et al., 2004). As innovation investment often occurs under uncertainty, a preliminary analysis of the potential returns is critical to owner-managers as it is likely to influence their decisions in relation to a particular innovation (Atkins
4.1 Introduction

and Anderson, 1999; Davis, 2002).

Prior literature on innovation has acknowledged the role of resource-based view in explaining the firm’s new product development success. However, little effort has been made to investigate the relationship between how SMEs deploy their resources in innovation management and these owner-managers’s assessment of the potential returns. Drawing on a sample of 525 SMEs within 10 OECD countries, our paper aims at investigating the owner-managers’ anticipated returns from organisational perspective. To address these issues, our paper focuses on answering the following question “what is the relationship between organisational factors and the anticipated returns?” More specifically, we aim to research these below sub-questions:

1. What are the effects of the organisational factors on owner-managers’ anticipated volume of innovation sales?

2. What are the effects of the organisational factors on owner-managers’ anticipated rate of margin?

3. What are the effects of the organisational factors on owner-managers’ anticipated duration of an innovation?

In examining those relationships, our paper provides new insights into the resource-based view (RBV) and clarifies the concept of innovation rent. More specifically, our empirical investigation into the organisational factors extends the scope of research in Adams et al.’s (2006) and deepens the knowledge of how entrepreneurs or small business owner-managers anticipate their returns. What is more, the SEM elaborating the interaction elements and the anticipated returns provides a comprehensive explanation for this cause-effect relationship in SMEs’ innovation management. The study also strengthens small business owner-managers’ knowledge in identifying their core competences to optimise their sales volume, profitability and
duration of innovation. Thus, this paper sheds an additional light on how owner-managers orient their rent-seeking profile and utilise their resources for innovation.

Our paper is structured as follows. In the next section, we develop three hypotheses based on the RBV and the organisational view. Then the analysis methodology presents the data sample and measurement of our key concepts. Finally, the results are discussed in-depth and concluded with the implications for research and practice, as well as suggestions for future research.

4.2 Theoretical background and hypothesis development

4.2.1 Owner-managers’ assessment of anticipated rent

Owner-managers’ intuitive judgement and experience play an important role in the decision-making process of a particular investment, due to small firms’ limited resources and capabilities (Casson, 2005). Hence, “an individual as the controller” is closely associated with the “organisation” itself, in which his judgemental decisions are vital to the growth and survival of the firm Casson (2005, p.238). The resource-based theory in Penrose’s (1959) study also reveals that an individual’s perception is empowered by his knowledge of the firm’s resources and their attributes (Foss et al., 2008).

Much of the literature has referred to the concept of “economic rent” as a core issue within the RBV as it helps to explain the entrepreneurial behaviour and the strategic management of firms (Mosakowski, 1998; Alvarez and Barney, 2004). The two most classical types of economic rent known to entrepreneurs are “Ricardian rent” and “Schumpeterian rent”. While the former is more concerned with the RBV that highlights the firm’s ability to control its bundle of tangible and intangible resources (Penrose, 1959; Wernerfelt, 1984; Barney, 2001), the latter emphasises the firm’s dynamic capabilities in deploying and exploiting its resources (Amit and Schoemaker, 1993). In fast-changing environments, the “Schumpeterian rent” which is also re-
4.2 Theoretical background and hypothesis development

ferred to as “entrepreneurial rent” is considered to be more important (Lim et al., 2013). Alvarez and Barney (2004) commented that rent generation and appropriation are the two most critical targets to entrepreneurs.

As innovation investment often involves some uncertainty, it is essential for entrepreneurs or owner-managers to have an assessment of its returns in advance (Mazzarol and Reboud, 2011). According to Milgrom and Roberts (1992, p.621), the potential innovation rent is defined as “a return received in an activity that is in excess of the minimum needed to attract the resource to that activity”. The potential innovation rent is generated from a particular innovation investment, which arises from the kind of innovation, characteristics of innovation and size of the potential market (Mazzarol and Reboud, 2005). In a further analysis of innovation returns, Santi et al. (2003) proposed an assessment framework, which is a useful guideline for owner-managers in anticipating the rent. As exhibited in Figure 5, the estimation of anticipated rent comprises the analysis of its three components: the potential annual volume of sales, the rate of margin (or profitability) and the length of an innovation.

1. The anticipated volume of sales is determined by four indicators including the potential of sector, geographic diffusion, the size of user markets, and the limits to exploitation.

2. The rate of margin is associated with the process of generating innovation, the types of innovation, and the kind of prior protection.

3. The length of innovation refers to the duration that an innovation can be exploited, depending on the complexity of innovation types, ease of use, and its application in different industries.

As SMEs are often controlled and owned by an individual or a small management team, their utilisation and combination of different resources is likely to influence
4.2 Theoretical background and hypothesis development

their assessment of the anticipated rent. This argument paves the way to our further analysis of the organisational perspective in the next section.

Figure 5: The Model of Rent Assessment
(Santi et al., 2003)

Thus the total amount of Rent = Volume x Rate x Length

4.2.2 Resource-based view

The RBV is regarded as one of the most prominent theories that influence the management at the firm-level (Wernerfelt, 1984; Kor and Mahoney, 2004; Hauschild and Knyphausen-Aufsess, 2012). This resource-oriented approach indicates that the firm’s ability to generate above average returns stems from the efficient allocation and deployment of its rare, strategic and valuable resources (Amit and Schoemaker, 1993; Barney, 1991; Crook et al., 2008). In addition, the firm’s core competences are considered as the root of its competitive advantages to outperform competitors and sustain in the market (Prahalad and Hamel, 1990). Hence, the firm’s key internal
physical, financial and intangible resources are significant to enhance its capabilities in innovation management (Canto and Gonzales, 1999). In accordance with the RBV, Verona (1999) stated that determinants of successful product development are technological capabilities (e.g. R&D, design and technical complementarities), internal and external knowledge integration (e.g. structure, managerial process and culture), and marketing capabilities (e.g. market research, strategic marketing management, marketing-mix policies and complementarities).

The RBV lays the ground for the organisational view that explores the nature of innovation management in the firm context (D’Amboise and Muldowney, 1988; Van der Panne et al., 2003; Adams et al., 2006; Tan et al., 2009; Plambeck, 2012). Prior research suggested several key success factors in NPD such as strategies, corporate culture, market analysis, and resource allocation. For example, Griffin and Page (1993) proposed key factors for NPD success including financial returns, time, costs and speed to market, customer and market, percentage of sales by new products. Bobrow (1997) defined key success factors for NPD such as strategic direction, corporate culture, resource allocation, and a cross-functional team. Chorda et al. (2002) emphasised the role of top management support, NPD process and market analysis. Despite tremendous studies on NPD success factors, scant research provides a comprehensive study that measures the impacts of the organisational perspective on the innovation returns empirically. The owner-managers’ estimation of the returns reflects their assessment of a particular investment, which potentially determines their decision-making in such innovation.

4.2.3 Hypotheses development

The framework suggested by Adams et al. (2006) was used to explore the effects organisational factors had on owner-managers’ anticipated rent. The focus was on the seven factors included in their model that were mentioned earlier (i.e. inputs,
4.2 Theoretical background and hypothesis development

knowledge management, innovation strategy, organisational culture, portfolio management, project management and commercialisation) and are discussed in subsequent paragraphs.

**Inputs management**  This category refers to the firm’s capability in allocating and deploying strategic resources such as financial, physical, human, technological and organisational factors efficiently for developing, manufacturing and distributing products and services to customers (Barney, 1991; Wernerfelt, 1984). These rare, valuable and imperfectly imitated resources are the basis to build the firm’s competitive advantage, which has a positive impact on profitability.

Technical resources such as engineering and production equipment, manufacturing facilities and information technology systems are determinants of new product success (Song and Parry, 1997; Mitchell and Zmud, 1999). Other scholars emphasised the role of qualified human capital with advanced technical skills, know-how in R&D projects, and risk-taking propensity on innovative activities (Hitt et al., 2001; Canto and Gonzales, 1999). Galende and Suarez (1999) described a positive relationship between a stock of qualified human capital and the probability of a firm to carry out internal R&D. Similarly, Therrien et al. (2011) indicated a high significant correlation between skilled human resource and the sales from innovation, thus underlining the role of qualified pool of workforce in enhancing innovation success. In the same vein, firms with larger pools of resources were found to have higher capacity and stronger cash flows for developing innovation (Lee et al., 2001; Canto and Gonzales, 1999; Rogers, 2004).

**Knowledge management**  This factor relates to the firm’s ability in obtaining and communicating ideas and information both explicitly and implicitly (Whittington et al., 1999). Regarding the industrial knowledge, Porter (1980) indicated the role of the five forces analysis, which helps firms to evaluate their competitive advantages
in the market. This assessment comprises the analysis of the bargaining power of customers, suppliers, the thread of substitute products, new entrants, and the intensity of competitive rivalry. Such knowledge management capability helps firms to build sustainable competitive advantages (Argote and Ingram, 2001) and underline new product success (Hoopes and Postrel, 1999). Uhlaner et al. (2007, p.5) acknowledged the positive role of tacit knowledge on the firm’s innovative ability (Damanpour, 1991). As suggested by Nonaka (1994), firms which enhance their human capital’s knowledge are in a better position to deal with uncertainty. Similarly, Zahra and G. (2002) indicated that obtaining external knowledge is significant for small firms’ success.

Organisational culture Earlier studies on organisational culture discussed the impacts of the firm’s internal communication and culture on the firm’s ability to innovate (Cohen and Klepper, 1996; Chandy and Tellis, 1998). The concept of organisational culture is defined as “collective programming of the mind which distinguishes the members of one organisation from another” (Hofstede, 1991, p.262). An open and flexible culture enhances the exchange of ideas internally and externally, which promotes the creativity in the organisation (De Jong and Brouwer, 1999; McFadzian, 1998). These prior findings on organisational culture thus raise the concern about its potential relationship with innovation outcomes.

Innovation strategy This element represents the organisation’s mission and strategic orientation in the firm’s management (De Jong and Brouwer, 1999, p.30). Prior literature on innovation strategy claimed its linkage with the corporate financial performance (Zahra and Das, 1993; Markham, 1998; Crespell and Hansen, 2008). More specifically, those firms pursuing an innovation strategy that focuses on innovation leadership orientation, product and process innovation, and investment intensity are likely to enhance the effective management system (Zahra and Das, 1993).
tion strategy is also regarded as a critical influencing factor that promotes the firm’s innovative capability and commitment on innovation investments (Cooper et al., 2004b; Fruhling and Siau, 2007; Li and Atuahene-Gima, 2001; Verhees and Meulen-berg, 2004; De Jong and Vermeulen, 2006; Nybakk and Jenssen, 2012). Hence, innovation strategy may contribute to the innovation commercialisation success (Lawson and Samson, 2001)

**Portfolio management** This capability relates to the process of evaluating, choosing and monitoring appropriate investments and allocating funds accordingly. As noted by Mikkola (2001, p.42), portfolio management is a powerful tool that allows “products and R&D projects to be analysed in a systematic manner, providing the opportunity for the optimisation of a long-term company’s growth and profitability”. Other scholars suggested that most successful firms are found to develop both product and process innovation simultaneously (Capon et al., 1992). In addition, Athey and Schmutzler (1995) confirmed that complementary and process innovation stipulates the net revenue in the short term. Thereby, a diversified portfolio of innovations is likely to be an effective factor to reduce risks and generate higher returns.

**Project management** This factor refers to the evaluation of the efficiency of the project, tools used, communications and collaboration within the team members. Kerzner (2006, p.5) defined a successful project management as “having achieved the project’s objectives within time, within cost, at the desired performance or technology level, utilising the assigned resources effectively and efficiently and accepted by the customers”. Hayashi (2004) remarked that efficient communication among team members enables knowledge sharing, which enhances the group performance. Holding the same view, Pons (2008) emphasised the role of an effective project planning and controlling on the NPD success. This raises the concern about the role of project management skills in generating innovation outcomes.
Commercialisation  As defined by Herdman (1995), the commercialisation process of innovation is driven by the firms’ expectations that they can gain a competitive advantage in the marketplace for a particular product, process, or service. Several scholars commented that customer knowledge enhances the success of NPD and commercialisation (Helfat and Raubiscek, 2000; Huang et al., 2002). Marketing capabilities such as market investigation, market testing and promotion play an important role in commercialisation processes (Verhaeghe and Kfir, 2002; Adams et al., 2006). In addition, several studies also emphasised the role of the legal protection of intellectual property (IP) such as patents as a part of the formal commercialisation in enhancing the sustainability of innovation and the firm’s competitive advantages (Candelin-Palmpvist et al., 2012; Burrone, 2005). As the commercialisation process is concerned with the introduction of new products or process to the market (Adams et al., 2006), a systematic management of organisational factors is likely to influence the owner-managers’ anticipated returns.

Based on the aforementioned literature and arguments, we hypothesise the positive relationship between the seven organisational factors in Adams et al. (2006) and the owner-managers’ anticipated rent. This leads to our following hypotheses.

- **H1**: Organisational factors are positively associated with owner-manager’s anticipated volume of innovation sales.

- **H2**: Organisational factors are positively associated with owner-manager’s anticipated rate of margin.

- **H3**: Organisational factors are positively associated with owner-manager’s anticipated length of innovation.
4.3 Methodology

4.3.1 Sampling

Drawing on a sample of 525 SMEs within 10 countries in the Organisation of Economic and Cooperation Development (OECD), our study targeted firms with annual turnovers of less than 50 million euros and fewer than 250 employees, as defined in OECD (2004). These firms were recruited from Australia (79 firms), Austria (78), Belgium (51), Canada (47), France (68), Italy (12), New Zealand (92), Spain (10), Switzerland (63), United States (26). These firms represented a range of industry sectors specifically manufacturing, services and those in specialised areas such as information technology or biotechnology. These enterprises range from micro (<9 employees) to small (10-49 employees) and medium (50-249 employees). These firms also cover a wide range of age, from 4 months to 167 years, with the mean age of 22 years. The average expenditure on R&D as a proportion of annual turnover across the sample was 23 per cent, indicating high level of R&D intensity within these SMEs.

In conducting this study, we have discounted the country effect as within the scope of organisational view, the country of origin insignificantly influences the entrepreneurs’ innovation management. Our earlier work reveals that minor differences among these SMEs are due to the firm characteristics and the nature of the firm sector rather than the country of origin (Mazzarol and Reboud, 2011). Data collection was a part of an international research project on strategic decision making of small firms in innovation management within the period 2006-2008. The questionnaires were deployed using an EXCEL spread-sheet that helps respondents to evaluate their own innovation activities and their perceived returns over such investments. The interviews were conducted face-to-face with entrepreneurs or owner-managers who are the key controllers of these SMEs.
4.3 Methodology

4.3.2 Variable Measurement

As suggested by Title and Hill (1967), Likert-scale is regarded as the most reliable and common use tool for researchers to measure correspondent’s attitude and perception within social science. Hence, the measurement of variables in our study is developed in a 5-point Likert-scale to assess the firm’s capabilities in innovation management and the owner-managers’ anticipated rent.

Based on Santi et al.’s (2003) study, the owner-managers’ anticipated volume of sales is measured by three 5-scaled items including the owner-manager’s expectation over the estimated geographic diffusion of innovation within the firm’s sector, the potential annual sales of such innovation over three years and the potential diffusion of innovation within segments of the firm’s market. The anticipated rate of margin is measured by three dimensions: the perceived level of gross profitability, the net profitability and the generated new market from such innovation. The anticipated length of innovation is measured by the entrepreneurial perception of their innovation novelty, the technical complexity and the imitability of such innovation from technical and legal perspectives.

The seven organisational factors reflect the firm’s capability in developing and commercialising innovation. The reliability of our measures is confirmed by the Composite Reliability (CR) and Average Value Extracted (AVE) tests. Their coefficients are higher than 0.7 and 0.5 respectively, confirming the strong reliability as mentioned in Fornell and Larcker (1981).

Variable inputs is measured by four items that indicate the firm’s possession of key technological, human, financial and physical resources. The measurement of this construct is based on the firm’s inherent resources for innovation as suggested by (Damanpour, 1991; Kimberly, 1981; Thompson, 2003; Adams et al., 2006). The composite reliability coefficient (CRC) of variable inputs is 0.8 and the AVE is 0.5.

Variable knowledge refers to the firm’s knowledge management of the market,
relating to the systematic assessment of bargaining powers of customers, suppliers and competitors, based on Porter (1980); Hoopes and Postrel (1999). The Composite Reliability Coefficients (CRC) of this construct is 0.82 and AVE is 0.52.

Variable *organisational culture* refers to the measurement of the flexibility of the firm’s culture and structure that enables internal and external consultation to get involved into the process of developing innovation. As shown in table 1, CRC and AVE of this construct, turn in turn, is 0.8 and 0.51.

Variable *innovation strategy* was a single item measuring how much a firm focuses on generating new innovation in a 5- likert scale. The measurement was formulated based on the definition of innovation strategy by De Jong and Brouwer (1999).

*Portfolio management* reflects the diverse types of innovations, for example, product innovation, process innovation, combination of product and process and other types such as marketing and administrative innovation. This nominative variable was measured by a single item that describes the major innovation types that a firm focuses on, based on Capon et al. (1992).

Variable *project management* assessed the firm’s possession of experienced project management team, the access to external expertise and government sponsor in innovation management process. The CRC is 0.77 and the value of AVE is 0.55, indicating a good reliability scale.

Variable *commercialisation* was estimated by four indicators that related to the market testing of such innovation, as suggested in (Adams et al., 2006), and the owner- managers’ formal access to the intellectual properties protection such as “patents” as mentioned in Burrone (2005). These items measure the formality of a firm’s approach to the commercialisation process. The CRC and AVE is 0.82 and 0.53 respectively.

The SEM analysis was conducted with Warp Partial Least Square 3.0 software. The fit of the model was based on the $R^2$ and the p-value. The significance of all models were estimated at two tailed levels (either $<0.05$ or $<0.01$). In verifying the reliability of the measures, CRC and AVE tests were conducted. The multi-
collinearity tests such as VIF between dependent and independent variables were also undertaken.

4.4 Results

As shown in Table 5, the descriptive analysis, the bilateral correlation among variables and scales for reliability test such as CRC, AVE are conducted. Except for variable inputs, six other organisational factors are significantly correlated with the volume, rate and length of innovation. The highest correlated variables are organisational culture, innovation strategy and commercialisation, indicating their stronger effects on the owner-managers’ anticipated rent.

The CRC and AVE of all constructs are higher than 0.7 and AVE higher 0.5 respectively, indicating strong scales of reliability (Fornell and Larcker, 1981). In addition, VIF values range from 1.29 to 1.59, which excludes the potential multicollinearity problem in our models. This preliminary analysis ensures the feasibility of undertaking the SEM testing.
### Table 5: Descriptive Analysis of the SEM Constructs

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>CRC</th>
<th>AVE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>3.73</td>
<td>0.77</td>
<td>0.80</td>
<td>0.50</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Knowledge</td>
<td>3.43</td>
<td>0.78</td>
<td>0.82</td>
<td>0.52</td>
<td>0.22</td>
<td>*</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Culture</td>
<td>3.94</td>
<td>0.59</td>
<td>0.80</td>
<td>0.51</td>
<td>0.10</td>
<td>**</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
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<tr>
<td>Strategy</td>
<td>4.15</td>
<td>1.04</td>
<td>−</td>
<td>−</td>
<td>0.15</td>
<td>**</td>
<td>0.20</td>
<td>**</td>
<td>0.27</td>
<td>**</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Portfolio</td>
<td>−</td>
<td>0.94</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>0.01</td>
<td>0.10</td>
<td>−</td>
<td>0.01</td>
<td>0.10</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Project</td>
<td>3.66</td>
<td>0.89</td>
<td>0.77</td>
<td>0.52</td>
<td>0.29</td>
<td>**</td>
<td>0.36</td>
<td>**</td>
<td>0.26</td>
<td>**</td>
<td>0.36</td>
<td>**</td>
<td>0.07</td>
<td>−</td>
</tr>
<tr>
<td>Commercialisation</td>
<td>3.01</td>
<td>1.16</td>
<td>0.82</td>
<td>0.53</td>
<td>0.15</td>
<td>**</td>
<td>0.29</td>
<td>**</td>
<td>0.24</td>
<td>**</td>
<td>0.26</td>
<td>**</td>
<td>0.13</td>
<td>**</td>
</tr>
<tr>
<td>Volume</td>
<td>2.97</td>
<td>0.97</td>
<td>0.78</td>
<td>0.55</td>
<td>−0.02</td>
<td>0.21</td>
<td>**</td>
<td>0.26</td>
<td>**</td>
<td>0.26</td>
<td>**</td>
<td>0.19</td>
<td>**</td>
<td>0.27</td>
</tr>
<tr>
<td>Rate</td>
<td>2.96</td>
<td>0.91</td>
<td>0.93</td>
<td>0.87</td>
<td>0.009</td>
<td>0.10</td>
<td>*</td>
<td>0.29</td>
<td>**</td>
<td>0.37</td>
<td>**</td>
<td>0.19</td>
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<td>0.19</td>
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<tr>
<td>Length</td>
<td>2.90</td>
<td>0.83</td>
<td>0.77</td>
<td>0.53</td>
<td>0.04</td>
<td>0.14</td>
<td>**</td>
<td>0.20</td>
<td>**</td>
<td>0.26</td>
<td>**</td>
<td>0.22</td>
<td>**</td>
<td>0.31</td>
</tr>
</tbody>
</table>

*p ≤ 0.05, **p ≤ 0.01
4.4 Results

As illustrated in the descriptive analysis, the mean value of variable strategy is 4.15 out of 5.0, which shows the strong commitments on innovation within these SMEs. As presented in Table 5, except for variable inputs, all other organisational factors are significantly correlated with the anticipated volume, rate and length of innovation. Among those relationships, variable commercialisation is considerably highly correlated with variable length (β=0.5), indicating the significant role of NPD and management of IP in the commercialisation process.

As exhibited in Figure 6, the first SEM elaborates the interaction between all the seven organisational factors and the anticipated volume, rate, length. Our results show that five out of seven organisational factors have direct effects on either the volume of sales, the rate of margin or the length of innovation.

Figure 6: Elaborated Interaction between Organisational Factors and Anticipated Returns (SEM 1)
4.4 Results

The $R^2$ values of these models are 0.21, 0.24 and 0.27 respectively, reflecting a reasonably good fit. Amongst all the examined relationships, the path coefficient between variables commercialisation and length is highly significant ($\beta=0.4$, $p < 0.001$), indicating their strongest interaction. The next significantly high path coefficient is between variables innovation strategy and rate of margin ($\beta=0.3$, $p < 0.001$). Factors such as organisational culture, innovation strategy, portfolio management and commercialisation are also found to have direct relationships with the volume and the length of innovation. By contrast, variables inputs and knowledge have indirect effects on all these three components of the rent ($p > 0.05$). Variable project management plays a minor role in determining the length of innovation due to its low coefficient ($\beta=0.1$, $p < 0.05$). Hence, our hypotheses are partly supported.

As illustrated in Figure 7, the second SEM modifies the relationship between organisational factors and the volume, rate, length. Variables inputs and knowledge management are omitted because of their insignificant coefficients in SEM 1. In addition, a further examination of the relationship between the volume, rate and length of innovation is added to the SEM 2 due to their high correlation as demonstrated in Table 5. The $R^2$ values of the models between the five organisational factors and the dependent variables volume, rate, length are 0.22, 0.34, and 0.3, respectively, all of which are highly significant ($p < 0.001$).

Typical differences between the SEM 1 and SEM 2 are related to the relationship between the organisational factors and the anticipated rate of margin. The $R^2$ values in SEM 2 are higher than that in SEM 1, reflecting the better adjustment of the examined relationships. As shown in Figure 7, the rate of margin is positively influenced by the volume ($\beta=0.21$, $p < 0.001$) and the length ($\beta=0.24$, $p < 0.001$). In addition, only two factors, i.e. organisational culture and innovation strategy, are positively associated with the rate of margin. Hence, organisational factors impose less impact on the owner-managers’ anticipated rate of margin, compared to the potential volume of sales and the length of innovation.
In brief, our findings show that the owner-manager’s anticipated rent is strongly interacted with five out of seven organisational factors, which partly confirms our hypotheses. The firm’s resource endowments and management of the industrial knowledge are insignificantly associated with either the sales volume, rate of margin or the length of innovation. Instead, critical elements for the firms’ innovation management from the organisational perspective are related to the organisational culture, innovation strategy, portfolio management, project management and the formal commercialisation.
4.5 Discussion and Conclusion

**Volume**: The firm’s innovation strategy is likely to impose the most impact on the expected volume of innovation sales. In other words, the firm’s strategic commitments on innovation are likely to accelerate the potential sales volume. Slighter effects are from the firm’s organisational culture, its management of a diversified innovation portfolio, and a formal commercialisation process. The $R^2$ value indicates that 22 per cent of the variances is significant in this model.

**Rate**: The estimated profitability (or potential rate of margin) of the innovation is positively associated with only two organisational factors: the organisational culture and innovation strategy. It means that the more open the firm’s culture to innovation management, the higher rate the owner-managers expect to achieve from such investments. In addition, the more the firm focuses on innovation as its major orientation, the higher profitability it expects to generate. Interestingly, the estimated volume of sales and duration of innovation also have significant positive effects on the rate of margin.

**Length**: The duration of exploiting innovation is significantly influenced by the firm’s formal commercialisation process. Their path coefficients in SEM 1 and SEM 2 are 0.38 and 0.4 respectively and significant at two-tailed level. Other factors such as innovation strategy, organisational culture, portfolio and project management factors have less effects on the anticipated life cycle of innovation.

4.5 Discussion and Conclusion

Overall, our findings indicate a positive relationship between organisational factors and owner-managers’ anticipated volume, rate and length. More specifically, the potential volume of sales is accelerated by the firm’s innovation strategy, organisational culture, portfolio management and formal commercialisation. Variable rate of margin is positively associated with the organisational culture, innovation strategy, as well as strongly interacts with variable length and volume of sales. The length
of innovation is potentially driven by factors such as a formal *commercialisation*, *portfolio management*, *innovation strategy* and is partly influenced by *project management* skills and *organisational culture*.

Regarding the resource endowment, which is widely known as a problem in many SMEs, our analysis reveals that the firm’s capability in deploying and utilising resource for innovation is perceived to be more important than its inherent stocks of inputs. What is more, the firm’s industry knowledge management is likely to have an indirect effect on the owner-managers’ assessment of their future returns. This finding indicates that owner-managers’ expectation of innovation returns are more likely to rely on their perceived knowledge of the internal forces rather than the external effects of the industry.

Our results also suggest that an open organisational culture innovation enabling internal and external consultancy in developing innovation is expected to boost the entrepreneurs’ or owner-managers’ confidence of achieving higher innovation returns. In addition, innovation strategy is also seen as a critical factor in orienting the firm’s strategic development that strongly stipulates the potential profitability. This finding is in line with the previous findings in Zahra and Das (1993); Markham (1998); Crespell and Hansen (2008); Lawson and Samson (2001), which emphasised the role of innovation strategy in enhancing the corporate financial performance. Interestingly, the estimated rate of margin is positively influenced by the volume of sales and the length of innovation. This relationship once more confirms the significant role of the anticipated volume of sales and the life cycle of innovation in estimating the profitability. Furthermore, the organisational factors are likely to have stronger effects on the anticipated volume and length than the rate of margin.

The firm’s orientation towards a diversified portfolio of product and process innovation enhances owner-managers’ confidence of accelerating the sales volume and lengthen the life cycle of innovation. In addition, the communication and coordination skills of the project management play a minor role in lengthening the innovation
4.5 Discussion and Conclusion

life cycle. These skills insignificant influence the anticipated rate of margin, which contrasts to Athey and Schmutzler (1995)’s views. Finally, a systematic commercialisation process based on a formal planning and legal IP protection are perceived to be the most critical factor that not only potentially boosts the sales volume but also lengthens the duration of exploiting innovation. This empirical result verifies the effect of the IP protection on innovation sales and its expected life cycle, which is in line with Candelin-Palmpvist et al. (2012) and Burrone (2005).

In conclusion, the present study explored the determinants of owner-managers’ anticipated returns from an organisational perspective. Five out of seven organisational factors influenced either anticipated sales volume, profitability (margin rate) or the time during which an innovation could be exploited. Our model showed the link between the RBV and innovation management theories, and improved our understanding of entrepreneurial rent, extending Adams et al.’s (2006) research and verifying the effects their suggested factor had on the owner-managers’ anticipated innovation returns.

The results should of interest to small business owner-managers, as they clarify their behaviour and strategic decision making in innovation management. More specifically, owner-managers at the helm of firms focusing on formal commercialisation processes, a diversified portfolio of innovation and an innovation-oriented strategy have more confidence they will generate high returns. Similarly, owner managers seeking high profitability and sales volume tend to have more open, informal organisational cultures and structures that enable internal and external consultation. This, in turns, fosters the development of innovations. For SMEs aiming at extending an innovation’s life, project management skills are seen as critical. Further, policy-makers may also gain a better understanding of the nature of SMEs’ innovation management to design programs to assist these small businesses in the commercialisation process and enhance innovation activities within the region.

Some limitations in our study are also acknowledged. The first limitation relates
to our data sample. Despite the similarity of the national innovation systems within these OECD countries, our sample is diverse in terms of the firm size and age. The scope of our study is more internally driven, focusing on the innovation capabilities within the firm context. External factors, such as the task environment, were not yet considered in our study. In addition, the personal traits of these owner-managers may also potentially bias their attitude and judgement towards a particular innovation investment.

Future research could explore the relationship between the entrepreneurial orientation, the owner-managers’ optimism and their perception of innovation risks and returns. Other entrepreneurs’ characteristics should also be considered because they are likely to influence their decision-making. Furthermore, a longitudinal qualitative study that enables a deep investigation into several cases studies is highly recommended because it helps to compare the impact of the organisational factors on owner-managers’ anticipated and appropriable rent. Such research could assess the impact of owner-managers’ optimism and provide further insights into the factors behind their successes or failures in innovation management.
5 Owner-managers’ Rent Seeking in Innovation Commercialisation: New Insights into a Small Business Typology

Abstract

This article investigates the innovation commercialisation practices of small business owner-managers and the determinants of their potential rent profiles. Employing a typology of 525 SMEs within 10 OECD countries, our findings reveal that market assessment is perceived to be the key to boost the sales volume of innovation that has a short life cycle. For those firms targeting long life cycle innovation, systematic approaches such as the formal new product development and protection of intellectual property rights are perceived to be the main accelerators of the sales and the length of innovation. Besides, firm characteristics such as the age and the R&D intensity also impose some effects in distinguishing these owner-managers’ rent-seeking. The R&D investment is perceived to be engaged more in firms seeking long life cycle innovation. By contrast, firm age is negatively associated with the formality of SMEs’ commercialisation management, thus resulting in the potential low volume of innovation sales and short life cycle.

Key words: Innovation, commercialisation management, sales, life cycle, SMEs

5.1 Introduction

Much scholarly attention has been drawn to the dynamic view of small business research over the last 30 years (Welsh and White, 1981; Schwalbach, 1994; Jovanovic, 1995).
As noted by Tan et al. (2009), small business has become the “centre of the action” in innovation, which has shifted the academic emphasis towards the firm’s attributes and strategies. In the context of small business setting, Tan et al. (2009) also remarked the significant contribution of typology studies on the theoretical aspects of the entrepreneurial research.

Regarding the literature of firm typology development, D’Amboise and Muldowney (1988) identified several areas for classification such as elements of the organisational configuration, managerial characteristics, success-failure, and the evolution of firms. Other scholars relied on criteria such as the corporate governance (Deeks, 1973), strategy (Verreynne, 2006), growth (Greiner, 1972), and industrial sectors (Pavitt, 1984). Despite a number of classification categories, there is still a paucity of typology studies focusing on the innovation commercialisation management practices of firms (Adams et al., 2006). As innovation is closely related to the development and the growth of firms, their commercialisation management are of great importance. Additionally, entrepreneurs or owner-managers’ judgemental decisions are vital to their businesses’ successes or failures (Casson, 2005). Hence, the estimation of the potential investment returns could have an impact on owner-managers’ decisions toward an investment.

Our paper aims to develop a typology of SMEs to deepen the understanding of their commercialisation management and factors influencing their assessment of the potential returns. More specifically, our investigation attempts to address the following questions:

1. *What are the determinants of the estimated volume of sales of firms targeting short life cycle innovations?*

2. *What are the determinants of the estimated volume of sales of firms targeting long life cycle innovations?*
5.2 Theoretical background

5.2.1 Typology of innovative small firms

Earlier studies have acknowledged the significance of typology development in explaining the management and behaviour of small businesses. D’Amboise and Muldowney (1988, p.12) commented “the typologies developed aid understanding by ordering information. Generally, the variables are observable, testable, and measurable, at least to the same extent as they are in other social sciences. In many cases, the behaviour of persons who operate within specific organisational environments is taken into account”. Despite the necessity of developing typology studies, scarce research focuses on examining the innovative behaviour of entrepreneurs and small firms (De Jong and Marsili, 2006). Besides the traditional classification of sectoral patterns as described in Pavitt’s (1984), Tidd (2001) developed a matrix of four firm clusters based on the two dimensions: the uncertainty and the complexity of the organisational structures.

Rizzoni (1991) generated six clusters of firms to distinguish their characteristics and behaviour towards technological innovation. The six firm types are named: “static” (firms that are sheltered from strong competitive pressures), “traditional” (operating in mature, non-capital-intensive sectors and under competitive conditions), “dominated” (producing on behalf of larger firms in either mature/ growing sectors with high barriers to entry), “imitative” (operating in stabilised sectors, market niches, medium-term targets of profits), “technology-based” (active in rapid-growth sectors where technology is not yet stabilised), and “new technology-based small firms” (in science-based sectors). This classification reflects the dynamism of small firms in innovation processes through their innovation behaviour in different types of markets/ sectors.

Despite the emergence of the concept “rent” since the 19th century, there have been very few empirical research investigating the small business owner-managers’
rent-seeking in the commercialisation process. Most studies focus on explaining the related theoretical concepts or constructing frameworks of the rent assessment. As defined by Miles et al. (2003), the rent is the financial returns that can be derived from a particular innovation investment. The framework suggested in Santi et al. (2003) encompasses four steps of rent assessment: (i) Analysis of the potential returns of innovation relating to the kind of innovation, number and size of the potential user markets; (ii) Analysis of the characteristics of the potential market environment and the related erosion effects; (iii) Analysis of the residual rent, considering the competitive strengths of the innovation; (iv) Analysis of the small firm’s competitive situation, its ability to launch the innovation and capture the appropriable rent. The potential rent comprises three components, namely the estimated volume of innovation sales (i.e. the potential annual amount of sales, the potential geographic within the sector and the potential diffusion of the innovation within the segmented market), the rate of margin (i.e. the estimated gross and net profitability rate of the innovation) and length of an innovation (i.e. the duration of exploiting the innovation) (Santi et al., 2003). In a further investigation of the small firms’ innovation management, Mazzarol and Reboud (2011) developed a typology of the rent configuration as illustrated in Figure 8.

1. Shrimp: the innovation type that offers potential low volume of sales, rate, and length. This type is popular for firms targeting low level of technological novelty.

2. Champion: the innovation type that potentially generates high volume of sales, rate and length. This type is likely to attract firms engaging in radical innovation and requires substantial investment.

3. Gadget: this innovation type offers a potential low volume of sales and short duration of exploitation, while generating a high rate of margin or profitability.
5.2 Theoretical background

Figure 8: Typology of Rent Configuration

(Mazzarol and Reboud, 2011)

4. Joker: firms developing this type of innovation are expected to obtain high volume of sales for a long time with a modest rate of profitability.

5. Flash in the pan A: this innovation type offers a potential high volume of sales with low rate of profitability for a short life cycle.

6. Oasis A: this innovation is estimated to generate a modest volume of sales and a low profitability rate over a long life cycle.
7. **Flash in the pan B**: this innovation type is anticipated to boost the sales volume and the profitability over a short duration of exploitation.

8. **Oasis B**: In contrast to Oasis A, this innovation type offers high profitability rate over a long life cycle. However, the estimated volume of sales is low, which suits small firms with limited production capacity.

As aforementioned, such typology of rent configuration illustrates the firm’s rent-seeking profile. As the anticipated returns is closely related to the implementation phase of innovation, the firms’ commercialisation practices are likely to have impact on the owner-managers’ assessment of the investment returns. Based on our preliminary analysis in chapter 4, the anticipated volume of sales and the duration of an innovation in Santi et al.’s (2003) assessment framework are more associated with the owner-managers’ innovation management practices. The rate of margin is likely to have less interaction with the organisational factors. Hence, this chapter aims to investigate the interplay between the SMEs’ commercialisation management and their anticipate rent profiles to understand the firms’ behaviour and characteristics in securing rents.

### 5.2.2 The commercialisation management of SMEs

Prior literature has described the innovation management of small firms from three different perspectives: the system (the common innovation national infrastructures and cluster-specific environment for innovation), organisational (i.e. activities/organisation of firm resources), and the individual view (i.e. entrepreneurial orientation, managerial, leadership styles, strategic partnering). In assessing the firm’s innovation activities, Adams et al. (2006) suggested a framework encompassing seven elements:

1. **Inputs** (e.g. human, physical and financial resources and tools);
2. **Knowledge management** (e.g. idea generation, knowledge repository);

3. **Innovation strategy** (e.g. strategic orientation, strategic leadership);

4. **Organisational culture** (e.g. Organisational culture and structure);

5. **Portfolio management** (e.g. risk/return balance, optimisation tool use);

6. **Commercialisation** (market research, market testing, marketing and testing);

Among these factors, the commercialisation process, which launches new products or services to the market, is regarded as one of the most important phase that directly determines the innovation returns (Author reference). The commercialisation process refers to the “implementation” phase, which “is concerned with making the innovation processes and product a commercial success; it includes issues such as marketing, sales, distribution and joint ventures” (Adams et al., 2006, p.37). Hence, marketing capabilities such as market analysis, testing, monitoring, and planning are the critical aspects of innovation commercialisation (Verhaeghe and Kfir, 2002).

Despite the SMEs’ strong commitment and engagement into innovation activities, their commercialisation success rate is often low due to their informal planning and management. As the commercialisation is associated with the procedure of implementation and launching new products or services into the market, the firm’s assessment of the potential markets and customers is critical to the commercialisation success (Huang et al., 2002). The firm’s cooperation with leading customers and suppliers in the new product development NPD is also critical (Miller, 2001). The empirical findings in Huang et al. (2002) revealed that marketing-related activities such as marketing testing and preliminary market analysis determine the NPD success. In addition, the firm’s knowledge of customers’ needs strengthens its ability to improve customer-perceived values (Slater and Narver, 1998; Cooper et al., 2004a).

Much of the literature has claimed the significant role of the resource endowments on the NPD and the commercialisation process (Penrose, 1959; Barney, 1991;
Adams et al., 2006). Prior investigation into the RBV has also noted the SMEs’ challenges in dealing with their limited capabilities, resources, and expertise in managing the commercialisation of innovation (Vermeulen, 2005). Similarly, Schendel (1994) remarked that the firm’s success is dependent on how owner-managers deploy the firm’s inherent resources and capabilities. Scarce, valuable and non-replicable inputs such as technological, human, physical and financial resources strengthen the firm’s competitive advantages (Barney, 1991), which fosters the firm’s innovation activities. The investment into research and development R&D is also considered to be one of the one of the most critical factors that determine the innovation success because it reflects the real amount of inputs engaging to innovation (Greeve, 2003; Baldwin and Hanel, 2003; De Jong and Vermeulen, 2006; Raymond and St Pierre, 2010). More specifically, Romijn and Albaladejo (2002) showed the positive relationship between the R&D investment and the number of patents. Deeds (2001) indicated the positive effect of the R&D on the market value added.

The strategic and formal planning in small business is also seen as a determinant of the firm’s financial performance in the past research (Kudla, 1980; Miller and Cardinal, 1994; Pearce et al., 1987). However, earlier investigations have revealed controversial findings about this relationship (Lyles et al., 1993). While Robinson and Pearce (1983) indicated an insignificant difference of financial performance between formal and informal planners, Bracker et al. (1988) found that strategic formal planning firms outperform their counterparts. Drawing on the meta-analytic data obtained from 26 prior published studies, Miller and Cardinal (1994) confirmed the positive relationship between formal planning and the financial performance. On the other hand, Lyles et al. (1993) claimed that even though formal and informal planned firms were not clearly distinguished in terms of the return on equity or return on assets, the growth rate of sales of these two groups were significantly different.

One of the strategic approaches to innovation commercialisation is related to the protection of IP. Within SMEs in the OECD countries, the IP plays an increasingly
important role due to the recent growth of the knowledge-intensive sectors (Burrone, 2005). Regardless of the firm size, sectors, resources and environments, patenting activities are acknowledged to be an essential protection tool, especially in high-tech sectors. However, the proportion of SME approaching a formal IP protection is still limited due to their scarce resources and capabilities in innovation management (Burrone, 2005).

Firm characteristics, such as the age and size, are described in the literature as critical factors in the commercialisation of innovation (Mazzarol et al., 2010). Several scholars have remarked the negative relationship between the firm age and innovation (Dibrell et al., 2011). Mature firms are likely to be less engaged into the high novelty of innovation because of their risk-averse behaviour to innovation (Warusawitharana, 2011). In addition, firm age is negatively associated with innovation outputs such as the number of new products and the percentage of innovation sales (Hansen, 1992).

In contrast to the firm age’s effect, firm size is considered to have positive impact on the firm’s innovation capability. Rogers (2004) also remarked the positive effect of the firm size on its access to the financial, human, and knowledge resources. In addition, larger firms have more advantages in reducing the fixed costs involving to innovation thanks to the economies of scales (Cohen and Klepper, 1996). By contrast, small firms often approach a more flexible and informal management due to their limited capabilities in innovation (Mazzarol and Reboud, 2011). This suggests the potential effects of the age and size of firms on their management behaviour and strategies in the commercialisation of innovation.
5.3 Methodology

5.3.1 Sampling

Drawing on a sample of 525 SMEs within 10 countries of the OECD, our study focused on firms with annual turnovers of less than 50 million euros and fewer than 250 employees, based on the SME definition in the OECD (2004). These SMEs were recruited from Australia (79 firms), Austria (78), Belgium (51), Canada (47), France (68), Italy (12), New Zealand (92), Spain (10), Switzerland (63), United States (26). They represented a range of industry sectors specifically manufacturing, services and those in specialised areas such as information technology or biotechnology. These business ventures were categorised as micro (fewer than 9 employees) to small (10-49 employees) and medium-sized (50-249 employees). These firms also cover a wide range of age, from 4 months to 167 years, with the mean age of 22 years. The average expenditure on R&D as a proportion of annual turnover across the sample was 23 per cent, indicating high level of R&D intensity within these SMEs. In conducting this study, we have discounted the country effect as our earlier work indicated the insignificant effect of the country of origin on these SMEs’ innovation management from the organisational context. Minor differences among these SMEs are more related to the firm characteristics and the nature of the firm sector rather than the country of origin (Mazzarol and Reboud, 2011).

Our data collection was a part of an international research project on strategic decision making of small firms in innovation management within the period 2006-2008. The questionnaires were deployed using an EXCEL spread-sheet that helps respondents to evaluate their own innovation activities and their perceived returns over such investments. The interviews were conducted face-to-face with entrepreneurs or owner-managers who are the key controllers of these SMEs in the commercialisation management.
5.3 Methodology

5.3.2 Variable Measurement

**Dependent variable**   As outlined in the previous section, we attempt to investigate the critical factors of the commercialisation management on the anticipated volume of sales and the duration of the innovation. The rate of margin is excluded in our study due to its dependence on the other two components of the rent as revealed in our earlier work in chapter 4.

Based on Santi et al. (2003); Mazzarol and Reboud (2005)’s studies, we measure the owner-managers’ anticipated volume of sales by three 5-scaled items including the estimation of the geographic diffusion of innovation within the firm’s sector, the potential annual sales of such innovation over three years and the potential diffusion of innovation within segments of the firm’s market. The anticipated length of innovation reflects the duration that an innovation can be exploited. It is measured by the owner-managers’ assessment of their innovation novelty, the technical complexity and the imitability of such innovation. The dependent variable reflects the formulation of the firm typology, which originates from the combination of the owner-managers’ estimated high/low volume of sales and the long/short duration of innovation. Consequently, four firm clusters are created based on their estimated rent profiles as illustrated in Figure 9.

**Independent variables**   In examining SMEs’ commercialisation management, we consider the potential impact of the firm’s assessment of the market research, its resource endowment, strategic management, and the formal NPD of innovation as well as its perception of the IP protection. In addition, other potential factors including the effect of firm size, age, and the real R&D intensity engaged to innovation are also taken into account. The systematic commercialisation management of SMEs are measured by four dimensions: Market, Resource, Innovation and Strategy as suggested in Mazzarol and Reboud (2006).
5.3 Methodology

Figure 9: Typology of SMEs

The reliability of all the measures for our constructs is confirmed by the Composite Reliability Coefficients (CRC), using Warp Partial Least Square program (Warp-PLS) version 3.0. The CRC of our constructs are as follows: Resource (CRC = 0.852), Innovation (CRC = 0.85) and Strategy (CRC = 0.89), to Market (CRC = 0.9). As suggested by Fornell and Larcker (1981), those constructs, of which CRC are higher than 0.7, indicate strong reliability.

- **Market index**: refers to the firm’s focus on customer needs and how the new innovation offers customers value for money.

- **Innovation index**: measures the firm’s systematic approach to the process of new product development (NPD), and its management of intellectual property.

- **Resources index**: measures the firm’s technological, human, financial and managerial resources for developing and commercialising innovation.
5.3 Methodology

- **Strategy index**: reflects the firm’s strategic planning in relation to its commercialisation process of innovation.

These 4 constructs are illustrated in Figure 10.

**Figure 10: Dimensions of the Small Firms’ Innovation Commercialisation**

(Mazzarol and Reboud, 2006)

Besides the commercialisation practices, firm characteristics such as the age, size and the R&D investment into innovation are also potential critical factors to their rent profiles that are taken into account in our study.

_Firm age_: The measure for the age of firms is based on the number of years since their foundation ranging from 4 months to 167 years. Due to its abnormal distribution, the data is spread out over a wide range of values. Hence, instead of using the original variable, we transformed it into the natural log of age, to bring
5.3 Methodology

it back to the normal distribution, which strengthens the measurement reliability, as suggested in (Anderson and Reed, 2003; Loderer and Waelchli, 2010)

*Firm size:* The size of a firm is measured by the number of employees in the organisation. Accordingly, 3 categories are employed to classify firms into micro (fewer than 9 employees), small (from 10 to 49 employees) and medium (from 50 to 249 employees), as suggested in (OECD, 2004). In our sample, micro, small and medium size firms account for 35.24 per cent, 31.24 per cent, and 33.52 per cent respectively.

*Research and development:* The R&D is measured as the percentage of the firm’s annual sales or turnover on innovation (Dibrell et al., 2011). This is the scale variable, with the mean proportional investment into R&D of 22.25 per cent.

5.3.3 Analysis Methodology

In distinguishing firms’ behaviour and characteristics in innovation commercialisation, we conduct a discriminant analysis, using the software program SPSS 20. More specifically, the analysis explores the differences among these SMEs’ commercialisation management (regarding their assessment of Market, Resource, Innovation and Strategy) and firm characteristics (i.e. firm size, firm age and R&D intensity), using the two discriminant functions. The first function represents the best combination of independent variables that maximises the distinction among the four groups, followed by the second function. The selection of variables is based on the Rao’s V index or the Lawley-Hotelling Trace which measures the differences between group means (Everitt and Dunn, 1991). The significance of the models is at the two-tailed level and determined by Wilks’ Lambda statistics.
5.4 Results

The discriminant analysis results show that 92.4 per cent of firms in our sample have valid values. In other words, our investigation verifies the commercialisation management and characteristics of 485 cases out of the targeted 525 SMEs. As displayed in Table 6, function 1 presents the most significant combination of discriminant coefficients among the four clusters, with 78.9 per cent of the variances explained. On the one hand, variable “Innovation” ($\beta = 1.01$) and R&D ($\beta = 0.43$) appear to be the strongest discriminant factors thanks to their high coefficients in the discriminant function 1. On the other hand, function 2 demonstrates the second most significant discriminant factors with 21.1 per cent of the variances explained. Variables “market index” and “firm age”, of which coefficients are 0.84 and $-0.67$ respectively, play a more influencing role within Function 2. All these discriminant coefficients are significant at two-tailed level.

Table 6: Rotated Standardised Coefficients of Discriminant Functions

<table>
<thead>
<tr>
<th>Variables</th>
<th>Function 1</th>
<th>Function 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market index score</td>
<td>-0.54</td>
<td>0.84</td>
</tr>
<tr>
<td>Innovation index score</td>
<td>1.01</td>
<td>-0.16</td>
</tr>
<tr>
<td>R&amp;D investment</td>
<td>0.43</td>
<td>-0.19</td>
</tr>
<tr>
<td>Firm Age (log of age)</td>
<td>-0.18</td>
<td>-0.67</td>
</tr>
<tr>
<td>Wilk’s Lambda</td>
<td>0.73</td>
<td>0.96</td>
</tr>
<tr>
<td>Canonical Correlation</td>
<td>0.49</td>
<td>0.18</td>
</tr>
<tr>
<td>% of variance</td>
<td>78.9</td>
<td>21.1</td>
</tr>
</tbody>
</table>

As shown in Figure 11, the differentiated commercialisation management and firm characteristics are depicted based on the rotated standardised canonical dis-
5.4 Results

criminant function coefficients. The horizontal axis represents the coefficients of all variables in Function 1. The vertical axis illustrates the coefficients of variables in function 2. The group centroid functions (or the group mean values) are used to allocate the four clusters in the diagram. The length of each arrow indicates the power of the discriminant effect. The direction of the four discriminant factors represents the coefficient scores across the two functions.

Figure 11: Plot of the SMEs’ Rent-seeking Profiles in Innovation Commercialisation

The plot of the firm typology shows that the firm’s Market and Innovation indexes are perceived to have a strong impact on the firm’s anticipated rent profile. The Strategy and Resources indexes are not seen as a discriminant factors among
the four groups. The “Shrimp” cluster can be described as mature innovators because this firm group is allocated closest to the “firm age” arrow. These firms are also positioned far from the Innovation, Market and R&D arrows. By contrast, the “Oasis” and the “Champion” are allocated near the R&D and the Innovation arrows, indicating their higher focus on the R&D investment and approaching a more systematic commercialisation process such as formal NPD, innovation testing, and IP protection. The “Flash” type is distinguished from the others in terms of their market assessment. It means that these SMEs aiming to have stronger market research and testing in the commercialisation process, compared to SMEs targeting the other rent profiles.

5.5 Discussion

Our investigation into the SMEs’ innovation commercialisation shows that the firm’s potential rent profile is not only determined by the market and innovation indexes but also the firm age and their actual proportion of the R&D investment. Surprisingly, the firms’ resources are not perceived to influence the SMEs’ rent-seeking profiles in the commercialisation process. In other words, the firm’s inherent stocks of inputs are not seen as a key to the potential innovation success. Similarly, firm size has an insignificant impact on distinguishing SMEs’ anticipated rent profile. Rather, it is the real R&D intensity that determines the potential returns, which is in accordance with the previous findings (Greeve, 2003; Baldwin and Hanel, 2003; De Jong and Vermeulen, 2006; Raymond and St Pierre, 2010). In addition, our findings indicate that “Strategy Index” does not significantly discriminate the four clusters. More specifically, the firms’ commercialisation strategy such as written formal business planning and the Porter’s (1980) five forces analysis are not perceived to influence the owner-managers’ targeted rent profiles.

As aforementioned, the “Flash” type is distinguished from the others in terms
of their market index. This cluster targets to achieve a high volume of innovation sales during a short period. Hence, there is no doubt that these SMEs tend to have a stronger focus on market investigation and testing. Market-orientation acts as the bridge to link firms to their customers, which supports the prior literature that emphasised the role of market assessment in the commercialisation process (Huang et al., 2002; Slater and Narver, 1998; Cooper et al., 2004a). Additionally, our results reveal that the firm’s market investigation is only perceived to boost the sales, in the context of firms targeting short life cycle innovations.

Regarding long life cycle innovations, the most significant factor enhancing the sales is perceived to be the “Innovation Index” which refers to the firm’s focus on the formal NPD and the IP protection issues. It can be seen from the cases of the “Oasis” and “Champion” which aim at commercialising long life cycle innovations. Even though the “Oasis” firms are more market-oriented than the “Champion”, their anticipated volume of sales is still lower than their counterpart. This is possibly due to their less focus on the formal NPD and IP protection, which results in the potential low sales volume. Surprisingly, the commercialisation strategies such as written business planning and the firm’s assessment of the five forces (i.e. suppliers, buyers, complementarities, new entry, competitors) are not perceived to influence the owner-managers’ estimated sales volume or the duration of an innovation. This reflects the SMEs’ orientation towards an informal planning and internal focus in the commercialisation process. Such informality may impose potential challenges to owner-managers in securing their estimated sales volume and duration of innovation under uncertain task environment contexts.

Mature firms tend to pursue a low rent profile such as the “Shrimp”. As illustrated in Figure 11, these firms have less focus on market assessment and R&D investment, neglecting the formal NPD and IP protection. These mature firms are likely to have less engagement into innovation activities. This inclination can be attributed to either their risks-averse behaviour in innovation that restricts their innovation sales, which
supports the prior findings about the negative relationship between the firm age and innovation (Dibrell et al., 2011; Hansen, 1992). Additionally, our results reveal a negative impact of the firm age on the formal management of commercialisation. It can be seen in Figure 11, which depicts the position of cluster “Shrimp” closely to the “firm age”, which is very far from the Market, R&D and Innovation index arrows, compared to other clusters. Their less formal commercialisation management can be attributed to either their established position in the market or their focus on incremental and short life cycle innovations, which IP protection may not be a big concern. The discriminant analysis of our typology study results in the following propositions about the interplay between SMEs’ commercialisation management and their targeted rent profiles:

- **Proposition 1**: For SME targeting short life cycle innovation, market assessment is positively associated with its potential volume of innovation sales.

- **Proposition 2**: For SME targeting long life cycle innovation, a formal approach to the NPD and IP protection is positively associated with its potential volume of innovation sales.

- **Proposition 3a**: The R&D intensity is positively associated with the potential volume of innovation sales.

- **Proposition 3b**: The R&D intensity is positively associated with the length or the life cycle of innovation.

- **Proposition 4a**: Mature firms tend to pursue a less formal management of commercialisation than young firms.

- **Proposition 4b**: Mature firms tend to target short life cycle innovations and expect low potential volume of sales.
5.6 Conclusion

Drawing on a typology study of 525 SMEs, our paper has investigated how these firms manage their commercialisation process and identify critical factors determining their oriented rent profiles. To sum up, our empirical analysis confirms that regarding firms targeting short life cycle innovation, the market assessment is perceived to be the most significant accelerator of the sales volume. For firms targeting long life cycle innovation, the R&D intensity and a formal approach to innovation including NPD and a legal protection of IP is the key to boost the sales and lengthen the duration of innovation. Despite the significance of the strategic planning and resource endowment in innovation as mentioned in the RBV literature, it is not perceived to influence the small business owner-managers’ rent profiles. Our findings also reflect the tendency of mature firms in pursuing the informal commercialisation management, and anticipating a low sales volume and duration of innovation.

In conducting our research, several limitations of this paper are acknowledged, many of which offer potential areas for future research. The first limitation pertains to the lack of examining entrepreneurs’ personal traits and characteristics in our survey. As these SMEs are mainly controlled by the owner-managers, their characteristics and personality could possibly have an impact on the firms’ commercialisation management. Hence, a followed-up survey regarding entrepreneurs or owner-managers’ characteristics and traits is highly recommended. Secondly, the range of industries and sectors of these SMEs in our sample is quite large, which may bias the owner-managers’ attitudes and perception toward the formal commercialisation. Thus, a further investigation of the SMEs’ commercialisation management should focus on specific industries such as manufacturing or services/retailing. The different nature of sectors may have an impact on both the targeted market and the kind of innovation that firms intend to commercialise.
5.6 Conclusion

5.6.1 Implications for further research

Our study provides new insights into the RBV and the theory of innovation management and entrepreneurship research. From the organisational perspective, the SMEs’ market assessment and systematic approach to innovation commercialisation (i.e. formal NPD and IP protection issues) are perceived to determine their sales volume and the duration of innovation. This finding sheds some lights on the literature of the SMEs’ innovation commercialisation and clarifies the assessment framework in Mazzarol and Reboud (2006, 2011).

Additionally, the resource endowments are not perceived to have any impact on the owner-managers’ assessment of their future innovation returns. Hence, the significant role of the RBV on the firms’ innovation management is likely to be context-dependent. Furthermore, our investigation into this typology study substantiates the prior typology of rent configuration in Mazzarol and Reboud (2005, 2006, 2011) and strengthens the linkage with the model of rent estimation suggested in Santi et al. (2003). Based on the original eight clusters, we have explored the new matrix of four groups of SMEs with distinct management practices and characteristics, which extends the scope of the typology study in Mazzarol and Reboud (2005, 2006, 2011). A further development of several cases studies is highly recommended so as to deepen the understanding of the owner-managers’ behaviour and characteristics in the commercialisation of innovations in specific market and industry sector.

5.6.2 Implications for practice

This article enhances the owner-managers’ understanding of the critical factors in the commercialisation of innovation. The typology study reflects the owner-managers’ perception in evaluating their commercialisation practices as well as their potential returns. On the one hand, market assessment is perceived to boost the sales volume for those firms targeting short life cycle innovation. On the other hand, the formal
5.6 Conclusion

approach to innovation management (i.e. the NPD and IP issues) has stronger impact on the sales volume of the firms that plan to develop long life cycle innovation. In addition, the R&D investment is also perceived to be one of the key to lengthen the duration of innovation, thus having positive impact on the firm’s future returns. In any case, a formal management of innovation commercialisation is highly recommended. Even though the SMEs’ resource endowments and strategic planning are not perceived to influence the anticipated rent profiles, they should not totally be neglected. Under uncertain environments, the firm’s strategic planning and resources can contribute to strengthen its capability to deal with the changes while securing the rent. Finally, the clarification of SMEs’ innovation commercialisation provides policy-makers a deeper understanding of the small firms’ management and characteristics to enhance the innovation activities and commercialisation supporting policies within the OECD.
6 Concluding Chapter

Based on the organisational perspective, this dissertation aims to investigate the SMEs’ strategic management of innovation within the OECD countries. Each of the four papers thus contributes to strengthen the understanding of the SMEs’ behaviour and characteristics in innovation commercialisation. Overall, the key findings of the papers suggest a linkage between the firms’ organisational factors and the anticipated returns from innovation. In addition, the systematic management of commercialisation is significantly associated with the owner-managers’ assessment of the potential sales volume, rate of profitability and duration of exploiting innovation. Besides, the firms’ characteristics and orientation towards innovation also impose some effects on the SMEs’ commercialisation management and targeted rent profiles.

6.1 Summary of theoretical and practical contributions

Drawing on the sample of 477 SMEs in 9 OECD countries, the first paper provides some empirical support that shapes the linkage between Adams et al.’s (2006) framework and Santi et al.’s (2003) measurement of the rent. This study reveals that the systematic management of innovation enhances the owner-managers’ confidence of generating high returns. By exploring the concept “anticipated rent”, this paper clarifies the knowledge of the entrepreneurial rent as mentioned in Alvarez and Barney (2004); Alvarez (2007) and provides new insights into the theory of small firms’ innovation management. The limited resources and capabilities in SMEs which challenges their engagement into the commercialisation (Vermeulen, 2005) are not found to determine the potential innovation sales and the duration of exploitation. Thus, this finding opens potential discussions about the effect of the RBV in the context of SMEs’ innovation management. In addition, the firm’s focus on organisational cul-
tive, portfolio, project management, and innovation strategy is also perceived to have a positive influence on the anticipated rent, which partly confirms the significant role of the organisational framework as suggested in (Adams et al., 2006). The investigation into this relationship clarifies the entrepreneurs’ estimation of the potential returns, and their perception of allocating the organisational resources in managing the innovation, which sheds additional light on the optimism of entrepreneurs over the potential returns. Such analysis contributes to enhance the policy-makers’ understanding of the nature of SMEs’ innovation management within the OECD, which helps to foster the environment for innovation development.

The second paper explores the impacts of the firm characteristics on the systematic management of the commercialisation process, and the assessment of anticipated rent. Based on a typology study of 525 SMEs within 10 OECD countries, the distinct behaviour and characteristics of the four clusters in the commercialisation management are identified. This study reveals that young small firms tend to have a stronger focus on the R&D investment and radical innovation, which results in their expected high returns. The firm’s emphasis on IP protection and equity-financing is also seen as the key to boost the anticipated rent. By contrast, such optimism and novelty of innovation declines in the cases of larger and older firms. This finding paves the way for further discussions between the entrepreneurs’ optimism as indicated in Dushnitsky (2010) and the firm’s life cycle in the commercialisation management. This paper contributes to strengthen the understanding of firm characteristics as well as the cause-effect relationship between SMEs’ commercialisation management and the anticipated returns. Hence, it extends the scope of research on small firms’ commercialisation assessment in Mazzarol and Reboud (2006) and Santi et al. (2003). Furthermore, this typology study provides entrepreneurs more insights into the systematic management of commercialisation and verifies the effects of firm characteristics on the SMEs’ behaviour in innovation management. Besides, further emphasis should be placed on the typology of larger-sized, and mature firms.
6.1 Summary of theoretical and practical contributions

to find the solutions to accelerate their innovation activities.

Based on the structural equation modelling (SEM) analysis, the third paper verifies the interaction between the organisational framework and the small business owner-managers’ assessment of the potential sales volume, profitability, and the length of innovation. This study reveals that firms which are strongly innovation-oriented and approaching a formal management of commercialisation are perceived to generate a high volume of sales and long life cycle of innovation, which is in line with Candelin-Palmpvist et al. (2012); Burrone (2005). The firm’s focus on developing a diversified portfolio of product and process innovation enhances owner-managers’ confidence of accelerating the sales volume and duration of innovation. Whereas, project management skills only play a minor role in determining the duration of exploiting innovation. Other factors such as industrial knowledge and inputs factors are not perceived to determine the owner-managers’ confidence about their investment outcomes. This reflects the small business owner-managers’ tendency in relying more on their perceived knowledge of the internal forces rather than external effects from the industry. In addition, the profitability rate tend to have less interaction with the organisational factors and is determined by the volume of sales and the duration of innovation. This finding indicates the inter-relationship among the three components of the rent developed by Santi et al. (2003). To sum up, this paper partly supports the Adams et al.’s (2006) framework and strengthens its linkage with the assessment of the potential returns initiated by Santi et al. (2003). The findings also suggest new insights to the RBV that young small firms appear to be more dynamic in innovation despite their scarce resources.

The fourth paper develops a typology study that distinguishes the firms’ orientation in the commercialisation management. While market assessment is perceived to stipulate the sales volume, the formal NPD and IP protection are critical to lengthen the life cycle of innovation. This finding substantiates the literature of innovation commercialisation within SMEs and deepens the assessment framework in Maz-
zarol and Reboud (2006). Our conclusions confirm the significant role of market assessment as indicated in Huang et al. (2002); Slater and Narver (1998) and extend its linkage to the life cycle of innovation. In contrast to the RBV theory, the firm’s strategic planning and resources do not significantly differentiate the owner-managers’ targeted rent profiles. Thus, this study enhances the knowledge of SMEs’ focus and orientation in the process of commercialisation. In addition, it contributes to clarify the typology of rent configuration as suggested by Mazzarol and Reboud (2011) and shapes the linkage to the firm’s approaches in managing the commercialisation of innovation.

In sum, this dissertation offers a snapshot of the SMEs’ innovation management practices and behaviour across the 10 OECD countries. While the first and third papers generate an aggregate picture of the relationship between the firms’ organisational factors and the potential returns, the other two papers verify the distinct characteristics, strategic focus and optimism of different SME clusters in managing the innovation commercialisation. Insights gained through the findings of these four papers constitute valuable contributions to the theory of entrepreneurial rent, the RBV, the organisational view and the innovation management research in the SME context. In addition, these studies enhance the owner-managers’ understanding about the systematic management of the commercialisation process and the predictors of the estimated sales volume, profitability and life cycle of innovation. Such analysis can assist managers to better assess their innovation capabilities and the trade-off of a particular investment, in order to identify appropriate strategies and orientation in innovation management. In addition, policy-makers can gain more understanding of SMEs’ characteristics and focus in innovation commercialisation, to strengthen the government’s sponsoring programs and networks to stipulate the innovation performance of small businesses in the OECD.
6.2 Limitations

This dissertation also acknowledges several limitations, many of which offer potential research directions. First, the sample of all these four papers was diverse in terms of the size, age, industry and country of origin, which may potentially bias the owner-managers’ perception in evaluating their innovation activities and management. Secondly, while most OECD countries tend to have comparably similar national innovative systems, the effects of the task environment should be taken into consideration. Finally, as the main focus of our papers is the organisational perspective, our survey is driven more towards the firm-level rather than entrepreneurs. Yet, the evaluation of the “anticipated rent” may be influenced by these owner-managers’ personal traits and characteristics that drive their optimism in innovation management.

6.3 Future research

As aforementioned, our findings reveal some implications for further research on the relationship between the entrepreneurial optimism and the age of firms. In addition, the entrepreneurs’ personal traits and characteristics should also be considered because they may influence their behaviour and attitudes towards the management of innovation. Hence, a follow-up investigation into these owner-managers’ characteristics will clarify their decision-making in innovation management. Furthermore, different characteristics among sectors and sub-sectors in the sample should also be taken into account. As our study focuses mainly on the organisational perspective, it is recommended to enlarge the scope of study to have a deeper insight into the innovation management of SMEs, considering external effects from the environment. In addition, a prospective longitudinal study should also focus on investigating the “residual rent” and the “appropriable rent” to verify these owner-managers’ optimism and identify the erosion effects in the commercialisation of innovation.
6.3 Future research

Case study development is highly recommended as it enhances the knowledge of the owner-mangers’ behaviour in the commercialisation of innovations in specific markets and industry sectors. Besides, the nature of the innovation types developed may also result in SMEs’ different approaches and strategies in the commercialisation process. Thus, the focus on specific types of innovation such as product or process innovation should also be taken into consideration in future research.
References


REFERENCES


REFERENCES


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**URL**: http://ssrn.com/abstract=1342248


REFERENCES


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REFERENCES


A Measures for Systematic Commercialisation

*(based on Mazzarol and Reboud (2006))*

**Market index**

*(5-point Likert Scale (CRC =0.9))*

1. Have you fully researched the benefits as perceived by the customer for this innovation?
2. Have you fully explored the most appropriate pricing strategy?
3. Have you researched how easily customers will understand it?
4. Have you researched how easy it will be for customers to test or trial it prior to adoption?
5. Have you researched how easy it will be for customers to do post adoption evaluations?
6. Have you fully explored how compatible it is with customers’ existing technologies/systems?
7. Have you fully examined customer perceptions of risk and cost?
8. Have you fully explored the opportunities it offers customers?
9. Have you fully explored the opportunities it offers customers?
10. Have you researched if there is already a customer ready to adopt this innovation?
Innovation index

(5-point Likert Scale (CRC = 0.847))

1. Do you have a formal process for new product development?
2. Do you feel that the generation of new innovations is a major focus of your firm?
3. Do you feel that you could fully develop the prototype technically without outside assistance?
4. Are you confident that the innovation has been independently tested or evaluated?
5. Do you actively involve employees in developing new innovations?
6. Have you fully explored with an intellectual property lawyer or patent attorney the IP management issues associated with the innovation(s)?
7. Does your innovation have legally protectable patents in-place or pending?
8. Do you use confidentiality agreements before showing your ideas to others?
9. Have you previous experience of commercialisation of your innovations?
10. Do you actively involve customers in developing your new innovation(s)?

Resources index

(5-point Likert Scale (CRC = 0.852))

1. Do you already have the technological resources to create a prototype?
2. Do you have the competencies to fully commercialise the innovation alone?
3. Do you have an experienced project management team to work on the idea?
4. Do you know how to find external expert assistance if required?
5. Are staffing resources adequate for the future development of the idea?
6. Are physical resources adequate for the future development of the idea?
7. Are financial resources adequate for the future development of the idea?
8. Have you fully explored government assistance programs designed to help small firms with commercialisation?
9. Have you identified sources of venture capital financing for the innovation?
10. Do you have a management board to provide guidance and advice?

Strategy index

(5-point Likert Scale (CRC=0.891))

1. Do you have a formal, written business plan for your innovation?
2. Have you fully assessed the bargaining power of your customers?
3. Have you fully assessed the bargaining power of your suppliers?
4. Have you fully assessed the threat of alternative technologies to yours?
5. Have you fully assessed the reaction of competitors to your innovation?
6. Are physical resources adequate for the future development of the idea?
7. Have you considered existing or anticipated government regulations?
8. Have you secured all necessary compliances and authorisations?
9. Have you undertaken a risk assessment in the light of potential threats?
10. Have you completed a comprehensive financial model?
B Measures for the Anticipated Rent

Volume

1. In your estimation what would be the potential geographic diffusion of this innovation? (1 = “very limited”, to 5 = “very wide”)

2. In your estimation what would be the potential annual sales for your innovation on a worldwide basis? (1 = < 5mto5 = >20m)

3. In your estimation what would be the potential diffusion of this within your industry sector? (1 = “very limited”, to 5 = “very wide”)

Rate of margin

1. In your estimation what could be the gross profitability of this innovation? As measured by gross profit margin (1 =< 20 percent, 2 = 21-40 percent; 3 = 41-60 percent; 5 = > 80 percent)

2. In your estimation what could be the net profitability of this innovation? As measured by net profit margin (1 = < 10 percent, 2 = 11-20 percent; 3 = 21-30 percent; 4 = 31-40 percent; 5 = > 40 percent)

3. In your estimation this innovation: 1 = “does not change the dominant design”; 2 = “substitutes one part of a system without changes to other parts”; 3 = “creates a better system without changing dominant design”; 4 = “creates a new design which could become dominant”; 5 = “creates a new market by creating a new dominant design”
MEASURES FOR THE ANTICIPATED RENT

Length

1. The technical base of this innovation? 1= “is a simple improvement of an existing process”; 2 = “consists in a new arrangement of existing techniques”; 3= “offers a new dominant design”; 4= “offers a new technical platform”; 5= “is a new scientific paradigm”.

2. From a technical point of view, would you describe this innovation? 1= “very easy to copy”; 2= “easy to copy”; 3= “neither hard nor easy to copy”; 4 = “hard to copy”; 5= “very hard to copy”.

3. From a legal point of view, would you describe this innovation? (1= “very easy to copy”; 2= “easy to copy”; 3= “neither hard nor easy to copy”; 4 = “hard to copy”; 5= “very hard to copy”.

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C Measures for Organisational Factors

Inputs

(5-point Likert-scale)

1. Do you already have the technological resources to create a prototype?
2. Are staffing resources adequate for the future development of the idea?
3. Are financial resources adequate for the future development of the idea?
4. Are physical resources adequate for the future development of the idea?

Industrial Knowledge

(5-point Likert-scale)

1. Have you fully assessed the bargaining power of your customers?
2. Have you fully assessed the bargaining power of your suppliers?
3. Have you fully assessed the threat of alternative technologies to yours?
4. Have you fully assessed the reaction of competitors to your innovation?

Organisational Culture

(5-point Likert-scale)

1. Other people within my firm consider pursuing this innovation to be? (1= “extremely unrewarding”, to 5 = “extremely rewarding”)
2. Other people external to your firm who you turn for advice consider this innovation to be? (1 = “extremely unrewarding”, to 5= “extremely rewarding”)
3. Other people external to your firm who you turn for advice consider this innovation to be? (1 = “extremely harmful”, to 5 = “extremely beneficial”)

4. Generally speaking, how much notice do you take of the views of other people to whom you turn for advice? (1 = “not at all”, to 5 = “very much”)

**Innovation Strategy**

*(5-point Likert-scale)*

1. Do you feel that the generation of new innovations is a major focus of your firm?

**Portfolio Management**

*(single item)*

1. What kind of innovation does this predominantly involve?
   a. Neither products or services innovations
   b. Process innovations
   c. Product innovations
   d. Combination of products and process innovations

**Project Management**

*(5-point Likert-scale)*

1. Do you have an experienced project management team to work on the idea?
2. Do you know how to find external expert assistance if required?
3. Have you fully explored government assistance programs designed to help small firms with commercialisation?
MEASURES FOR ORGANISATIONAL FACTORS

Commercialisation

(5-point Likert-scale)

1. Does your innovation have legally protectable patents in place or pending?

2. Are you confident that the innovation has been independently tested or evaluated?

3. Have you fully explored with an intellectual property lawyer or patent attorney the IP management issues associated with the innovation (s)?

4. The protection of the intellectual property upon which the innovation was based?
### Table 7: Variable Measurement and References Summary

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Measures and References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inputs</strong></td>
<td>Technical resource (Song and Parry, 1997; Mitchell and Zmud, 1999)</td>
</tr>
<tr>
<td></td>
<td>Human resource (Hitt et al., 2001; Canto and Gonzales, 1999)</td>
</tr>
<tr>
<td></td>
<td>Financial resource (Lee et al., 2001)</td>
</tr>
<tr>
<td></td>
<td>Physical resource (Adams et al., 2006)</td>
</tr>
<tr>
<td><strong>Industry Knowledge</strong></td>
<td>Assessment of power of suppliers, customers, competitors, alternative technology (Porter, 1980; Whittington et al., 1999)</td>
</tr>
<tr>
<td><strong>Organisational Culture</strong></td>
<td>Open to internal and external consultancy on innovation (Vanhaverbeke and West, 2006; De Jong and Brouwer, 1999)</td>
</tr>
<tr>
<td><strong>Innovation Strategy</strong></td>
<td>Generating innovation as a major focus (De Jong and Brouwer, 1999)</td>
</tr>
<tr>
<td><strong>Portfolio Management</strong></td>
<td>Innovation portfolios (Capon et al., 1992; Athey and Schmutzler, 1995)</td>
</tr>
<tr>
<td><strong>Project Management</strong></td>
<td>Communication, efficiency of project management (Adams et al., 2006)</td>
</tr>
<tr>
<td><strong>Commercialisation</strong></td>
<td>Innovation testing, Patents, IP management issues, IP protection (Miller, 2001; Candelín-Palmqvist et al., 2012; Burrone, 2005)</td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td>Potential annual sales, potential geographic diffusion and potential diffusion of innovation within industry sector (Santi et al., 2003; Mazzarol and Rebold, 2011)</td>
</tr>
<tr>
<td><strong>Rate</strong></td>
<td>Potential gross profitability, net profitability and the innovation novelty on the market and technical design (Santi et al., 2003; Mazzarol and Rebold, 2011)</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>Complexity of technical base, technical and legal imitability of the innovation (Santi et al., 2003; Mazzarol and Rebold, 2011)</td>
</tr>
<tr>
<td><strong>RENT</strong></td>
<td>Estimation of the volume, rate and length (Santi et al., 2003)</td>
</tr>
<tr>
<td><strong>Firm Size</strong></td>
<td>(Forsman and Rantanen, 2011)</td>
</tr>
<tr>
<td><strong>Firm Age</strong></td>
<td>(Mazzarol et al., 2010)</td>
</tr>
<tr>
<td><strong>R&amp;D</strong></td>
<td>Percentage of annual turnover on R&amp;D (Hirsch-Kreinsen et al., 2008; Baldwin and Hanel, 2003)</td>
</tr>
<tr>
<td><strong>Industry</strong></td>
<td>(Porter, 1980; Donate and Guadamillas, 2011)</td>
</tr>
</tbody>
</table>
Curriculum Vitae

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Education

<table>
<thead>
<tr>
<th>Date</th>
<th>Degree</th>
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<tr>
<td>09.2009 – 02.2014</td>
<td>Ph.D in Management</td>
<td>University of St. Gallen (HSG), Switzerland</td>
</tr>
<tr>
<td>09.2006 – 07.2008</td>
<td>Master of Science in Economics</td>
<td>University of Lugano, Switzerland</td>
</tr>
<tr>
<td>09.2001 – 01.2006</td>
<td>Bachelor in English and International Business</td>
<td>University of Foreign Trade, Hanoi, Vietnam</td>
</tr>
</tbody>
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Professional Experience

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<th>Date</th>
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<th>Organization</th>
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<tr>
<td>02.2012 – 07.2013</td>
<td>Research Associate</td>
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</tr>
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<td>02.2008 – 05.2008</td>
<td>Intern</td>
<td>Credit Suisse, Lugano, Switzerland</td>
</tr>
<tr>
<td>08.2005</td>
<td>Team Assistant Intern</td>
<td>World Bank, Hanoi, Vietnam</td>
</tr>
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Others

Languages  Vietnamese (mother language), English (fluent),
German (Intermediate), Italian (Basic)

Hobbies  Piano, travelling, reading, social activities