Abstract

Track Title: creativity and innovation

SME Owner-Managers' Anticipated Returns to Commercialisation: The Influence of Organisational Factors

Introduction

The ability of small and medium enterprise (SME) owner-managers to identify potential opportunities has been recognised as a critical determinant of their firms' success (Kirzner, 1997). However, their decision-making in relation to investments in the commercialisation of innovations is often based primarily on informal, intuition rather than formal or systematic process (Lindman, 2002). Consequently, SMEs are often less successful at commercialisation than large firms, perhaps due to their informal planning and management (Wheelen and Hunger, 1999). This situation has recently come to the attention of scholars who wish to better understand SMEs' innovation management processes (Mazzarol and Reboud, 2011; Reise and Bier, 2011; Terziovski, 2010). From a micro-level perspective, organisational issues and resource allocation are critical to an innovation's success (Teece, 2006; Cordero, 1990). Indeed, the organisational factors associated with innovative capabilities are vital to building a firm's core competences (Prahalad and Hamel, 1990). Adams, Bessant and Phelps (2006) suggested a framework of seven interconnected organisational elements (inputs, knowledge management, innovation strategy, organisational culture and structure, portfolio management, project management and commercialisation) that could be used to better understand innovation's key drivers. Each element represents a combination of resource bundles that can be used to enhance innovation activities. However, little research has examined the relationship between SMEs' deployment of resources and owner-managers' assessment of potential returns, which led to the present study. Drawing on a sample of SMEs from selected OECD countries, we aim to shed some lights on owner-managers' anticipated returns and to answer three general research questions, namely:

1. What effects do organisational factors have on owner-managers' anticipated sales from an innovation?
2. What effects do organisational factors have on owner-managers' anticipated margins from an innovation?
3. What effects do organisational factors have on owner-managers' anticipated length of the returns obtained from an innovation?

In examining these questions, it was hoped the study will provide new insights into the resource based view (RBV) of SMEs engaged in the commercialisation of innovation, and the way in which owner-managers assess future returns or "innovation rent" from such activities. More specifically, the investigation extends Adams et al.'s (2006) conceptual model and deepens our knowledge of the variables that influence owner-managers' anticipated returns (rents) from their innovations. The study also provides insight into SME owner-managers' views about the resources and competences needed to generate sales, profits and to extend the timeframe during which returns are obtained from an innovation. In the next section, we formulate a series of hypotheses anchored in the resource-based and organisational views. In the methodology section, we outline the sample used and the measurement of the key constructs. Finally, we present the model that was developed to examine the various hypotheses and we discuss the implications for theory and practice, as well as potential areas for future research.

Theoretical foundations and hypothesis development

Owner-managers' assessment of anticipated rent

SME owner-managers' intuitive judgement and experience play an important role in decision-making as small firms have limited resources and capabilities (Casson, 2005). There is a strong link between such individuals as controllers and the organisations themselves (Casson, 2005). Hence, their perceived assessment is vital to the firms' growth and survival. Penrose (1959) suggested that managers' perceptions are influenced by their intuitive knowledge of their firms' resources and their attributes, which drives their decisions over particular investments (Foss et al., 2008).

"Economic rent" is a core issue, as it helps to explain entrepreneurial behaviour and strategic management (Mosakowski, 1998; Alvarez and Barney, 2004). The two classical types of economic rent are "Ricardian rent" and "Schumpeterian rent". While "Ricardian rent" highlights a firm's ability to control its bundle of tangible and intangible resources (Penrose, 1959; Wernerfelt, 1984; Barney, 2001); "Schumpeterian rent" emphasises a firm's dynamic capabilities to deploy and exploit its resources (Amit and Schoemaker, 1993). In fast-changing environments, "Schumpeterian rent," which is also known as "entrepreneurial rent," is more relevant (Lim et al., 2013). Alvarez (2007) classified "entrepreneurial rents" as economic returns that are generated by entrepreneurs engaged in collaborative activities combining resources to produce innovations that have economic value. They are created under conditions of uncertainty and have not yet been tested in the market. They are therefore "anticipated rents". As investment in an innovation often involves uncertainty and risk, it is essential for SME owner-managers to assess any potential returns in advance. Milgrom and Roberts (1992, p. 621) defined potential or anticipated innovation rent as:

> *"A return received in an activity that is in excess of the minimum needed to attract the resource to that activity"*.

Anticipated rents are generated from investments in innovation where the information available on the size and likely adoption rate of the market is unknown as are the financial and technical risks (Mazzarol and Reboud, 2005). Santi et al. (2003) developed a useful assessment framework to examine such rents. This comprised three components. The first of these is the *volume* of sales that is anticipated from the innovation. This is determined by four indicators (the sector's potential, geographic diffusion, the size of user markets and limits to exploitation). The second is the *rate* of profit that is anticipated from the innovation (both gross and net), and the third is the *length* of the anticipated lifecycle of the innovation. This depends on the ability to put "isolating mechanisms" in place (e.g. intellectual property rights protection, technical complexity) (Dierickx and Cool, 1989; Alvarez and Barney, 2004). As SMEs are often controlled and owned by an individual or a small management team, the use and combination of different resources is likely to influence their assessment of anticipated rent. This paved the way for the present analysis based on an organisational perspective as outlined in the next section.

A resource-based view

The RBV is a prominent firm-level management theory (Wernerfelt, 1984; Kor and Mahoney, 2004; Hauschild and Knyphausen-Aufsess, 2012). The approach suggests a firm's ability to generate above average returns comes 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, a firm's core competences are seen as the key to its competitive advantage, enabling it to outperform competitors in a sustained way (Prahalad and Hamel, 1990). Hence, a firm's key internal physical, financial and intangible resources enhance its innovation management capabilities (Canto and Gonzalez, 1999). In accordance with the RBV, Verona (1999) suggested determinants of successful product development include

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, which has been used to explore the nature of innovation management (Van der Panne, Van Beers and Kleinknecht, 2003; Tan et al., 2009). Prior research has suggested key new product development (NPD) success factors include chosen strategies, corporate culture, market analysis and resource allocation (Plambeck, 2012). Griffin and Page (1996) found key NPD success factors included financial returns, time, costs and speed to market, customer and market factors and the percentage of sales obtained from new products. Bobrow (1997) also suggested some key NPD success factors, including strategic direction, corporate culture, resource allocation and cross-functional teams. Chorda et al. (2002) emphasised the roles played by top management, the NPD process itself and appropriate market analysis. However, despite numerous studies, an agreed framework that can be used to measure organisational factors' impacts on innovation returns has not been developed. Nevertheless, owner-managers' estimation of these returns reflect their assessment of a particular innovation investment, which influences their decision-making.

Hypotheses development

The framework suggested by Adams et al. (2006) was used to explore the effects organisational factors have on owner-managers' anticipated rent forecasts. The focus was on the seven factors included in their model that were mentioned earlier (i.e. inputs, knowledge management, innovation strategy, organisational culture, portfolio management, project management and commercialisation) and are discussed in subsequent paragraphs.

Inputs management: This factor refers to a firm's capacity to allocate and deploy strategic resources (such as financial, physical, human, technological and organisational factors) efficiently, so as to develop, manufacture and distribute products and services to customers (Barney, 1991; Wernerfelt, 1984). Ideally these should be rare, valuable and imperfectly imitated resources of both a tangible and intangible nature (Song and Parry, 1997; Mitchell and Zmud, 1999). They can also include human capital (Hitt et al., 2001; Canto and Gonzalez, 1999; Galende and Suarez, 1999; Therrien et al., 2011). Such resources enhance a firm's ability to successfully develop an innovation (Lee et al., 2001; Canto and Gonzalez, 1999; Rogers, 2004).

Knowledge management: This factor relates to a firm's ability to obtain and communicate ideas and information (Whittington et al., 1999). It can also include the firm's ability to negotiate or 'bargain' with buyers and suppliers (Porter, 1980), or to work with complementary actors to secure enhanced bargaining power (Aarikka-Stenroos and Sandberg, 2009; Mazzarol and Reboud, 2008). Such knowledge management capability helps firms build a sustainable competitive advantage (Argote and Ingram, 2001) and impacts on new product success (Hoopes and Postrel, 1999).

Organisational culture: Organisational culture has been defined as the "collective programming of the mind which distinguishes the members of one organization from another" (Hofstede 1991, p. 262) and it seems it can impact on a firm's ability to innovate (e.g. Cohen and Levinthal, 1990; Chandy and Tellis, 1998). An open and flexible culture improves the exchange of ideas internally and externally, which promotes creativityand innovativeness (de Jong and Brouwer, 1999; McFadzean, 1998).

Innovation strategy: This element reflects a firm's mission and strategic orientation. Prior research has suggested a link between strategy and financial performance (Zahra and Das, 1993; Markham, 1998; Crespell and Hansen, 2008). Innovation strategy also impacts a firm's innovative capability and commitment to innovation investment (Cooper et al., 2004; Fruhling and Siau, 2007; Li

and Atuahene-Gima, 2001; Verhees and Meulenberg, 2004; De Jong and Vermeulen, 2006; Nybakk and Jenssen, 2012).

Portfolio management: This capability relates to the process of evaluating, choosing and monitoring appropriate investments and allocating funds. Mikkola (2001, p. 42) suggested portfolio management was 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 company's long-term growth and profitability". Other scholars have suggested successful firms manage a diversified portfolio of product and process innovation simultaneously (Capon et al., 1992); which can positively impact on the firm's net revenue over the short-term (Athey and Schmutzler, 1995).

Project management: This refers to the efficiency of a firm's project management process, including the tools used and communications and collaboration within the team so as to complete a project on time, cost and within desired performance measures (Kerzner, 2006). Its success is determined by the efficiency of communications and knowledge sharing within the project team (Hayashi, 2004), and good coordination and control (Pons, 2008).

Commercialisation: The commercialisation process involves inserting the innovation into the market in order to secure a competitive advantage (Herdman, 1995). Key elements are the ability to understand the customer's needs or 'voice of the customer' (Griffin and Hauser, 1993; Helfat and Raubitschek 2000; Huang, Soutar and Brown 2002), marketing skills (Verhaeghe and Kfir 2002; Adams et al., 2006), and IP rights protection (Candelin-Palmqvist et al., 2012; Burrone, 2005).

As the commercialisation process is concerned with the introduction of new products or processes to the market, a systematic management of organisational factors is likely to influence owner-managers' anticipated returns. The preceding discussion suggests relationships between the seven organisational factors that were included in Adams et al.'s (2006) framework and owner-managers' anticipated rent, leading to three hypotheses, namely:

> H1: There are positive relationships between owner-managers' perceptions of each of the seven organisational factors and their estimate of an innovation's sales volume.
>
> H2: There are positive relationships between owner-managers' perceptions of each of the seven organisational factors and their estimate of an innovation's profitability (rate).
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> H3: There are positive relationships between owner-managers' perceptions of each of the seven organisational factors and their estimate of the time over which an innovation can be exploited.

The study undertaken to examine these hypotheses is discussed in the next section.

The Study

Sampling and data collection

The data were obtained from a sample of 526 SME owner-managers operating in ten OECD countries (i.e. Australia, Austria, Belgium, Canada, France, Italy, New Zealand, Spain, Switzerland and the USA). The distribution of these firms across the ten countries varied from 10 to 12 firms in Spain and Italy, to 92 firms in New Zealand. The sampling process was purposive rather than random and companies were selected on the basis of their being small (e.g. with fewer than 250 employees and less than €50 million) (OECD, 2004), and having an innovation ready for commercialisation within the next three years from date of interview. All data was collected via face-to-face interview in a "case study survey" methodology (Yin and Heald, 1975), with a key collection instrument being a diagnostic assessment tool built into an EXCEL spreadsheet. This was translated into several languages. Interviews took place in the respondents' companies, which enabled a direct assessment of their innovation and commercialisation strategy. The

respondents were located across a range of industries and included micro-firms (<9 employees), to medium sized firms (50-249 employees). There was also a diversity of age of firm ranging from 4 months to 167 years old, with a mean age of 22 years. The average investment across the sample into R&D as a proportion of annual turnover was 23%, reflecting a very high level of innovation investment or "R&D intensity" in the sample (Cordero, 1990).

The Variables and Analysis

A total of 30 items were used to measure 10 constructs "variables" (see Table 1). Most items were assessed using 5-point Likert-type scales. The seven organisational factors identified by Adams et al. (2006) were measured with 3 to 4 item scales, with the exception of "strategy" and "portfolio", which had a single item for the first and a 'dummy' variable for the latter. The anticipated rent dependent variable was measured using the three variables identified by Santi et al. (2003) with 'volume', 'rate' and 'length' each measured by 3 items. The items were developed with reference to the literature: i) *inputs* (Damanpour, 1991; Kimberly, 1981; Thompson, 2003; Adams et al., 2006); ii) *knowledge* (Porter, 1980; Hoopes and Postrel, 1999); iii) *culture* (de Jong and Brouwer, 1999); iv) *strategy* (Adams et al., 2006); v) *project management* (Kimberly, 1981; Pons, 2008); vi) *commercialisation* (Adams et al., 2006; Burrone, 2005). A Partial Least Squares (PLS) to estimate the model's parameters. A PLS approach was chosen because "it is considered as a soft modelling approach where no strong assumptions (with respect to the distributions, the sample size and the measurement scale) are required" (Esposito Vinzi, V.et al., 2010, p. 48). It is also more oriented to optimizing predictions (explained variances) than statistical accuracy of the estimates, and appropriate where the research purpose is prediction or exploratory modelling (Garson, 2014)

The Results

As can be seen in Table 1, the mean scores of the constructs ranged from a high of 4.15 (strategy) to a low of 2.90 (length), all of which were around the midpoint of the five-point scales that were used, suggesting there were a range of responses to the various constructs. This can also be seen in the standard deviations that ranged from 0.59 (culture) to 1.16 (commercialisation). Thus, it seems worthwhile to examine the suggested relationships. The measurement properties of the various constructs were assessed first to ensure they were acceptable before the hypothesised relationships were estimated. As can be seen in Table 1, all of the multiple-item scales had acceptable reliability, as their composite reliability coefficients exceeded 0.80 (Fornell and Larcker, 1981). Further, the scales had convergent validity as their average variance extracted (AVE) scores all exceeded 0.50 (Fornell and Larcker, 1981). Finally, as Fornell and Larcker (1981) have noted, discriminant validity can be assumed if the squared variance between a pair of constructs is less than their AVE score. As the highest squared correlation (shared variance) within all of the various constructs pairs was 0.25, while the lowest AVE score was considerably higher (0.56), it is safe to assume discriminant validity. Not surprisingly, multicollinearity was not a problem, as the highest VIF was 1.94, well below the upper limit of 5 most people suggest implies a potential problem (Kline, 1998).

<INSERT TABLE 1 ABOUT HERE>

The relationships between the seven organisational factors and anticipated *volume*, *rate* and *length* were examined first. As can be seen in Figure 1, the same four factors were significantly related to estimated sales, rate and length (i.e. culture, innovation strategy, portfolio management skills and commercialisation skills), while project management skills only had a minor impact on the estimated duration of exploiting innovations. The R-squared values for the three rent constructs were 0.19 (volume), 0.17 (rate) and 0.27 (length), suggesting Adam et al.'s (2006) factors explained a moderate amount of the variation in the rent

constructs. As can be seen from Figure 2 the *commercialisation* factor was found to have the strongest relationship with all three of the variables measuring anticipated rent. Of these the strongest relationship was with *length* (β=0.42, $\rho < .01$). The other four factors that were found to have significant relationships with the three "anticipated rent" measures were *knowledge management*, *innovation strategy*, *organisational culture* and *portfolio management*. Of these the most influential was *organisational culture*, with a particularly strong influence show on *rate* (β=0.24, $\rho < .01$).

<INSERT FIGURE 2 ABOUT HERE>

Discussion and Conclusions

The findings from this analysis suggest that one of the most influential organisational factors for SME owner-managers when making assessments of the anticipated rent from their innovations is their perceived readiness for commercialisation (i.e. how formal or systematic their commercialisation processes are). This was found to influence all three measures of the rent profile, particularly the *length* or lifecycle. This can be explained by the fact that this measure included how difficult the innovation was to copy in both a technical and legal sense. Firms that had strong "isolating mechanisms" such as patents or other formal IP rights in place were more confident of their ability to secure long term rents from their innovation. This verifies the effect IP protection has on an innovation expected sales and life cycle, and is in line with Candelin-Palmqvist et al. (2012)'s and Burrone's (2005) views. The relative influence of *organisational culture* (i.e. support for innovation from others within the firm and owner-manager's willingness to listen to such views) is also worth noting, as this also impacted on all three of the rent variables. This suggests the owner-manager's sense of the support for the innovation from within their firm is likely to influence the anticipated rent, particularly likely *rates* of profit. This is in line with prior research (Zahra and Das 1993; Markham 1998; Crespell and Hansen 2008; Lawson and Samson 2001). The influence of *knowledge management* (i.e. assessment of responses from customers, suppliers and competitors) and *innovation strategy* (i.e. firm's commitment to innovation) on the anticipated *volume* of sales reflects the owner-managers' perception of the likely market adoption and diffusion rate for the innovation and their general commitment to getting it into the market.

In conclusion, the study provides some useful insights into the influence of organisational factors on SME owner-managers' assessments of anticipated rents. It supports the RBV theory of entrepreneurial firms (Alvarez and Barney, 2004; 2005) and the importance of the owner-manager's sense of having the right process for commercialisation, a supportive culture for the innovation, knowledge of the likely market adoption rate and a general commitment to innovation as a source of maintaining a competitive edge. The study has limitations, first although the sample is fairly large it is not representative of all SMEs or all countries. Size and age effects within the sample are also important and will be the subject of further analysis. Second the past experience of the owner-manager in commercialisation was not assessed and will also need to be examined in future research as well as the nature of the firm's 'task environment' (D'Amboise and Muldowney, 1988) and whether this was dynamic or static in nature. Future research could explore the relationship between entrepreneurial orientation, optimism and perceptions of innovation risks and returns. Longitudinal analysis is would also be beneficial. However, the study provides SME owner-managers with a 'blue print' for assessing future investments in innovation. In summary, make sure you have a systematic or formal process for commercialisation. Collect data on your market, including customers, suppliers and competitors. Foster an organisational culture that supports innovation and make this a clear strategic aim for your business.

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Table 1: The Constructs' Measurement Properties

	Variable	Number of Items	Mean	SD	Lowest Loading	Composite Reliability	AVE Score
1	Inputs	4	3.73	0.77	0.66	0.84	0.57
2	Knowledge	4	3.43	0.78	0.72	0.85	0.58
3	Culture	4	3.94	0.59	0.72	0.88	0.64
4	Strategy	1	4.15	1.04	na	na	na
5	Portfolio (dummy)	1	na	na	na	na	na
6	Project	3	3.66	0.89	0.64	0.81	0.58
7	Commercialisation	4	3.01	1.16	0.63	0.83	0.56
8	Volume	3	2.97	0.97	0.70	0.81	0.58
9	Rate	3	2.96	0.91	0.53	0.84	0.64
10	Length	3	2.90	0.83	0.80	0.83	0.61

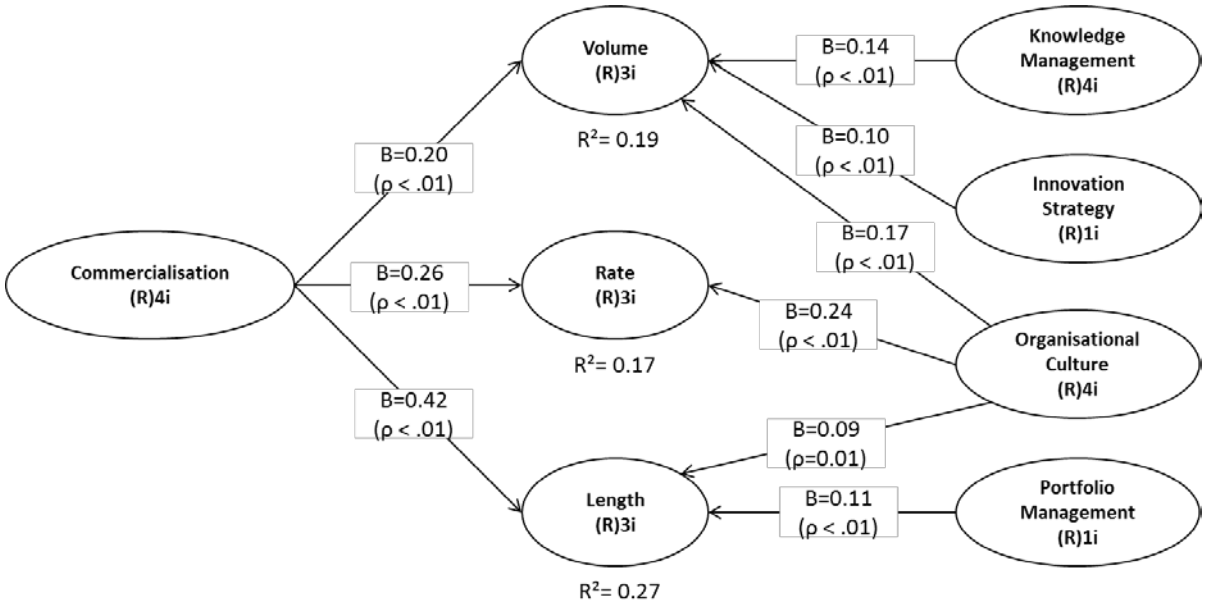

Figure 1: PLS path model for testing the relationships between variables