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Risk Assessment in SMEs, a proposed tool

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Abstract

Small to medium enterprises (SMEs) are frequently associated with high levels of innovation and a commitment to innovative behaviour as a means of achieving competitive advantage. However, it is difficult for the entrepreneurial managers of such SMEs to fully assess the merits of a particular innovation, particularly in relation to its risk-return trade off. To address this need, CEREN – ESC Dijon, in conjunction with LINEN – HEC and INPI commenced in 2002 the development of a screening tool designed to assist entrepreneurs evaluate the risk-return profile of future innovation investment. The preliminary model developed measures the anticipated 'rent' or financial return expected from a particular investment in an innovation. During 2003 CEREN – ESC Dijon collaborated with CEMI – GSM, UWA to develop the tool with a pilot survey of small innovative firms in Western Australia. An additional component of the study sought to determine the relative influences of Attitude and Subjective Norm on the decision making process of the entrepreneur. The preliminary results of the pilot study undertaken by CEREN and CEMI suggest that the evaluation tool has potential value in assisting the small firm entrepreneur to assess the merits of a future innovation investment. It also indicated that many entrepreneurs seem to rely upon external influences to support and reinforce their pre-existing attitudes towards a particular innovation investment. Following future analysis of the findings from the pilot study undertaken in Western Australia in 2003 it is proposed to evaluate the too via a multi-country study designed to explore strategic decision making within innovative small firms across a multi-national sample, to examine the influences of local environment and culture.

Key words: SME, innovation, decision-making, risk assessment, strategic management, entrepreneur

Introduction: Aims and Significance

Innovation, risk and SMEs: the necessity of a assessment tool

Small firms (e.g. those employing less than 100 persons) are not only the most numerous form of business enterprise in most economies, but also a major source of new innovation (Freel 2000; Hansen et al 2002; Mogee 2000). For example, in the United States, small, entrepreneurial firms have been accredited with the introduction of 67 percent of inventions and 95 percent of radical innovations since 1945 (NCOE, 2000). Moreover this phenomenon has been observed in other economies including the European Union (European Commission, 2003) and Asia (APEC, 2003).

Within a business context innovation involves entrepreneurial activity, usually in the form of new products, processes or market activities that have the potential to generate new economic or social potential (Drucker, 2002). By its nature innovation requires change, and this in-turn imposes risk upon the enterprise seeking to implement it, due to uncertainty over the future technical, commercial and financial returns to the investment. The risk is related to the uncertainty an innovator is facing when working on an innovation (Catignon and Robertson 1993; Dziura 2001; Ravichandran 2001). Assessing the risk associated with a particular innovation is therefore a critical factor in its overall evaluation.

Despite the importance of small firms to enhancing innovation, it remains difficult for the owner-managers associated with such businesses to fully assess the relative merits of their innovation in relation to risk-return trade offs. Innovations can be incremental or radical (Freeman & Perez 1988), isolated or systematic (Rigby & Zook 2002; Foray

2000), and associated with process or product (Abernathy & Utterback 1975). Successful diffusion of an innovation frequently involves consideration of a range of variables associated with market forces, including the relative power of competitors, suppliers and customers and regulatory agencies (Tidd, Bessant & Pavitt 2001). For most small business operators, the evaluation of these many factors remains complex and difficult. Thus an evaluation tool designed to assist owner-managers of small firms assess the merits of their innovations is likely to be of significant value.

A frequent difference between anticipated rent and captured rent

While financial models (e.g. Net Present Value) can offer a guide to the potential attractiveness of innovations, these measures are limited in their capacity to fully assess the non-financial variables likely to impact on the investment, such as the competitive reactions of the environment.[1] Moreover the innovator might be convinced of the value of its innovation but unable to analyse it or even prove its reality. There can be three main reasons to explain this.

First an innovator often places more emphasis on the anticipated absolute value of the innovation without considering the potential difficulties associated with its launch (Martin & Scott 2000). This evaluation can frequently be overly optimistic either because the anticipated interest is overestimated, or because it does not take into account the erosion of the rent due to the bargaining power of such environmental actors as suppliers and customers, and due to the effects of competition.

Second the innovator may have had an unstructured way of reasoning, thus they may act on an intuition rather than on a rational reasoning (Mockler 2003). This is a high probability among small firms where the owner-manager 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 over progress is difficult to anticipate. A risk assessment tool able to overcome these problems is therefore highly desirable for small firms.

Innovation management vary following the type of SME manager

As with many other aspects of how small firms operate, the way an innovating Small to Medium Enterprise (SME) evaluates the risks related to its innovation as well as the way the process of innovation itself is run can be highly idiosyncratic. An important part of the difference relies on the personality of the owner manager of the SME (Smallbone, Leigh & North 1995; Autio & Lume 1998), and this can even be a criterion to analyse the behaviour of SMEs owner-managers (Ajzen and Fishbein 1980). The personality of the owner-manager, and the way it influences their decision making in relation to the innovation management process is therefore important. Questions of specific interest might include: whether or not they use tools to help them make decisions? To whom do they turn to for advice? And would their main advisors themselves use a screening tool to help them analyse the situation?

To address this need, and following a request of INPI (*Institut National de la Propriété Industrielle – French Institute for Intellectual Property*), CEREN – ESC Dijon, in conjunction with LINEN – HEC, commenced the development of a screening tool designed to assist entrepreneurs from small firms quickly evaluate the risk-return profile of future innovation investment opportunities (Santi et al 2003). This tool is supposed to help an innovator or its advisor to choose an adapted strategic choice for the innovation: to launch or not, to protect or not, to share the innovation with suppliers, customers, competitors, or not. In this paper we will first present the screening tool and its logic, and then present the past, current and future analysis of the interest of this tool and its potential use by SMEs managers.

1. The screening tool developed by CEREN – ESC Dijon and LINEN – HEC

11. Aims and logic of the model: advices to choose a strategy in industrial property

The model developed so far measures the anticipated 'rent' or financial return anticipated from a particular investment in an innovation (Miles & Wilhite 2003). In order to help the innovator not only to correctly assess the initial anticipated value of its innovation but also the erosion effects it will face when launched on the market, the process of analysis follows several steps (Santi et al 2003) (see Figure 1]:

1. Analysis of anticipated rent (the 'potential rent'), related to the kind of innovation and the number and size of the potential using markets;
2. Analysis of the characteristic of the environment of the potential using market, and the related erosion effects;
3. Analysis of the competitive strengths the innovation will have to face, leaving only a 'residual rent'; and

[1] For more details see the review made by Beaudoin and St Pierre, 1999.

4. Analysis of the competitive situation of the SME and its ability to launch the innovation, able to catch an 'appropriable rent'.

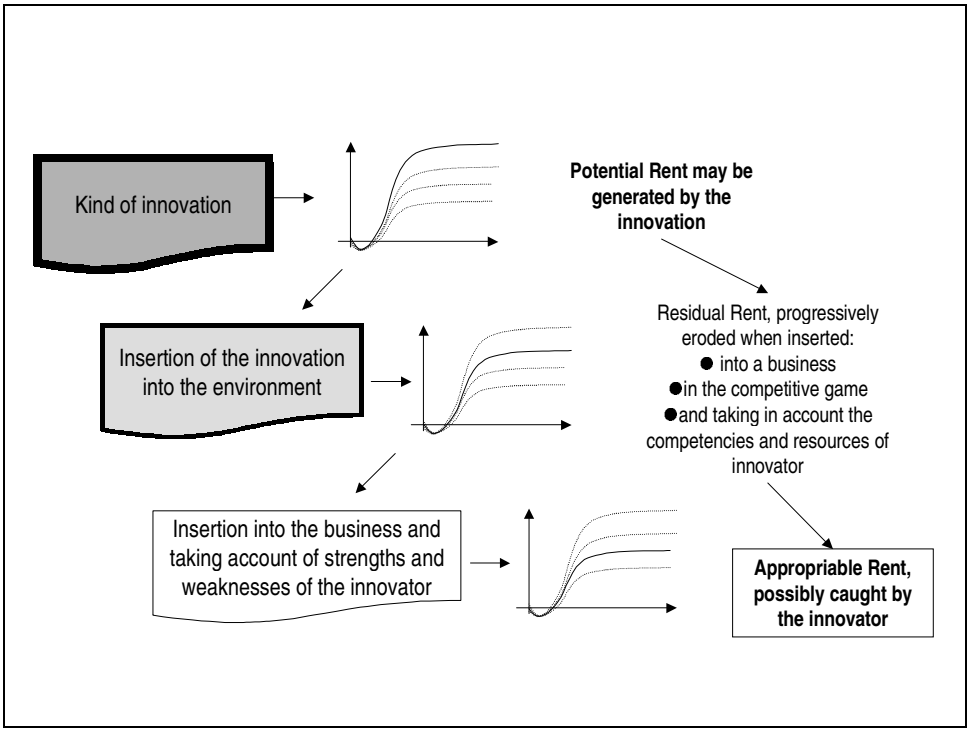

Figure 1: Logic of The Analysis Process (Santi et al 2003)

Innovation is in the economic theory a potential source of competitive advantage (Nemeth 1997). The rent associated to this competitive advantage is the condition for its success and further development. An innovator is thus going to develop a new resource or competence or going to create a new combination of existing resources and competencies (Schumpeter 1912). A firm with a competitive advantage should be able to generate a rate of profit higher than the mean rate of profit in its industry and even more to keep this rate higher during a given period. In many cases of innovation the durability of the advantage can be protected thanks to the patent system.[2] The innovator is then the only legal user of the innovation for a twenty-year period securing a legal monopoly and creating a sustainable competitive advantage. This emulates the concept of Ricardian rent.[3]

12. The model of assessment of risk

The potential rent

To analyse the interest of an innovation it is then necessary to measure the amount of rent it would be likely to generate. This amount will be the combination of three components, which will vary independently one from the other:

1. **Volume** – as measured by volume of sales over one year;
2. **Rate of Margin** – as measured by profits generated from the innovation;
3. **Length** – or duration or life cycle of the innovation.

Thus: RENT = VOLUME X RATE X LENGTH.

[2] For a complete analysis see "Revue d'Économie Industrielle" number 99, 2nd trimester 2002.

[3] For more details on the concept of rent, see Schumpeter [1912], Lewin and Phelan "*Rent and Resources: an Austrian perspective"*, University of Dallas, 2002, Dagnino, Giovanni Battista; "*Understanding the Economics of Ricardian Chamberlinian and Schumpeterian Rents: Implications for Strategic Management*"; Rivista Internazionale di Scienze Economiche e Commerciali, Jan.-March 1996, v. 43, iss. 1, pp. 213-35.

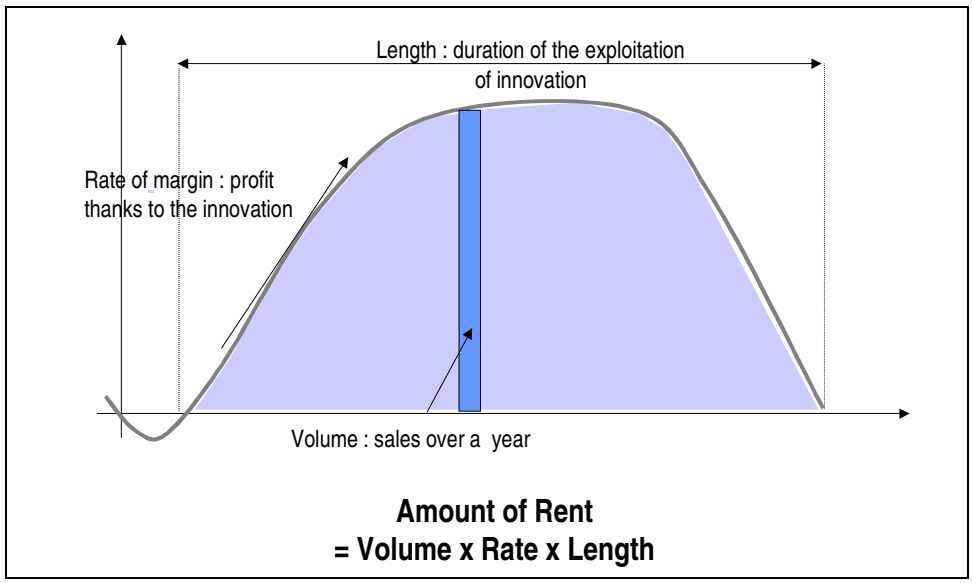

Figure 2: Components of the Rent (Santi et al. 2003)

As the combination of these three variable components, a rent can be characterised by its extreme profile: large/small volume; high/low rate of margin; short/long life cycle. With two possibilities for each variable the total number of combinations is eight.

Prior to introducing the innovation to the market a first step for the SME would be to first analyse the expected amount of potential rent. Measuring the volume, rate and length of the anticipated rent to be generated by the innovation before any interaction with market forces is therefore a desirable initial stage. The indicators proposed by Santi et al (2003) for this analysis are presented in Table 1.

Volume	Rate of margin	Length
The volume is calculated on the basis of the mean potential annual sales on the whole market possibly interested by the innovation	The rate of margin is related to the value and size of the competitive advantage created by the innovation	The length or duration of the life cycle of the innovation is related to the durability and sustainability of the innovation in the using sectors
<u>Indicators</u> Potential of sector diffusion Potential of geographic diffusion Size of user markets Limits due to prior patents	<u>Indicators</u> Process of generation of the innovation Kind of innovation Kind of prior protection	<u>Indicators</u> Technological basis of the innovation Innovative intensity of the using sector Copiability of the innovation (legal and technical)

Table 1: measure of potential rent (Santi et al.[2003])

To characteristics that are of particular importance to the assessment of the innovation, and that might have an influence on the rest of the evaluation process are:

1. The stand alone or systematic character of the innovation (kind of innovation, with possible effect on recommendations); and
2. The existence of one or more sectors of application of the innovation (sectorial potential of diffusion).

The research undertaken by CEREN and LINEN identified six configurations among the eight

associated with these variables.[4] These are illustrated in Figure 3, where the options are shown with their various trade-offs of volume, rate and length within the rent equation.

[4] the configurations #5 and #6 group the cases of high and low rate of margin, because the length and volume effects were evaluated as determinant.

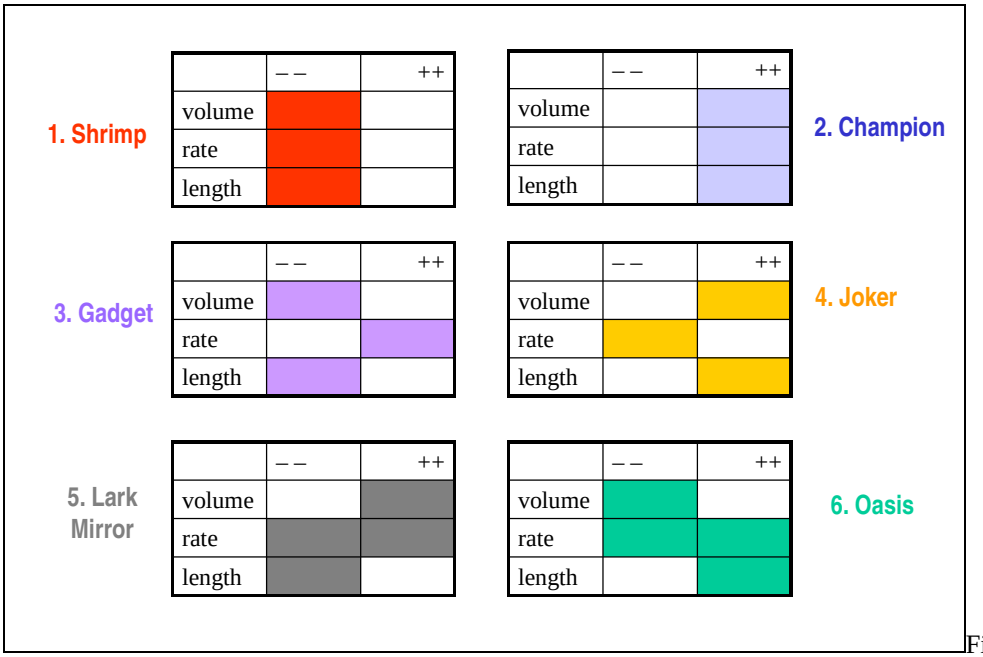

Figure 3: **Typology of configurations of rent of an innovation (Santi et al. 2003)**

Each configuration involves different levels of volume, rate and length thereby determining the anticipated rent to be derived from the innovation. As shown in Figure 3 these configurations are labelled: 'Shrimp', 'Champion', 'Gadget', 'Joker', 'Lark Mirror', or 'Oasis'. These may be further described in the following terms:

1. **Shrimp** – a configuration offering low rent potential due to its modest levels of volume, rate and length, as such it is unlikely to be of much interest;
2. **Champion** – a configuration with high potential rent;
3. **Gadget** – a configuration offering low volume and length but high rate, leading to little interest overall. Such a configuration would not justify significant investment;
4. **Joker** – configuration with high volume and length but low rate making it little better than the 'Gadget' despite its apparently attractiveness;
5. **Lark Mirror** – a configuration with good volume but poor length and may experience both high or low rate, making it challenging for the investor that may need to outlay substantial capital to secure the return over the short life cycle; and
6. **Oasis** – a configuration that offers good length but low volume and high or low rate.

The CEREN and LINEN study suggested that even if the "Champion" configuration seems the most suitable, the "Oasis" configuration is more adapted for an SME because of the smaller and more tractable volume of sales (Santi and al, 2003). It was also found that the rent might be eroded following the introduction of the innovation into the market. A distinction must therefore be made between the potential amount of rent (before any market introduction) and residual rent (after insertion in an economic environment).

Erosion of the rent: the residual rent

The actual experience of many innovators is the need to convince potential users to adopt their innovation and to face the market dynamics associated with the bargaining power of suppliers and customers. Additional challenges may be associated with the activities of competitors who may threaten to erode any competitive advantage with imitation or substitution innovations. These market forces (Porter 1980) are likely to impact on any new innovation delivering an erosion of competitive advantage and effecting anticipated rent.

The customer

Assessing the power of the customer requires evaluation of their generic propensity to adopt the

innovation within the targeted market sector. If they have a low adoption propensity the anticipated volume of rent is likely to be diminished. The *trade off* made by a potential user is between what the innovation is likely to provide, and what its adoption will require them to risk or abandon. This process of trading off by a potential adopter is described as the "customer perceived utility value" (CPUV). If the CPUV is low the volume of rent will be eroded within the market.

The Porterian bargaining power

In a market where the bargaining power of customers or suppliers is strong the rate of profit derived from the innovation may be significantly eroded because such actors may either capture the profit for themselves, or hinder the diffusion process. A better awareness of this risk might help the innovator to make the appropriate choice: either to make an association with the more powerful actor, stop to work on the innovation project or even restrict the niche to face a less competitive situation.

An analysis of the threat of potential substitutes to the innovation can also assist in estimating whether the duration of the rent might be short or long. How the industry in which the innovation is located is regulated should be assessed to determine it impact on the diffusion process. Innovators rarely consider this aspect of how industry regulation may help or hinder the development of the innovation.

Additionally it may be important to study the need of complimentory actors (Hax & Dean 2001) especially in the case of a systematic innovation, because the innovation will have to be inserted into an existing system, or into a system to be created, possibly mastered by a powerful actor, that may not be ready to share the rent.

The power of the competitors

One of the most important parts of the model is the assessment of the power of competitors. Further, it is an aspect frequently underestimated by the innovator. According to analysis by the Boston Consulting Group[5], the erosion effect on the potential rent is dependent on the competitive intensity within the targeted industry and the type of competitive system found there. It is also imperative to know if the business that will be impacted by the innovation is a core or a marginal business for the competitor because their reaction will be very different (Rafii & Kampaas 2002).

[5] The Boston Consulting Group designed a typology of competitive systems following the existence of entry barriers and the price elasticity in the sector.

Captation of the rent: Appropriable rent

Eventually the model of evaluation requires careful analysis of the innovating small firm's possession of the resources necessary to successfully launch the innovation. This analysis might reveal the need for rare technical resources or the requirement to seek external commercial or financial resources (e.g. consultants or venture capital). However, it is common for many owner-managers within small firms to resist seeking help or external support (Mazzarol 1999; Bougrain & Hauteville 2002; Katila & Mang 2003).

13. Innovation and the SME

A key point in the research of CEREN – LINEN is that not every innovation has the same value for a firm, and in the case of SMEs, not every configuration of rent is valuable. The relative lack of resources available to the average SME led CEREN and LINEN to consider that the best configuration for a small firm seeking a long and regular development was that of the "Oasis" type (e.g. one of small volume, to be able to supply, high or low rate of margin, and long length). All the other configurations present one or more specific dangers for the SME. For example, the "Shrimp" is unattractive for any firm while the "Gadget" offers only a short length leading to a 'take the money and run' strategy. The other three configurations – "Lark Mirror", "Joker" and "Champion" – are all characterised by high volume and may not be easily followed by small firms with limited capacity to commit to such production.

14. Validation of the model (experts, then managers)

The model constructed by CEREN – ESC Dijon and LINEN – HEC proposes an adapted strategic recommendation while providing advice on industrial property following the progressive erosion of the potential rent anticipated for the innovation.

Drawing on a panel of intellectual property experts, this evaluation tool was constructed and then piloted with a small sample of 15 small business owner-managers in France during 2002. The study led by CEREN and LINEN for the INPI has shown that this process of analysis was a good way to evaluate the risk taken by an innovator (Santi et al, 2003). However, the question remains of whether and how the small business managers usually assess the risk they incur when launching an innovation. CEREN in collaboration with the UWA-GSM CEMI aims to answer that point via the further development to be undertaken.

2. Extension of the study: out of France and towards a more quantitative analysis

21. Two steps in the extension process

During 2003 CEREN collaborated with CEMI to further develop the tool with a pilot survey of small innovative firms in Western Australia and interviews with local WA entrepreneurs engaged in technology innovations.[6] The aim of this part of the study was to test that the tool developed in France was not so specific to France that other SMEs managers would not understand it.

The results of the pilot studies undertaken by CEREN – ESC Dijon and CEMI – GSM, UWA, suggest that the evaluation tool has potential application and value in assisting the small firm to assess the merits of a future innovation investment. Further, with respect to the strategic management decision-making environment in which the entrepreneur is operating many entrepreneurs seem to rely upon external influences to support and reinforce their pre-existing attitudes towards a particular innovation investment. This implies that an evaluation tool of the kind under development can play a useful role in assisting the owner-manager to approach strategic decisions in a more systematic way. However, these findings are only preliminary that thus require further validation.

To address this need CEREN and CEMI designed a survey based on the French tool, with questions following the steps of the model, asking the respondent to evaluate from 1 to 5 the degree of his/her responses. The survey was piloted with two owner-managers in Western Australia, known for their high level of innovation investment in new products. One company was engaged in high technology medical training equipment, the other was operating in the information and telecommunications industry. These owners assisted the CEREN and CEMI research staff to evaluate the new survey instrument and provided valuable advice on the wording of questions. During late 2003 the questionnaire was distributed to around 500 SME identified as highly innovative. These firms were registered with the WA State Government Department of Industry and Resources, who facilitated the data collection process. At time of writing a total of 60 responses had been received to a mailed questionnaire, although a further version of this was being distributed via email for an online data collection.

In addition to this categorisation of risk-return, the survey also contained additional questions designed to investigate the owner-manager's decision-making environment. Question items drawn from Ajzen and, Fishbein's (1980) research into the Theory of Reasoned Action (TRA) were employed. This component of the study seeks to determine the relative influences of Attitude (e.g. beliefs and rational evaluation) and Subjective Norm (e.g. normative beliefs and motivation to comply with external influences). Past research suggests that small firm entrepreneurs are likely to be influenced more by Attitude than Subjective Norm, indicating that external influences are likely to be weak in comparison with entrepreneur's own self-belief and judgement (Thompson & Panayiotopoulos 1999). However, the uncertainty of many innovation investments would suggest that weak reference to the opinions of external advisors could be detrimental to success.

22. Expected results

The first set of the expected results should help us to evaluate what were the main configurations of the innovations the SMEs have launched the last three years, thus the risk they have taken. It should then be possible to evaluate if they were aware of the risks they have taken. The second set of results should help to answer the question whether the kind of configuration of innovation can be related to a type of decision-making process and to a specific type of manager.

3. Extension to a multi-country study

The pilot survey undertaken in Western Australia in 2003 is proposed as the first step of a wider multi-country study. The aim of this step is to test the survey designed after the pilot French study and former research on entrepreneur's decision making (Mazzarol 2002). It will then be translated and distributed to SMEs in several countries including Italy, Denmark, the United Kingdom, Indonesia, Singapore, Southern Africa the United States and China.

The principal aims of this multi-country study will be:

- To validate the innovation risk-return measurement tool using a multi-country study;
- To explore the nature of innovation risk assessment profiles across a multi-national sample;
- To explore the nature of strategic decision making within innovative small firms across a multi-national sample.

The anticipated outcomes from this study will be the evaluation of the impact of country factors and cultural characteristics on the behaviour of SME owner-managers in relation to evaluation of innovation risk assessment. It should then be

[6] This study is currently being undertaken with a survey of WA firms planned to occur during July-August 2003 assisted by the Department of Industry and Resources.

possible to more fully answer the questions: "What do SME managers have in common?" and "Are cultural characteristics more important or are there some common behaviour components to be found in SME managers regardless of nationality?"

Identification of uniform patterns in responses across a multi-country sample would suggest that the innovation risk assessment tool has potential universality as an instrument for assisting SME owner-managers in evaluating future innovation investments. It would also provide insight into the possible universality of small business behaviour. However, a culturally specific finding would indicate that country or nationality factors should be taken into consideration when applying innovation strategies to small firms and may provide insights into why some countries SME appear to generate more innovation than others.

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