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Innovations and Internationalization under Economic Crisis

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Abstract

It is a common understanding that innovations cultivate MNEs' international performance, although the relationship is not that self-evident. The current economic crisis forces firms to make choices not only to survive from the competition, but also to survive from the globally decreasing demand. In this study, it is shown using NASDAQ OMX Helsinki data that innovativeness and investment in R&D has a positive effect on MNE international performance under economic turbulence. However, results give no support for the hypothesis that publicly funded R&D has a positive impact only on larger MNEs' international performance since these are more capable capitalizing of their R&D investments.

Keywords: MNE, innovativeness, international performance, economic crisis.

1. INTRODUCTION

Over the past decades, scholars in strategy have tried to explain why some firms outperform others (see. e.g. Rumelt et al. 1991, Dyer et al. 2008). Sources of competitive advantage have been derived from industry structure, popularized by Porter (1980, 1985, 1991), and from firms' internal resources (Barney 1991, Rumelt 1984 and 1991, Wernerfelt 1984). According to resource-based view of the firm (RBV), sustainable competitive advantage is a result of unique, immobile, rare, and inimitable accumulated resources. Since the seminal thesis of Hymer (1976), empirical studies in the international business literature have tried to prove if these firm-specific advantages can be successfully transferred across borders.

Capabilities are complex combinations of firm-specific resources and processes, a repository of social knowledge, and the nature of capabilities vary across market situations. In moderately dynamic markets, capabilities can be compared to firm routines, whereas in high-velocity markets, capabilities become simple, experiential, and unstable processes yielding unpredictable outcomes. (Eisenhardt and Martin, 2000; Helfat and Peteraf, 2003). In this

setting resources do not necessarily have to be unique. As complex combinations of firm-specific resources, capabilities are probably impossible or difficult to imitate or be transferred to other companies. Further, certain capabilities are easier to transfer across borders within the firm than across organizations. Comparative advantage between firms and countries explains trade between parties, and the 'hazard' of markets explains the internalization of some of the markets. (Kogut and Zander 2003).

Innovativeness produces organizational capabilities and these capabilities support firms to outperform others, even in highly competitive markets (Nelson and Winter 1982). Knowledge is not a public good; it accumulates over time. Prior experience affects the cost of transferring knowledge, and is obviously different between the firms. (Kogut & Zander 2003). FDI is a means of transferring knowledge, whether it is technology, production, R&D or some other activity (Caves 1971). Knowledge is often internalized, not licensed or cross-licensed. Because of its tacit nature, knowledge is costly to exchange. It follows from information asymmetry that buyers cannot be told explicitly what they are buying without revealing the tradeable information – i.e. transferring the know-how for free (Hennart 1988, p. 365).

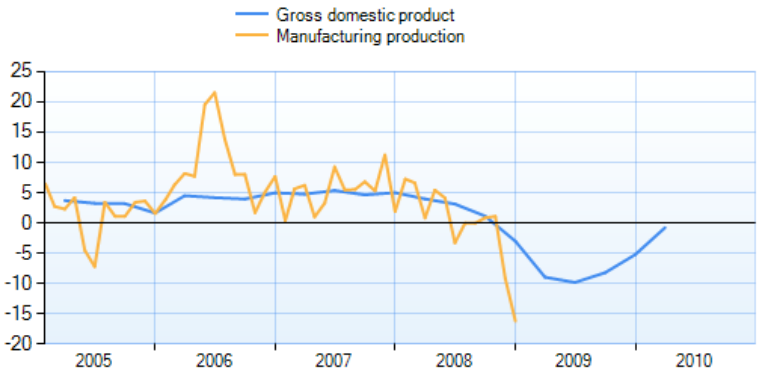

Figure 1. Gross domestic product and manufacturing production in Finland 2005-2010, percentage change from previous year (Bank of Finland 2010).

In the international business literature, there are studies that have made substantial contributions to our understanding of the innovation-performance relationship. However, there is less proof about how firms are able to continue capitalizing their R&D expenditures in international markets when economic conditions change dramatically. As can be seen from the figure 1, along with economic crises, Finland's GDP started to decrease in the beginning

of 2008, followed by a dramatic decrease in the manufacturing production in the end of the same year. This meant that companies needed to find ways not only to compete against each other but also to survive from decreasing demand.

The importance of examining the effects of unusual economic conditions relates to the theoretical discussions of firm-specific advantage. The question arises: does the economic downswing challenge this advantage, and if it does, are there specific factors that affect the sustainability of that advantage? Further, does national R&D funding have more importance on firms' international performance under economic crisis situation?

2. MNES' INNOVATIVENESS

Innovativeness cultivates internationalization. The role of R&D, product development, innovations, and knowledge, often used as synonyms, has an essential presence in international business literature. Innovations can be used to produce new products and services, the opening new markets, internationalization has been said to be an innovative act (Schumpeter 1939, Casson 2000, Knight & Cavusgil 2004). Innovativeness has great impact both on smaller and larger firms, even though its role might be somehow different. Innovations in smaller firms are often closely related to the internationalization process. As Andersen (1993) notes, this can especially be seen in the stage models of internationalizing business (Bilkey & Tesar 1977, Johanson & Vahlne 1977, Reid 1981, Cavusgil 1982, Czinkota 1982) in which innovativeness is paralleled with internationalization. Further, when it comes to rapid internationalization of born-globals, factors enabling growth often include innovation culture, knowledge, and capabilities (Knight and Cavusgil 2004).

The crucial role of know-how and product development is well acknowledged in the MNE literature. It has been argued that products and services (as outcomes of the firms' knowledge and embedded capabilities) determine firm boundaries, not the market failures of buying and selling of knowledge (Kogut & Zander 2003, p. 520). In contradiction to others (e.g. Johnson 1970, McManus 1972, Magee 1977), Rugman (1980) states that markets for knowledge are imperfect; in fact, there are no proper markets for knowledge, and consequently, there is no

price for such knowledge, and MNEs create internal markets for knowledge to overcome this fact.

It has been commonly agreed that innovativeness enhances MNEs' economic performance and profitability (Kotabe et al. 2002). Innovations mobilize new competences and create new competitive advantages (McGrath et al. 1996). However, not all firms are able to benefit from innovation. Intense competition and imitation (Arrow 1962) and competing firms' neutralizing innovations (Porter 1980, Chen and Miller 1994) have challenged this positive innovation-performance relationship. As Knight and Cavusgil (2004) note, innovations are based either on firms' internal R&D or the imitation of others. If the technology is commonly available or is general knowledge, it can be expected that replication will occur. It has been suggested that firms need to reach a certain level of internationalization in order to be able to enjoy the benefits from innovations (Kafouros et. al. 2008). Moreover, innovativeness is negatively related to firm age, often correlated with firm size. As a conclusion, R&D activities decline along with firm size, i.e. with firm age (Lewin et al. 2009). Further, Thomas and Eden (2004) show that the length of time involved in foreign countries has a positive effect on firm performance.

Most internationalization studies on innovativeness deal with R&D at the corporate level (Carlson 2006). For example, a Swedish study of 35 innovations shows that the more tacit in its nature the technology is, the more probable it is that it will be transferred to wholly owned subsidiaries (Kogut & Zander 2003). Typically, internationalization of innovative activities is less rapid than production-related activities. When compared to other value creation activities R&D follows a more gradual evolution. (Dunning & Lundan 2009). It has been shown that in the large MNE who perform their RD in their home countries, skills and know-how are less internationalized than other dimensions of corporate activity (Pavitt 2002; Patel and Pavitt 1991; Pavitt and Patel 1999).

As argued by Dunning and Lundan (2009) it is important that national innovation systems (NIS) bring domestic knowledge to the use of MNEs. Since publicly funded R&D is growing in importance, attention must be paid to processes that help the firm capitalize on global gains from innovation. National factors, such as scientific and technological institutions, education and training systems, financial systems, the structure of the labor market and industrial specialization, among others, affect how innovation activities are carried out. These shape the

conditions how countries respond to changes (Archibugi and Michie 1997, Lorenz and Lundvall 2006).

Hypothesis 1: Innovativeness and related R&D helps MNEs to prevail in their international performance under economic crises.

Hypothesis 2: Publicly funded R&D cultivates MNEs' innovative actions regardless of the economic situation.

3. MNE INTERNATIONAL PERFORMANCE

Although firm-specific advantage is not location-bound and could be deployed globally – in principle – MNEs' internationalization patterns seem to follow intra-regional, rather than inter-regional routes. Further, because of the lower liability of intra-regional expansion, firms expand internationally in most cases within their home regions (Rugman and Verbeke 2007). By expanding, MNEs transfer their firm-specific advantages across borders, but it has remained unclear or at least it has not been verified if there exists a systematic internationalization-performance relationship (Ramaswamy 1995). In the international business literature, reasons for a positive relationship as well as negative relationship are evident. Different factors, e.g. home country, host country, industry, age, size, degree of product diversification, immaterial assets, strategy, timing and speed of the internationalization process, product diversity, marketing capabilities, and technological capabilities (Tseng & Yu 2008) drive international performance in different directions. Whilst some factors enhance positive impact, others dilute positive performance. When reviewing past internationalization studies, Oesterle et al. (2008) suggest looking for a net effect. Rather than net effect, Contractor et al. (2003) and Contractor (2007) note that performance often follows a three-stage process when analyzed longitudinally. Initially the internationalization-performance relationship is unprofitable because of the liability of foreignness and lack of experience. In the second stage, international operations become profitable, and finally in the third stage, costs of overseas coordination exceed the benefits. In addition, Ahokangas et al. (2010) provide further evidence on the cyclic nature of the competitiveness. However, more proof from longitudinal studies is required.

In the past research timing is relative to competitive actions. There are less empirical studies, based on firm-level data, if and how the prevailing overall economic conditions affect MNEs' international performance. One of the few studies by Filippetti and Archibugi (2010) shows that during the economic downswing in 2008 – 2009, European firms dramatically decreased their spending on R&D. In 2009, 26.7% of the European firms were about to decrease their innovation expenditures. International competition requires asset power; this asset power is reflected by firm size. Firms owning superior assets and capable of developing differentiated products are able to earn economic rents to cover the higher costs of serving foreign markets and run the risks of losses under uncertain conditions (Agrawal & Ramaswami 1992), so it can be assumed that firms which are spending more on R&D are probably more likely to survive economic crises. Under normal economic conditions, even in a highly competitive environment, differences in firm-specific advantages are less stressed. Remarkable changes in economic conditions reveal those firms which are able to continue capitalizing their innovativeness, and consequently, continue transferring advantages across the borders. Thus we suggest:

Hypothesis 3: Firm size and the related asset stock of the firm matter. Larger firms are better off in sustaining their international performance even under economic crises.

Studies measuring internationalization and related performance have produced a variety of operationalizations. In the richness of available approaches, Sullivan (1994) concludes that due to the lack of a coherent approach, measuring of the degree of internationalization has remained arbitrary. Traditional international performance measures consist of firm's foreign sales (e.g. Buckley et al. 1977, Beamish & daCosta 1984, Autio et a. 2000), ratios of foreign sales to total sales (Stopford & Dunning 1983, Grant 1987, Geringer et al. 1989, Daniels & Bracker 1989, Tallman and Li 1996, Rugman and Verbeke 2007), export sales as a percentage of total sales (Sullivan & Bauerschmidt 1989), and foreign profits as a percentage of total profit (Eppink & Van Rhijin 1988). In addition, structural attributes describe the firms' foreign relative resources compared to domestic resources, as firms' spread to different countries, foreign assets' share of total assets (Daniels & Bracker 1989) or overseas subsidiaries percentage of total subsidiaries (Stopford & Wells 1972, Vernon 1971) whilst attitudinal attributes - e.g. top managers' international experience (Perlmutter 1969, Maisonrouge 1983) or psychic distance (March & Simon 1958, Johanson & Vahlne 1977,

Sullivan & Bauerschmidt 1990) - capture the essence of the cultural challenges in the internationalization process.

4. DATA AND MODEL

In order to test the above hypotheses, Finnish R&D oriented MNEs were chosen for this study. Firms listed in the NASDAQ OMX Helsinki stock market belonging to industrial products and services, information technology, and health care services comprised a population of 71 firms in the year 2009. After excluding firms that were not multinational, or which did not report their R&D expenditures or their sales from home country / home region (Finland / Europe, respectively), the sample was reduced to 46 firms. Time series cross-sectional data were collected from firms' annual accounts covering fiscal years 2008 and 2009. The time series cross-sectional data permits to increase the degrees of freedom available for estimation, analyzing 46 firms over two periods of time, concluding 92 observations, as opposed to 46 observations in the cross-sectional study (see e.g. Kotabe et al. 2002).

The variables in this study were operationalized as follows. Like Autio et al. (2000), International performance was measured in terms of foreign sales. Foreign sales were defined as all sales from exports and other international operations. Foreign sales is generally used as an indicator of an MNE's capability of transferring its firm-specific advantages across borders, thus as an indicator of MNE's international performance. Innovativeness was operationalized as R&D intensity and it was measured in terms of R&D expenditure. It has been noted that there are problems with measuring innovativeness within an internationalizing firm. However, the sample in this study consisting of stock listed MNEs should not include such a bias. External R&D funding was measured in terms of received funding from the Finnish Funding Agency for Technology and Innovation (TEKES). Since the log of zero is undefined, one was added to all observations, then taking the log, we followed a 'standard' procedure. One of the purposes of this study was to explore if there was a statistically important difference between smaller and larger MNEs in explaining international performance, a dummy variable for size was used. Size had a value of 1 for

larger firms having assets equal or more than 100 m€; the rest belonging to a group of smaller firms had a value of 0.

To test the hypotheses, the following regression model was estimated:

$$\ln INT\ PERF_{i,t} = a0 + a1 \ln R\&D_{i,t} + a2 \ln TEKES_{i,t} + a3\ SIZE_{i,t} + \varepsilon_{i,t}$$

where:

i is the firm, t is the year,
ln INT PERFi,t is the natural logarithm of international sales of the firm i in the year t,
ln R&Di,t is the natural logarithm of R&D expenditures of firm i in year t,
TEKESi,t is the natural logarithm of the funding received from Finnish Funding Agency for Technology and Innovation (TEKES),
SIZEi,t is the dummy variable indicating assets either smaller or larger than 100 m€; and
εi,t is the error term.

Table 1. Descriptive statistics

Variable	Mean	Std.Dev.	Minimum	Maximum
ln INT PERF	18,5	2,035	14,63	24,64
ln R&D	15,76	1,825	11,51	22,51
ln TEKES	8,52	,501	,00	1,00
SIZE (dummy)	,54	,501	,00	1,00

5. RESULTS

The focus of this study is on the effects of innovativeness, firm size and national R&D funding on MNEs' international performance under economic crises. Table 2 shows the estimation results from ordinary least squares regression. The coefficient for ln R&D is significantly positive ($p<.01$), which supports the first hypothesis that firm's investments in

R&D enhance international performance even under economic crises. The estimated coefficients indicate that a 1% increase in R&D is associated with an expected 0.47% increase in the level of international performance. The coefficient for TEKES has no significant explanatory power, thus the model does not provide any support for hypothesis 2. The significantly positive coefficient of size ($p<.01$) indicates that large MNEs are stronger in their international performance even if the economic conditions change dramatically, which supports hypothesis 3.

Table 2. Linear ordinary least-squares regression of ln INT PERF

Variable	Coefficients	t	F	R^2
Constant	10,001 **	7,225	44,701	0,604
ln R&D	,469 **	4,786		
ln TEKES	,007	,247		
SIZE (dummy)	1,93 **	6,239		

** Significant at 99% level

Requirements for the regression error terms ε_i were met

The model was able to explain 60% of the variance in international performance.

6. CONCLUSIONS

The purpose of this study was to explore how the relationship between MNEs' international performance and innovativeness might vary under times of economic crises. Results suggest that R&D expenditures positively impact international sales even under economically unstable conditions. This not only supports earlier findings (see e.g. Autio et al. 2002) on the relationship between innovativeness and MNE performance, but also confirms the crucial role of innovativeness as one determinant of firm-specific advantage that can be transferred across borders. The study provides support for hypothesized relationships suggesting that accumulated asset stocks enhance international performance under economic crises. Future research should test these interactions in other countries, as well as with other determinants with observations from a longer period of time.

The results should be viewed with caution in light of the method used and available data employed. The sample consists of Finnish MNEs from specific industries. Finnish MNEs in the NASDAQ OMX Helsinki are relatively small in size and are very export oriented compared to stock-listed firms in other countries. In order to generalize the results to other countries, data should be extended to cover more representative countries. Data was reduced since some of the firms did not report their R&D expenditures. In most cases, these companies were non-manufacturing firms. It was not possible to make a clear distinction if in such cases marginal R&D expenditures would have been essential for these firms' performance. In addition, funding received from Finnish Funding Agency for Technology and Innovation (TEKES) could have been extended to cover the funding of subsidiaries of MNEs. Despite of these limitations, our results are among the first to shed light on the determinants of MNEs' international performance under times economic crisis.

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Appendix

Correlations between the variables:

Correlations

	ln INT PERF	ln R&D	ln TEKES	SIZE (dummy)
ln INT PERF	1			
ln R&D	,655 **	1		
ln TEKES	,343 **	,533 **	1	
SIZE (dummy)	,677 **	,470 **	,209 *	1

** Significant at 99% level

* Significant at 95% level