

PATTERNS OF INTERNATIONALISATION OF FINNISH INNOVATIVE FIRMS

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The innovative companies are said to be a driving force for economy. The born global firms are relatively new phenomena in economy, and they are quite often characterised to be highly innovative and internationalise rapidly. We begin our analysis by identifying and dividing innovative SMEs into three distinct groups: born global, older and non-exporting. The term internationalisation can be understood several ways, in our discussion the term is defined simply as the commencement of exporting. Our second aim is to find out whether our data supports a common belief that born globals are identified to operate in high-technology industries. In addition, innovation characteristics vary, and these features are believed to affect firm's internationalisation. In order to success in innovation process, SMEs often need external know-how, both domestic and foreign. Especially relevant co-operation is for SMEs where certain restriction in resources may apply. The analysis places emphasis also on distribution of SMEs' collaboration partners, and how co-operation affects innovation activities/process. Lastly, paper aims at getting more information on the relatedness of innovation characteristics to born global phenomena. The data used covers some 1600 Finnish innovations commercialised in 1985-98. The results indicate born globals to be highly innovative and produce innovations that are radical in nature, and spread across world markets. Innovative SMEs, in general, have certain advantage of their innovation regarding the internationalisation.

KEYWORDS: Innovation, born global, co-operation

1. Introduction

In this study, we analyse the internationalisation performance of Finnish innovative firms. These companies are said to be the driving force for economy. Innovativeness is enhanced in several ways in the economy, and new policy measures are introduced. Our focus is to identify these innovative companies, born globals in particular, and have a closer examination of innovation's effect on these companies' internationalisation. Born globals are relatively new phenomena, and they are quite often considered to be highly innovative and also follow rapid internationalisation. This is one of the reasons why they caught our interest in the discussion of innovation and firm internationalisation.

We begin our analysis by dividing innovative companies into three distinct groups: born global, older and non-exporting. As born global firms are identified those that have started to export their innovation within three years from establishment. Older group consists of companies that have commenced exporting after three years, and non-exporting companies have not exported their innovation. In this study, internationalisation is defined simply as the commencement of exporting.

Born global companies are commonly identified to operate in high-technology industries. Our second aim is to find out whether our data supports this common belief, and what sectors innovative companies are located. Innovations are not in one form but they are varying, for instance in novelty and complexity. Some innovations are only new to the firm while others attain world-wide recognition. We believe that innovation characteristics affect firm's internationalisation, more precisely the commencement of exports.

The importance of collaboration in innovation process has been widely addressed in the literature (Narula 2004). Companies need to seek, both domestic and foreign, partners in order to produce innovations efficiently. Especially, in small and medium-sized firms certain restriction in resources, i.e. lack of experienced workforce or capital, may apply. The analysis places also emphasis on distribution of collaboration partners of innovative firms. Lastly, what effect, if any, the collaboration partners have on innovation attributes. Does the increased collaboration lead to more novel innovations?

On a more general perspective we would like to get more information on the relatedness of innovation characteristics to born global phenomena. Do firms that follow born-global approach in internationalisation have more unique products, i.e. radical innovations, than other innovative companies? In order to achieve our objectives, we use data of some 1600 Finnish innovations commercialised in 1985-98.

2. Empirical and Theoretical Background

The phenomenon of rapidly internationalising companies has been widely discussed in the literature of international business. These companies are usually referred as Born Globals, International New Ventures, Global Start-ups or High-Technology Start-ups depending on the author (see Madsen & Servais 1997). First tracks to this phenomenon can be traced to 1990s when group of small, and usually knowledge intensive start-ups caught several authors' interest with different internationalisation behaviour compared to traditional exporting companies. (see e.g., McDougall et al. 1994; Knight & Cavusgil 1996). The explanation for the increase of small companies' rapid internationalisation and following non-sequential path is claimed to be globalisation of business, meaning more globalised markets and new advancements in communication and transportation technologies not to forget people's individual international experience.

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What are then these mysterious new companies that seem not to follow traditional internationalisation theories? Several characteristics related to these companies can be identified from the literature. First of all, these companies are often identified as small or medium sized. The rapid, concurrent and proactive approach to engage in international markets allures small rather than large companies (Bell & McNaughton 2000; Rasmussen & Madsen 2002). Another commonly accepted characteristic is that born global firms start international operations straight, or shortly after, establishment (e.g. Bell & McNaughton 2000; Madsen & Servais 1997; Rennie 1993). Additionally, these firms operate in sectors that are identified as knowledge intensive. Born global companies can be found from sectors where competitive advantage is based on knowledge, such as companies producing high technology products (see e.g., Bell 1995; Coviello & Munro 1995; Autio & Sapienza 2000). Since these companies operate in knowledge intensive field, usually their main markets are identified as niche or lead markets (Madsen & Servais 1997; Larimo & Pulkkinen 2002). Their internationalisation strategy is to reap profits of being first in the market, as well as rapidly penetrate global segments. In distinction to traditional exporting companies, born global firms often internationalise simultaneously into several foreign markets. Similarly, exports may have been started at the same time as domestic sales.

Additionally, internationalisation requires resources and, more importantly, experience. These factors might be large obstacles to smaller companies in their internationalisation process. It has been widely agreed in the literature that one peculiar characteristic for born global firm is their entrepreneurial approach (Autio, Sapienza & Almeida 2000; Burgel & Murray 2000; Madsen & Servais 1997). For example manager's previous experience from operating in foreign markets has enhancing effect on internationalisation. The already established foreign contacts and networks assist born global companies to enter foreign markets. Since born global companies operate on foreign markets from early on, they naturally tend also to have high foreign sales (Bell 1995; Knight & Cavusgil 1996). For example, the export ratio (percent of export from turnover) has been used as an indicator explaining born global approach. Exports exceeding 50 percent of turnover are regarded high for example in Bell et al. (2001) study. Some authors, for instance Moen (2002), have used 25 percent export ratio as a definition for born global firms. In reality, studied companies had much higher export ratio in both studies.

According to the characteristics described above, the internationalisation process of born global can be depicted as rapidly and simultaneously reaching several foreign markets. These companies are often compared to traditional exporting companies that reach international markets in more gradual and reactive manner (see comparison, Bell & McNaughton 2000). These more "traditional" companies start exports first close to domestic countries gradually extending to more distant markets. These widely agreed internationalisation process theories in the business literature emphasise gradual and sequential process consisting of several small stages. Each step confirms company's commitment and increases knowledge in international activities (see Johanson & Vahlne 1977). Internationalisation commitment intensifies from early exporting activities towards more investment intensive, such as establishment of overseas sales subsidiary or manufacturing unit (Johanson & Wiedersheim-Paul 1975; Luostarinen 1979). Firms move on to extend operations stepwise abroad after developing them first at domestic market. Several authors have identified different export stages in order to understand the internationalisation process (Bilkey & Tesar 1977; Cavusgil 1980). Companies follow through stages which each include deeper experience and commitment decisions.

It has been discussed that the above described so called traditional theories are, in several parts, outdated and lack characteristics to explain internationalisation in today's companies. First of all, global competition has forced companies to react to changes, opportunities, challenges, as well as threats quickly. Whereas the new developments in communication and technology have provided tools to be part of global business more efficiently than maybe in some 20-30 years back. The operational scope for 21st century companies is quite different compared to older companies. Therefore it is highly likely that internationalisation patterns have evolved along overall change that has occurred. However, our aim in this paper is not to discuss new internationalisation patterns of firms but to identify possible internationalisation patterns for innovations.

According to the previously identified characteristics commonly related to rapidly internationalising small and medium sized companies, we could presume that:

H1: Innovative born globals are located at knowledge-intensive sectors.

Some authors have concentrated on examining exporting behaviour of innovative companies; see e.g. Roper & Love (2002) and Wakelin (1998). The former study considers export behaviour of manufacturing plants in the UK and Germany. Export performance is positively affected by product innovation. Export probability and propensity are likely to increase in accordance with product innovation in both countries but not with plant's innovativeness in Germany. Characteristics of product innovation allowed plants to enter export markets more easily but did not, though, expand their export sales.

Wakelin's (1998) discussion considers exporting behaviour of non-innovative and innovative firms. Her findings were distinct to general belief of export behaviour of innovative firms. Non-innovative companies seemed to be more export oriented than innovative firms. In addition, large innovative companies are more likely to enter foreign markets through exports than smaller companies. High costs for engaging in foreign markets are said to be one reason for small firms' reluctance to export. Large firms have more resources to be devoted to foreign operations. Supporting results occur also from Bloodgood et al. (1995) study. Greater innovativeness did not lead to increased internationalisation of new ventures studied.

Neither of the above introduced studies on export behaviour and innovation take into account the characteristics of innovation, i.e. novelty and complexity. Nor do these studies discuss other aspects related to internationalisation of innovations and their effect on export behaviour.

Over the years innovations have been classified in several distinct ways. One of the most common has been the division between incremental and radical innovations (Fagerberg 2004; Freeman & Perez 1988; Henderson & Clark 1990). The former are said to occur relatively continuously in any industry. The changes to existing products are minor and already developed designs are used. However, it might have significant effect to firm or economy as a whole. Radical innovations, on a contrary, occur from discontinuous events (Freeman & Perez 1988). They are also said to be outcome of deliberate research and development. New market opportunities may be opened rather to radical than incremental innovations.

Some researchers have examined the role of innovation characteristics in firm's export behaviour. However, a thorough analysis of innovation's complexity and novelty to firm's export behaviour is lacking. Papers of Coviello & Munro (1995) and Rennie (1993) showed that investigated small companies exported leading-edge technology to foreign markets. It could be assumed that leading-edge technology is highly innovative since its characteristics of newness to market, knowledge intensiveness and complexity. Small companies are judged to be more able to react to changes and opportunities in contrast to larger, often inflexible, organisations. In order small companies to be competitive in global scale they often follow niche strategy, i.e. product is offered to specific and small user group. Nevertheless, the study of Lindell & Karagozoglu (1997) revealed the opposite. Small firms produced largely incremental products, even though radical innovations aimed at niche markets and lead users are thought to provide competing advantage to small firms.

H2: Born globals are exporting incremental type of innovations.

Small and medium sized businesses are said to concentrate on developing more incremental type of products than large multinational companies. It has also been argued that development process lacks overseas partners, small companies tend to rely more on local networks and seek know-how locally. The main argument behind this is scarce resources (Freel 2003; Burgel & Murray 2000), it could be presumed that small companies lack resources to build long-lasting relationships with overseas partners. Entrepreneurship, more specifically entrepreneur's previously gained contacts and experience of foreign activities may enhance collaboration that is especially relevant for new start-up companies (see e.g., Burgel & Murray 2000).

A study conducted of sample of UK based innovative SMEs indicated international co-operation to be positively correlated to product novelty (Freel 2003). In other words, when company develops novel innovations it is likely to have more overseas co-operation partners, i.e. universities, research organisations, competitors or customers etc., compared to development of incremental innovations. The results of Lindell & Karagozoglu (1997) study show small R&D intensive companies to rely on foreign co-operation activities as well. Suppliers and partners in marketing were the main foreign collaboration partners. Co-operation in R&D was also considered important. The study sample constituted small and medium sized R&D intensive companies in the US and Scandinavia.

The role of cooperation in innovation process has been widely recognised in innovation literature Narula (2004). Companies, regardless of size, rely on external networks in order to take an advantage of technological competences. (see also study of Finnish companies' R&D made by Koskinen 1999). SMEs are said to utilise and engage in knowledge produced outside the firm better than large firms. They also use larger share of R&D budget for outsourcing. Reasons for collaboration are many, such as reduction in risk and costs, but main motive seemed to be getting innovations faster to market and utilising complementary technologies. SMEs were collaborating to conduct applied research and development, whereas development and production and marketing were preferred activities of large firms. Nevertheless, however important co-operation with external partners is, it does not guarantee successful innovations as the study of Bougrain & Haudeville (2002) reveal.

Collaboration is important in developing complex and novel innovations. Furthermore, contacts to foreign collaboration partners may enhance exporting as experience and knowledge of foreign operations is increased.

H3: Radicalness of innovation correlates with foreign partners (during R&D-process).

3. The Data

The data we use in this study originates from the Finnish innovation data, Sfinno®, for period 1985-98. The innovation data is based on the so-called literature-based innovation output (LBIO) method (Palmberg et al. 2000). The innovation data covers around 1600 innovations commercialised in Finland by Finnish companies. An innovation has been defined as "invention that has been commercialised on the market by a business firm or the equivalent" (see OECD Oslo Manual 1997). For each innovation, there is information on the commercialising firm. This information includes entry, exit, geographical location, turn-over, number of employees, patents, and industrial classification (SIC) according to the main industrial sector of the firm. An innovative firm has been defined "as a firm, which has developed and commercialised a new product – an innovation".

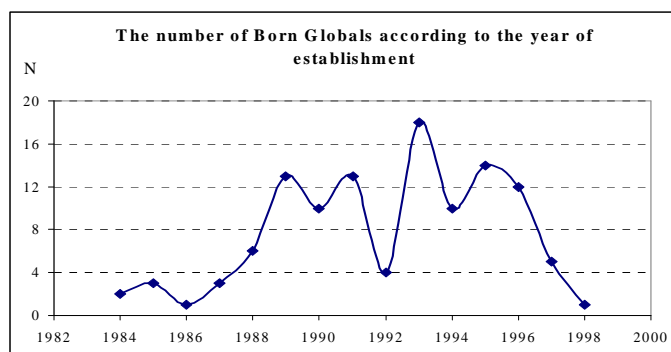
In order to get some indications about the degree of novelty, the classification provided by OECD (1997) has been applied in Finnish innovation data. The novelty of innovations has been analysed from the perspective of the firm.

This means that an innovation is considered novel if it is new to the firm, and therefore has required some reconfiguration or accumulation of the knowledge base of the firm. To get some knowledge about the novelty of innovation in geographical respect (or from the market perspective), a simple classification “new to the Finnish markets” versus “new to the world markets” has been included. This type of classification has also been implemented from the OECD’s definition, in which the distinction was made between firm-only innovations and world-wide innovations. It is also compatible with evolutionary theories, which stress the complex set of interactions between innovation and dynamic competencies of the firm (Henderson & Clark 1990; Teece 1988; Teece et al. 1997).

In order to identify born global companies, data on the years of major phases in the innovation's development cycle were collected. In the Sfinno® survey data, the respondents were asked to indicate the years of major phases in the innovation’s development cycle, including the year of basic idea, first prototype, commercialisation, break-even point and first exports. In cases where commercialisation or exports had not yet occurred, the respondent was asked to indicate this. The year of the basic idea is considered to reveal the year when the first initiative for the development of the innovation was voiced. The year of commercialisation marks the year when the innovation entered the market on a larger scale than that of a mere prototype. In this context, the development time of an innovation is defined as a time it takes from basic idea to commercialisation.

As has already been stated before, the central theme for this paper is internationalisation behaviour of Finnish innovative firms, more emphasis put on born global type of companies. By internationalisation, in this study, we mean the commencement of exporting. This narrow definition is largely to do with database restrictions. On the basis of the criteria of internationalisation, we can divide the firms in our data sample into three different groups. Firstly, we have firms, which belong to the group of born globals according to the definition. These are young firms, which have started their export activities in three years time from their establishment (this issue will be discussed more in chapter 4). Although the definition of born globals varies largely in the literature, from the age of two years to age of eight years, we set a tight limit to three years in order to surely capture the very firms “global” product of the firm. The distribution of born globals is presented in Figure 1.

Figure 1 Distribution of born globals.



According to Figure

1, the number of born global companies started to increase since 1986, passing the annual level of ten in 1989. Right after the deep economic crisis, which Finland faced in 1991, the annual number of born globals crashed in 1992, but recovered soon achieving the maximum value of 18 in 1993. Since 1995 the number of born globals has been declining mainly due to the time period of our innovation data.

The second group of firms is called “Older” firms. These firms have started to export their particular innovation at the age of four or more. Particular here refers to our time-period of innovation data, which is 1985-98. For this group of older firms, we are not able to judge whether we have data on their first commercialised innovation or not. Due to the limitations of our data, we are not able to capture the most well-known Finnish born global, namely Vaisala Ltd. Fortunately, a positive thing with our time period is that before the mid 1980s, most of the new start-ups in Finland had their first markets in home country. The technological level of their products, particularly in their first products, was not high enough to face the international competition on the foreign markets. Products were usually developed and designed to the Finnish circumstances, in terms of their temperature durability, tight standards and legislations etc. (Saarinen 2005). For these reasons, the number of born globals was rather small during the period before 1985.

Our third category consists of firms, which have not started to export their innovations during the period 1985-98. This group is called “Non-exporting” firms. In order to minimise biases in the latter part of the time period, we have excluded firms, which have commercialized innovations after 1994 and not started to export them yet in 1998. This type of exclusion means that in our final sample, the representativeness of born globals is relatively better compared with the representativeness of other groups of firms. However, as the main focus of this paper is to study internationalization patterns of born globals, the sample we use is suitable for the achievement of our objective.

Descriptive statistics in Table 1 illustrate some characteristics of the different groups of firms. As expected, according to our definition of born globals, the average age of born globals is much smaller as compared with other groups. The same matters also in the size of the firms. Half of born global companies are small micro firms with less than ten employees. Large share of non-exporting firms are also rather small.

Table 1. Descriptive statistics.

	Born Global	Old	Non-Export
n=	115	298	275
Size of firm			
1-9	52 (51%)	67 (22%)	106 (38%)
10-99	29 (29%)	67 (22%)	54 (19%)
100+	13 (13%)	163 (55.7%)	110 (39%)
na	7 (7%)	1 (0.3%)	11 (4%)
Age of firm			
0-9	101 (100%)	120 (40%)	132 (47%)
10-49		129 (43%)	75 (27%)
50+		49 (17%)	50 (18%)
na			24 (9%)
Patent applied			
Yes	65 (64%)	162 (55%)	137 (50%)
No	36 (36%)	132 (45%)	136 (50%)
Type of innovation			
Totally new	78 (77%)	162 (54%)	175 (63%)
Major improvement	23 (23%)	120 (40%)	85 (31%)
Incremental improvement		15 (6%)	17 (6%)

It seems that firms use patenting to protect their innovations. More than half of sample innovations are patented even though it is expensive and resource demanding. Especially smaller firms might find patenting too demanding because of lacking resources. However, as Table 1 displays, in almost two thirds of innovations originating from born globals, a patent has already been applied. In older and non-exporting firms, this share is somewhat lower, 55 and 50 percent respectively. These results indicate that patenting has been considered as an important instrument, particularly among the group of born globals. This result is interesting in a sense that as we know, patenting is a time consuming activity. In young, just established firms, which usually are small in their size, patenting requires also resources. However, in light of our data and results, born globals are extremely fast in their movements already from the very beginning of the company life-cycle. In three years, a new company has been started, a novel product has been developed, patent application has been sent, and even exports of the new product have begun. This raises a question about the background of personnel involved in these firms. It is reasonable to argue that many of them have previously worked in another company, created contacts and networks there, spinned-off and started a new business. Whether this type of reasoning makes sense, is left for the forthcoming papers.

If we look at innovation characteristics and their distribution among different types of innovations it can be observed that large share are totally new to the firms. To born global companies these are even more common than for other company groups. Major share of not exported innovations are classified as totally new to firm. This is a little surprising since it could have been assumed that non-exported innovations are more incremental type. However, some other kind of resource restrictions may apply into these cases. It might be these companies are lacking for instance experienced personnel as was hinted above.

4. Results and Analysis

When do innovative firms start their exports?

In order to get some idea about the age of firms as they start exporting their innovations, some basic results are presented. The first limitation in this examination is the time period of our study. We have information only on innovations, which have been commercialised during the period 1985-98. This means that in case of old firms, let's say more than ten years, we are not able to say whether they are born globals or not. Putting this more clearly, if a firm has been established in 1975, has started export activities already in the late 1970s, develops a new innovation in the mid 1980s and starts exporting the new item in 1987, our method gets an age 12 for this firm. This means that by help of our innovation data and the methodology we use, we are not able to capture possible born globals from the period before 1985. However, what we can do with our data is to focus on the born globals from the period 1985-1998. By setting tight criteria in our born globals, three years from the establishment of the firm to the start of exports of an innovation, we can be quite convinced that we capture the very first innovation developed and commercialised by that particular firm.

Table 2. Stock of innovations according to the age of firm at the commencement of exports of innovation.

Years	Stock	Years	Stock
0	5,1 %	10	56,4 %
1	12,1 %	20	68,0 %
2	17,2 %	30	74,1 %
3	27,8 %	40	81,1 %
4	33,7 %	50	88,4 %
5	39,2 %	100	97,3 %

Table 2 presents the stock of innovations according to age of firm at the commencement of exports of innovation. The table clearly illustrates that a large number of innovations are exported soon after the establishment of the firm. More than fifty percent of all innovations see their daylight in foreign markets in less than ten years time after the birth of the firm. The share reaches its maximum value three years after the establishment of the firm, as over ten percent of innovations are started to be exported. This result gives some support for our definition and criteria of born globals.

In the light of results reported above, it can be assumed that producing of innovative products enhance firm's internationalisation drastically. Reasons for this are many. Especially in small countries, like Finland, the size of domestic market is very limited. Innovations that are aimed at niche market segments need to seek sales from abroad. In many cases domestic market is non-existent, or extremely small and foreign markets are the primary market for some innovations.

Sectoral coverage

It has been argued that innovative companies can be found from high-technology industries, or industries that are regarded as knowledge intensive. Our sample of innovative firms does not bring exception to this common thought, as can be observed from Table 4.2.

Table 4.2 Sectoral coverage of innovations.

RANK	Born Globals	Older	Non-Exp
1	Electronics 17,4 %	Machinery 23,8 %	Services 12,4 %
2	Services 13,0 %	Services 8,7 %	Machinery 10,5 %
3	Software 11,3 %	Electronics 7,7 %	Foodstuffs 9,8 %
4	Machinery 8,7 %	Software 6,7 %	Software 8,0 %

Almost the same industry sectors can be found in each group studied, only the rank varies. Majority of born global firms operate in electronics and services, machinery hosting also small amount of innovative born global firms. In the older firm category innovations in machinery are evidently the most common. Traditionally, machinery is thought to represent low technology industry, at least less technology intensive than for instance electronics or software. Not surprising is either services' first position in the category of non-exporting firms. Services are commonly seen non-exportable because of their characteristics, such as intangibility and the relatedness of production and consumption (Grönroos 2000). However, service industry appears in the other two categories relatively high in rank. The commonly related difficulties to service exporting are not seen in the sample of studied firms. Quite often service function is applied to high-technology products which might partly explain the relatively high share of companies operating in service industry. Service is coupled to product innovation, and therefore offered in foreign markets.

Overall, the above results support our first hypothesis - born global companies engage in high-tech industries.

Novelty of innovations

To get some knowledge about the novelty of innovation in geographical respect (or from the market perspective), a simple classification "new to the Finnish markets" versus "new to the world markets" has been included. This type of classification has also been implemented from the OECD's definition, in which the distinction was made between firm-only innovations and world-wide innovations (OECD 1997: 34). Following the OECD's definition, a world-wide innovation occurs the very first time a new or improved product or process is implemented. Firm-only innovation, in turn, occurs when the new or improved product or process is novel to the firm but has already been implemented in other firms and industries. Firm-only innovation can be novel in the domestic context. All the above characteristics of an innovation describe the technological nature of an innovation. In the following table, the novelty across different groups of firms is presented. The evaluation of novelty has been done by company respondents.

Table 4.3 Market novelty of innovations.

	Finnish	Global	NA
Born Globals	9.6 %	87.0 %	3.5 %
Older	19.5 %	75.2 %	5.4 %
Non-Exp	35.3 %	57.8 %	6.9 %

The results presented in Table 4.3 indicate that in terms of novelty, born globals are commercialising more radical innovations compared with the other groups of firms. This result is not in line with our second hypothesis, in which the novelty of born globals' innovations was argued to be incremental, not radical. However, as our results clearly illustrate,

87 percent of innovations developed and commercialised by born globals are evaluated to be new to the world markets. Compared with the other groups of firms, the difference is significant. In the group of older firms, the share of world novel innovations is 75 percent, whereas in the group of non-exporting firms, the share is only 58 percent.

Collaboration

International collaboration and partnership between companies are considered important vehicles to take advantage of new opportunities, to achieve mutually beneficial goals (Peters 1991), to use existing resources in a more efficient way, and to facilitate technological development (Håkansson & Henders 1992). However, despite the opportunities opened up by globalisation effect (see Barlett & Ghoshal 1989) and despite the value of international partnerships, empirical studies reveal that they tend to be more rhetoric than reality (Peters 1991), and that partnerships with domestic firms still dominate (Håkansson & Henders 1992). In the Finnish context, the importance of collaboration was highlighted in a comparative study on Austrian and Finnish collaboration behaviour. According to that study, the high share of collaboration in Finland could be explained by a “national culture of co-operation”, which is deep rooted in the underlying innovation system (Dachs, Ebersberger & Pyka 2004).

In our innovation questionnaire, we distinguished between domestic and foreign collaborative partners to obtain a better picture of the nature of networks connected to innovation processes. In light of the previous results, an overwhelming majority of the innovations have been developed in some kind of collaboration, irrespective of industry. The extent of collaboration ranges from 77 percent in foodstuffs to 91 percent in software, the average being 87 per cent. Across the firm size groups, the extent of collaboration remains very similar irrespective of firm size.

In order to approach the role of international collaboration in Finnish innovative firms, we present an index to measure the importance of international collaboration. We simply compare the importance of various partners and make a division between foreign and domestic collaborators. The index presented in Table 4.4 can be calculated by using the following formula:

$$IIC = \frac{\sum C_f [value]}{\sum C_d [value]}$$

in which,

IIC = Internationalisation index of collaboration,

C_f

= foreign collaborator,

C_d

= domestic collaborator,

[value]

= importance of collaborator, likert scale 0-3.

This means that if the index is below 1, the role of domestic collaboration has been more important as the foreign one. If the index is over 1, foreign collaborating partners have been of greater importance.

Table 4.4 Internationalisation index of collaboration.

	Born-Globals	Older	Non-Exp
Customers	0,91	0,88	0,38
Consults	0,58	0,56	0,34
Subcontractors	0,69	0,58	0,40
Universities	0,81	0,70	0,77
Research Institutes	0,56	0,61	0,40
Competing company	1,65	1,77	0,72
<i>Average</i>	<i>0,87</i>	<i>0,85</i>	<i>0,50</i>

The first observation from the table is that domestic collaborative partners are considered to be more important than foreign ones. This applies for almost all types of partners. Only in case of competing companies, the collaboration has been judged as more important as the domestic one. However, this should not be interpreted to mean that innovation-related networks are mainly domestic since we do not know to what degree foreign partners have taken part in the innovation processes. A more suitable conclusion could be that firms appropriate the most important external knowledge inputs to innovation from domestic customers, subcontractors, universities and research institutes, while more peripheral knowledge enters from foreign sources, e.g. from competing companies.

The second result from the table is that there actually do exist differences between collaboration patterns of different groups of firms. Particularly, in the group of non-exporting firms, the importance of domestic collaboration partners has been significant. This is indicated by the values below one. Non-exporting firms get their highest index in the class of universities, in which they actually manage to pass older firms and approach born globals. This means that foreign universities play a fairly important role in the development projects of non-exporting firms. Considering born globals and older firms, the results are relatively equal. However, born globals get slightly higher scores in four classes out of six, research institutes and competing companies being as an exception.

Novelty of innovation versus collaboration

In previous sections, we have witnessed some special characteristics of the innovations developed and commercialised by born globals. We have seen that born globals commercialise more novel innovations (as analysed from the market point of view) than the other groups of firms. We have also noticed that international collaboration partners matter for born globals, although they have not displaced the importance of domestic partners. In this section, we combine the novelty of innovations and importance of international collaborative partners during the development process of innovation.

Table 4.5 Novelty of innovation versus collaboration.

	New to the Finnish markets	New to the World markets
Customers	0,51	0,82
Consults	0,39	0,49
Subcontractors	0,58	0,53
Universities	0,14	0,33
Research Centres	0,34	0,63
Competing company	1,21	1,38

Table 4.5 displays the results of the role of international collaboration in relation to novelty of innovation. The same method was used as in previous section. If the index is below 1, the role of domestic collaboration has been more important than the foreign one. If the index is over 1, foreign collaborating partners have been of greater importance. The results indicate that the role of foreign collaboration is more significant in producing radical innovations, i.e. those that are new to world market, than in the development of incremental innovations. Subcontractors seem to be only exception. The role of competing companies in the foreign collaboration is exceptionally high. One reason for this could be the lack of domestic competitors. Innovative firms aim at global niche markets and in small country like Finland the critical mass does not exist, or is insufficient. Due to this, firms rely more on foreign expertise. To conclude, new to the world innovations are characterised by higher degree of international collaboration.

5. Conclusions

This analysis has sought to highlight the patterns of internationalisation of Finnish innovative firms, and characteristics of their innovations. We began our analysis by dividing innovative companies into three distinct groups: born global, older and non-exporting. A special attention was paid to study born globals, which have achieved recently wide attention in the literature of international business. We defined born globals as firms, which start exporting their own products in three years after the establishment of the firm. Due to our tight criteria, we were able to identify 115 firms from our innovation data, which fulfil the criteria. A large share of these firms employed less than hundred employees.

In the paper, we had three main arguments, which were tentatively analysed. Firstly, we argued that innovative born-globals are located at knowledge-intensive sectors. According to results, this statement held as the majority of born global firms operate in electronics, services, software and machinery sectors. Secondly, we argued that born-globals are exporting incremental type of innovations. However, as it turned out born globals develop and export more radical than incremental type of innovations. This means that our second hypothesis was rejected. Thirdly, radicalness of innovations correlates with foreign partners (during R&D-process). Those companies that had international collaboration developed more radical innovations. To conclude, the paper provides new information concerning the innovation activities of born globals. It also raises the question of importance of foreign collaboration partners during the innovation process. This paper was the first attempt to combine the concept of internationalisation and innovation regarding the data we used.

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