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Abstract

The aim of this paper is to look at the extent and type of internationalization among Hungarian information technology (IT) small- and medium-sized enterprises (SMEs) and the possible relationship between the degree of innovativeness and the internationalization of these companies. Information technologies play an important role in the Hungarian economy: this sector is one of the most R&D intensive industries in which many SMEs are active.

The paper reviews relevant theories of internationalization in research, development and innovation (RDI) to give a broader picture of the environment in which SMEs have to succeed. This is followed by a secondary data analysis to show the situation of the industry in Hungary, then by an analysis of the survey data and interviews designed specifically for the purpose of this research.

The new empirical results show that Hungarian IT SMEs are still at the beginning of the internationalization process: while aware of the advantages of collaborations and internationalization, they are still reluctant to venture out of their “safety zone” and therefore they collaborate only with their closest partners. Very few SMEs have decided to establish international RDI contacts.

The analysis suggests that the main barriers in internationalization of the Hungarian SMEs are due to lack of capital, appropriate managerial capabilities and innovation-friendly economic environment.

So far, most theories/empirical research have concentrated on the role and activities of multinational enterprises in the internationalization of RDI, while in the literature less relevant knowledge on SMEs is available. The aim of this paper is to contribute to this latter part of the literature by analyzing the international activities of innovative/R&D-intensive SMEs in Hungary.

Keywords: RDI, internationalization, SMEs, Hungary IT

JEL: O30, O52, F23

Introduction

Internationalization/globalization and the growing knowledge intensity of products have made RDI capabilities a key factor. Multinational corporations (MNCs) are the main drivers and the main beneficiaries of these processes. As a result, most theories of globalization, international trade or innovation management (e.g. open innovation) deal with MNCs. However, these processes have a much broader impact, affecting the whole spectrum of economic actors. Nowadays even the smallest companies may find themselves confronted with the challenges posed by internationalization or by the need for innovativeness. Their successful engagement in these activities is crucial for national economies, as SMEs represent the vast majority of entrepreneurial entities.

Information and communication technologies (ICT) play an important role in the Hungarian economy, as they exercise a combined direct and indirect impact. The direct impact of the industry's expenditures, innovations or sales is substantially complemented by its indirect impact through productivity growth in other sectors. Furthermore, ICT is not only one of the most R&D intensive industries in Hungary – as well as in Europe – but is also inherently connected with globalization. Nowadays, internationalization activities go beyond production or marketing factors, as they have included also R&D and innovation activities, what can be seen in the performance of this industry. For these reasons the ICT sector is an ideal field in which internationalization of R&D and innovation activities can be observed. The participation in such international activities is a good measure of the international competitiveness of Hungarian enterprises.

ICT is a broad industry with various sub-sectors, each with their distinctive characteristics. Knowing these differences, this study concentrates on information technologies (IT) – leaving out communication – and more specifically on computer services and software development. These are fields in which Hungarian entrepreneurs may have some comparative advantages due to the highly skilled local workforce and because these areas do not require substantial initial investments like the hardware industry. It is also expected that the vast majority of firms in these service-like sub-sectors are SMEs, thus providing us with a large pool of RDI-intensive SMEs whose internationalization patterns we can study. So far, most of the theories/empirical research have concentrated on the role and activities of multinational enterprises in internationalization. The SMEs role in internationalization is not less important than that played by larger enterprises, but complements the latter. At the same time, the large number of SMEs is in itself a justification for a better understanding of the factors that could ensure their (international) success. The empirical research builds on the results of an online survey supported by in-depth interviews at internationally successful Hungarian SMEs, concerning such an understanding is the aim of this paper¹.

The structure of the paper is as follows: the next chapter gives a brief overview of the relevant theories on internationalization, R&D and innovation in SMEs, and provides the theoretical basis of the investigation. The second part characterizes the role of I(C)T industry in the Hungarian economy, which was a help in better assessment of the empirical results of our survey. The third section gives detailed information on the empirical research results, while the last part contains the main conclusions. The picture they show is rather bleak, for – despite this industry’s potential to be highly open and innovative – local SMEs show very little involvement in the more advanced type of international activities.

General aspects

Internationalization of R&D and innovation

It was in the early 1990s, when globalization performed by multinational corporations expanded into new geographical areas and new corporate functions, that researchers began to address the issue of the internationalization of R&D and innovation [Howells, 1990; Archibugi and Michie, 1997]. Ever since, the study of internationalization has primarily remained tied to the investigation of multinational corporations, as they were the main actors driving and embodying this process. Over the last two decades, different categorizations and theories have emerged to describe the internationalization process of R&D and innovation, arguing about home base exploiting and home base augmenting strategies [e.g. Kuemmerle, 1999]. In the first case, intra-firm relations played a substantial role, while external relations remained relatively unimportant. In the second case instead external connections that are the driving forces, like supplier-customer relations, there were interactions with local players, etc. This bipolar approach has been modified and complemented from many sides what has added more details to the process of internationalization, and allowed to describe further types of foreign R&D activities. Some papers [von Zedtwitz and Gassmann, 2002; Sachwald, 2008] have identified different “levels” or degrees of internationalization, depicting a scale of international RDI activities ranging from simple adaptation to a truly global RDI system.

This phenomenon has not bypassed SMEs. In an era of knowledge-based economies, participation in the internationalization process and R&D collaborations are both very important, as they are an important source of knowledge and experience which determine international competitiveness. The growing knowledge-intensity of current products and services increase the importance of having a large and flexible knowledge base [Edler, 2003; Tödtling et al., 2009; de Jong and Freel, 2010]. While firms concentrate more and more on their core competences, this means that there is a growing need for external knowledge sources even at the largest (multinational)

enterprises. As SMEs are more limited in their human resources, they are even more in need of external knowledge sources. With the development of IT solutions, it is easier than ever for them to access outside – even foreign – sources. There is some evidence that SMEs investing in R&D and innovation activities can be more productive if they can utilize these external knowledge sources [Audretsch and Vivarelli, 1996; Cerrato, 2009]. There are various theories which try to describe the internationalization process of SMEs (from the “Uppsala-model” to network-theories) both as an incremental and as a radical process (e.g. born globals) [see e.g. Lopez et al., 2009; Sass and Antalóczy, 2011]. These theories emphasize the varied behavior of SMEs and that there is no single road to success. R&D and innovation efforts as well as internationalization in this field are also influenced by the industry in which they operate. The international literature suggests that SMEs are more active in the internationalization of their RDI activities in high-tech industries where the highly-skilled labor force plays a decisive role in determining competitiveness [Narula, 2004; Lindstrand et al., 2011]. There are also indications that SMEs in the transition economies of Central and Eastern Europe are more internationalized than SMEs from large Western European economies, although this is also influenced by managerial capabilities as well as by the geographical location of firms [Glas et al., 1999; Musteen et al., 2010]. Thus, the topic of RDI internationalization of SMEs in the Hungarian IT sector was a promising one in which there were enough target firms for our study. Measuring the extent and forms of these processes can potentially contribute to a better understanding of the international competitiveness of this industry.

The Hungarian IT industry

Information and communication technologies are the important and constantly growing parts of the economy in Europe, the US and Asia. The scope of this sector covers a broad range of activities from IT hardware manufacturing to software development and various services. In Europe, it encompasses more than 450,000 enterprises, employs over 2.5 million workers and generates a turnover of 30 billion EUR. The sector shows above-average growth within the manufacturing industry and is one of Europe’s most export-oriented industries [Schmicom, 2006], where the most important sub-sectors are communication, software, and IT services, covering 60% of the whole ICT market [epp.eurostat.ec.europa.eu]. The situation is slightly different in Hungary, because many large IT hardware manufacturers have established subsidiaries in the country, and therefore the shares of hardware manufacturing, software development and services are mutually quite balanced [HCSO, 2009]. Besides these multinational corporations, another important feature of this industry is the availability of highly skilled workforce. They are not only a target for multinationals, but have also set up a number of independent SMEs who are now successful international players (e.g. Graphisoft with ArchiCAD, or very recently, Prezi.com). As for Hungarian owned

companies, SMEs have a comparative advantage in those activities that are knowledge-intensive rather than resource-intensive (e.g. services and software development). In Hungary, there were approximately 12,700 enterprises in the ICT industry employing 52,000 people in 2007. An important feature of this sector in Hungary industry is its export-orientation and, in some sub-sectors, the high share of foreign affiliates in the industry's performance.

In OECD member countries, amount of R&D spending in the ICT sector is 2.5 to 3 times higher than in some other traditionally R&D-intensive areas (e.g. in the automotive industry). The largest enterprises devote 6% of their income to R&D and innovation [NFGM, 2009]. However, European enterprises seem to be underperforming in this field, as compared to their US and Asian counterparts, who are spending even more in this field. The largest European investors in ICT R&D are Germany, France, UK and Sweden [EC, 2010], while the Hungarian ICT industry lags behind the EU average in this respect. Although the industry's importance in Hungary is comparable to that in other EU countries, its R&D and innovation expenditures are significantly lower than elsewhere in Europe. Even within Central and Eastern Europe, the Czech Republic spends 6-7 times more on ICT R&D than Hungary [OECD, 2008], although the R&D intensity indicators for the two countries are similar. R&D intensity in Europe fluctuates around 6%, while it is 11% in the US and Japan, and 12-16% in South Korea and Taiwan [EC, 2010]. Among European countries, Finland, Sweden and Denmark show the highest levels of R&D expenditures in the ICT industry (0.5% to 1.5% of BERD-to-GDP) while this share in Hungary is among the lowest ones (0.1%) [NFGM, 2009]. A more detailed examination shows that it is caused not only by expenditures which are limited but also by the scale of human resources. Only in Slovenia and Mexico there are fewer researchers employed in the ICT sector than in Hungary, and this picture could be only slightly better if we compare the number of ICT researchers to the total number of researchers [OECD, 2008]. Only Spain, Switzerland, Poland and Mexico are placed lower than Hungary in this respect.

An investigation of R&D activity in the Hungarian ICT industry reveals that it is higher in the manufacturing sub-sector which comprises only a smaller share of R&D laboratories (Table 1). This could be due to the fact that while there are less hardware manufacturers than in the other sub-sectors, they are much bigger in size and thus have more resources than enterprises (mostly SMEs) active in the other sub-sectors. Interestingly, the difference in the number of research labs is not mirrored in the number of employees. This number is very similar in the two sub-sectors, what also strengthens the opinion that there are more but smaller research establishments in the field of information and communication (services).

The two sub-sectors analyzed in Table 1 are responsible for 10% of all business R&D positions in Hungary, a number which could be even higher if we took into consideration those laboratories that are listed under different "sectors", e.g. R&D in natural sciences or

TABLE 1. Selected data of business R&D in selected sectors related to ICT, 2008

Sector	Number of R&D laboratories	Actual number of R&D employees (Headcount)		Number of R&D employees (FTE)		R&D expenditures (M HUF)
		Total	Researchers	Total	Researchers	
Manufacturing of computers, electronic and optical products	27	843	654	777	618	8 151,9
Information, communication	98	1 150	884	875	662	4 955,3
Grand Total*	1 155	14 043	9 408	11 373	7 912	140 041,9

Notes: * Grand Total refers to the total business sector values.

Source: HCSO, 2009, pp. 86–87.

engineering that include other laboratories working on ICT projects. But even this 10% shows that the ICT industry plays a very important role in business R&D as compared to other industries. However, it also seems to suggest that multinational companies play a more significant role in the industry than the numerous SMEs.

SME-specific data on RDI activity are hardly available. The European Union Innovation Scoreboard 2009 provides data only on the macro level. According to this source, 33% of EU-27 SMEs are engaged in product or process innovations, while this share is 17% among Hungarian SMEs (there are some other Hungarian studies that underline the lower-than-average innovativeness of Hungarian SMEs [See e.g. Inzelt, 2003; Inzelt and Szerb, 2003]). If we look at organization and marketing innovations, this picture looks slightly better: 40% of EU-27 and 26% of Hungarian SMEs are involved in these kinds of activities. Among innovative SMEs, only 9.5% in the EU-27 are engaged in collaborations, while such a figure for Hungary is a merely 6.5% [EC, 2009]. There is very little evidence as to whether the ICT sector performs above or below the national average. The sparse available data [HCSO, 2006] suggest that SMEs in the ICT industry are more innovative than average and also that they establish more R&D collaborations.

Altogether, these data underline the important role of the industry in the Hungarian economy. However, it seems that the relatively low R&D expenditures in the ICT sector and the small domestic market are the two most important challenges for the Hungarian industry and, at the same time, the main obstacles in the growth of the industry. Although the ICT sector analyzed in this section covers a broader set of activities than the underlying research presented in this paper, the main statements also extend to those SMEs in the IT services on which we are focusing over here. The following parts of this paper will refer to this narrow sub-sector.

Research methodology and sample

Data

It has been already mentioned that the ICT industry covers a whole range of different activities, what hampers any attempt to “identify” and characterize this industry. What is considered as a part of the ICT industry varies from one study to another, depending on the research aim or the available statistical data. In 1998, the OECD established a widely used categorization dividing the ICT sector into manufacturing and service sub-sectors, which are related to the electronic storage, transfer and display of data and information [OECD, 2002]. Beyond this definition, one can also identify computers and parts manufacturing, products related to broadcasting as well as computer services or communication. Looking at the impact of the ICT industry in a broader sense, researchers take into consideration IT user industries in the manufacturing/service sector which rely heavily on the latest ICT developments [e.g. Némethné, 2005].

The Hungarian categorization of the ICT industry generally follows the international recommendations with a few slight differences. The Hungarian Central Statistical Office collects data in four categories: a) post and communication, b) Internet services, c) information technology services, d) use of information and communication instruments and e) content management. In this approach however, the ICT and ICT-user industries are not separated. Under the Hungarian government’s action plan, the ICT industry is broken down into three groups: a) IT hardware and software companies, b) telecommunication service providers and c) professional IT service companies [NFGM, 2009].

The definition used in this article – based on the underlying research – concentrates on those sub-sectors that potentially contain a large number of SMEs, and thereby provide an appropriate field to investigate the internationalization of their RDI activity. Therefore, according to the TEÁOR’08 (Hungarian version of NACE, rev. 2.1.) the categories which we investigated were:

- Manufacturing of computer, electronic and optical instruments (26)
- Other manufacturing (32)
- Information technology services (62).

These selected fields exclude the “C” (communication) from ICT, therefore from the next section of the paper onwards, we will refer to IT and the IT industry when characterizing the subject of the analysis. The paper will overview the R&D and innovation activities of Hungarian SMEs in the selected sub-sectors to highlight the main forms and extent of globalization in this field.

The empirical research used an online survey (mid-2009) as its main method which was complemented with in-depth interviews at some of the Hungarian IT SMEs that were the most successful internationally. A total of 230 IT SMEs were contacted by e-mail to fill in the questionnaire and at the end, there were 49 completed responses

available for analysis. The quantitative information thus obtained was enriched by six interviews, presented in an integrated way². They served to provide more details on certain aspects of our investigation and to provide some explanations other than the numbers. When we compiled the list of target SMEs for the questionnaire, we were looking for companies potentially involved in RDI activities and/or involved in any kind of internationalization. The questionnaire included various topics: innovation activity, networking, competitiveness, internationalization and motivation behind internationalization. The following part of the paper will concentrate on a) innovation activity and b) internationalization.

In the course of the research, we received 49 valuable answers from a wide variety of firms. Three-quarters of them provided us with some of their basic financial and personnel data. According to them, the income of respondents varies greatly, between 1 and 1,350 M HUF (0.004 and 5 M EUR), their R&D expenditures between 7 and 60 M HUF (26,000 and 222,000 EUR). The data show a slight increase between 2004 and 2008, but still most of the respondents left these answers blank or entered "0". The personnel data reveals that 43% of the respondents are small enterprises, 24% of them are micro enterprises and another 24% are enterprises without employees. The small increase in the size of enterprises could be also traced in their personnel data. The majority of respondents employed 1 to 4 persons in R&D positions in 2008, but 36% of them employed none.

The vast majority of the respondents in our online e-survey are engaged in IT (computer) services. According to the relevant TEÁOR'08 categories, 94% of respondents listed information technology services as their main area of business, and 6% could be categorized as IT hardware manufacturers. This data supported our selection principles to focus on such sub-sectors where a large number of relevant SMEs could be found. It was also a sign that hardware production remains an area for large well-funded companies who can exploit the advantages of economies of scale. It is much easier to set up a new business in fields requiring less capital and where a few capable employees can utilize their knowledge and flexibility on the market. Those managers who were interviewed during the research further corroborated this statement with their own stories.

Information technology is a rapidly changing industry which is usually characterized by the consistently large number of new entrants on the market and by the high fallout rate. In our sample, almost 49% of the respondent enterprises had been established after 2001 and 16% of them even after 2008. This information seems to support the views about the short life cycles in the industry, the potential of an innovation to provide new opportunities to anybody and the danger of losing one's position if one fails to continuously adapt to changes. On the other hand, there is an almost equal number (16%) of firms that were established before 1991, what means that there are many opportunities to remain successful over time in this industry – a point

which was made by several interviewees, many of whom belonged to this category of “old” enterprises. One of the important factors of their long-standing success is – apart from the unique product/service – human resources and human resource management.

Innovation activity

As was expected from our sample selection methodology, the vast majority (90%) of respondents had introduced innovation in the last three years and/or in the last twenty years. Unfortunately this is not true for the Hungarian SME sector in general. Looking at the responses, it was also clear that in many cases, enterprises have introduced more than one innovation, often combining different types of innovation³. The most common types were product and process innovations and the combination of these two types, while the number of cases mentioning organization or marketing innovations was much smaller. Altogether, respondents cited 30 product innovations, 41 process innovations, against 8 organizational and 5 marketing innovations (Table 2). It is not surprising that in a more service-oriented field, the number of process innovations was higher than product innovations. It is more interesting that in such a competitive environment, enterprises did not engage in organizational and marketing innovations, which could be crucial for their market success.

TABLE 2. Innovation developers by type of innovation (number of references)

Innovation developers \ Type of innovation	In-house	In collaborations
Product innovation	18	12
Process innovation	19	22
Organizational innovation	8	0
Marketing innovation	3	2

Source: KKVENT_8.

The majority of respondents developed these innovations in-house, but a significant part of them (43%) relied on one or several external partners. This proportion was significantly higher than the national average cited in the previous chapter. If we look at the different types of innovations, it can also be seen that enterprises introduce more process innovations developed in collaboration than those developed in-house. Although we can interpret this as a small shift towards the innovation patterns seen in the most developed countries, it is still striking that respondents did not mention the purchase

of innovations developed elsewhere. The interviewed SMEs' managers recounted that they "try to keep knowledge – central to their growth and development – within the organization and collaborate only if necessary". This could also be the reason why firms are reluctant to sell their latest developments and why they prefer to do it on their own rather than buy it. In most cases, their innovations require such specific knowledge that it would be difficult to obtain it elsewhere than in-house. Apart from the unique solutions which their innovations generally require, the limited capital available to the enterprises also makes it difficult to purchase R&D results from an external partner.

Innovation is not a one-step activity, but a process in which a range of partners may play different roles at various stages. It is also possible that enterprises would sell their R&D results instead of, or besides utilizing them by themselves. Only the minority (44%) of respondent IT SMEs reported having sold their R&D results to third parties, in which case the buyers were predominantly domestic and foreign SMEs (32–32%), as opposed to large domestic companies and multinational firms. This is basically the only aspect of the whole innovation process where foreign actors play a significant role in the life of Hungarian SMEs. The e-survey asked about potential partners in idea generation, R&D, and the previously analyzed collaborations, but in most parts of the innovation process, domestic actors – like other Hungarian firms (suppliers, customers) or higher education institutions – played the role of main partners, while foreign partners were only listed after them.

The responses to the questionnaire corroborated the general impression that networking activity in the Hungarian economy remains below the average of the developed economies (see networking activity [e.g. Roijakkers and Hagedoorn, 2006]). This weakness of the Hungarian economy is even more true for the innovation systems which can also be seen among IT SMEs. Only 5% of our respondents were members of any kind of network (distribution, supplier etc.) and only 3% had joined an international network. Among domestic networks, RDI-type partnerships predominate, but they are seen less frequently on the international level where distribution-type partnerships are the most common networks. This is an important problem because RDI networks are usually a useful way to follow the latest trends, issues and developments in the industry, and to collect a wide array of useful market information. The only positive trend we can see from these data is a weak indication of learning (or at least the potential of that): domestic network memberships generally last three to five years, while international memberships are only for one to two years. This suggests that enterprises start to collaborate on the local level, and then move on to the international scene once they have accumulated some experience. The relatively short time in international networks means that it will take a few more years before we see a growing number of international RDI network-memberships. However, this does not only depend on the enterprise's decision-making; some external factors are also needed to bring a positive contribution to this process.

Internationalization

Before analyzing the internationalization of R&D and innovation, it is useful to begin with looking at the overall extent of the internationalization of SMEs. This can take many forms: from indirect export to foreign investments/subsidiaries requiring various efforts from the SMEs themselves. The e-survey contained questions about some of the main types of internationalization in order to be able to assess their extent and relevance. These types included export/import, supply, transfer of intellectual property, and foreign investments.

An aspect highlighted by the responses was that among the main types of international activity, only exporting affects a significant (though not overwhelming) proportion of SMEs, as 31% of enterprises (15) included it in their responses. Importing is much less common among IT SMEs as compared to exporting, because only 12% reported this activity. A possible explanation for this could be that the IT software/service industry is less dependent on foreign materials and that SMEs try to perform their activities using human value-added potential rather than physical components. The main type of input that they can require from other countries is knowledge, but this is not captured by import data. An examination of the extent of export/import in the activities of SMEs shows mixed results. Exportation was accounted for under 10% of the income in one-third of exporting companies, but represented over 70% of total income in 27% of the companies. This diversity is also apparent with regards to importing: it remained below 30% of the income in half of the companies, but over 50% in the other half of the importing companies.

These data show a lower than expected rate of exporting, which conflicts somewhat with our expectations about a globalized industry. Considering the important and integrating role of large multinational companies, one would expect more interaction with such international actors or simply a more global business orientation. Interestingly, this was only seen at those SMEs who saw it as somehow natural to target the global market with their products or services. These firms had realized that the domestic market was too small to allow for growth beyond a certain level and had developed a niche product or service which could also be marketed globally, seeing this as key for their longstanding success.

Although their number is not very high, it might be interesting to take a closer look at the content of export/import deals. It seems that there are clear relationships between the type and volume of exports/imports. Respondents who were exporting at a low level mainly sold high-tech parts and intermediary products abroad. On the contrary, those SMEs who were export oriented (for whom export activities exceeded 70% of turnover) mainly sold high-tech products or services (Table 3). Interestingly, services only played an important role in exporting and were hardly mentioned as an area of activities by importing SMEs.

TABLE 3. Product categories in export (Number of references)

Product-categories	under 1%	1–10%	11–70%	71–100%
Parts/Intermediary products	9			
High-tech parts/intermediary products	9			
Products	4		1	5
High-tech products	5		1	4
Services		4	3	6

Source: KKVENT_8.

Responses regarding any other forms of internationalization were not convincing. Only 20% of respondents mentioned that they were suppliers of foreign or foreign-owned companies. Hungarian enterprises took part in the international transfer of intellectual property in two forms. More firms (24%) mentioned that they had purchased know-how from abroad, while a small share of respondents (10%) had developed know-how together with a foreign partner. Internationalization based on foreign direct investment is a complex and resource-intensive form which is not really typical among our IT SMEs. Among the respondents of the e-survey, only one case could be found that an enterprise had established a foreign subsidiary. Considering the size of SMEs, their limited resources and the uncertainty that is attached to a decision of this nature, the infrequency of such activities is not surprising.

In order to better judge the picture on internationalization, is it useful to know what motivates managers to go abroad – or not. SMEs rated knowledge-related factors as the most important incentives for internationalization (Table 4). The “access to new knowledge” was the most important motivation for most SMEs. Meanwhile, although the response “speed up the RDI process by accessing modern infrastructure” received a higher average rating, it was mentioned by fewer enterprises (and was therefore omitted from the table). Following “knowledge acquisition”, “improvement of competitiveness” and “access to information” were the two highest rated motivations (these factors can be classified as very important, as the average rating for all of these factors was over 2.5).

Towards the middle of the ranking, we find further factors related to competitiveness and knowledge, complemented with factors like “obtaining references” or “becoming known” for business partners. On the other hand, traditional factors like geographical proximity, cost cutting, local economic policy or other market-driven motivations are less relevant for internationalization. As was already mentioned previously, human resources are relatively competitive in Hungary, therefore it is understandable that factors related to human resources received a low rating in this ranking as well.

TABLE 4. Main motivations of international activities

Motivation	Average*	Very important**	Important**	Not important**
Access to new knowledge	2,6	18	3	3
Improving competitiveness	2,6	16	12	
Access to information	2,5	13	12	
Access to new technology	2,4	15	3	6
References	2,4	13	14	1
Following the main trends	2,4	12	9	3
Becoming well-known	2,4	10	18	
Hiring highly skilled workforce	2,3	12	8	5
Entrance into new markets	2,3	10	12	3
Domestic economic policy	2,1	6	11	4
Broadening R&D employees	2,0	5	10	6

Notes: Only those motivations are listed which received response from at least 40% of our sample.

* Average of responses (3 = very important, 2 = important, 1 = not important).

** Number of firms ticking the given answer.

Source: KKVENT_8.

If we concentrate on the internationalization of R&D and innovation activities, the picture is similar, albeit with some notable differences. In this field, the most important motivation is the “development of business relationships” instead of knowledge-seeking. This is a sign that R&D and innovation collaborations, and internationalization itself are the results of a development process which is built up on pre-requisites such as trust, previously established business relationships, knowledge of one another’s capabilities, etc. Once this basic relationship reaches a certain level, R&D and innovation can be involved to further enhance the relationship with the partners [e.g. Gilsing, 2005; Csonka, 2009]. Apart from this, among the most important motivations for internationalizing RDI we find “access to special knowledge” and “broadening of financial resources for innovation” followed by two time-related factors: “quicker development” and “quicker innovation process”. This latter factor however was only of average importance while the previous four could be categorized as very important. Even less important for our respondents were human resources, as well as – perhaps more interestingly – the “availability of state support”. These were mentioned by so few respondents that we omitted them from the table (Table 5).

TABLE 5. Main motivations of RDI internationalization

Motivation	Average*	Very important**	Important**	Not important**
Developing existing business relationship	2,7	13	6	
Access to special knowledge, technology	2,6	12	6	1
Access to financial means supporting innovation	2,5	9	6	1
Opportunity to speed-up development	2,5	7	6	
Speed-up innovation process	2,2	3	9	1

Notes: * Average of responses (3 = very important, 2 = important, 1 = not important); ** Number of firms ticking the given answer.

Source: KKVENT_8.

Even once a company decides to go abroad, there are many factors that influence its actual choice of where to go in order to broaden the activities of the SME. If one expects a strategic approach to this decision, it will not be fully confirmed by the answers for this e-survey. Three aspects seem to guide the SMEs' decisions, all of which were related to the local (potential host) "capabilities". These are the connections with research institutions or knowledge centers in the target country and opportunities for RDI collaborations. All these aspects received relatively high average ratings, but relatively few respondents mentioned them. More firms mentioned some market-related aspects (size of market, attractiveness of market) or existing partner-related considerations, but these factors received rather average ratings, which were then followed by geographical and policy-related aspects. The factors rated as least important were those related to travel, clusters and previous experience in the target country (Table 6).

Looking at the motivations is only one side of the coin. There may be other barriers that are just as relevant and worth knowing about if we examine the main reasons for the limited level of internationalization among SMEs. Based on the responses, it can be said that the main obstacles in international expansion are the high costs attached to this step along with various problems related to the local (Hungarian) economic environment. It was only after these factors that "human resources" and "lack of information" were mentioned. The SMEs were very divided as to whether or not they cited "foreign language knowledge" and "lack of appropriate foreign partner" as obstacles. Some of them rated these aspects as very important while some of them did not see them as a difficulty at all. This might be tied to the level of internationalization at those enterprises, as an aspect which was highlighted by the interviewed SMEs. They mentioned that initially, when they started to internationalize their activities they lacked human resources and their

TABLE 6. Factors affecting the choice of foreign target country

Factors	Average*	Very important**	Important**	Not important**
Relationship with scientific institutions	2,8	6	3	1
Knowledge centers in the target country	2,8	6	3	1
Opportunities for RDI collaboration	2,8	6	3	1
Size of market	2,4	11	4	3
Foreign invitation	2,4	9	4	2
Attractiveness of market	2,4	8	10	
Existing personal relationship	2,3	7	10	1
Existing business relationship	2,3	6	12	
Geographical proximity to buyer(s)	2,3	4	8	
Economic integration (EU)	2,3	10	4	4
Government support, other allowances	2,2	3	7	1
Good transport from Hungary	2,0	6	4	4
Agglomeration, cluster issues	1,9	3	3	4
Previous economic experiences at the target country	1,6		9	5

Notes: Factors are listed here only if more than 10 respondents reflected on them.

* Average of responses (3 = very important, 2 = important, 1 = not important).

** Number of firms ticking the given answer.

Source: KKVENT_8.

foreign language knowledge was weak but that these factors soon become irrelevant after a few years of experience. Therefore it should be those enterprises that are making their first steps on the international market who consider the language barrier and the availability of appropriate partners to be an important issue, while those who have been doing business on the international market for a few years have mainly overcome these issues. Only a few firms mentioned and did not attach to much importance to factors such as the foreign exchange risk, host country economic system or the openness of human resources to work abroad (Table 7).

The interviewed successful SMEs shared their experiences that in most cases, current business opportunities drove the decision of where to appear with their products/services. Only very few SMEs had followed any kind of strategic approach in choosing to expand internationally, but once they had made the decision, they were undeterred by minor obstacles. Obviously the hiring of external experts to guide this process would

TABLE 7. Potential barriers of international expansion

Barriers	Average*	Big problem**	Problem**	No problem**
High costs	2,8	10	1	
Problems with economic environment in Hungary (e.g. regulation, administration)	2,5	10	6	1
Lack of human resources capable of driving international expansion (knowledge, experience)	2,2	7	2	3
Knowledge difficult to obtain	2,2	6		4
Lack of financial resources	2,1	6	8	4
Lack of knowledge (e.g. target country's economy)	2,1	6	4	4
Lack of foreign language knowledge	2,0	7		7
No foreign partner	2,0	6	2	6

Note: Barriers are listed here only if more than 10 respondents reflected on them.

* Average of responses (3 = big problem, 2 = problem, 1 = no problem).

** Number of firms ticking the given answer.

Source: KKVENT_8.

improve the position of the enterprises, but neither the interviewees nor the e-survey respondents mentioned doing so. When looking for external support, most of them relied on the domestic institutional system, which is mainly made up of professional organizations, the International Trade Development (ITDH) organization and the National Development Agency in the field of RDI. Several of the enterprises had taken part in R&D and innovation support programs, but only a few mentioned that they had applied for state support for their international expansion through the ITDH. Even less companies had requested any kind of aid from the host country's institutional system (only 3 SMEs mentioned this). This seems to suggest that although there is an institutional framework in Hungary to support internationalization, its efficiency and/or effectiveness is not attractive enough for SMEs to draw on their services.

Conclusions

Internationalization, especially in the field of R&D and innovation, has become a key phenomenon of economic development during the last two decades. Successful enterprises who strive for sustainable growth have been internationalizing their

activities – not only multinationals but also SMEs. **Having an international presence can provide feedback on enterprises' competitiveness, because it requires more and better capabilities than serving only the domestic market.** If a firm can face these challenges one can take it as a sign of better than average capabilities. On the macro level, an economy with many internationalized firms is potentially more competitive in the globalized world.

The IT sector is one of the most globalized industries, which is a mean and a subject of networking. Its role in the Hungarian economy is very important: the latest government programs have identified this field as a possible leading market mobilizing the entire economy. However, the statistical data regarding the growth of the industry and about its R&D and innovation activity suggest that the present situation cannot be maintained without improved efforts of the enterprises and the government. **One of the sector's weaknesses is that SMEs have largely failed to integrate within the global economy.** Analyzing the main forms and extent of internationalization and especially the R&D and innovation activities would help to better understand the present situation, to identify the main strengths, weaknesses and break-out points. The utilization of this knowledge might help to improve the whole economy's global competitiveness.

According to theories in the international literature, R&D and innovation activities have a positive influence on the performance of enterprises, what (partly) depends on RDI collaborations. The e-survey of Hungarian IT SMEs only partially corroborated this view. The percentage of respondent SMEs who had some kind of RDI collaborations was slightly higher than the national average but the majority of these collaborations were domestic. It seems that these SMEs were still at the beginning of a process: they had become aware of the advantages of collaborations, but still preferred to remain in their "safety zone" and continue to collaborate only with their closest partners. Very few SMEs moved beyond this stage and proceeded to establish international RDI contacts. Those who did so, usually achieved sustainable success on both the national and international markets. It is promising – and a sign of the potential of the domestic research capabilities – that one can find equal numbers of domestic and international actors among the buyers of research results.

Another weakness of the RDI collaborative efforts of Hungarian IT SMEs was that those partnerships usually remained on the level of informational bilateral collaborations. There were very few respondents who reported network memberships and even less in the field of RDI. This can be a sign of the absence of a strategic approach, short-sighted management and mainly ad hoc (or periodical) collaborations. Less than one-fifth of SMEs were members of any network and less than half of these networks involved RDI. Here again is an indication of the **importance of learning, because the most important motivation to join a network is knowledge-seeking. Accordingly, we can expect that the number of such initiatives will grow in the future.**

This view is supported by the interviewed SMEs who had found a global niche market for a good product/service in order to gradually build their international business. They invested a lot to strengthen basic and core competences (like absorptive capacity, human resources), which are the key for long-term success. Their stories supported both theoretical strands in the literature: gradual or born global internationalization. The difference is partially the result of the product/service, because in some cases the Hungarian market is simply too small to support even a SME. However in either case, it required time to build up their success on the international level. Respondents to the e-survey tended to be younger than most of the interviewed SMEs, what suggests that they still have time to learn and establish an international name for themselves. They were in a pre-internationalized phase which did not go beyond export/import activities, but there were some signs that respondents had started to build relationships that might help them in the future to take part in the internationalization of RDI and other complex forms of internationalization.

Our research suggests that in order to improve the internationalization of Hungarian SMEs, it is essential to improve the availability of capital (a permanent weakness of the national economy) and the overall economic environment. It is interesting that while firms were satisfied with their professional human resources, most of them lacked the management capabilities to navigate international expansion. The higher education system has to provide enough highly skilled human resources in both fields. In addition, there is a need for further efforts to make SMEs aware of the importance of R&D and innovation: that if they start to strengthen their activities, it will launch a self-propelling process leading to the desired higher level of internationalization.

Notes

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² The SMEs interviewed were: Graphisoft Kft, IND Group, Morphologic Kft, 4D Soft Kft, NNG Kft and Balabit Kft.

³ Our questionnaire about innovation activity referred to the operation of the firms during the last three years before the survey. Therefore throughout this chapter, data on the innovativeness of the surveyed firms apply to 2007–2009.

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