

A multidimensional decision-making model for internationalization of high-tech SMEs in transition economies

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Abstract

Until now, international entrepreneurship has mainly used stage theory, institutional theory, transaction cost economics and the resource-based view to explain or describe the internationalization of SMEs in transition economy context. Following recent literature we contend that these approaches are highlighting interesting elements of decision processes for internationalization, but are not yet enough managerial applicable because of the unidimensionality of these theories. We provide a model in four steps which enables multidimensional analyses of internationalization processes. In this the strengths and weaknesses in the strategic, economic, cultural and social network capital of the focal firm are assessed. Shortcomings in these capitals can be complemented by their partners to increase chances of successful internationalization. This article is a deductive study on three innovative Russian high-tech SMEs. The first case illustrates a clear fit with a potential partner, the second case describes a poor fit and in the third case the firm would not benefit from internationalization.

Keywords

Entrepreneurship, Internationalization, Decision-making, (Russian) high-tech SMEs,

Introduction

International entrepreneurship has been defined as the “discovery, enactment, evaluation, and exploitation of opportunities – across national borders – to create future goods and services” (Oviatt and McDougall, 2005, p. 540). High-tech SMEs increasingly internationalize. They need to improve their chances of survival in this increasingly globalized world with its accelerating rate of innovation (Karagozoglu and Lindell, 1998; Oviatt and McDougall, 1994 and Spence, 2003). SMEs have relatively fewer resources than large firms, which could hinder internationalization (De Chiara and Minguzzi, 2002; Kalantaridis, 2004 and Reuber et al., 1997). According Katila and Shane (2005) the access to resources is critical for the commercialization of technology. High-tech SMEs encounter additional challenges, as they operate in niche markets and face shortened windows of opportunity. In this context, of special concern is internationalization from transition economies to developed economies. We define transition economies as post-socialist economies in transition towards market economies. Problems derive from underdeveloped infrastructure, cultural heritage, but specifically limited experience. Internationalization from transition to developed economies is underrepresented in extant literature, as this mainly covers internationalization from developed into transition economies. (i.e. Bruton et al., 2008; Danis and Parkhe, 2002; Fey and Beamish, 2000; Hitt et al., 2000; Hitt et al., 2004 and Luo,1997). Furthermore, big strategic companies have been studied more in this context than smaller firms (i.e. Bulatov,

1998; Luo and Tung, 2007; Vahtra and Lorentz, 2004; Yamakawa et al., 2008). Several authors have stressed the need for more research on the internationalization of SMEs from transition economies into developed economies to keep up with practice (i.e. Lu and Beamish, 2006; McDougall and Oviatt, 2000; Westhead et al., 2001; Wright et al., 2005 and Yamakawa et al., 2008). We contribute to the literature by looking at internationalization as a process of decisions. Furthermore, we add to the literature a multidimensional approach instead of the more used narrower views that tend to oversimplify the complexity of internationalization. Partnerships can help high-tech SMEs to obtain critical resources. This has the added advantage that small firms can use these resources without owing them, increasing flexibility (Reuber et al., 1997). After briefly discussing the main theories, our model provides a multidimensional, four-step approach to systematically analyze relationships with (potential) partners. Three Russian cases will show how this model can lead to better decision-making in internationalization. These cases create the possibility to make recommendations for other high-tech SMEs that want to internationalize.

This article is structured as follows: First, there will be a theoretical background to explain the current state in the literature. Then, the model will be described, after which the methods used are elaborated upon. The use of the model will be clarified by three cases in the Russian high-tech SME context. Last, a cross-case analysis will be presented, followed by a discussion and conclusion.

Theoretical background

Several theories are used to describe or explain internationalization. We will discuss a general internationalization theory, the three main theories used for internationalization in the context of emerging economies, and one theory on partnering.

A theory that explicitly focuses on the process of internationalization is stage theory (Johanson and Vahlne, 1977). Stage theory argues that initial internationalization activities take place in markets with small psychic distances to the home country, and that the less committed modes of entry tend to be used. The firm learns, and both international market knowledge and experience increase. This leads to an increase in commitments to the foreign market and the targeting of more distant markets (Johanson and Vahlne, 1977). This theory received much criticism from the scholarly world. It is pointed out that the theory is inappropriate for accelerated internationalization (Kundu and Katz, 2003; Crick and Spence, 2005; Ruzzier et al., 2006; Autio et al., 2000 and Rialp et al., 2005), which follow a different path than the gradual evolvement from domestic firm to MNE. (Oviatt and McDougall, 1994 and 2005).

Other than stage theory, Hoskisson et al. (2000), Wright et al. (2005) and Bruton et al. (2008) argue that institutional theory, transaction cost economics and the resource-based view of the firm are the three primary perspectives on internationalization of economies which they call emerging. These include but are not restricted to transition economies.

Institutional theory “emphasizes the influence of the systems surrounding organizations that shape social and organizational behavior” (Scott, 1995 in Hoskisson et al., 2000) including strategic internationalization choices (Yamakawa et al., 2008). Institutions are informal constraints and formal rules that structure political, economic and social interaction (North 1991). Hitt et al. (2004) defined institutions as “shared, collective understandings or rules of conduct reflected in laws, rules, governance mechanisms, and capital markets” (Hitt et al.,

2004, p. 174). Institutional theory has proven useful in transition economy contexts where institutions have a firm hold on society. Luo and Tung (2007) argue that emerging economy firms use internationalization to overcome institutional constraints in the home country. Nevertheless, institutional theory mainly focuses on external cultural influences. Contrary to this, De Chiara and Minguzzi (2002) stated that “the main obstacle to international activity often lies within the firm itself rather than outside it (...) as it has to do with internal resources and limited capacities” (De Chiara and Minguzzi, 2002, 145). Also, it does not describe the decision-process of internationalization, which is needed to offer guidance in decision-making.

The second theory used in transition economy context is transaction cost economics. Trade-offs between costs and benefits are optimized to decide whether to cooperate or to internalize. This approach is founded on the concept of bounded rationality and the risk of opportunism. Bounded rationality makes it impossible to fully understand all consequences of making a decision, and this influences the transfer of knowledge across organizational boundaries. The concept of opportunism implies that there is a risk in transferring knowledge, as others might behave in their own interests, using collaborative contracts for other purposes than those originally intended (Shrader, 2001). Transaction cost economics is a useful approach in explaining the form of international relations, but focuses less on the decision-process or the content of a relationship. It is strategically oriented in which financial resources play an important role, paying less attention to aspects as culture and social networks. Furthermore, the theory is widely applied in developed markets with strong legal frameworks and binding social norms. McDougall and Oviatt (2000) believe that “transaction costs arguments appear to be more applicable in individualistic societies”. Transaction cost economics still requires research to be performed to be directly applied to transition economies (Hoskisson, 2000).

The third theory utilized for internationalization of emerging markets is the resource-based view. This theory argues that sustained competitive advantage can be achieved through valuable, rare, inimitable and non-substitutable resources (Barney, 1991). To realize full competitive potential of these resources, the firm must be appropriately organized (Barney, 2001). In international operations, a firm should choose a structure that is consistent with the “firm’s emphasis on being responsive to local markets, on exploiting international integration opportunities, or both” (Barney 2001, p.547). Valuable unique assets permit firms with constrained resources to enter foreign markets (Oviatt and McDougall, 1994). The resource-based view provides a rather static explanation of international competitive advantage, in which the process of obtaining the necessary resources is not explained. Also, the types of necessary resources are undefined. It implies that all resources are good by themselves, as long as they comply with the previously mentioned characteristics. Moreover, the resource-based view tends to be internally oriented, whereas we argue that value creation processes take place in interaction and interdependencies with others. Håkansson (1987) believes that development and innovation take place in interplay between actors, in which counterparts can add value to the firm instead of being competitors (Håkansson, 1987; Håkansson and Snehota, 1995). In line with this, Groen et al. (2002) assume that links play an important role in identification and exploitation of opportunities in innovation processes of firms.

Based on transaction cost economics and the resource-based view, Gulati developed a network perspective to the study of strategic alliances. He believes that the resource-based view does not sufficiently address the process through which firms create the resources necessary for competitive advantage, and that performance is better understood by a relational than an atomistic view (Gulati, 2000). He argues that firms form alliances when they perceive

strategic interdependence between each other. There is strategic interdependence when one firm has resources that are beneficial to, but are not possessed by the other (Gulati, 1995). Gulati states that network resources are inimitable and non-substitutable resources that are created and provided access to by networks (Gulati, 2000). Prior alliances, both direct and indirect, are a valuable source of market information. Firstly, they create awareness on the existence of viable partners, including their resources. Established partners are likely to have a reasonable understanding of the needs of a firm, thus being able to recognize opportunities for them. Secondly, they serve as a basis for trust between partners to counterbalance risks associated with forming alliances (Gulati, 1995). Referrals from third-party partners reduce hazards. Thirdly, prior alliances ensure that potential partners learn about opportunities at the right time (Gulati, 1999). This is especially important for high-tech SMEs that need to have access to resources in a short window of opportunity (Katila and Mang, 2003). This theory is very useful to the literature in that it focuses on the question with whom a firm is likely to collaborate, rather than when and why. However, the resources necessary to create strategic interdependence are unspecified. Furthermore, the importance of prior alliances for the creation of future alliances cannot be applied to start-ups without alliance history.

We conclude from the description of previous approaches that they do not describe decision-making processes for internationalization and focus on only one or two dimensions. Rialp et al. (2005) argue that studies on managerial decision-making are underrepresented. Only stage theory and the study of strategic alliances describe processes, but not on a decision-making level. In addition, we saw that they are unsuitable for high-tech SMEs that participate in accelerated internationalization or for start-ups without alliance history. Furthermore, we saw that institutional theory stresses cultural influences on the firm, that transaction cost economics is strategically oriented in which financial resources play an important role, and that in the resource-based view dimensions cannot be distinguished as such, and the networking aspect is underdeveloped. Yamakawa (2008) is one of the scholars to support that one single perspective oversimplifies the complexity of internationalization of emerging economy firms and combined insights are needed. Rialp et al. (2005) agree and believe that a single theoretic framework is reductionist. To address the two concluded problems we elaborate on a multidimensional decision-making process theory.

The model

As shown before, SME internationalization for firms in transition economies is multidimensional, meaning that multiple dimensions need to be taken into consideration when making decisions. In addition, internationalization is a process of decisions rather than a single decision. This means that several steps need to be distinguished. We recognize the literature previously described, but we take a more sociological approach that builds on the work of Parsons (1964). We acknowledge, in line with Crick and Spence (2005), that decision-making is not always a rational process. Yet, several studies have described that by decomposing and systematizing the decision process, decisions can improve. Our approach is based on a multidimensional decision-making model that distinguishes four steps that need to be taken. This model is presented in figure 1. We first discuss the dimensions and then turn to the four steps.

The dimensions

The dimensions are categorized into capitals according to the function that they have for organizations (Kraaijenbrink and Groen, 2008), originally distinguished by Parsons (1964) in his social system theory. The basic assumption of this theory is sustainability of a social

system over time, based on four mechanisms. These are goal alignment, adaptation, latency and integration. (Parson, 1964). In each of these mechanisms, a certain type of capital can be used:

1. **Strategic capital.** This refers to the set of goals of an actor in terms of mission and strategy and its ability to attain them.
2. **Economic capital.** Efficient economic allocation of scarce resources leads to more efficient processes.
3. **Cultural capital.** To regulate exchange, it is essential to have culturally structured and shared symbols.
4. **Social capital.** Networks provide connection to resource providers.

(Groen, During and Weaver, 2002; Groen et al., 2008)

Strategic capital is “the set of capacities that enables actors to decide on goals and to control resources and other actors to attain them” (Groen et al., 2008, p.62) through power, influence and authority. Strategic capital can reside both in people and in artifacts. The first step in the decision-making model is taken in this dimension.

Economic capital is a “set of mobile resources that are potentially usable in exchange relationships between the actor and its environment in processes of acquisition, disposal or selling” (Groen et al., 2008). Firms should seek the efficient scale for operations, or try to become more efficient than competitors by using money. It is important to note that resources are not in themselves tied directly to a particular goal (Kraaijenbrink and Groen, 2008).

Cultural capital was defined as “the set of values, norms, beliefs, assumptions, symbols, rule sets, behaviors and artifacts that define the actor in relation to other actors and environment” (Groen et al., 2008). Knowing how to do things effectively and efficiently leads to a fixed pattern of skills, and certain behaviors, values and methods of dealing with certain situations that are supported whereas others are not in terms of the goals set by the firm (Groen, During and Weaver, 2002).

Social capital is ‘the set of network relations through which actors can utilize, employ or enjoy the benefits of capital that is controlled or owned by other actors’ (Groen et al., 2008). Social capital is the network, through which strategic, economic, cultural and other social capital can be obtained. The resources themselves are not included in social capital.

Each type of capital contributes to the performance of the firm and none of the four is determining. Possession of superior resources gives firms a potential of competitive advantage, whereas increased performance is dependent upon the actions in which these resources are deployed (Kraaijenbrink and Groen, 2008). When firms do not have all of the four capitals themselves, they get it elsewhere. There needs to be a fit between the capitals of the partners, and shortcomings in capital in one firm can be overcome by strengths in these types of capital by another firm. This is in line with Hitt et al., (2004), who state that firms need to partner with others who can complement skills and capabilities, and with Yamakawa et al. (2008), who argue that strategic alliances can be effective in overcoming capability deficiencies.

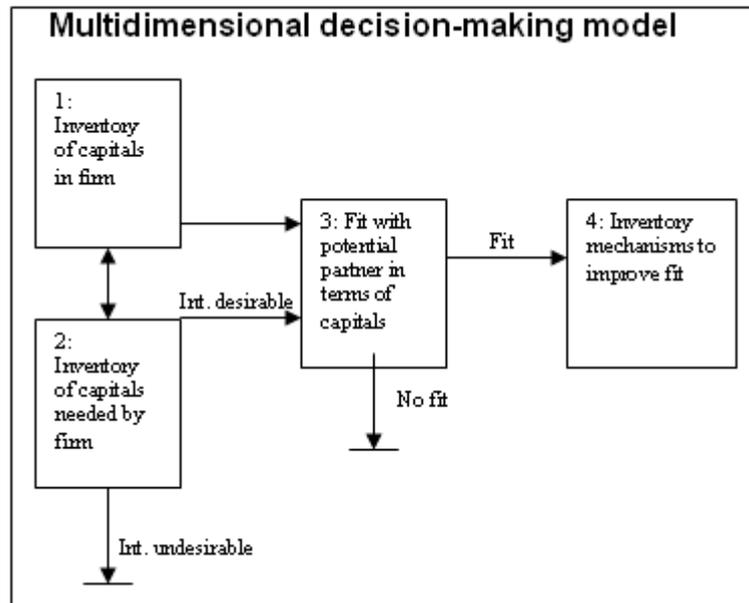


Figure 1: Multidimensional decision-making model

The steps

For internationalization with a partner, a series of decisions need to be taken. We distinguish four steps in which decisions are made in relation to the availability of the four capitals. The first step involves an inventory of business characteristics that are present in the firm in terms of strategic, economic, cultural and social capital. From this, weaknesses and strengths of the firm become apparent and the firm can identify in what areas additional assistance would be useful. Therefore, once the present business characteristics are known, an inventory can be made of strategic, economic, cultural and social capital that is needed by the firm. This is the second step. As stated before, shortcomings can be complemented by a partner. When an inventory shows that a firm does not have many needs in capitals, it might decide that internationalization with a partner is not a suitable option. When a firm does decide to internationalize, the third step evaluates the fit with a potential partner. More specifically, it assesses the extent to which strategic, economic, cultural and social capitals of the firms complement and align with each other. This is a critical step. If there are unacceptable differences, the firm should discontinue the process with this partner as it is likely to result in a dissatisfying experience for both parties. However, it is unlikely that a partnership is a perfect match in all aspects. Therefore, in the last step, an inventory needs to be made on suitable mechanisms for improving the match with a partner. Again, the strategic, economic, cultural and social capitals are used for this purpose. As firms and partnerships are dynamic, continuous evaluation of capital needs, fits and mechanisms is necessary.

Methods

Selection of firms

This paper studies a multidimensional decision process for internationalization, which justifies the use of a case-study (Yin, 1994). We selected our firms from a Moscow technology university located in a technology park ‘Technopark’ to show the use of the model. Our method was to choose firms that had complementary firms in a developed economy. Access to both parties was essential for the controllability and execution of testing the model. As we are associated with the University of Twente, the study took place in an experimental, artificial setting in which the developed economy was represented by the Twente region in the Netherlands. We could not depend on industrial codes for sector

compatibility because of incomplete registrations on the Russian side. Therefore, we consulted experts on entrepreneurial activity at Technopark and in the Twente region. These included the director of Technopark, the CEO of the Innovation Lab in Twente, and three project leaders and members of a selection committee of entrepreneurial support in Twente. Final selection of Twente firms occurred partly through self-selection. One of the members of the selection committee of entrepreneurial support in Twente sent an inquiry to his entire network of SMEs to ask whether or not they were interested in collaborations with any of the Russian firms. In addition, all consulted experts from the Twente side suggested firms that could be suitable for collaboration, and these were then approached individually. Of the in total 25 firms at Technopark, there were ten that operated in sectors that could also be found in the Twente region. Four of them did not see the need to internationalize with a partner and did not go beyond the second step. Five of the ten firms found a potential partner, but encountered differences between them that could not be overcome. They were not able to pass the third step. There was only one firm who found a potential partner with whom collaboration can work, and completed all four steps. To present a full spectrum of uses of the model, one firm in each of these three categories was selected to be described in this paper. These are *Radiodevice*, *Aqua* and *Simulator*. *Radiodevice* matches very well with the Dutch firm *Scentsystem*, whereas *Aqua* and the Dutch firm *Water* is a poor fit and *Simulator* is not interested in internationalization.

Measurements

Every dimension of the model is operationalized into various aspects. Firms might not be aware of certain shortcomings that they might have, making it difficult to assess what type of capital is needed from a partner. This problem is minimized by using as many indicators as possible for the operationalizations of the four dimensions, and by combining existing scales with perceptions from interviewees. The operationalizations and their indicators are summarized in Appendix A.

In strategic capital, we analyzed two interpretations of strategy; what are the goals of the firm and what is the capability of the firm to attain the desired goals. The type of strategy of the firm was defined by the typology of Miles and Snow, meaning that a firm could either be a prospector, a defender, an analyzer or a reactor (Miles and Snow, 1978). Furthermore, Slater and Narver (1996) imply that “a study comparing the strategic profiles of different orientations would be interesting and useful to their more complete understanding” (Slater and Narver, 1996, p. 170). There are five orientations: towards innovation, competitors, suppliers, alliance partners and customers. Orientation towards suppliers is not considered of relevance in this paper, which is why it is excluded. International orientation is included, as it is essential in this research to know to what extent the firms have the intentions to internationalize. Orientations towards competitors and customers are combined into marketing orientation. To objectively test qualitative data from interviews, the MKTOR scale of Narver and Slater (1990) is used. The original scale also included interfunctional coordination to measure alignment of strategy between departments. Our selection of cases forced us to exclude interfunctional coordination since all of our firms were too small to have departments. The capability to attain preset goals is analyzed by power, reputation and flexibility, as operationalized by Kerssens-van Drongelen and Groen (2008).

In economic capital, the financial position of the firm needs to be assessed. The traditional production factors are land, labor and capital (Smith, 1776). We consider all financial assets, both human and non-human, as financial resources. To see how much output is generated by these financial resources, financial performance of the firms is measured. This is done in

terms of return on investments, profits and revenues in relation to the results of the previous year and the expectations in five years time. Last, the operations of the firm are assessed by researching how most money is spent, in what areas costs could be cut according to the director, if the firm uses investments of others and what the firm's perception is on its own efficiency.

In cultural capital, skills and values are analyzed. According to Groen, Jenniskens and van der Sijde (2005), successful high-tech firms should possess technical skills and entrepreneurial skills. Entrepreneurial skills are divided into marketing, business administration and organization and financial management. The values of the firm are assessed by its entrepreneurial orientation. Qualitative data from interviews is added by the entrepreneurial orientation scale of Lumpkin and Dess (1996), based on the strategic posture scale of Covin and Slevin (1989). International orientation is included to research to what extent the firms are ready to internationalize.

In social capital, typical social network measures of ties are used. These measures can be divided into positional and relational aspects (a.o. Burt, 1982, 1992, 1997, 2005, Brass, 1995). Next to this, the degree of internationalization of the current network is taken into account, as well as the perceived importance of the current network to the firm and of the firm to the current network.

Information gathering

Information on the Russian firms was gathered through both secondary and primary research. Secondary research was done by means of desk-research. Written information provided by Technopark and the firms were extensively studied and the Internet offered valuable information on the activities of the firms. Primary research included in-depth interviews with the directors of the firms. To have close access, one of the authors worked at Technopark during a two-month period to execute the interviews. These were recorded and transcribed into detail. From this, systematic analysis was possible, as every sentence from the interviewee could be carefully tested for its applicability in one of the four capitals. Our research might suffer from single informant bias at the firm level, as it was not possible to interview additional employees. However, at a higher aggregation level it was possible to put the answers of the individual directors into perspective, as other directors were interviewed. The interviews were conducted in the Russian language to preclude language barriers. In addition to the Russian language skills of one of the authors, questions were translated from English into Russian by a native Russian academic that were checked by two other native academics. Some interviews were conducted by native Russian students of the Faculty of Innovation Management of the technical university. To limit interview bias, the interviews were structured by an extensively developed questionnaire and an interview protocol. The interviewers were trained to increase homogeneity in information gathering. Identical interviews were conducted with directors of the Dutch firms. In addition, they were also asked specific questions about their vision on collaboration with the pre-selected Russian high-tech SMEs. These interviews were held in the Dutch language.

The Russian firms

Radiodevice

Radiodevice produces small devices to measure radioactivity for daily use. No special knowledge in the field is required for operating the devices. The devices are cheaper than professional equivalents. They are used by individuals who are concerned about their health,

by ecological and metallurgical companies that cannot afford professional equipment, by banks and by schools for safety education. Radiodevice's strategy is to produce devices that measure radioactivity that are understandable for the lay person. It has not researched market needs or why current customers buy the product. Nevertheless, it is the philosophy of the firm to solve problems of customers rather than to sell goods. The strategy of Radiodevice does not contain active international aspects. The firm wants to internationalize if opportunities emerge, but considers the Russian market sufficiently big. It has one international patent that is valid in France, Germany, and Italy. Radiodevice currently has sufficient financial resources for operations. Nevertheless, it foresees lack in production space and investments if the firm wants to grow. Furthermore, it has already attempted to increase efficiency through the implementation of an automated production line and to outsource several aspects of the production process. The staff has extensive technological educational backgrounds and experience in technology. However, only the director took courses in marketing and business administration. Moreover, nobody at Radiodevice received education in the international management field. Although the firm's website is created in different languages, the firm does not have staff who speak foreign languages. Radiodevice has many irregular but long-term ties with resellers, product developers and its mother university. From its contacts, Radiodevice is able to obtain foreign language skills, marketing skills and supplies. It is looking for a long-term relationship with a foreign reseller.

Aqua

Aqua develops household filters and extra-productive systems for collective and industrial water purification. Its filters are mostly used by house-holders, in offices, kindergartens, schools, hospitals, hotels, restaurants and in the food industry. The unique selling points are its longevity and simple mode for ordinary users, prevention of bacterial breeding, high productivity rate of the filters and a really competitive price. Aqua has clear short-term and long-term goals to achieve a new quality level and to develop water purification systems with better technology and performance features compared to its competitor's models. The firm intends to internationalize. There have been previous attempts – although unsuccessful – and international production standards are met. Averagely small customers are responsible 60% of revenues and the firm has not actively tried to become well-known in the market. Moreover, the firm is flexible to sacrifice its strategy for network partners. The firm wants to grow rapidly within the next five years if new complex construction, increased manufacturing space and proper equipment can be financed. For this future growth, the firm foresees a lack of financial resources. In addition to that, Aqua generates the lowest revenues per employee with high overhead costs. The staff of Aqua have excellent technical skills, but not in marketing, financial management, international management or foreign languages. There are intentions to hire managers in marketing and finance, but not in international management or foreign languages. Aqua has stable contacts with others although the frequency of contacts is quite low. All contacts trade different resources with the firm. The firm is looking for a reseller.

Simulator

Simulator develops trainer-simulators to train personnel at nuclear power plants. It also creates tools for the development of such trainer-simulators. Its unique selling point is its effectiveness of trainer-simulators. Simulator aims to finish the development of a fully prepared trainer-simulator for digital industrial control. On the long run, it wants to consolidate its position in the Russian market. Although Simulator has collaborated with a German firm in developing trainer-simulators for nuclear power plants in Latvia and Switzerland, there are no goals in the international market. The nuclear power industry is a sensitive industry, and the firm argued that operations abroad can severely harm contacts in

Russia. Furthermore, Simulator uses its means efficiently. Nevertheless, it is difficult for the firm to have access to sufficient financial resources, as projects are done on contractual basis. A large part of Simulator staff consists of technical specialists. Finally, Simulator has long-term partnerships.

Cross-case analysis

This section provides a cross-case analysis of the three cases with respect to the multidimensional four-step decision model. The results are summarized in table 1.

Step	Radiodevice	Aqua	Simulator
1 Inventory of capitals in firm	<ul style="list-style-type: none"> • Strat: Large power base to attain goals, but goals are rather straightforward • Ec: Sufficient financial resources for current operations but in need of future investments • Cult: High technological skills. Low skills in marketing, business, international management and foreign languages • Soc: Stable network with irregular ties 	<ul style="list-style-type: none"> • Strat: Clear goals but low power base to attain them • Ec: Sufficient financial resources for current operations but foresees lack in future investments. Low efficiency • Cult: High technological skills. Low skills in marketing, financial management, international management and foreign languages • Soc: Stable but weak network. Non-redundant use of ties 	<ul style="list-style-type: none"> • Strat: Both specific and unspecific goals, mediocre power to attain goals • Ec: Few financial resources, but efficiently used • Cult: High technological skills, adequately skilled in financial management • Soc: Stable network
2 Inventory of capitals needed by firm	<ul style="list-style-type: none"> • Strat: Better strategic understanding, higher market orientation, active international strategy • Ec: New investments • Cult: Better skills in marketing, business administration, international management and foreign languages • Soc: Long-term reseller abroad 	<ul style="list-style-type: none"> • Strat: Larger power base • Ec: New investments, more efficiency • Cult: Better skills in marketing, financial management, international management • Soc: Reseller abroad 	<ul style="list-style-type: none"> • Strat: Foreign expansion can harm existing relations in Russia. Internationalization with help of a foreign partner is not advisable
3 Fit with potential capital	<ul style="list-style-type: none"> • Strat: Integration of devices with Scentsystem's software management platform. Clear strategic understanding, but demands solid strategy from partner. Help in formulating strategy in Dutch market • Ec: Potential access to investor • Cult: Low skills in marketing and international management. Different business skills. Language problem not solved • Soc: Agreement on long-term collaboration 	<ul style="list-style-type: none"> • Strat: Potential partner Water has a larger power base, but goals do not closely align. Collaboration is not advisable. 	
4 Inventory of mechanisms to improve fit	<ul style="list-style-type: none"> • Strat: Radiodevice should establish solid strategy • Ec: - • Cult: Both parties should improve marketing skills. Need to create patterns of doing business and should learn about each other's culture • Soc: Awareness of differences in pattern maintenance 		

Table 1: Results cross-case analysis

Step 1: Inventory of strategic, economic, cultural and social capital present in the firm

The firms need to make an inventory of their business characteristics in the first step of the decision-making model. This needs to be done to create a better picture on what business characteristics are lacking and need to be present at the partner.

It was said that there is strategic capital when a firm is able to attain its goals. The director of Radiodevice noted that the firm has few competitors in its targeted segment, has patents to protect its intellectual property and other parties stay informed about the firm's activities. Furthermore, he stated that Radiodevice is able to persuade others to do something for the firm, but is not willing to sacrifice its goals for the benefit of others. Furthermore, the interview made clear that the firm is not dependent on a small number of customers, whereas it is responsible for a relatively large amount of revenues generated by its suppliers. From this, we conclude that there is a large power base, a good reputation and inflexibility to adapt goals for others, bringing Radiodevice in a solid position to attain its goals. The question is what goals to attain. The strategy to produce the devices is rather push-oriented. This is contradictory to the director's perception on the philosophy of the firm, which is to solve problems of customers rather than to produce goods. Furthermore, the MKTOR score of 6.1 on a scale from 1-7 indicates a high market orientation, although Radiodevice does not do market research. In addition to this, the director could not elaborate on a specified international strategy. Radiodevice has indicated that the Russian market is currently sufficiently big. Nevertheless, it has expressed a willingness to internationalize if any opportunities emerge. The firm would like to find resellers abroad to introduce the devices in foreign markets. The international patent and the website in foreign languages show the firm's international orientation. Economic capital of Radiodevice is sufficient for current operations. The director reported that there are enough financial resources to operate and financial performance is regarded as satisfactory by him. Nevertheless, he expressed his concerns about the future. More investments in property and production space are needed if the firm wants to grow. In cultural capital, there are little marketing and business administration skills. As the director pointed out, the Soviet era did not consider these skills as necessary, leading to the fact that there is a very young tradition in these skills. It is our belief that better skills in marketing and business administration would improve the firm's exploitation of opportunities that derive from its excellent technological skills. Moreover, low international management skills and lack of knowledge in foreign languages do not facilitate internationalization. Radiodevice is slightly entrepreneurial, as it scores 3.75 on a scale from 1-5. Finally, from the irregular contacts as described by the director, one could argue that the social network is weak. Nevertheless, relationships are said to be stable and the firm is able to obtain necessary resources from them.

Contrary to Radiodevice, Aqua has clear short and long-term goals in the strategic dimension, but has limited ability to attain them. The interview depicted that a high percentage of revenues is generated by few small customers and the director stated that the firm is very flexible to adapt its goals for others. This leads us to argue that Aqua's power-base is low. The strategy of Aqua is production-oriented because market needs are not included. Nevertheless, it is rather innovative. According to the typology of Miles and Snow, Aqua is a prospector. Furthermore, the director believes that the firm prefers radical innovation over incremental innovation. Aqua also has intentions to internationalize. Similar to Radiodevice, it wants to find resellers to introduce the filters abroad. There have been previous, though unsuccessful, attempts to enter foreign markets. In addition, the director informed that the firm complies with international standards in production and production processes. So far, Aqua has not filed for international patents because of the expenses. The economic capital of

Aqua is not optimal. Through the interview it became apparent that most money is spent on production and salaries, but also on rent. The high overhead costs and low revenues per employee indicate inefficiency. Also, financial resources as forecasted now, are not enough to finance future growth according to the director. In addition to that, there is an imbalance in cultural capital. The opportunities that rise from excellent technical skills cannot maximally be exploited due to low skills in marketing and financial management. This is even more so in foreign markets due to lack in international management skills and knowledge of foreign languages. Aqua is slightly entrepreneurial, as it scores 3.35 on a scale from 1-5. In the last dimension, Aqua is said to have a weak but stable social network. This is because the frequency of contacts is low, but long-term. Aqua makes non-redundant use of its ties because different resources are traded.

Simulator has a clear short term goal, namely to finish the development of a trainer-simulator for digital industrial control. Contrary to this, the long-term goal is less specific, namely to consolidate its position in the Russian market. However, we argue that Simulator has a mediocre power base to attain these goals. The director indicated that the firm does not possess patents or certificates, and has never developed a product or service that has become standard in the industry. In this way, the negotiation position of the firm is not strengthened. On the other hand, Simulator publishes articles and participates in conferences and congresses, which increases the reputation of the firm. Also, the director believed that the firm is able to persuade others in the network to do something for them. Simulator does not have an active international strategy. Although it has previously collaborated with a German firm, the director explained that the firm prioritizes the Russian market. There are enough opportunities for trainer-simulators for nuclear power plants in the Russian market. In economic capital, the director noted that it is very difficult for the firm to attract enough financial resources, as work is done on contractual basis. However, according to the director, the few financial resources available are efficiently used. In cultural capital, we can argue that the technological skills are very high, since the entire staff constitutes of technological specialists. There is no information available on the amount of people in the firm who received training or education in marketing, financial management, business administration or international management, but the director believed Simulator to be extremely adequately skilled in financial management. Simulator has a slight entrepreneurial orientation, as it scored 3.1 on a scale from 1-5. In social capital, the director of Simulator stated that there are long-term strategic partnerships and the firm is able to obtain most of the necessary resources from its network.

This step in the model offers a systematic instrument for Radiodevice, Aqua and Simulator to highlight their strengths and weaknesses in the four types of capital. This offers a clear picture of what capitals are sufficiently developed, and what capitals are not. In this way, it is a systematic way to confront the entrepreneur with the business characteristics of the firm. The weaknesses in capitals can be translated into needs of the firm that can be fulfilled by a partner. Furthermore, as this step systematically describes the capitals, it enables the firm to identify what the capitals of the partner should look like to be compatible. This leads to step 2.

Step 2: Inventory of strategic, economic, cultural and social capital needed by the firm.

In the second step, the firm can make an inventory of needed strategic, economic, cultural and social capital in relation to the strengths and weaknesses of the capitals in the firm itself as highlighted by step 1.

The current strategy of Radiodevice is full of inconsistencies. The push-oriented strategy is contradictory to the firm's philosophy and market orientation. The firm is not aware of this, as it believes to have a solid strategy. The straightforward strategy could be more guiding if strategic understanding is enhanced. This also involves more attention for customers and competitors. In addition, an active international strategy would facilitate internationalization immensely. In economic capital, Radiodevice needs new investments for future growth, as the director foresaw lack thereof. The cultural capital can be increased through better marketing and business skills to exploit opportunities. Next to this, better international management skills and skills in foreign languages facilitate communication with foreign partners. To limit possibilities for conflict, a partner should have a compatible entrepreneurial orientation to Radiodevice. In social capital, the director indicated that Radiodevice is looking for a long-term reseller.

The strategic capital of Aqua could benefit from a partner with a larger power base, which increases the likelihood of attaining the goals of the partnership. In economic capital, Aqua is in need of new investments for future growth and its relative inefficiency of operations could be improved. Aqua has low marketing and financial management skills in its cultural capital, which do not facilitate the exploitation of opportunities derived from excellent technical skills. To facilitate interaction with foreign partners, Aqua could benefit from more international management skills. To prevent problems caused by different values and attitudes, the partner's entrepreneurial orientation should align with that of Aqua. Concerning social capital, Aqua is looking for a reseller.

In strategic capital, Simulator could benefit from a partner with a large power base, to increase its own potential to attain its goals. Nevertheless, it has indicated that partnerships with foreign firms can harm existing contacts with Russian partners because of the sensitivity in the market. In this way, foreign partnerships would not have added value to the firm, but even severely decrease Simulator's potential to attain goals. Therefore it would be better to remain in Russia, making further analysis of needs in capitals irrelevant.

The inventory of needs of Radiodevice and Aqua enables them to look for a partner who possesses business characteristics to complement these shortcomings. It is a systematic instrument on what type of partner to look for. Furthermore, this step analyzes the functionality of collaborating with a partner. Radiodevice and Aqua can clearly benefit from external parties in strategic, economic, cultural and social capital. However, internationalization with help of a partner did not prove to be a sensible decision for Simulator. In this sense, the model can also be a critical decision-making moment on whether or not to continue.

Step 3: Assessment of fit with a potential partner

Once a potential partner is found, the firms can assess the fit in terms of strategic, economic, cultural and social capital.

Scentsystem is a potential Dutch partner for Radiodevice who expressed interest in collaboration. Scentsystem protects ICT and production processes that need to remain active. Its software integrates processes and detects possible dangerous situations, after which early warning is possible. This could relate to temperature, ink supplies, spam, and so on. Another system detects changes in atmospheric composition such as humidity or bacteria. The firm wants to integrate its products with the devices of Radiodevice. In this way, changes of

radioactivity can be measured and integrated with other kinds of measurement. Both firms would be partners in product development where Scentsystem acts as an indirect reseller.

Radiodevice and Scentsystem complement each other in all four dimensions. In the strategic dimension, the activities of both firms complement each other very well. Also, Scentsystem has extensive knowledge of the Dutch market from lengthy experience, which it can transfer to Radiodevice in order to establish a strategy in this market. Furthermore, the director of Scentsystem stated that the firm consults experienced mentors for its strategy formulation and explained that the firm is very concerned with marketing its products effectively before developing new ones. The interview showed that the firm's competitive advantage is its flexibility and evolutionary development of software in accordance with market needs. From this information it could be argued that Scentsystem can guide Radiodevice towards higher market orientation. Nevertheless, it was pointed out by Scentsystem that it requires Radiodevice to have a clear vision and strategy. In the economic dimension, the director stated that Scentsystem can give access to a possible investor from its own network. In the cultural dimension, both have technological skills in their own area of expertise, so that both can profit from each other. However, neither firm is well skilled in marketing or international management. Furthermore, both firms have to be aware that their functioning in business administration differs from each other. They both obtained business skills in a different manner, which is likely to affect their behavior. Scentsystem received education in the field and has experience in doing business in a developed economy. Radiodevice did not receive any education in business, and staff needed to learn this intuitively after the Soviet Union collapsed. They have to adapt to each other's pattern maintenance. This is facilitated by a comparable entrepreneurial orientation between the two, as Scentsystem scores 3.5 compared to the 3.75 scored by Radiodevice. In the social network, both firms have pointed out contacts that the other party can benefit from. These are mostly distribution channels, investors and external partners. Both Radiodevice and Scentsystem prefer long-term collaborations.

Water is a potential Dutch partner for Aqua. Water develops systems for water purification in three fields. Firstly, the client specific systems purify ground water into drinking water, ground water into process water, or they treat waste water. Secondly, it develops standard installations and products, usually of considerable size. Thirdly, the firm offers service and maintenance on water treatment installations, whether built by Water or by its competitors. The firm believes that Aqua does not have much potential in the Dutch market because of the high quality of drinking water in the Netherlands. In this sense, it sees limited possibilities for collaboration in the BtoB segment in which Aqua's small filters could be integrated into the large installations of Water when a client or project requests such filters.

There are many differences between Water and Aqua. According to the director, the goal of Water is to be a real service organization, whereas Aqua is more production-oriented. This could cause friction in the strategic dimension. Nevertheless, Water expressed its willingness to help Aqua to define its strategy in the Dutch market, as the former perfectly understands the "do's" and "don'ts" of this market. However, it must be pointed out that Aqua cannot target its usual market segment in the Netherlands, because of the near universal access to high-quality drinking water. Furthermore, Aqua is more innovative than Water, as the latter stated that it is more concerned with its stability. In addition to this, Water has a larger power base than Aqua because of an impressive reference list and little flexibility in sacrificing its goals for others. Water would have more influence on Aqua than vice versa, enabling the former to attain its goals while severely limiting the attainment of goals for the latter. Given this misfit in strategic capital, there is little reason to believe that collaboration between Water

and Aqua would succeed. There is no purpose in continuing the decision process for internationalization.

This step in the decision-making process clearly shows the importance of alignment in capitals. The strategic capital of Aqua and Water do not align. Even if the other types of capital align very well, these mechanisms would not be directed towards attaining the same goals, limiting the potential for collaboration. For this reason, the process could better be discontinued. In this way, this step has proven to be a critical step. Radiodevice and Scentsystem, on the other hand, align in all four dimensions, even though not all to the same extent. This forms a basis to expect that collaboration between these two firms would be useful. It also provides incentives to assess the mechanisms that can be used to improve the match to become even more fruitful to both parties. This is done in the last step.

Step 4: Inventory of suitable mechanisms for improving the match with a partner

Once a match has been made, it is unlikely that both partners fit perfectly well. As there is always room for improvement, this step provides the opportunity to use mechanisms to create a maximally successful collaboration.

Scentsystem requires a solid strategy from a partner, which is why Radiodevice should be triggered to put more effort into formulating a guiding strategy. After this, both firms could negotiate the terms of their collaboration and establish clear joint goals that will facilitate the partnership. Next to this, both parties can secure access to financial resources in this partnership, as Scentsystem indicated it can introduce Radiodevice to a potential investor. This omits the need for mechanisms to improve the economic fit between the two. However, several things can be done to improve the cultural fit. First, lack in marketing skills is not compensated. Both firms could put more effort in improving these skills to overcome this gap. Second, both firms have different patterns of business administration due to the different manners in obtaining these skills. It is advisable to create patterns of business administration that are satisfactory to both. Last, this collaboration contains a low level of international management skills. To facilitate understanding between the two, Radiodevice and Scentsystem could both learn about each other's cultures. In the social network dimension, Radiodevice and Scentsystem have different manners of relationships maintenance. The interviews showed that Radiodevice has irregular contacts, whereas Scentsystem is used to more frequent contacts. It is suggested that they reach an agreement on frequency of contacts and the intensity of ties.

This last step in the decision-making model provides a continuous opportunity to improve a partnership in a systematic way. This also means that the firms should continually assess the partnership as was done in step 3, and continually assess the firm's own business characteristics. In this way, the collaboration adapts to changing circumstances and is more likely to remain successful on the long run. Furthermore, the continuous assessments provide a mirror to the entrepreneur on how to improve its own business characteristics.

Discussion and conclusions

International entrepreneurship literature uses several theories to explain and describe internationalization from transition economies to developed economies. Few of the studies in this context engage themselves with high-tech SMEs. Following Yamakawa (2008) and Rialp et al. (2005), we stated that current theories focus on only few dimensions or neglect the decision-making process aspect of internationalization, leading to difficulties in managerial

application. To provide a solution, we developed a multidimensional model on the decision-making process for internationalization of SMEs from transition economies. The basis of the model originally derived from sociology (Parsons, 1964, Groen, 2005). The basic assumptions are that value is created in networks and that partnerships should contain sufficient strategic, economic, cultural and social capital. We distinguished four steps for analyzing the international decision process: (1) inventory of strategic, economic, cultural and social capital of the firm; (2) inventory of strategic, economic, cultural and social capital needed by the firm; (3) assessment of fit between the firm and a potential partner and (4) inventory of mechanisms to use to improve the match between the firm and a potential partner. The second and fourth steps are labeled as critical steps, after which it is possible to discontinue the process. The model was illustrated by three cases. One of the cases, Simulator, did not prove suitable for internationalization because it would harm existing relations. We did not need analysis of all four capitals to come to this conclusion. To make the model more efficient, we suggest separating part of the strategic capital from the first and second step into an earlier step. This step would involve the decision of the firm to internationalize or not based on preferences or circumstances. The second step would still be a critical one, however. A firm can come to the conclusion that they do not have any needs in capitals, limiting the necessity to internationalize with a partner. The other way around is also possible; the firm might decide not to internationalize, whereas analysis of the capitals would show that internationalization would be desirable. Further research could shed light on how this problem could be solved.

This paper shows that it is very useful to recognize internationalization as a decision-making process in a multidimensional manner. Decomposition of this process into four systematic components enables entrepreneurs to take better decisions, and also confronts the entrepreneur with its own business characteristics in a clarifying way. In this paper, it became apparent that it would be better for Simulator not to internationalize. In a similar fashion, Aqua had intentions to internationalize, but the model showed that collaboration with Water is unlikely to succeed. Radiodevice, on the other hand, has excellent opportunities to collaborate with Scentsystem, as clarified by the model. Concerning reflection on own business characteristics, it became apparent that the three Russian firms have straightforward strategies, high technological skills, but low marketing and international management skills. Rather than solely focusing on synergetic effects from partners, the model provides clear insights into the firm's own strengths and weaknesses. Furthermore, it provides clear possibilities to continually assess a partnership, while providing an instrument on how to improve it to make it maximally successful. This was illustrated by Radiodevice and Water. Besides entrepreneurs, the model can also be used by external individuals such as consultants or investors. We have applied the model to transition economies, but believe it to be applicable to other contexts as well. From theoretical point of view, the model provides a more complete picture of the complex decision-making process for internationalization of a firm with use of a partner. Stage theory, institutional theory, transaction cost economics and resource-based view would not have provided the insights as are presented here, as they have narrower orientations.

This research is subject to several limitations. Partnerships need to possess sufficient capital to survive. The level of sufficiency is decided upon by the entrepreneur. In the future, more objective measures can be used. Next to this, we observed that the strategies of the firms were oriented on the short-term. Further research could shed a light on how measures on long-term strategies could be included and operationalized into the model. Furthermore, our study might suffer from single informant bias, since only one person per firm was interviewed. Nevertheless, multiple firms were interviewed, putting the responses of individual directors in

perspective. There was also asymmetry in information gathering as there was no fit readily-made with a Dutch firm when interviewing the Russian directors. When interviewing the Dutch directors, this fit could readily be observed. This influenced the level of hypothesizing on a potential collaboration with the other firm. Last, the interviewees might suffer from unconscious incapability, leaving them unaware of certain shortcomings that they might have. To overcome this, as many indicators – qualitative data and existing scales – per operationalization were used.

This paper served as an illustration of our model. This model supports decision-making, not the complete search trajectory of finding a potential partner. Further research could provide instruments to help entrepreneurs where to find their partners. Also, we urge for more research to test the validity of this model in different contexts. For example, currently we are working on existing companies in manufacturing industry who are searching for partners to create new business. In addition, as stated earlier, more research could elaborate on how an earlier step could be included to fine tune the order of analysis of the dimensions to prevent unnecessary evaluation of dimensions. Finally, additional research can shed light on the extent to which integration with other theories on internationalization is possible, and in which contexts. In so doing, more attention should be paid to the re-evaluation of models and theories that derived from developed economy context, to test their validity in transition economy context.

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Appendix A: Measurements			
Dimension	Operationalization	Indicators	Question type
Strategic capital	International orientation	Foreign goals, Protection intellectual property abroad, International standards, International conferences	Open questions Open questions Yes/no Yes/no
	Orientation towards innovation	Type of strategy (Miles and Snow), Preferred type of innovation	Closed-ended question Closed-ended question
	Market orientation	MKTOR (Narver and Slater, 1990) (interfunctional orientation excluded) Competitive advantages, Firm philosophy	Open question Likert-scale questions (1-7,0) Open questions Closed-ended question
	Orientation towards partners	Taking goals of partner into account in strategy	Likert-scale question (1-5,0)
	Power	Possession of IP, Standards in industry, Influence of customers, Influence over suppliers	Open questions Likert-scale question (1-7,0) Yes/no Closed-ended question Open question Open question Likert-scale question (1-5,0)
	Reputation	Publications, Participation congresses & exhibitions, Other firms stay informed or not	Yes/no Yes/no Likert-scale question (1-5,0)
	Flexibility	Adaptations of strategy for partner	Open question
Economic capital	Financial resources	Human assets, Facilities, Funding	Open questions Closed-ended question Open question Closed-ended questions Open question
	Financial performance	Return on investments, Revenues, Profits, Forecast in 5 years	Closed-ended question Closed-ended question Closed-ended question Closed-ended question
	Operations of the firm	Efficiency, Most money spent, Areas to cut costs, Using investments of others	Likert-scale question (1-5,0) Open question Open question Open question
Cultural capital	Technical skills	Number of technological employees, Technological background director Educational backgrounds Refreshment courses	Numerical question Open question Open questions Open questions
	Entrepreneurial skills	Education in marketing, finance, business administration, Adequacy in marketing, finance, business administration, Having another firm (for business administration) Educational backgrounds Refreshment courses	Open questions Likert-scale questions (1-5,0) Open question Open questions Open question
	Entrepreneurial orientation	Lumpkin & Dess (1996)	Likert-scale questions (1-5,0)
	International orientation	Education in international management, International experience, Adequacy in international management	Open question Open question Likert-scale question (1-5,0)
Social capital	Positional	Picture current network	Open question
	Relational	Picture current network, Important ties, Duration of relationships, Frequency of contacts	Open questions Open question Open question Open question
	Perceived importance	Importance of network, Importance of firm to network,	Likert-scale question (1-5,0) Likert-scale question (1-5,0)

		Willingness to share resources	Open questions
	Internationalization	Foreign contacts, Efforts to establish foreign contacts, Importance of international network	Open questions Open questions Likert-scale question (1-5,0)