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International activities of knowledge-intensive SMEs: The example of an Open Source Software firm

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ABSTRACT

Purpose − The aim of this paper is to develop a framework that explains international activities of open source software firms.

Design/methodology/approach − This study reviews relevant literature related to international operations of knowledge-intensive firms, especially in the software industry. Theoretical development is based here on a combination of the network approach, the international new venture theory, and inward-outward internationalization.

Findings − The findings in this study suggest that the international activities of open source software firms can be divided into project activities and business activities. Project activities include inward and outward linkages, and partner identification. Business activities include domestic and partner network activities that can lead to international business as well.

Research implications − For scholars, the framework provides a new approach to explain many international activities of open source software firms by integrating three international business theories. In addition, it provides good starting point for further empirical examination.

Practical implications − The framework helps managers to get a better understanding of complex circumstances embedded into the international activities of open source software firms. With that better understanding, the managers can focus their activities, which helps further to improve their firms' competitiveness engendered by the international activities in the open source software development.

Originality/value − To the best of our knowledge, the framework developed in this study is the first serious attempt to provide a deeper theoretical understanding of international activities of open source software firms.

Keywords − international activities, inward and outward operations, open source software, internationalization, software firms, knowledge-intensive firms, international new ventures

Paper type − Conceptual paper

Introduction

Internationalization of knowledge-intensive small and medium-sized enterprises (SMEs) has been the subject of growing interest since the seminal works by McDougall (1989) and Oviatt and McDougall (1994). These firms, so-called 'born globals' or 'international new ventures', seek growth opportunities in a multitude of countries from the inception of their activities (Oviatt and McDougall, 1994). In empirical studies related to knowledge-intensive SMEs, several authors have selected the software industry as the target group for their studies (e.g. Bell, 1995; Ojala and Tyrväinen, 2007). The reasons for this are either methodological or industry-specific. From a methodological viewpoint, selecting a single industry helps avoiding the influence of industry-specific variations and, thus, decreases the possibility of confounding findings (Coviello, 2006; Zahra and Bogner, 2000). Software industry is also very attractive due to its fast growth rate (EITO, 2006; McQueen, 2005) and global markets (Nambisan, 2002).

Ojala and Tyrväinen (2006) argue that current studies related to internationalization of software firms do not pay enough attention to differences between various types of software firms. This is despite the fact that several studies have acknowledged that the nature of the product (e.g. Burgel and Murray, 2000; Jones, 1999), requirements for customer support (Burgel and Murray, 2000), customization of a product (McNaughton, 1996), and the nature of business (Jones, 1999) influence the internationalization of knowledge-intensive SMEs. In addition, managers' attitudes towards internationalization are dependent on market characteristics (Javalgi et al., 2003). Hence, it should be evident that internationalization is more product and market specific and the form of internationalization varies among different types of firms. For instance, domestic markets may be unfavorable or unattractive for high-tech firms, so they have to seek export markets (Moen, 2002). This is helped by the fact that firm-specific or location-specific factors do not limit service firms the same way they limit

manufacturing firms (Javalgi et al., 2003). In many cases, software products can be sold and distributed electronically through Internet, thus the location is less important (Moen et al., 2004; Ojala and Tyrväinen, 2006). However, visits to customers (Cornish, 1996; Seringhaus, 1993) or local presence (Ojala and Tyrväinen, 2006) are often needed to understand the customers' needs and requirements for customized software products.

For the reasons discussed above, this study focuses on international activities of open source software (OSS) firms. It can be argued that product and market-specific characteristics are closely related to the international activities of OSS firms from their inception. OSS firms differ remarkably from other software firms, because their products can be freely copied, distributed or even modified and are downloadable from the Internet (Krishnamurthy, 2003). Thus, foreign parties can usually download the software freely. In traditional technologies, it is the exporter who can ultimately decide whether to export their products to specific markets (Chen and Sun, 2000). In many cases, OSS firms belong to global product development networks and use these networks to gain alternative resources (Krishnamurthy, 2003). In addition, software quality is ensured by the relationships and interactions between community members (von Krogh, 2003). These networked resources may help them in achieving competitive advantages for both their domestic and international activities. For these reasons, it can also be argued that OSS firms represent a sample of international new ventures in what comes to their product development activities. This kind of activity is common for international new ventures which are able to use human resources located in various countries for their product development activities (Oviatt and McDougall, 1994).

Based on this understanding of the OSS firms' nature and their related activities, the aim of this paper is to develop a framework that explains many of the international activities of OSS firms. The framework has been developed by following the systematic approach presented by

Miles and Huberman (1994). It bases on: 1) the objectives of this study, 2) the key constructs in the theories presented, 3) the relationships among the key constructs, and 4) the relevant literature in the field. The literature for this study was searched from the major databases (EBSCO host, Emerald, JSTOR, ScienceDirect, ProQuest) using relevant keywords. Because the search from the databases produced a large amount of literature, only the most relevant sources were selected for further investigation based on the objectives and key constructs in this study.

The framework developed is important for practitioners, academics, and for theory development. From the managerial point of view, it is important to study and get a better understanding of international activities of OSS firms, because: a) OSS firms are playing an increasingly important role in the world's software markets while challenging proprietary software firms (Murphy, 2004), b) OSS community is global (Krishnamurthy, 2003), and c) companies form part of this community that has knowledge to create and control software code (Dahlander and Magnusson, 2005). A better understanding of international connections and relationships can help the managers of OSS firms to optimize their activities and further improve their competitiveness. For academics and for theory development, the framework provides a new approach to explain international activities of OSS firms by integrating the network approach (Johanson and Mattsson, 1988), the international new venture theory (Oviatt and McDougall, 1994), and the inward-outward activities in the internationalization process (Welch and Luostarinen, 1999).

Theoretical background

Most of the internationalization theories have focused on explaining the gradual internationalization of large manufacturing firms from developed countries (Axinn and Matthyssens, 2002). Generally, internationalization models are either establishment chains

(see e.g. Johanson and Wiedersheim-Paul, 1975; Luostarinen, 1979) or innovation-related models (see e.g. Lee and Brasch, 1978). Both of these internationalization model categories assume that firms become internationalized through incremental stages (Bell, 1995; Madsen and Servais, 1997). Regardless of a widespread acceptance of these models (Barkema et al., 1996; Barkema and Drogendijk, 2007), they are also criticized. There is now evidence that many firms, especially SMEs in knowledge-intensive industries, do not internationalize according to the stage models (e.g., Bell, 1995; Oviatt and McDougall, 1994). For instance, Bell (1995) draws a conclusion that the relevance of stage theories in the internationalization of high-tech and service firms must be questioned in the present global environment. Axinn and Matthyssens (2002) list limitations to traditional internationalization theories, including the inability explain some entry modes and speed of internationalization and the ignoring of services and management's influence among other things. As a consequence of this criticism toward establishment chain and innovation-related models, several studies (e.g. Coviello and Munro, 1997; Jones, 1999) have indicated that the network approach (Johanson and Mattsson, 1988) is superior to that of the incremental internationalization models in explaining the internationalization of knowledge-intensive SMEs.

Network approach

According to the network approach (Johanson and Mattsson, 1988), a firm internationalizes when it starts to develop relationships with actors belonging to another network in a foreign country. The approach proposes that a firm is dependent on resources (tangible or intangible) which are controlled by other actors in the network. However, the firm can get access to these resources by developing its position in the network. Firms belonging to the network share common interests, and by maintaining relationships with each other they can provide and

create mutual benefits within the network (Johanson and Mattsson, 1988; Johanson and Vahlne, 2003).

The relationships in networks can be formal relationships with business partners, informal with friends and relatives (Coviello, 2006; Westphal et al., 2006) or intermediary relationships with third parties (Havila et al., 2004; Oviatt and McDougall, 2005). In the network approach, these relationships between firms act as a bridge to foreign markets (Johanson and Vahlne, 1990). Cooperation in these cross-border relationships help in trust building (Fink and Kraus, 2007), knowledge sharing (Valkokari and Helander, 2007), identifying new opportunities, and establishing cooperative activities (Oviatt and McDougall, 2005), such as joint development projects.

International New Ventures

Because SMEs in the knowledge-intensive industries tend to internationalize their marketing and product development activities very early in their life-cycle, the international new venture theory (Oviatt and McDougall, 1994) has received increasing attention. In their seminal work, Oviatt and McDougall (1994, p. 49) define international new ventures as "a business organization that, from inception, seeks to derive significant competitive advantages from the use of resources and the sale of outputs in multiple countries". The theory indicates that international new ventures are international from their inception, because they have linkages to valuable resources in more than one country and they have already made some decisions related to their further international activities before a formal establishment (McDougall et al., 1994; Oviatt and McDougall, 1994). The theory emphasizes the fact that international new ventures do not have to own all the resources needed for growth, because they are able to use external resources provided by relevant networks. For this reason, the network structures that

a firm belongs to are seen as a valuable resource that creates new opportunities for further growth and foreign expansion.

Inward-Outward activities

In the internationalization process both inward and outward operations have become more closely linked (Welch and Luostarinen, 1999). In inward activities, the firm performs activities in its home country for an overseas organization and in outward activities the firm extends its operations to abroad (Jones, 1999). Outward activities include operations such as foreign investments and exports (Karlsen et al., 2003). A firm can become internationalized through inward activities and through activities in which inward and outward activities are linked (Fletcher, 2001). According to Jones (1999), the nature of some modern technologies suggests that the internationalization process of technology based firms may include both inward and outward activities.

Fletcher (2001) stresses the importance of inward-outward activities and links between them in the internationalization of firms. Liang and Parkhe (1997) share a similar approach, in which import and export behaviors are seen as two sides of the same coin. Outward operations might benefit significantly from the experience of inward activities, where the firm can build relationships and learn about foreign trade or markets (Karlsen et al., 2003; Welch and Luostarinen, 1993). However, most of the attention of researchers and practitioners has been on outward activities (Karlsen et al., 2003), even though internationalization also includes inward activities (e.g. Fletcher, 2001; Karlsen et al., 2003). Thus, Karlsen et al. (2003) suggest taking a wider view on internationalization to include inward-outward connections as these connections may unveil hidden incremental processes or even explain some of the international new ventures' internationalization behavior.

Special features of OSS

In OSS, skilled users can make modifications and fix problems, because the software's source code is freely available for everyone through the Internet (Krishnamurthy, 2003). Because of the free availability, OSS can be easily customized and there is no risk of becoming locked-in to a single vendor (Economist, 2003; Murphy, 2004). The nature of OSS can also motivate the users to take part in the developing process (Fuggetta, 2003), whereas in commercial software development the developers and the users are separated (Krishnamurthy, 2003).

Even though the source code of the OSS is available for free download and distribution, product disks can also be for sale (Krishnamurthy, 2003) at the same time. Thus, there are a number of firms selling, e.g., Linux operating system packages (e.g. Mandriva, Novell, Red Hat and Red Flag). De Laat (2005), however, questions the feasibility of selling OSS as a business model because of free availability of the software in the Internet. Otherwise, business in OSS is mainly related to the service side of the software business (Bonaccorsi and Rossi, 2003; Krishnamurthy, 2003) involving market-driven complementary services and products (DeLong and Froomkin, 2000).

Firms can also benefit from OSS: for instance, it helps cutting development (Krishnamurthy, 2003) and maintenance costs by using available source code (Hawkins, 2004). In addition, they can even release their proprietary software as open source. As an example, IBM can save around $900 million per year by investing on Linux development (Tapscott and Williams, 2007). It appears that the open source development model is more efficient than proprietary software models (e.g. Dalle and Jullien, 2002; Suzor et. al., 2004), although some (e.g. Fuggetta, 2003) doubt it.

International activities of OSS firms

International activities in the context of OSS can be broken up into two parts - those related to project, and those related to business activities. In this way, international activities can be explained with the help of earlier research findings about international business. In the proposed framework, international activities include both informal and formal activities where the activities embedded in OSS projects contribute to the actual business activities in both the domestic and the international context through networks initiated in the OSS project. To maintain flexibility and to acknowledge the richness of internationalization processes in internationalized markets (Fillis, 2001; Madsen and Servais, 1997), this framework does not propose any specific form of internationalization for OSS firms. In fact, Fletcher (2001) suggested that a holistic approach to internationalization - including both inward and outward activities and activities where these activities are linked - is more appropriate for understanding the nature of various types of international firms and sophisticated forms of international involvement.

In the proposed model (Figure 1), OSS firms are assumed to engage in activities related to OSS projects that are informal and international in inward-outward connections. In addition to inward and outward links within the OSS project (the upper box in Figure 1), firms may engage in more formal activities that involve distribution agreements, formal import/export through purchasing/sales, buy-outs, franchising, formal development abroad through hiring personnel etc. These 'actual' business activities (the lower box in Figure 1) in the OSS context may evolve to international business through domestic, network activities and/or activities within the OSS project. The framework presented in Figure 1 is explained in the remaining of this section. A Chinese OSS firm offering examples of various OSS activities was selected to illustrate the presented framework. The interview with the Strategy Manager

from a firm named Alpha (pseudonym) was conducted face-to-face and through email. The case is provided as an illustrative example and not as a full-scale case study.

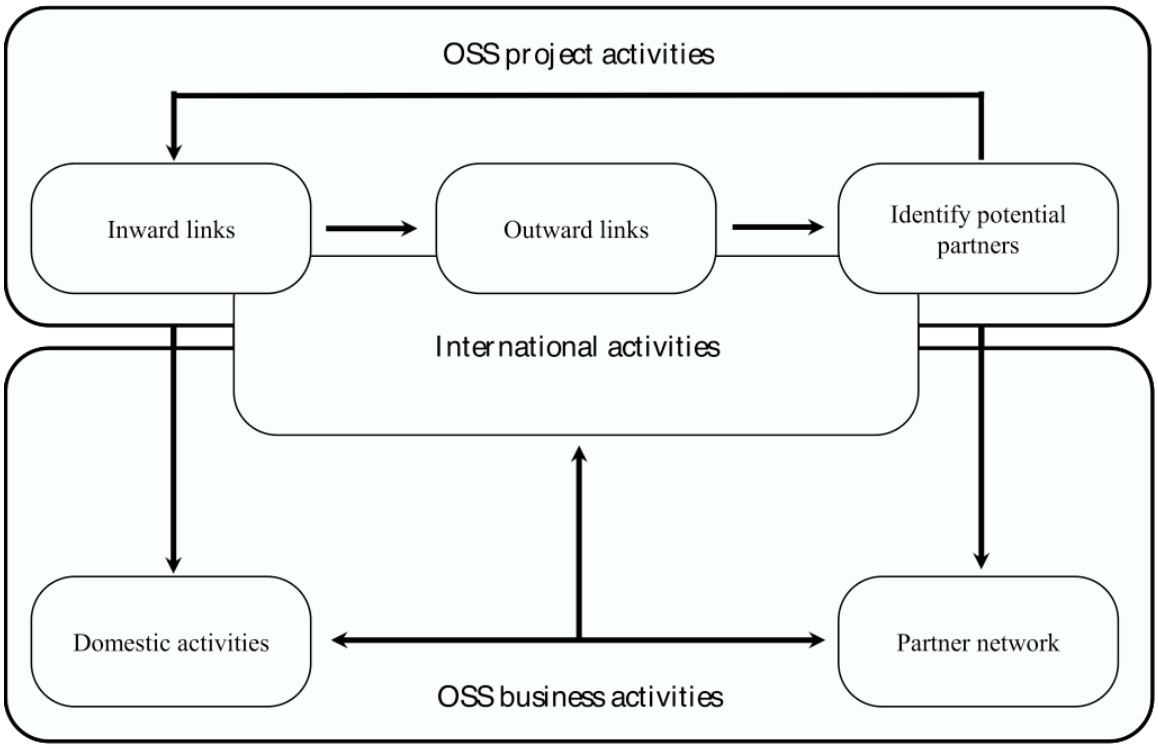

Figure 1. Integrated model of international activities of OSS firms

OSS project activities

The upper box in Figure 1 depicts the activities within an OSS project. Firms that are involved with OSS development are likely to have at least informal international networks from inception. OSS firms are commonly using this type of resource, because OSS is developed in Internet communities (Hars and Ou, 2002) of developers located all around the world (Hertel et al., 2003). OSS firms are embedded in these networks and can download, use and modify software from the Internet for their own purposes (inward links) and contribute to OSS projects or make software available as downloads in the Internet for further use (outward

links). This kind of international behavior becomes apparent in the inward-outward linkages (see e.g. Welch and Luostarinen, 1999; Jones, 1999).

For the OSS firms, inward activities are practically required due to the nature of the software and the community, not necessarily due to their business practices. Inward activities may provide opportunities to create relationships with foreign parties (Karlsen et al., 2003) and outward connections. Thus, for managers it may become important to identify the links with foreign partners that will be most beneficial for the firm's development (Jones, 1999). For instance, international arrangements can be used to acquire new skills or to improve the existing ones (Negassi, 2004). Furthermore, they allow access to opportunities that could improve the further development of small firms (Jones, 1999). By using the knowledge achieved from inward activities these firms could start or expand international outward operations more easily (Karlsen et al., 2003). According to Welch and Luostarinen (1993), any form of inward activity signals the beginning of a relationship that can later extend even to outward activities.

The case of Alpha provides a good example of the importance of inward activities. The Strategy Manager of Alpha emphasized that the business in OSS (and increasingly in the software sector in general) is about selling competence and not so much about selling products. Alpha could achieve competence by following what is happening in OSS (an inward activity) enabling it to combine a number of OSS products and then making these pieces to fit together in their own business model/product portfolio. Another inward activity they are engaging currently is arranging a conference in China for an OSS project. The conference is the main annual event for the OSS project community that includes companies and private contributors. Alpha expects to reach their customers, and they want to establish more ties with the OSS community by arranging the conference.

Outward activities, in contrast, depend on the willingness to contribute to OSS projects. By disclosing pertinent information, firms can improve their reputation and, by doing so, increase their chances for getting into innovation networks, which in turn may enable them to access external sources of knowledge (Muller and Pénin, 2006). In inward activities the firm can learn about other parties and their skills, whereas in outward activities others can learn about the firm.

From Alpha's point of view, outward activities in OSS may serve for several purposes. Alpha is not required by the licensing terms of this particular OSS project to contribute all the modifications and new features back to the OSS project. However, Alpha's Strategy Manager explained that there are technical and business reasons why they choose to contribute the features back to the OSS version. If the new features were kept private, then these features should always be re-implemented for each new version of the OSS product (a technical reason). This would create extra costs for each new version (a business reason), thus it is better to contribute the changes back to the OSS version. Perhaps a more important reason to contribute is that, by contributing, the firm can steer the OSS project to a direction they want it to go, serving thus their own goals. Currently they have tens of engineers fully integrated to the OSS project development. Table 1 summarizes the case examples and framework connections.

The process circle in the upper box of Figure 1 may start from any given point, that is, the firm may first start either the outward or inward activities depending whether the OSS project is started by it or by others. Likewise, the firm may start looking for partners first as well. Both the inward and outward links in OSS automatically contribute to the ability to identify potential partners. Initially, the inward-outward and partner recognition activities may be informal, voluntary and narrow through import and export activities, taking the form of

downloading, contribution and management of OSS projects. As shown by the example, the project's inward and outward activities both may provide opportunities to contribute to the firm's business activities. Depending on the firm's strategy these activities can be either for domestic or international business purposes. In either case, these enabling inward-outward links in the OSS community may lead to further cooperation in the international arena - international competitiveness, after all, also requires international cooperation (Fink and Kraus, 2007; Fletcher, 2001).

Project activity	Case example	Outcome	Background theory
Inward	- Downloading OSS software and following an OSS project. - Arranging a conference/meeting for the OSS project in China.	- Competence to see what is happening in OSS, which will help in combining important pieces of software for one's own competitive offering.	Inward/INV
Outward	- Contributing to an OSS project in the form of modifications and additions of new features.	- Ability to steer the OSS project to the direction that is the most beneficial for the firm.	Outward/INV
Partner recognition	- In addition to inward-outward activities the firm arranges an international conference for the OSS project. This helps them to reach more customers and to integrate within the community.	- Potential partners identify the firm from outward activities. - Ability to identify potential partners from inward activities.	Network

Table 1. Summary of project activities in OSS context

OSS business activities

It is worth recalling that using OSS firms can lower development and maintenance costs. Likewise, OSS can also be used to attack competitors or to protect a market (Fuggetta, 2003). Cost savings and market protection from OSS allow the firm to have longer domestic

operations that may not be an option with commercial software. In general, in the high-tech sectors firms cannot first target domestic markets and then go after foreign markets (Seringhaus, 1993). Domestic activities of OSS firms are expected to be influenced by the partner networks and the nature of OSS (as indicated in Figure 1).

In some cases, the purpose of international activities in the context of OSS may be to achieve a competitive advantage in the domestic markets. Firms that are extensively externally networked are among the most successful small high-tech firms in the domestic context (Jones, 1999). For instance, a firm may download and use international OSS projects with its own products/services, improve competitiveness and use contributions as a signaling tool in the local markets. Likewise, that firm could set their own product as OSS for the international community in order to improve it, gain a larger user base or lower the development and maintenance costs. Domestic market performance has a strong influence on the export performance of new products (Atuahene-Gima, 1995), and overseas expansion activities of international new ventures may reflect the nature of their domestic operations (Fletcher, 2001). Therefore, a strong domestic position of OSS firms through international activities in OSS projects (the upper box in Figure 1) and partnership networks may initially be used for the purpose of developing a strong position in the local markets that will contribute later to international business operations (the lower box in Figure 1). Once in possession of suitable resources and competencies, whether own or networked, the firm can focus on international markets.

To highlight this issue, the case firm, Alpha, is using and developing OSS software to produce its own branded software package focusing on the Chinese market (100% of offerings on domestic markets). The product base is acquired from an international OSS project. Currently

they are number one Chinese software firm in the product category on which they focus in China.

Apart from the usefulness of user and developer networks in OSS business, the importance of networks in the internationalization process has been clearly pointed out in the literature (e.g. Coviello and Munro, 1997; Oviatt and McDougall, 2005). The difference between traditional international business and that of OSS is that in OSS these networks are more natural and more easily created due to the nature of OSS projects (the upper box in Figure 1). Partners can be identified easily within an OSS project, which should bring more easily realizable advantages in the internationalization of OSS firms. For example, a common mistake is choosing a poor partner (Simmonds, 1999): as in the selection of a right partner for international operations significant resources may be required (Moen et al., 2004). Thus, the contacts of an entrepreneur in the establishment phase of OSS firms are particularly important to enable access to these global networks. This is in line with Oviatt and McDougall (2005, p. 544), who argue that "networks help entrepreneurs identify international opportunities" which often lead further cooperation. Cooperation and opportunities are found to influence the internationalization of SMEs (Fink and Kraus, 2007; Mtigwe, 2005). Thus, both domestic activities and partnership network contribute to the firm's international business activities.

The case of Alpha highlights how the firm can use various partners in their business activities. In the beginning they used personal contacts to contribute to international OSS projects through a foreign firm in China. Later this foreign firm mentored the engineers from Alpha. Although Alpha lacks international business activities at the moment, they are interested in international markets and are looking for opportunities for their future product(s) that will be targeted to international markets. Based on their interest towards international business and their activity in the international OSS community it seems that they are preparing for

international business activities. Table 2 summarizes the framework business activities illustrated by the case example.

Business activity	Case example	Outcome	Background theory
Domestic business	- An OSS solution for domestic markets achieved from the inward activities. - Outward activity in the OSS project serves the firm's domestic business.	- Number one Chinese firm in their software category in the Chinese markets.	Inward
International business	- No formal international business activities yet. - Planning to introduce product(s) to the international markets.	- Signs of preparation: arranging an international conference and active inward-outward activities.	Outward
Partner network	- Contributed, previously, through a foreign firm in China. - Arranging a conference/meeting for the OSS project in China.	- A foreign firm in China acts as a mentor for the firm's engineers.	Network

Table 2. Summary of business activities in OSS context

Conclusions

Researchers have proposed the use of a more holistic approach (Fletcher, 2001) and industry specific studies (Fillis, 2001) to explain internationalization. In this paper, theory development focused on the software sector and, more specifically, on the OSS as a type of software. Moreover, in the theory development informal activities related to the OSS project were accounted for, as far as they are likely to contribute to business activities. The breakdown to OSS project activities and business activities in the focal context is reasonable

due to the nature of OSS. In OSS, the project development activities are international and firms, depending on their strategy, may choose to focus their business activities, such as sales and marketing, either on domestic or international markets with the resources originating from the OSS project. We argue that this is due to the special nature of those OSS firms that belong to international development networks from inception and use both inward and outward linkages for product development and marketing activities.

In the framework, attention was paid to the ability and influence of partner identification, integrated inward-outward connections, and the embedded global nature of OSS. Based on previous studies about international business and characteristics of the OSS, the suggested framework combines international business theories including inward-outward internationalization, the international new venture theory, and the network approach. These have been regarded as helpful in understanding international activities and internationalization processes. Together they also can explain the activities within an OSS project and their subsequent business activities whether the business is domestic or international. OSS firms are international from the beginning at least in their development activities, which is captured in the suggested model. These activities, as argued, are useful in partner recognition and forming relationships. Activities within an OSS project and potential partner networks can then be used for domestic or international business depending on the business strategy. Overall, the suggested model captures the inherited international activities that OSS firms are dependent upon.

As a limitation, it should be noted that the suggested model may not be suitable for traditional software firms due to the special nature of OSS. The model also requires empirical validation which certainly will help to refine the model, its theoretical background, and its applicability in the practice. Thus, we hope that the model will act as a fruitful base for further empirical

research related to this complex process that is embedded into international activities of OSS firms. Because of the complexity of the process, the case study approach might be the best choice for investigating OSS firms' international activities. According to Yin (1994), the case study method enables investigating the cause-and-effect relationships of the phenomena. It also helps to investigate circumstances when the boundaries between a new phenomenon and the real-life situations are not clearly evident. Thus, by using the case study method, researchers can investigate the reasons for and initiations of inward and outward activities, how OSS firms establish and maintain their network relationships with development communities, and how international operations of these OSS firms' contribute towards domestic operations and vice versa.

References

Atuahene-Gima, K. (1995), "The Influence of New Product Factors on Export Propensity and Performance: An Empirical Analysis", Journal of International Marketing, Vol. 3 No. 2, pp. 11-28.

Axinn, C.N. and Matthyssens, P. (2002), "Limits of internationalization theories in an unlimited world", International Marketing Review, Vol. 19 No. 5, pp. 436-449.

Barkema, H.G., Bell, J.H.J. and Pennings, J.M. (1996), "Foreign entry, cultural barriers, and learning", Strategic Management Journal, Vol. 17 No. 2, pp. 151-166.

Barkema, H.G. and Drogendijk, R. (2007), "Internationalising in small, incremental or larger steps?" Journal of International Business Studies, Vol. 38 No. 7, pp. 1132-1148.

Bell, J. (1995), "The Internationalization of Small Computer Software Firms: A Further Challenge to "Stage" Theories", European Journal of Marketing, Vol. 29 No. 8, pp. 60-75.

Bonaccorsi, A. and Rossi, C. (2003), "Why open source software can succeed", Research Policy, Vol. 32 No. 7, pp. 1243-1258.

Burgel, O. and Murray, G.C. (2000), "The international market entry choices of start-up companies in high-technology industries", Journal of International Marketing, Vol. 8 No. 2, pp. 33-62.

Chen, X. and Sun, C. (2000), "Technology transfer to China: alliances of Chinese enterprises with western technology exporters", Technovation, Vol. 20 No. 7, pp. 353-362.

Cornish, S.L. (1996), "Marketing software products: the importance of 'being there' and the implications for business service exports", Environment and Planning A, Vol. 28 No. 9, pp. 1661-1682.

Coviello, N. (2006), "The network dynamics of international new ventures", Journal of International Business Studies, Vol. 37 No. 5, pp. 713-731.

Coviello, N. and Munro, H. (1997), "Network relationships and the internationalisation process of small software firms", International Business Review, Vol. 6 No. 4, pp. 361-386.

Dahlander, L. and Magnusson, M.G. (2005), "Relationships between open source software companies and communities: Observations from Nordic firms", Research Policy, Vol. 34 No. 4, pp. 481- 493.

Dalle, J.M. and Jullien, N., (2002), "Open-source vs. proprietary software", Free/Open Source Research Community, MIT. At http://opensource.mit.edu/papers/dalle2.pdf, last accessed 29th of January, 2008.

DeLong, J.B. and Froomkin, A.M. (2000), "Beating Microsoft at its own game", Harvard Business Review, Vol. 78 No. 1, pp. 159–164.

Economist. (2003). "Microsoft at the power point", Economist Vol. 368 No. 8341, (13.09.2003) p. 59.

EITO (2006), European Information Technology Observatory 2006. Berlin, Germany.

Fillis, I. (2001), “Small firm internationalisation: an investigative survey and future research directions”, Management Decision, Vol. 39 No. 9, pp. 767-783.

Fink, M. and Kraus, S. (2007), “Mutual trust as a key to internationalization of SMEs”, Management Research News, Vol. 30 No. 9, pp. 674-688.

Fletcher, R. (2001), “A holistic approach to internationalisation”, International Business Review, Vol. 10 No. 1, pp. 25-49.

Fuggetta, A. (2003), “Open source software – an evaluation”, The Journal of Systems and Software, Vol. 66 No. 1, pp. 77-90.

Hars, A. and Ou, S. (2002), “Working for free? Motivations for participating in open-source projects”, International Journal of Electronic Commerce, Vol. 6 No. 3, pp. 25–39.

Havila, V., Johanson, J. and Thilenius, P. (2004), “International business-relationship triads”, International Marketing Review, Vol. 21 No. 2, pp. 172-186.

Hawkins, R.E. (2004), “The economics of open source software for a competitive firm: Why give it away for free?”, Netnomics, Vol. 6 No. 2, pp. 103–117.

Hertel, G., Niedner, S. and Herrmann, S. (2003), “Motivation of software developers in Open Source projects: an Internet-based survey of contributors to the Linux kernel”, Research Policy, Vol. 32 No. 7, pp. 1159–1177.

Javalgi R.G., Griffith D.A. and White D.S. (2003), “An empirical examination of factors influencing the internationalization of service firms”, Journal of Services Marketing, Vol. 17 No. 2, pp. 185 – 201.

Johanson, J. and Mattsson, L-G. (1988), “Internationalisation in Industrial Systems – A Network Approach”, in Hood, N. and Vahlne J-E. (eds.) Strategies in Global Competition, London: Croom Helm, pp. 287-314.

Johanson, J. and Vahlne, J-E. (1990), “The Mechanism of Internationalisation”, International Marketing Review, Vol. 7 No. 4, pp. 11-24.

Johanson, J. and Vahlne, J-E. (2003), “Business Relationship Learning and Commitment in the Internationalization process”, Journal of International Entrepreneurship, Vol. 1 No. 1, pp. 83-101.

Johanson, J. and Wiedersheim-Paul, F. (1975), “The internationalization of the firm: four Swedish cases”, Journal of Management Studies, Vol. 12 No. 3, pp. 305-322.

Jones, M.V. (1999), “The Internationalization of Small High-Technology Firms”, Journal of International Marketing, Vol. 7 No. 4, pp. 15-41.

Karlsen, T., Silseth, P.R., Benito, G.R.G. and Welch. L.S. (2003), “Knowledge, internationalization of the firm, and inward –outward connections”, Industrial Marketing Management, Vol. 32 No. 5, pp. 385-396.

Krishnamurthy, S. (2003), “A managerial overview of open source software”, Business Horizons, Vol. 46 No. 5, pp. 47-56.

von Krogh, G.. (2003), “Open-Source Software Development”, MIT Sloan Management Review, Vol. 44 No. 3, pp. 14–18.

De Laat, P.B. (2005), “Copyright or copyleft? An analysis of property regimes for software development”, Research Policy, Vol. 34 No. 10, pp. 1511–1532.

Lee, W-Y. amd Brasch, J.J. (1978), “The Adoption of Export as an Innovative Strategy”, Journal of International Business Studies, Vol. 9 No. 1, pp. 85-93.

Liang, N. and Parkhe, A. (1997), “Importer behavior: The neglected counterpart of international exchange”, Journal of International Business Studies, Vol. 28 No. 3, pp. 495–529.

Luostarinen, R. (1979), “Internationalization of the Firm: an empirical study of the internationalization of firms with small and open domestic markets with special emphasis on lateral rigidity as a behavioral characteristic in strategic decision-making”, Acta Academiae Oeconomicae Helsingfors, Series A:30. Helsinki.

Madsen, T.K. and Servais, P. (1997), "The internationalization of Born Globals: An evolutionary process?", International Business Review, Vol. 6 No. 6, pp. 561-583.

McDougall, P.P. (1989), "International versus local entrepreneurship: New venture strategic behavior and industry structure", Journal of Business Venturing, Vol. 4 No. 6, pp. 387-400.

McDougall, P.P., Shane, S. and Oviatt, B.M. (1994), "Explaining the formation of international new ventures: The limits of theories from international business research", Journal of Business Venturing, Vol. 9 No. 6, pp. 469-487.

McNaughton, R.B. (1996), "Foreign market channel integration decisions of Canadian computer software firms", International Business Review, Vol. 5 No. 1, pp. 23-52.

McQueen, D.H. (2005), "Growth of software related patents in different countries", Technovation, Vol. 25 No. 6, pp. 657-571.

Miles, M.B. and Huberman, A.M. (1994), "Qualitative Data Analysis: An Expanded Sourcebook", Sage Publications, California.

Moen, Ø. (2002), "The Born Globals: A new generation of small European exporters", International Marketing Review, Vol. 19 No. 2, pp. 156-175.

Moen, Ø., Gavlen, M. and Endresen, I. (2004), "Internationalization of small, computer software firms: Entry forms and market selection", European Journal of Marketing, Vol. 38 No. 9/10, pp. 1236-1251.

Muller, P. and Pénin, J. (2006), "Why do firms disclose knowledge and how does it matter?", Journal of Evolutionary Economics, Vol. 16, pp. 85-108.

Murphy, V. (2004), "Open Season", Forbes, Vol. 173 No. 8, pp. 88-89.

Mtigwe, B. (2005), "The entrepreneurial firm internationalization process in the Southern African context: A comparative approach", International Journal of Entrepreneurial Behaviour & Research, Vol. 11 No. 5, pp. 358-377.

Nambisan, S. (2002), "Software Firm Evolution and Innovation-orientation", Journal of Engineering and Technology Management, Vol. 19 No. 2, pp. 141-165.

Negassi, S. (2004), "R&D co-operation and innovation a microeconometric study on French firms", Research Policy, Vol. 33 No. 3, pp. 365-384.

Ojala, A. and Tyrväinen, P. (2006), "Business models and market entry mode choice of small software firms", Journal of International Entrepreneurship, Vol. 4 No. 2-3, pp. 69-81.

Ojala, A. and Tyrväinen, P. (2007), "Market Entry and Priority of Small and Medium-Sized Enterprises in the Software Industry: An Empirical Analysis of Cultural Distance, Geographic Distance, and Market Size", Journal of International Marketing, Vol. 15 No. 3, pp.123-149.

Oviatt, B.M. and McDougall, P.P. (1994), "Toward a theory of international new ventures", Journal of International Business Studies, Vol. 25 No. 1, pp. 45-64.

Oviatt, B.M. and McDougall, P.P. (2005), "Defining international entrepreneurship and modeling the speed of internationalization", Entrepreneurship Theory and Practice, Vol. 29 No. 5, pp. 537-553.

Seringhaus, R.F.H. (1993), "A comparison of Export Marketing Behavior of Canadian and Austrian high-tech Firms", Journal of International Marketing, Vol. 1 No. 4, pp. 49-69.

Simmonds, K. (1999), "International Marketing - Avoiding the Seven Deadly Traps", Journal of International Marketing, Vol. 7 No. 2, pp. 51-62.

Suzor, N., Fitzgerald, B. and Bassett, G. (2004), "Legal issues for the use of free and open source software in government", Free/Open Source Research Community, MIT, available at http://opensource.mit.edu/papers/suzorfitzgeraldbasset.pdf, last accessed 29th of January, 2008.

Tapscott, D. and Williams, A.D. (2007), "Wikinomics: How Mass Collaboration Changes Everything", Penguin Group, the USA.

Valkokari, K. and Helander, N. (2007), "Knowledge management in different types of strategic SME networks", Management Research News, Vol. 30 No. 8, pp. 597-608.

Welch, L.S. and Luostarinen, R. (1993), "Inward-outward connections in internationalization", Journal of International Marketing, Vol. 1 No.1, pp. 44-56.

Welch, L.S. and Luostarinen, R. (1999) "Internationalization: evolution of a concept", in Buckley, P.J. and Ghauri P.N. (eds.) The Internationalization of the Firm, A Reader. Second Edition, London, International Thomson Business Press, pp. 43-54.

Westphal, J.D., Boivie, S. and Chng, D.H.M. (2006), "The strategic impetus for social network ties: reconstituting broken CEO friendship ties", Strategic Management Journal, Vol. 27 No. 5, pp. 425-445.

Yin, R.K. (1994), "Case Study Research: Design and Methods", SAGE Publications, California.

Zahra, S.A. and Bogner, W.C. (2000) "Technology Strategy and Software New Ventures' Performance: Exploring the Moderating Effect of the Competitive Environment", Journal of Business Venturing, Vol. 15 No. 2, pp. 135-173.