Cross-border IT-support to the International Subsidiary Establishment Process: The Diffusion of Innovations Based Conceptual Model

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ABSTRACT

Rapid and effective internationalization has increasingly become important for high-tech companies. This study examines how companies can use cross-border IT-support to effectively share and utilize information from the target country environment for internationalization through a subsidiary. This study investigates the research question "How can IT provide cross-border support to the establishment process of a foreign subsidiary". This study also introduces the diffusion of innovations based conceptual model for the establishment process of a foreign subsidiary. The research findings are useful for both practice and further research.

INTRODUCTION

High-tech companies are seeking new business opportunities in foreign countries due to the liberalization of trade polices, improvement of information technologies (ITs) and saturation of the home markets, to name a few (Nahar, 2001). Researchers (Huda, Nahar & Tepandi, 1999; Nahar, 2001) indicate that internationalization is important for high-tech companies when they are facing increased competition and saturation in their domestic markets, or competing in the niche market segment (Bell, 1997). To take advantage of the company's chances for growth and success in a target country, it is usually important to have a strong presence nearby customers. Through establishing a subsidiary in the target country high-tech companies can deliver their products and services, provide after-sales support, and control the market.

In the establishment phase of a subsidiary, a company needs lots of information from the target country to evaluate its business opportunities there. Nowadays companies are increasingly using various IT-tools to evaluate business opportunities, support internationalization process and control foreign markets. IT-tools can support companies in the establishment process of subsidiaries, acquiring information from target country environmental factors, and facilitating global information change (Blaine & Bowen, 2000; Nahar, 2001). However, companies also need to know how they can use and take advantages of these IT-tools. Researchers (Huda et al., 1999)

also indicate that abusage of IT-tools can decrease a company's market potential and slow down the internationalization process.

There is a considerable amount of literature on internationalization of companies (see e.g. Bradley, 1995; Luostarinen & Welch, 1990), but very limited literature exists on how IT can be used to provide cross-border support for the establishment process of a foreign subsidiary. Internationalization through the subsidiary is very costly and a risky process. The selection of a suitable market for the establishment of a subsidiary will have a long-term effect on the success and growth of the company (Huda et al., 1999), whereas poorly planned internationalization and an erroneous selection of the target country will inflict loss of the actual costs and other related costs such as missed opportunities in more suitable markets (Bradley, 1995).

Due to the aforementioned reasons, research is needed on how high-tech companies can use various IT-tools effectively to share and utilize information from the environmental factors of the target country for the establishment process of a subsidiary. This information is also needed to understand and facilitate diffusion of a company's products into the target country. The research question addressed in this study is: "How can IT provide cross-border support to the establishment process of a foreign subsidiary?" This research attempts to provide an answer to this question by a systematic analysis of the relevant literature.

This paper proceeds as follows: a literature review on cross-border IT-support for business operations is carried out first. Based on the literature review, the conceptual model is developed. Finally, we draw the conclusions on this study, and suggest future research directions.

LITERATURE REVIEW

Cross-border IT-support to Business Operations

Cross-border IT-support enables employees to work on the same project worldwide by using various IT-tools and assists companies in controlling their global business tasks, reducing costs, and assisting information-sharing and dissemination (Nahar, 2001). Effective utilization of cross-border IT-support enables companies to support and coordinate their business processes on a real-time and global basis (Blaine & Bowen, 2000). IT-support also provides a global competitive advantage in several ways, e.g. IT helps companies to acquire information regarding customers' needs, to differentiate and customize products for the market, etc. (Huda et al., 1999).

Monitoring and Controlling of Subsidiaries and Foreign Markets

Utilization of various IT-tools allows companies to monitor and control business activities in distant locations. Monitoring is targeted at collecting information regarding customers' needs and changes in the environment in the target country (Roche, 2002). By using various monitoring and controlling systems, companies can tap new opportunities and reduce risks in the foreign markets, attain competitive advantages, as well as ensure coherent strategies between the parent company and its subsidiaries (Nahar, 2001). Monitoring and controlling of subsidiaries can be handled by utilizing, e.g. databases, website of the competitors, e-mail, Intranet, tele- and video-conferencing. With all these available IT-tools, companies can monitor changes in the selected

market areas and control progress of their own strategies, as well as actions of the competitors (Huda et al., 1999).

Global Information Sharing Between the Parent Company and Subsidiaries

Cross-border IT-support enables a real-time exchange of information between the parent company and its subsidiaries. Information-sharing about business strategies, new products, competitors, and customers' needs, etc. is essential in a global business environment. Integration of a company's information systems with Intranet, Extranet, groupware, database, teleconference and other geographically distributed systems enables managers to share information with others throughout the globally distributed business environment, overcoming the barriers of time-zone difference, distance, culture, and organizational boundaries (Nahar, 2001). Through the utilization of IT-tools, employees from around the world can work together and make decisions faster concerning business strategies and projects (Nahar, 2001; Roche, 2002).

Global Training

Especially, in the start-up phase of the subsidiary, the parent company needs to train their employees in the subsidiary and the distributors to sell their products and provide support to new customers (Nahar, 2001). Due to the development of IT industry, various IT-based training tools are becoming beneficial and easier to use for global training. Interactive multimedia training utilizing Extranet, video conferencing and computer-based simulation software make training more effective, reduce face-to-face training needs, increase training capacity and enable real-time training. Effective utilizations of these IT-tools can facilitate international training, decrease training costs and the need to travel (Nahar, 2001). Global training can be used to train the employees of the subsidiary and the distributors across national borders.

Sharing and Managing Global Know-how

Global high-tech companies need to collect, maintain, and share information from their employees. Therefore the utilization of ITs allows companies to store, share, and distribute this know-how in various phases of the subsidiary establishment process. IT helps companies to locate relevant knowledge quickly, expedite better and faster decision-making, easily locate employees with needed expertise in a shorter period of time, and solve problems quickly (Nahar, 2001). Global cross-border know-how sharing between a parent company and its subsidiaries can be facilitated by using Extranet, Intranet, groupware applications, tele- and video- conferencing, employees' skills databases, etc. Through the utilization of these IT-tools, stakeholders around the world can make contributions in the form of their know-how and expertise. This also decreases employees' needs to travel to the project location for sharing knowledge and solving problems (Ives, Jarvenpaa & Mason, 1996; Nahar, 2001).

Global Coordination

Global coordination is needed when a company develops distributed products and markets them in a global environment, as well as coordinates customers, suppliers and alliance partners (Nahar, Käkölä, Huda & Deo, 2003). Effective utilization of cross-border IT-support allows companies to coordinate their business, R&D and production activities in distant locations between a parent

company and its subsidiaries (Roche, 2002), as well as offer competitive advantage in a global marketplace. Utilization of Internet, Extranet and Intranet based collaborative IT-tools (Nahar et al., 2003), integrated global planning applications, common language (Nahar, 2001), and software engineering tools and methods (Roche, 2002), helps companies to conduct timely and accurate coordination between the parent company and subsidiaries. Implications of the coordination are increasing the manageable scale and scope of the company, as well as increasing output and productivity (Blaine & Bowen, 2000).

Providing Technical Support and Solving Complex Problems

In some cases, the subsidiary, distributors and customers may need problem-solving support. Company's website can have special support sections for a subsidiary, distributors and customers that provide problem-solving information on a 24-hour and seven-day basis (Philips, 1998). The Internet, Extranet and Intranet, companies' databases, a centralized call centre and e-mail can also be used to ease information-sharing that can overcome distance and cultural barriers, and organizational boundaries between the parent company, subsidiaries, distributors and customers (Nahar, 2001). In order to solve complex technical problems, the experts from a parent company can connect to customers' computers over the Internet and solve problems (Philips, 1998). The aforementioned methods can therefore enable rapid problem-solving between the parent company and subsidiaries, and improve customer satisfaction.

Continuous Information Supply

Multinational companies have to collect, share and maintain information from different global business tasks (Roche, 2002). IT plays a critical role when companies integrate and synchronize various tasks between the parent company, subsidiaries and suppliers. A company's Internet, Extranet, Intranet and data warehouses-based information could be supplied constantly to distributors, customers and consumers. If marketing-related materials are developed separately by the parent company, a subsidiary and distributors, work can overlap and spoil efforts and resources. Redundancy of different information in different places can be avoided through IT-supported collaboration. The successful information supply can foster coordination of the activities of the extended supply chain in a way that decreases development time with improved quality and lower costs (Nahar, 2001).

Global Project Management

Project team members and managers of the company can be located in different places around the world. A project manager can utilize various IT-tools, techniques and processes to define goals of the project, lead and support various project teams, monitor progress and ensure that the project is done in a satisfactory way (Nahar et al., 2003). Project managers can use various project management tools to estimate the requirements of various skills, resources and schedule the project. Utilization of software project management tools and mobile computing systems integrated with Intranet can help the project manager to monitor events, detect problems early on, initiate timely corrective actions, and control day-to-day project activities (Nahar, 2001).

Access to Advice of Remote Experts

Access to the advice of remote experts enables a quicker decision-making process, as well as allowing more immediate problem-solving. Companies can utilize the advice of remote experts between parent company and subsidiaries. If an employee in a subsidiary faces some problem, he/she can contact the parent company and get help immediately to resolve the specific problem. Extranet, Intranet, tele- and video- conferencing can be utilized between the parent company and subsidiaries to solve any difficulties encountered. Utilization of these tools enables quicker and accurate decision-making and problem-solving, as well as saving time and expenses associated with overseas traveling (Nahar, 2001).

Diffusion of Innovations Theory

According to Rogers (1983, pp. 5-11), an innovation is "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" and diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system". This study conceptualizes an innovation like a new practice to acquire and use information by using various IT systems to support the establishment process of a foreign subsidiary in a target country. It is highly influenced by micro-, telecommunications and IT industry-, and macro level factors. The common diffusion of innovations theory by Rogers (1983) does not include these kinds of factors, thus this study utilizes an extended version of diffusion of innovations theory based on the framework by Nahar (2001).

Micro Level Factors

Micro level factors include the characteristics of an innovation and the characteristics of a company. The characteristics of a company have long been associated with its capacity in the successful implementation of an innovation (see e.g. Zaltman, Robert & Jonny, 1973). An innovation is more successful if it includes the following characteristics (Rogers, 1983):
   a) **Relative advantage:** the determinant issues that are an innovation's relative advantages to consumers, and the consumers' capability to see the benefits of an innovation.
   b) **Compatibility:** an innovation that is more compatible with cultural values and beliefs, with previous innovations or with consumers' needs, has higher potential to be adopted.
   c) **Complexity:** complexity of the innovation may have negative impacts on the rate of adoption among consumers.
   d) **Trialability:** an innovation that can be tried on the installment plan has a higher potential to be adopted more rapidly than those that do not.
   e) **Observability:** if an innovation is easily observed and communicated to others, it has a higher potential to be adopted by consumers.

The key characteristics of a company can be classified by the following:
   a) **Need for the innovation:** high-tech companies are dependent on their capabilities to improve innovations to increase productivity and competitive edge (Nahar, 2001).
   b) **Resources and experience:** successful implementation of an innovation needs adequate resources, such as material and financial resources, knowledge, etc. (Nahar et al., 2003).
   c) **Management and leadership:** the successful management and leadership require the ability to plan, implement, provide support, lead, motivate, and control (Nahar, 2001).

d) **Training:** specific knowledge and skills are needed in high-tech companies. Successful training enhances the adoption of new IT-tools (Nahar et al., 2003).

Telecommunications and IT Industry Level Factors

Industry level factors include the characteristics of the telecommunications and IT industry of the target country. These factors influence companies' capabilities to implement IT innovations in a selected country. When a high-tech company establishes a subsidiary in a target country, it needs to utilize various IT-tools. Availability of IT-support providers and their level of knowledge influence a company's capabilities to solve problems related to IT-tools (Nahar, 2001).

An advanced telecommunications infrastructure has positive influences on the implementation of IT innovations (Mata & Fuerst, 1997; Nahar, 2001). If the telecommunications infrastructure is progressive, it enables high quality Internet services. Availability of the bandwidth in the target country is essential for the company. Bandwidth enables high quality connections and makes implementation of innovations favorable. Security of the telecommunications infrastructure in the target country is also essential for a company. Low security of the Internet in the target country may be a barrier for the successful implementation of innovations (Nahar, 2001).

Macro Level Factors

Macro level factors include the characteristics of the target country. These characteristics influence the IT-supported business process and diffusion of innovations in the country in question. The macro level factors can be divided into the following categories: a) political and legal factors, b) cultural factors, c) economic factors, and d) marketing factors (Nahar, 2001).

Political stability and safety in the target country has a significant role in IT-supported business processes (Blaine & Bowen 2000). Legal or political restrictions on IT-sectors of the local government negatively influence the implementation of IT-supported processes in the target country (Mata & Fuerst, 1997; Nahar, 2001). Several researchers (see e.g. Blaine & Bowen, 2000; Nahar, 2001) indicated that cultural issues influence the company's capabilities to do business in the target country. Mutual cultural understanding among the managers and employees enables effective communication and successful management of the company. Good knowledge of the local culture enables successful implementation of innovations.

Having a stable economic situation also positively influences the implementation of IT innovations, e.g. stable exchange rates of the currency influence a company's availability to implement an IT-supported business process. The availability and quality of IT-trained employees in the target country is also essential for the company (Nahar, Käkölä & Huda, 2002). The large size of the market and/or demand for a specific product makes a country attractive to foreign companies (Ojala & Nahar, 2004). Laws and regulations regarding marketing the product (e.g. quality standards) vary in different countries. If these differ substantially, it may hinder the implementation of innovations in the target country (Nahar, 2001). Several other factors may also influence the implementation of innovations, technological innovations, and IT innovations; therefore, the aforementioned factors may not be comprehensive. The internal factors of the company are more controllable than external factors (Nahar, 2001).

THE DIFFUSION OF INNOVATIONS BASED CONCEPTUAL MODEL OF IT-SUPPORTED INTERNATIONAL SUBSIDIARY ESTABLISHMENT PROCESS

The diffusion of innovations based conceptual model of an IT-supported international subsidiary establishment process (see Figure 1) is developed on the basis of the diffusion of innovations theory (Nahar, 2001; Rogers, 1983) and an in-depth literature review. The conceptual model deals with the IT-supported international subsidiary establishment process in the context of the environment of the target country.
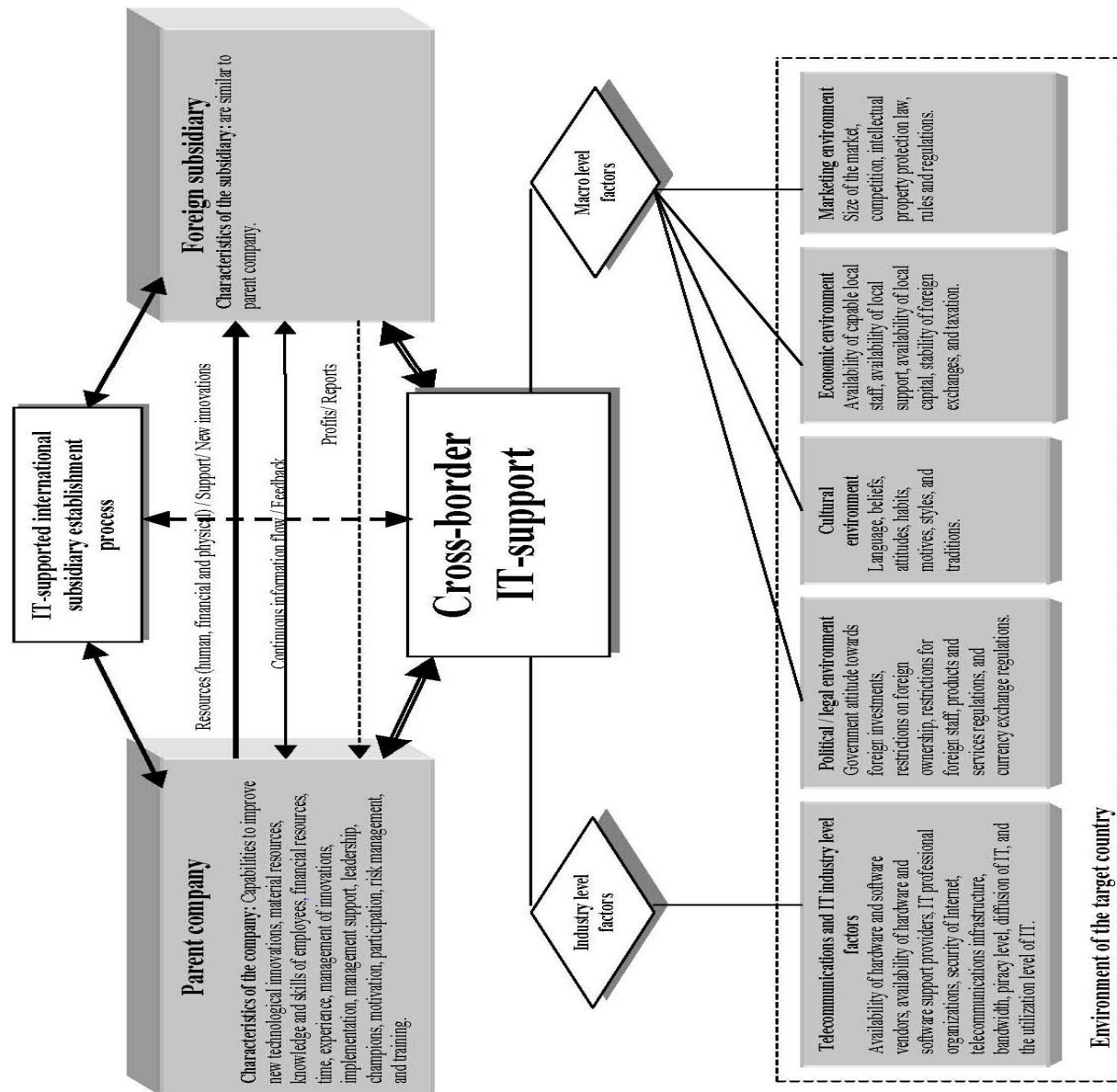
Figure 1: The Diffusion of innovations based conceptual model of IT-supported international subsidiary establishment process.

In the conceptual model, the key actors are the parent company and the foreign subsidiary. Between the parent company and the foreign subsidiary, the IT-supported international subsidiary establishment process has been demonstrated, see Ojala and Nahar (2004). The arrow from the parent company, through IT-supported international subsidiary establishment process to the foreign subsidiary is a two-way flow, because the parent company supports the subsidiary process and information flows both ways. In the establishment process of the subsidiary, cross-border IT-support is needed, because in the different phases of the subsidiary process, information from the target country's macro- and industry- level factors is needed. The operations between the parent company and its foreign subsidiary are described by using three arrows. The upper arrow describes resources, support and new innovations that flow from the parent company to the foreign subsidiary. The middle arrow presents the continuous information flow and feedback between the parent company and the foreign subsidiary. The lower arrow exhibits profits and reports that the foreign subsidiary returns to the parent company. The industry level factors are interconnected to the telecommunications and IT industry level factors and the macro level factors are interconnected to political/legal, cultural, economic and marketing environments of the target country.

The arrows from the parent company through cross-border IT-support to the foreign subsidiary is a two-way flow, because both of them can collect information from industrial and macro level factors and share information by utilizing various IT systems. Based on the in-depth literature review, the cross-border IT-support has been categorized within the context of supporting the establishment process of the foreign subsidiary (see Table 1).

Capabilities of ITs	Potential tasks of cross-border IT-support	Expected impacts on cross-border IT-support
Monitoring and controlling of subsidiaries and foreign markets	• Monitor information on the customers' needs and changes in the market. • Control different business tasks in the global market.	• Enable to make appropriate decisions. • Implement suitable strategies. • Standardize planning and budgeting systems. • Develop multicultural collaboration. • Enable real-time reporting.
Global information sharing between the parent company and subsidiaries	• Share information about corporate and subsidiary strategies, new products, competitors, product development strategies and customers' needs.	• Enables employees to work together over national borders. • Facilitates faster decisions concerning business operations and strategies.
Global training	• Interactive multimedia training through utilizing various IT training tools.	• Reduces face-to-face training needs. • Enables remote real-time training. • Decreases cost of training.
Sharing and managing global know-how	• Collect, maintain, store, and share data in various phases of the subsidiary establishment process.	• Locate relevant knowledge. • Enable faster decision-making and problem-solving. • Reduce need to travel.

Global coordination	• Develop distributed products and market them in global environment. • Coordinate customers, suppliers, and alliance partners.	• Decreases risks of global software production. • Increases the manageable scale and scope of the company. • Provides better customer services and coordination of activities.
Providing technical support and solving complex problems	• Handle information-sharing by overcoming distance, cultural barriers, and organizational boundaries.	• Facilitate faster problem-solving support on a 24-hour and seven-day basis. • Improve customer satisfaction.
Continuous information supply	• Collect, share and maintain information from different global business tasks.	• Reduces work overlap. • Decreases product development time, as well as spoiling of efforts and resources.
Global project management	• Estimate requirements of various skills, resources, and project scheduling.	• Detects problems early on. • Controls day-to-day project activities.
Access to advice of remote experts	• Share information and get help immediately to resolve specific problem.	• Enables quicker decision-making and problem-solving. • Reduces need to travel.

Table: Capacities of ITs and their potential for supporting the establishment process of the subsidiary.

CONCLUSIONS AND FUTURE RESEARCH

High-tech companies are worldwide seeking new business opportunities in countries where they can market their products, recover R&D costs, and make a profit. New IT-tools are creating opportunities for companies to acquire information from attractive countries, share information over the borders, and facilitate the establishment process of a subsidiary. Unfortunately, most companies are failing to avail themselves of these opportunities, as very limited literature exists on how IT can be used to provide cross-border support for the establishment process of a foreign subsidiary. This research examined and analyzed how high-tech companies can use IT-tools to collect, share and utilize information from the environmental factors of the target country for the establishment process of a subsidiary.

This study makes a theoretical contribution and extends both traditional diffusion theory (Roger, 1983) and the extended version of diffusion of innovations framework (Nahar, 2001). The research result is unique, as no prior scholarly inquiry has examined and introduced a diffusion of innovations based conceptual model for the establishment process of a foreign subsidiary. This study suggests that utilization of a variety of IT-tools for cross-border support assists companies to acquire information from the target country environment, supports their internationalization process, enhances cross-border assistance, and facilitates effective management of information.

The conceptual model developed in this study, can be used to identify, analyze, and understand the characteristics of an innovation and a company, as well as the industrial and environmental factors of the target country. Companies can use this model when they evaluate their capabilities for foreign markets and identify attractive markets. The knowledge obtained from this research will assist companies in managing and developing their business in foreign countries.

The conceptual model has not been validated empirically. In the future, empirical research is needed to validate and refine the model. Further research is also necessary on the barriers that are encountered in cross-border IT-support. This research develops a generic model of diffusion of innovations based conceptual model of IT-supported international subsidiary establishment process. Further research is necessary regarding how much the IT environment of some specific country influences cross-border IT-support.

REFERENCES

Bell, J. (1997). A Comparative Study of the Export Problems of Small Computer Software Exporters in Finland, Ireland and Norway. *International Business Review, 6*(6), 585-604.

Blaine, J. M. & Bowen, J. (2000). The Role of Information Technology in International Business Research. In E.M. Roche & J.M. Blaine (Eds.), *Information Technology in Multinational Enterprises.* (pp. 21-56). UK: Eward Elgar Publishing Limited.

Bradley, F. (1995). *International Marketing Strategy.* Second edition. London: Practice Hall International.

Huda, N., Nahar, N. & Tepandi, J. (1999). IT-Enabled International Business Intelligence for Hi-tech Companies. In R. Hackney (Ed.), *Proceedings of the Business Information Technology Management: Generative Futures.* UK: 9th Annual BIT Conference.

Ives, B., Jarvenpaa, S.L. & Mason, R.O. (1996). Global Business Drivers: Aligning Information Technology to Global Business Strategy. In C. Deans & J. Jurison (Eds.), *Information Technology in a Global Business Environment.* (pp. 143-167). USA: Boyd & Fraser publishing company.

Luostarinen, R. & Welch, L. (1990). *International Business Operations.* Finland: Kyriiri Oy.

Mata, F.J. & Fuerst, W.L. (1997). Information Systems Management Issues in Central America: A Multinational and Comparative Study. *Journal of Strategic Information Systems, 6*(3), 173-202.

Nahar, N. (2001). *Information Technology Supported Technology Transfer Process: A Multi-site Case Study of High-tech Enterprises.* Finland: University of Jyväskylä. Jyväskylä Studies in Computing 9.

Nahar, N., Käkölä, T. & Huda, N. (2002). Diffusion of Software Technology Innovations in the Global Context. *Proceedings of the Hawaii International Conference on System Sciences.* Hawaii: IEEE.

Nahar, N. Käkölä, T., Huda, N & Deo P.S. (2003). *International Software Product Development for World Markets in a Software Start-up.* New Jersey: 1st Annual Conference on Systems Integration.

Ojala, A. and Nahar, N. (2004). A Conceptual Model for the IT-supported International Subsidiary Establishment Process. *Proceedings of the Managing New Wave Information Systems: Enterprise, Government and Society.* Australia: The 15th Annual ACIS2004.

Philips, R. A. (1998). *Guide to Software Export: A Handbook for International Software Sales.* USA: International Business Press.

Roche, E.M. (2002). Avoiding Bad Decisions on the Road to Globalization. In P.C. Palvia, S.C.J. Palvia & E.M. Roche (Eds.), *Global Information Technology and Electronic Commerce: Issues for the New Millennium.* (pp. 86-99). USA: IVY Language Publishing Limited.

Rogers, E.M. (1983). *Diffusion of Innovations.* New York: The Free Press.

Zaltman, G., Robert D. & Jonny, H. (1973). *Innovations and Organizations.* NY: Wiley.