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Benefits and risks of the influence of IT Evolution in the relationship between companies and suppliers (the case of seven companies)

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Abstract
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Title:

1) Benefits and risks of the influence of IT Evolution in the relationship between companies and suppliers (the case of seven companies)

Purpose: The main purpose of this thesis is (1) to describe the influence of IT evolution in the relationship between buyers and suppliers (2) to focus on benefits and risks in the adoption of IT with their suppliers

Methodology: The methodological approach chosen for this research is Realist approach. We used qualitative method to analyze the information collected. The secondary data were obtained from different kind of sources such as journals, books and electronic resources (electronic libraries, journals and databases). The primary data were collected using semi-structured interviews in seven companies of different industries.

Empirical data: The companies that proportionate empirical data were chosen based on a number of contacts we have in different industries. Managers of seven companies from different kind of business in Thailand, Mexico and USA were interviewed providing useful information to this research.

Key words: evolution of Information Technology, supplier-buyer relationship, technology evolution, IT development, information sharing, infrastructure, SCM systems, new technology, IT benefits, IT risks, IT effects, management suppliers relationship, IT business effects, Information Technology Management, Effect of IT evolution in business process, Effect of IT adoption, IT adoption in buyer-suppliers relationship, risk in IT implementation, changes in information technology, information technology development, benefits of IT in a relationship with suppliers, risks implementing IT with suppliers, management of supplier relationships affected by Information Technology.
**Conclusion:**

IT evolution has changed the way firms operated in the past and it has been used for the companies mainly to increase the efficiency and to improve collaboration with their suppliers using infrastructure and specialized systems.

According to the findings companies have identified several benefits implementing IT in their relationships with suppliers, being “Improving management efficiency” the most important factor. Nevertheless there are also drawbacks for the managers to decide adopt IT in their businesses, for example in this case “Incompatible processes, applications or technology between organizations” is a factor that still influences companies due to the complications that can represent start sharing work processes with suppliers.

Enhancing the benefits of adopting IT in the relationship of the companies with their suppliers and be careful with the management of risks can help to better meet the company’s business objectives.
1. Introduction

1.1 Background

These days there are significant changes in the business environment that have occurred with the evolution of Information Technology and e-commerce that have affected business relationships (Leek, et al, 2003). Evolution of Information Technology transforms the nature of work (Dede, 1989) in business representing opportunities for all organizations to improve the performance in their work processes (Bartoli and Harmel, 2004) and building collaborative relationships with their partners to get competitive advantage (Corsten and Kumar, 2005).

Collaborative relationships between partners starts when organizational boundaries are crossed integrating activities that traditionally were considered just company or supplier responsibility (Yilmaz and Hunt, 2001) with the objective of “improving visibility, service levels, flexibility, greater end-customer satisfaction, and reducing cycle times” (Daugherty et al., 2006) so the influence of Information Technology evolution in the collaborative relationships started adopting a long-term approach to create unique values that partners could not create independently (Corsten and Kumar, 2005) because of the lack of human, financial and technological resources to operate separately in every market and with every product (Bleeke and Ernst, 1993). Based on the statement that the proportion of purchases to sales has increased significantly in a large number of industries and the response to the market depends in grand part on the quality and reliability of supplies, the relationships that companies establish with their suppliers are becoming one of the most important factors of competitive advantage (Toni, et al, 1994).

1.2 Problem statement

In today’s competitive market we found out that exist different ways the companies increase the level of profitability and productivity in their businesses. One way the companies start making this possible is improving supplier collaboration by using information technology in their relationships.

However, the influence of Information Technology has brought different kind of benefits and risks for the companies that start adopting IT in the relationships with their suppliers.
1.3 Research purpose

The purpose of this research is to describe the influence of IT evolution in the relationship that companies establish with their suppliers and to analyze the benefits and the risks that have been identified with the adoption of IT.

1.4 Target group

The result of this research can be useful for managers that are considering adopting Information Technology in the relationship with their suppliers and partners. It can be reviewed the kind of benefits and drawbacks that companies could confront before taking the decision of using IT as an alternative. This research can also help researchers interested in the impact of IT evolution in the industry.

1.5 Research question

The following research question will be study to achieve the purpose of this research:

*How IT evolution has influenced the relationship companies establish with their suppliers and which are the benefits and risks that have been identified on the adoption of IT?*
2 Literature review

2.1 IT evolution in business

Traditionally, businesses were carried out based upon arm’s length relationships among members, putting emphasis on individual activities, restricting information sharing, and focusing on negotiating the lowest price. (Cheng, et al., 2010); at the same time organizations had independent relationships, competing for resources and ignoring cooperative efforts that lead to a lack of integration, especially when parties were located in different areas or regions. (Cheng, et al., 2006).

When the Internet Era started, web based technologies become part of the strategic and operational management activities in the companies (Michelino, et al., 2008), the importance of business to business commerce increased dramatically enhancing co-operation to save costs of transferring data (Mclvor and Humphreys, 2004) and integrating value chains make them more efficient; moreover, the change of relationships was emphasized on service-centered relationships rather than product-centered relationships like in the past. (Hansen, 2009)

The changing in the relationships made use of e-business technology in the creation of new market opportunities through electronic channels that enabled companies to lower transaction costs, reduce delivery times, improve customer services, and add convenience to the relation (Damanpour, 2001). E-collaboration started to be used through internet and digital technologies among partners to facilitate and share resources. (Cheng, et al., 2006). The connectivity associated with the Internet as electronic commerce had the potential to bring an industry’s suppliers into a unified marketplace (Mclvor and Humphreys, 2004).
Additionally, the evolution of electronic commerce technologies such as websites, electronic mail, extranets, etc had a considerable impact on communication in supplier networks in many industries reducing the cost of integrating buyers and suppliers through electronic networks. Companies then could achieve an integration effect by linking processes reducing the cost of procurement and errors in orders and invoices. (Mclvor and Humphreys, 2004)
In this integration effect, Information Technology aimed to fundamental changes in how business operated, for example, low-cost computing power and Internetworking technologies started to provide a low cost virtual connection and help to cover new business needs. The operational functions of many business continued evolving based on new technologies and interconnecting their systems with more complex infrastructures that were part of their work processes (Applegate, et al., 2007).

The business network started changing the way it was managed from only the use of IT infrastructures to the interactions between businesses and individuals. Over the time, organizations moved from ”a stable and slow-moving business” to an open digital based business network where businesses were conducted faster despite different processes and computer systems. (Heck and Varvest, 2009)

“Computer and people have complementary intellectual strengths, each can supply what the other lacks” (Dede, 1989). The companies realize that, the combination of people and IT give them a superior competitive advantage (Roy and Sivakumar, 2007) to increase speed and accuracy of decision making (Vesset, 2005)

2.2 Changes of buyer-supplier relationships influenced by Information Technology

The evolution of Information Technology is constantly producing new tools to enhance productivity (Vesset, 2005) and the adoption of technology on the relationships between the companies and their suppliers have been an important factor to improve efficiency and get competitive advantage (Toni, et al.,1994).

In the past the business relationships between buyers and suppliers were a simple exchange of an object (material, or components) and commercial transaction based on price; then the development of the supply transaction became more often an exchange of information and coordination of complex activities (design, production and logistics) with business partners to achieve at first just the goal of saving costs. (Toni, et al., 1994) Moreover, the shift from adversarial relationships between partners turned into cooperative, service-centered relationships becoming an important factor of business growth (Hansen, 2009).
The evolution of a buyers-supplier relationship was developed in parallel with the change in business processes in an industry that faced aggressive competition and high technology development. (Boeck, et al., 2009) For example the workplace started adopting electronic databases for information management, spreadsheets for modeling, computer-aided design systems for manufacturing, word processors, text analyzers and graphic tools and other kind of technologies (Dede, 1989).

When the network Era started year 2000 (Hedman and Kalling, 2002) the impact of internet and e-mail created bonds across organizations (Toole, 2003) Internet radically changed the ways in which human networks operated and gave power to business-to-business markets; attitudes regarding information became less rigid and relationships were an important key to improve work processes (Roy and Sivakumar, 2007). Electronic contact, new systems and Internet changed business conduct and accelerated business activities, increasing global competition (Damanpour, 2001).

Companies began to use Information Technology infrastructure as electronic exchange platforms to conduct business to business commerce (Boeck, et al., 2009) as an example companies started using bar code readers and scanners increasing efficiency and productivity because the job requires less skills to perform the work that in the past was made introducing the information into a register (Dede, 1989).

After the development of bar code systems, more cooperative relationships started using co-managed inventory and sharing information in their work processes using Information Technology and e-commerce as an intermediary in business to business transactions between suppliers and buyers (Hansen, 2009). The activities became even more co-operative and interdependent, and at the same time, the electronic mediated interactions between business partners started replacing and transforming the traditional methods of conducting business (Boeck, et al., 2009). As an example Wal-Mart placed a co managed inventory system where manufacturers write themselves purchase orders without any Wal-Mart signatures or approvals (Barratt and Oliveira, 2001) that indicated a complete trust in the relationship. However, jobs started demanding higher skills to extract the knowledge and functionality of the new tools as work processes became more intelligent (Dede, 1989).
In the supply chain, SCM (Supply Chain Management) systems integrated information about suppliers, inventories, warehouses and centers of distribution, products, deliveries issues, prices and orders. SCM systems collected and distributed information using computer terminals, e-mail, electronic data interchange (EDI), scanners or other IT resources such as CRM and ERP systems (Hedman and Kalling, 2002). The new developments of SCM (Supply Chain Management) systems improved coordination between suppliers and buyers, shorter lead times, greater productivity, lower inventory and increased delivery reliability enabling lower cost of product to be provided to the buying company’s customer. (Giunipero and Brand, 1996). According to what was stated, IT has played an important role in the supply chain integration being information sharing through e-business technology a fundamental element (Cheng, et al., 2010).

The traditional methods of conducting business were changed when companies started connecting with suppliers checking inventories across multiple locations through Internet support systems, reducing distances and increasing communication (Michelino, et al., 2008). But because the routines parts of the work started to be automated, a greater proportion of decisions started requiring also ethical choices (Dede, 1989). Managers started facing grave challenges regarding their ability to manage relationships and coordinate activities among multiple players and a big grade of flexibility was required to manage a meaningful integration with suppliers (Hill, et al., 2009). The management of relationships with suppliers became an important issue, as the effects of IT evolution enhance collaborative businesses, “Most progressive companies view their customers, vendors and suppliers as partners in the quality-price-service chain of events” (Hansen, 2009) trying to build stronger business relationships in long term.
2.3 Effects of Implementing Information Technology in relationships with suppliers.

Initially the application of Information Technology was focused on internal effectiveness, when the companies were typically process-oriented and worked with separate business units (Mutsaers et al, 1998). Later companies faced challenges such as increasing competition, getting higher performance levels and globalisation, that forced them to continuously re-organise themselves to become more flexible and to increase performance using Information Technology as an important factor (Mutsaers, et al, 1998) creating and supporting interorganizational integration with suppliers (Mulligan and Gordon, 2002) and moving towards the improvement of the business network in which the company operates (Mutsaers et al, 1998).

Information technology is an integral part of services, products, distribution channels and delivery processes providing access to a shared infrastructure (Mutsaers et al, 1998). Due to this, it is important to study the positive and negative effects that the companies face and consider when decide to adopt Information Technology in the relationships with their suppliers.
2.3.1 Benefits of adopting IT in relationships with suppliers.

There are some benefits attributed to the adoption of Information Technology in relationships with suppliers, however, sometimes the benefits cannot be reached without having certain maturity in the use of Information Technology (Mutsaers et al, 1998).

Benefits attributed to the influence of IT evolution in relationships with suppliers

Cost reduction. Communication with suppliers has improved with the introduction of Information Technology become quicker and accurate (Leek, et al., 2003) being the main objective of early IT developments to improve organizational and operational efficiency and to reduce costs (Fang, et al., 2006). IT helps the company to save costs in communication with faster interaction via computer networking (e-mail) (Kleiner and Nour, 1992) also replacing manually processes as paper-based transactions (Porter and Millar, 1985). The improvement of supplier collaboration has a positive influence in the company performance applying new technology and new innovation in terms of financial results (Rajagopal and Rajagopal, 2009). At the same time IT can reduce coordination costs standardizing and automating processes (Mukhopadhyay et al, 1995).

- Lower Transaction Costs are probably the most important benefits. Internet-based transactions systems cost less over the long run because they reduce the need of acquiring a large organizational system reducing operational costs (Damanpour, 2001) and facilitating more efficient operations in the business environment (Chan, 2000).

- Reduction of inventory levels and shorter order cycle times increasing visibility and efficiency, enhancing the potential of suppliers (Cheng, et al., 2010). Information Technology allows the detail monitoring of process status and transform unstructured transaction processes in routines; it can include the establishment of a Just in time inventory system and total quality management (Chan, 2000) reducing inventory costs and have more accurate orders checking purchasing histories and sales volume (Kleiner and Nour, 1992).

- Better communication between organizations, improving operation management and enhancing new business model development facilitating data transmission and mass exchangeable information that will reduce complex management (Michelino, et al.,
In electronic commerce Internet allows more personalized services and improves buyer-seller interaction (Chan, 2000).

- **Support of strategic activities** such as integrated forecast, production planning, new product development, and stock and transportation management toward effective management, improving SCM process inside the networks. (Michelino et al., 2008)

- **Increased flexibility and quality** in production (Sanchez, 1991). Firms aim at improving efficiency, advancing quality and responding dynamically to a constantly changing environment (Fang, et al., 2006). The new combination of business processes enable better lead times, process execution and inventory costs, improving also the quality of the processes (Trkman et al, 2007) using also EDI and just in time (JIT) inventory management that at the same time improves production and distribution issues (Bandyopadhyay et al, 1999). In addition information technology is also transforming the production process to be faster, more accurate and more flexible in manufacturing. (Porter and Millar, 1985).

- **Data standardization** is enhanced and more flexible and cheaper data sharing can be achieved by enhancing know-how coding and diffusion. The routines can reduce the uncertainty and increase behavioral stability and predictability, so, they can facilitate real time transmission and strategic information sharing which reducing transfer time and cost. (Michelino, et al., 2008). Shared databases facilitate the information dissemination process and standardize the format in which all receive the information (Chan, 2000).

- **Better Management Information**: Faster and better management of sales, data reporting, analysis production, inventory and distribution, marketing and sales, and more effective R&D and product development. (Damanpour, 2001). Organizations install and use communications developments, software and database systems to improve knowledge management (Green, 1991) allowing the dissemination of information to improve the business processes (Chan, 2000). In addition, firms can access up-to-date information via systems to support accurate decision making. (Kleiner and Nour, 1992) and improving
efficiency management by driven better information that will help to manage better the flows of material. (Morrell and Ezingead, 2002)

Better Integration of Suppliers and Vendors: Information Technology enables stronger links with customer, suppliers and other stakeholders (Mutsaers et al, 1998; Porter and Millar, 1985). Information Technology represents the ability to improve business integration and to increase work efficiency integrating IT resources (IT infrastructure and communication technology) by technical interconnectivity and interdependency of business processes (Fang, et al., 2006). Information Technology has influenced the way organizations compete facilitating relationships between companies and suppliers (Green, 1991).

Better Channel Partnership: Better communication with partners (Damanpour,2001). Communication takes place commonly through applications such as voice mail, email, video and teleconferencing (Chan, 2000). Besides, through ERP, SCM or CRM systems companies can keep in touch tightly with suppliers and customers to react to change and solve issues in a faster way (Fang, et al., 2006). EDI is used to communicate with other business partners to transfer information and improving integration (Iskandar, et al., 2001).

Better Market Understanding: E-commerce transactions can automatically extract information about customers, market trends, sales having a better understanding of the business’ needs (Damanpour,2001). Information Technology is used not only to strengthen operational efficiency, but also to answer quickly to customer needs and competitive pressure (Mutsaers et al, 1998). For example, American Express has developed different travel services for their customers through the use of information technology to arrange and monitor individual expenses, offer lowest airplane fares and track travel expenses for each cardholder to increase customer’s loyalty. (Porter and Millar, 1985)
✓ **Expanded Geographical Coverage:** E-business can be accessed from any place, at any time (Damanpour, 2001) and at the same time organizations are able to think locally but to act globally having a global sales market focused on requirements of individual customers and coordinating the activities locally and globally representing the core of a virtual business (Mutsaers et al, 1998). IT can transfer and coordinate information faster across long distances making the processes independent of the geography (Chan, 2000).

✓ **Support the implementation of strategies** in order to integrate applications of partners outside the organization, to coordinate resources or to set up probably new business models providing firms with new opportunities to create competitive advantage in the industry, business or companies existing operations (Fang et al, 2006). Moreover, Information Technology is also creating new interrelationships among businesses, expanding the scope of industries that will have an opportunity to expand their businesses with new partners. (Porter and Millar, 1985).

✓ **Provides better competitive environment.** On line competitive environment based on new needs, pushes companies to improve their Websites adding new features to attract customers facilitating on-line experience and in Electronic Commerce Internet improves interaction with suppliers (Chan, 2000). At the same time information technology can help the company to create new businesses within the old ones to increase competitive advantage and to expand its business increasing the relationship in its network (Porter and Millar, 1985).
2.3.2 Risks of adopting IT in relationships with suppliers

Besides advantages, there are some challenges that the firms confront when decide to adopt Information Technology with suppliers.

*Company distinctiveness and integrity*

The evolution in IT has made possible the collaboration among businesses, gaining efficiency and flexibility, but exist some hidden dangers that are important to take into account when businesses decide to share information and merge their companies, because the use of IT “can have also the potential to undermine a company’s distinctiveness and in the long run its profitability, that is why companies will always need their walls erected over the years to defend and protect their advantages” (Carr, 2004). As stated also by Green (1991) Information Technology changes the structure of the organizations and alters the control mechanism and task performance and by Nash (1987) the technology impact will transcend departmental and functional boundaries influencing the culture and structure of the organization.

Due to what was stated before, there are important reasons to keep some activities inside the control of the company when the firm starts thinking about building a business relationship with suppliers, because a supplier can have its own economic interests that could not match with the same of the company; however companies expect to build a win-win partnership relationship, although at the end in the industry companies are in constantly competition to obtain profits for themselves “In assessing potential partnerships or outsourcing opportunities managers must be careful to keep their own companies’ interests” (Carr, 2004).

As a result of these considerations managers need to be careful building relationships with suppliers that can put the profits of the company in risk and the company integrity must be seen as a stand-alone business. “The worst think a business leader can do is to go with the flow” (Carr, 2004).

*Integration of applications and different technological platforms*

One risk that needs to be considered is when companies and suppliers with different technological backgrounds and systems need to integrate their activities, reflecting inefficiencies on the final product if it is not managed with care. (Lippert and Forman, 2006).
Old systems should be replaced to facilitate integration but sometimes partners are owners of old applications (legacy systems) difficult to replace with modern and more suitable systems making sometimes them unable to change technology easily because of the obsolete functionality that is not flexible enough to support the new required changes (Mutsaers et al, 1998).

Besides, the challenge could increase if the integration of suppliers with the company becomes tighter because they will be every time more dependent on the relationship for long-term goals, and it could be a risk for the companies to probably have them more as a competitive threat than just exclusive suppliers. On the other hand the tighter relation could lead to the suppliers to act against the company in case it discontinues a product or service from them, when the company consider it as necessary (Hansen, 2009).

*Sharing information and members commitment*

Nowadays organizations use more Information Technology to share information reducing risks as long as the information can be accurate and easily available. Besides, it is getting importance also the knowledge of the employees about the impact of using new Information Technology when start sharing activities and work processes with partners. (Lippert and Forman, 2006). Users often expect to have the new system solve all the business problems (Vesset, 2005) because sometimes the employees could trust the new technology but not the relationships among all the members involved in the process, influencing in this way the easy adoption of new technology (Lippert and Forman, 2006).

Sharing information via information technology and getting members commitment to utilize new developments are considered together part of organizational strategies used to decrease risks if they are focused correctly (Lippert and Forman, 2006). As stated by Zhao et al (2008) the commitment and trust that can be established lead to integration bringing benefits such as reducing transaction costs.
**Sharing information and management of trust**

The last statement serves as an introduction related to the management of trust. Many companies are reluctant to implement internet-based real time data visibility products throughout their supply chains because of trust barriers (Lippert and Forman, 2006) however investments made to improve information sharing can increase at the same time commitment and trust (Nyaga, et al., 2009).

The level of information that companies start sharing depends on the amount of trust between them. Additionally, building trust in new technology is getting more importance because every time the organizations are becoming more dependent on the use of technology to link partners requiring inter-organizational trust (Lippert and Forman, 2006). Some companies enhance supplier capability “sharing information intensively but in a selective way” (Rajagopal and Rajagopal, 2009).

Usually vertical information sharing is viewed as positive in a service-centered model inside a company. However horizontal information sharing is more complicated and needs to be manage carefully considering also legal aspects; for example if exists too much horizontal information sharing it could be possible that one of the partners could share information with company’s competitors and trust would be lost between companies, on the other hand, to little horizontal information sharing could represent that one of the partners is not integrated or interested in the relationship, so the trust could also be affected (Hansen, 2009).

**Hidden costs**

There is a risk to install systems between organizations that could generate unnecessary spending hidden costs because it is not just purchasing a software package but rather it needs to be considered before the complexity of the business processes and how the acquisition of new technology will be adjusted. Some companies have to re-engineer all the work processes to make them fit with the new systems taking more risk of implementation. The common types of hidden costs are underestimated as: training cost for staff and suppliers and the cost of data conversion transferring data from old systems to the new systems included cost of modifying data; so the company at the end needs to hire professional staff to do this process. In addition, high consulting cost to implement and install new systems would not normally be included in company’s budget of IT implementation. (Tarn, et al., 2002) so the companies will need to
justify expenditures for security issues that have to be provided by network service staff or systems software vendors (Spinellis, et al., 1999)

**User acceptance**

Users have to take an active part in the development of new applications, learning to translate business needs in IT solutions and see the need of a common infrastructure and applications (Mutsaers et al, 1998) but Information Technology is a change in which individuals are not always willing to participate, because it implies changes to their occupations, both in the way they work and where they work and at the same time the threat of unemployment become a negative perception for many (Nash, 1987). In addition, a previous research found that 57 percent of small firms think IT is not important for their businesses growth and not very important to create competitive advantage for them leading to have a negative perception to adopt IT in their businesses. Moreover, some of them also faced with the lack of financial resources to invest in IT. (Mltev and Marsh, 1998). However, there is also a high level of user acceptance in other companies in which IT has inspired confidence making them to have fully commitment to learn and understand new technology (Cannon, 1994)

**Security**

When starts the adoption of IT between organizations, the security issues are critical factors that need to be identified, as an example the risk of sharing data between network environments is high (Bandyopadhyay, et al., 1999) due also to the number of suppliers and multiples IT systems involved (Cannon, 1994). The greatest levels of risks in a network environment can be identified as natural disasters, intrusion by computer hackers and weak or ineffective control of IT systems (Bandyopadhyay, et al., 1999). In addition, Gottfried (1989) also mentions internal and external risks such as technical failures, sabotage and unauthorized access. It is clear that a risk assessment should be done before adopting IT among organizations (Maguire, 2002)
2.4 Management after adoption of IT in a relationship with suppliers.

Once the technology is adopted to share processes and activities between companies and suppliers, there is an important issue that should be taken into account to manage and maintain the balance of the relationship with suppliers.

The increasing use of technology has an impact on managing relationships with suppliers. Using new electronic communication methods remove the visual and physical presence and could affect the nature of the communication between partners because relations can become depersonalized and less collaborative. It might decrease trust, or have another kind of impacts. A trusting relationship allows confidential information to be exchanged; so if the relationship is damaged or weak, the trust could be affected. (Leek, et al., 2003). The loss of personal contact with the adoption of IT is barrier to develop trust between business partners resulting from an absence in face-to-face conversation (Nash, 1987).

The decrease in face to face meetings, impersonality and formality could provide less opportunity for “crisis insurance contacts” to get support when a problem appears. Besides, if the relationships are not as close and cooperative, then problems are going to be so much harder to solve and both suppliers and buyers will find relationships more difficult to manage. (Leek, et al., 2003). Due to what was stated it is so important to keep close and personal contact with partners once Information Technology was adopted programming face to face meetings and visits to increase collaboration in the relationship.

Regarding the management of user acceptance, training is one solution to help to produce the kind of beliefs that are necessary when Information Technology is not introduced in the best way to overcome the changing in jobs that is felt by workers (Nash, 1987) Whereas, Mltev and Marsh, (1998) also suggested informal training to support IT knowledge and to have closer relationships joining activities in a training program. In this way, increasing IT knowledge and having a closer relationship can motivate users to adopt IT successfully.
As IT plays an important role in organizations, it also implies that IT needs the appropriate attention of top management dealing with the complexity of IT issues (Mutsaers et al., 1998). Managers need to be aware of the effect of IT on the nature of communication and adapt the technology methods used to the function of the communication with suppliers (Leek, et al., 2003). IT project development and adoption “should be viewed as a business rather than a technical activity (Gary & Ives, 2004; Stewart and Mohamed, 2002) also considering previously risks, benefits and cost impacts monitoring continuously project performance (Stewart and Mohamed, 2002).
3 Research methodology

3.1 Research method

The methodological approach that we decided to take for this research is Realist approach.

According to Fisher (2007), realists consider that the knowledge that is acquired can be used as a guide to know what should be done, looking for associations between variables trying to establish links of cause and effect. These links then are studied to know about what kind of associations can be established between them, and then the result knowledge of these associations can be used as a basis to make future decisions.

The variables that we used for this research are IT evolution, risks and benefits, management, companies and suppliers, then we started analyze the relationship among all the variables, looking for associations between them that will help us to find the answer to our research question and end with conclusions.

Moreover, according to Fisher (2007) much realist research is based upon a comparison of qualitative case studies, so for this research we will use qualitative analysis to compare the case of seven companies to study the connections between the variables that we stated before.

Fisher (2007) mentions that some realists use qualitative methods but sometimes they add some quantification to the qualitative material for example counting the frequencies and classifying the findings under different headings. For this research, based on the results of the interviews we analyze the frequencies of answers for some questions that we used as a base to draw our conclusions.

Besides, exploratory research method as is stated by Fisher (2007) involve the use of different methods to collect material such as interviews, observation and documents, being interviewing the most common method in Master’s level. In this research we will use semi-structured telephone interviews and different kind of literature to complete our investigation. Qualitative method will be most used to analyze the information that provides relevant data to our research question.
3.2 Data collection

3.2.1 Secondary data

According to Fisher (2007) there are different sources to find relevant material and literature for a research that include books, journals, the World Wide Web and electronic resources such as electronic libraries, journals and databases.

For this research, we used different kind of sources to collect the secondary data:

- Academic journal databases (ELIN@ and Emerald) representing the first source we utilized to collect data.
- Ebrary
- Books
- Text literature and on-line research.

The following terms were used to find the required information: evolution of Information Technology, supplier-buyer relationship, technology evolution, IT development, information sharing, infrastructure, SCM systems, new technology, IT benefits, IT risks, IT effects, management suppliers relationship, IT business effects, IT management, Information Technology Management, Effect of IT evolution in business process, Effect of IT adoption, IT adoption in buyer-suppliers relationship, risk in IT implementation, changes in information technology, information technology development, benefits of IT in a relationship with suppliers, risks implementing IT with suppliers.

3.2.2 Primary data

The primary data were collected using semi-structured interviews. According to Fisher (2007) this kind of interview has a schedule including main topics that will have to be covered and the respondent has the opportunity to answer to the questions in a more subjective way according to ways seem sensible to them.

For the interviews we prepared several questions according to the theme we wanted to focus on; then we selected them based on our research topic, we gave priority and decided the questions that would be open and closed having at the end an interview questionnaire of 12 questions. The
questionnaire was designed analyzing several sources on-line related to questionnaire designs as we explain further.

Before conducting the interviews, letters to ask for permission and a summary of the questionnaires that will be included in the interview were distributed to companies of different industries that currently use IT as a medium to communicate with their suppliers in Thailand, Mexico and USA. Due to the location of the different companies, we scheduled interviews via Skype and telephone and according to Fisher (2007) we tried to keep the interviews as short as possible, avoiding asking questions about complex matters or including questions that would require more details or longer answers.

3.2.3 Questionnaire design

The questionnaire is a structured technique for collecting primary data. The respondent can provide answers in verbal or written format, which will depend on the researcher design. A well-designed questionnaire has to motivate the respondent to provide complete and accurate information. (Northeastern University, 1999) meet the research objectives, and should be easy for the respondents to understand. (Crawford, 1997)

According to our research, we selected the type of questions that we would use to access relevant data. We developed the questions based on the research purpose and literature review that we collected for this document and arrange them in a way that could be easy to follow and understand for the respondent.

We designed the questionnaire by using open-ended and rating questions. The open-ended questions are using to open a great freedom for respondents to express their opinion. (Galloway, 1997). The open-ended questions is one of the best techniques for exploratory research. (Northeastern University, 1999). In order to access more relevant data, we are using rating scale questions to investigate about the perceptions and attitudes of the respondents related to benefits and risks of IT adoption. We try to make the questions in simple language and short sentences.
3.2.4 Sample of companies

The companies that proportionate empirical data were chosen based on a number of contacts we have in different industries. Managers of seven companies from different kind of business in Thailand, Mexico and USA were interviewed providing useful information to this research.

We sent letters to ask the participation in our research to 16 companies, however due to the limitation of time, it was not possible to get response on time of all the companies that were requested to interview. Nevertheless, the data provided for the seven companies is important and useful for this research. All the companies were interviewed by Skype or telephone.

The companies that are included in this research are:

- Acer Computer
- American Standard B&K Public Company Limited
- Connell Bros Co. Ltd.
- TWBA Co. Ltd.
- Tractus Co. Ltd.
- ALCE de Mexico
- OMAX Corporation (USA)

3.3 Analysis of collected data

Parting from the realist approach and as we mentioned before and using qualitative analysis to organize and study the data we selected some strategies stated by Fisher (2007) to give structure to all the material collected: identifying themes and sorting and dividing the research material by topics. We applied these strategies mainly to arrange all our secondary data.

For the primary data for every company we used qualitative analysis for all the interviews describing the answers of the respondents by company in the findings section. We related the findings with the concepts that we decided to include as part of our literature review making a connection that is explained in the analysis part.
4 Findings

Seven companies provided useful information to this research that will help to gain different perspectives regarding the effects of IT evolution in the relationship the companies establish with their suppliers. It was provided information from different business industries to gain several perspectives of IT user’s attitudes, perceptions and the trend of IT infrastructure in a particular industry. It will provide useful information to the reader to get some ideas that can help to make decisions regarding IT management in the future.

4.2.1 Acer Computer (Thailand) Co., Ltd.

The number two leader in the world of PCs and notebooks was founded in 1976. A profitable and sustainable Channel Business Model is part of the company’s continuing growth, while its multi-brand approach effectively integrates Acer, Gateway, Packard Bell and eMachine brands worldwide. (Acer, 2010)

The effects of IT evolution in business relationships

The company totally agreed that IT evolution influences the relationship between the company and its networks not only for suppliers, but also with partners, customers and all branches of retailers worldwide. IT evolution encourages the efficiency of workmanship to save time and cost in work processes.

To interact and communicate with suppliers, in the past, the company used telephone calls and faxes to check first the stock level with retailers and then to make orders to suppliers. Apart from that, in retail stores, the company used many staff to check stock level piece by piece and check barcode of each product taking too much time and cost.

Nowadays, the company has improved the method of checking stock levels by using bar code systems setting the same code for the company, customers and suppliers as well. It is easier and accurate to check stock levels. To transfer data that include stock level information is used an internet-based transaction or e-mail. The company sends e-mails to suppliers weekly to confirm and approve orders.
Bar code systems changed work processes in the company tracking data of customer easier, preparing invoices and checking stock level.

A Barcode system improves service quality when customers take their laptops to the service center for repairing. The technical staff can track data of a laptop scanning the barcode and it includes guarantee period, history upgrade system and also the problem and condition of this laptop over the time. The data is sent to Acer’s center to record and track the history. The records of customer visits can be useful for the company to analyze and planning strategies and promotions, such as discounts when a customer buys a new model of laptop.

The company also gains benefit from web-based systems providing its own website to increase marketing channel and to offer new products and services online.

The company uses e-mail also as a medium to interact and communicate with its suppliers. However, the company still has to develop IT infrastructure to manage sharing information. Most of the suppliers provide their own website, so the company can check the cost of materials and order online. It makes the order transaction faster and more accurate because the company can check order process and status by tracking the order number in a supplier’s website. Moreover, the company can gain benefit comparing the price of material before making the decision of selecting the best price.

**Benefits of adopting IT with suppliers**

One of the most important benefits of adopting IT with suppliers, is how IT has increased efficiency after the company implanted the barcode system. The barcode system has improved relationships with the suppliers making faster transactions and reducing errors. The barcode systems can benefit the company in several ways:

- Saving costs and time to getting accurate data of inventory level. It is easier to control stock level in each retailer decreasing inventory cost and maintaining accurate production planning because exists a balance between supplies and customer’s demand due to the continuous update of the stock level.
- The barcode systems improve the management of suppliers, customers and retailers. For customers, the company can track data and the history of a particular product by scanning the
barcode. The company offers a better service and has a better understanding of the customer’s needs due to the history data of a particular customer. Moreover, the company can use these data in promotions for specific customers using this as a competitive strategy to increase customer loyalty. For suppliers and retailers, the company improves standardization of work process between them in a more precisely and smoothly manner. The relationship between become stronger and closer due to the decrease of conflicts.

Apart from barcode systems, the company also gain benefits from IT by using web-based systems as e-mails to interact with suppliers and retailers. These systems help them to save costs of communication with faster interaction among networks. Moreover, the company can have real time response to customer’s demands by provided its own website to increase market channel service product and service online.

In other hand, the company also gain benefit from the existing suppliers because they also provide their own websites to check status of work processes such as shipping, product status, deliveries, etc. Moreover, the company can check and compare prices of material among many suppliers before making orders finding out first the best price.

The company perceives IT as a powerful resource to enhance business management with suppliers and as a strategy to gain competitive advantage.

**Risks adopting IT with suppliers**

The company still needs to improve its systems to integrate and share data with its suppliers due to the different types of IT infrastructure between them. Each supplier has its own IT systems that increase the complexity because of the different work processes that are managed between them. At the same time, the company is still worried about supplier’s commitment and lack of cooperation.
4.2.2 American Standard B&K (Thailand) Public Company Limited

Company background

American Standard Asia Pacific is a part of INAX Corporation; INAX is the top manufacturer of tiles and fixtures for kitchens and bathrooms, with 85 histories. The company principle is “pursue of quality excellence”, producing superior quality of bathroom solution as the core business such as bathroom furnishing, etc. The products are sold in Asia, Europe and USA under “American Standard” brand. (American Standard, 2005)

The effects of IT evolution in business relationships

In the past, the company transferred data and contacted suppliers using telephone and fax to approve weekly orders. Transaction flowed slowly between them in the work process because they did not have response in real time. The documents such invoices, raw material orders and another kind of documents were sent by fax and it was necessary to make calls to approve them. There were some errors in data transfer because the work process was based on manually transactions. Some data were missing, and existed many mistakes in records that affected forecast in inventory level.

Nowadays, the interactions between the company and suppliers are easier using a SAP Program and E2 open systems to support the activities. The transaction flows faster. It begins with a customer’s order or demand, the data is sent to the SAP program to calculate material requirement uploading prices in the E2 open system, the suppliers then can download the company’s demand for material from the E2 open system daily, however, the approval is confirmed to suppliers by e-mail.

In addition, the company also provides a website with information of products, promotion and news, location of stores and customer care centers that facilitates customer contact.

IT evolution has influenced the company to increase its capability to update customer’s demands and accurate production forecasting, and also to support Just-In-Time (JIT) processes. The IT systems reduce error rates and time cycle, operation cost and working hours of employees.
IT evolution as an internet-based system between the company and suppliers has improved the relationship but the company still faces the problem of cooperation from suppliers to use IT, although the company provides training to understand SAP program and SAP snapshots screen in order to request prices of material.

Showing a low level of commitment, suppliers have stated that they will not provide additional IT infrastructure or special systems to improve efficiency in work processes with the company.

**Benefits of adopting IT with suppliers**

The main benefits that the company gets from Information Technology in its relationship with suppliers are reducing time, costs and the improvement of work processes due to the use of IT systems such as SAP Program, E2 Open systems and internet based systems. Comparing to the past work processes included so many steps to be concluded, so IT increased the efficiency to complete the work and made a better use of the inventory level decreasing costs. Moreover, company uses e-mail as a medium to interact and approve orders with suppliers. It facilitates the flow of transactions due to the faster interactions between them increasing work standard as well.

**Risks of adopting IT with suppliers**

However, the company stills faces some problems using IT with suppliers due to the lack of suppliers IT knowledge. To solve this problem, the company provides training programs for suppliers to understand the functionality of the IT systems and to improve the efficiency in the work processes with them. On the other hand, due to a strong relationship that the company maintains with the suppliers, the company considers that the suppliers’ lack of knowledge could not be considered the main problem of IT adoption because the firm can provide training programs to motivate and encourage their suppliers to learn and use the new technology.
4.2.3 Connell Bros (Thailand) Co. Ltd.

Company background
Connell Bros Co., Ltd. is one of the largest international distributors of chemical, minerals, ingredients for food and consumer products. The company provides a complete supply chain from transportation and documentation to warehousing, sale and distribution in Asia. (Connell brothers, 2006)

The effects of IT evolution in business relationships
The company agreed that IT evolution influenced its work process. It is now more effective to communicate and interact with customers and suppliers in order to transfer and receive data in real time. The development of IT infrastructure in the company would be used mainly for internal purpose to improve work processes and internal management. They use JD Edwards ERP as the data center of all branches and also Business Intelligence tools to generate management reports about sales volume, sales history and planning before making any decision.

IT evolution as ERP systems is changing the work process inside the company compared to the past. All data need to be recorded in a computer instead of writing data on papers. The company provides different kind of training to employees when new technology is implemented. However, every time the employees need more training in ERP systems to develop skills and improve their work processes with suppliers.

Using ERP systems, all the data is shared across the company. The integration of data will improve work processes to be more efficient due to the existence of a database. Managers can make right decisions faster improving all work processes and quality and increasing customer’s satisfaction as well.

The company’s website includes company’s profiles and information. The customer can search information about product and services.
In order to interact with suppliers, in the past the company had used fax and telephone calls to communicate with them. Nowadays, the company uses e-mail in order to transfer data, orders and transactions.

In turn, suppliers provide interactive website to the company to check shipment progress.

The use of internet interaction can improve the relationship between the company and suppliers to be closer and stronger due to an accurate and faster response in work processes, which reduces conflicts between them.

**Benefits of adopting IT with suppliers**

The main consideration of adopting IT in the company was first for internal purpose as the company currently uses ERP to improve management and standardization of work processes. In addition, the company realized that existing data in ERP can provide accurate data not only to support decision making inside the company but also work flow processes between the company and suppliers to be more effective and faster. Moreover, company uses e-mail to increase interaction and transfer data with suppliers, due to more frequently interaction between them that enhances the relationship to be stronger and closer.

**Risks of adopting IT with suppliers**

The main problem of using IT infrastructure that the company perceived was sharing data with outside companies according to its politics related to security. There is a low level of trust between the company and suppliers. Moreover, most of the suppliers are from small companies so they do not want to invest in IT systems and they are not interest in learning about IT, so it leads to a lack of IT knowledge from the suppliers side; hence, the company mainly focuses on using IT for internal purposes. The main internal problem was related to the lack of employee’s skills to use IT, although, the company provides training programs to employees to understand more the new IT processes every time a new technology is adopted.
4.2.4  TBWA (Thailand) Co., Ltd.

Company Background:

International advertising agency that creates marketing campaigns for customer’s product and business. Customer’s profiles are Absolut Vodka, Nissan, Gatorade, etc. (TBWA, 200-)

The effects of IT evolution in business relationships

The company agreed that IT evolution today helps them to communicate, interact and share data with suppliers and customers. The company works on presenting images, concepts and ideas to customers and transfer data to suppliers to produce advertising including pictures, text and descriptions. In the past, the company used telephone call and fax to communicate with suppliers and transferred data and pictures via fax or mail. Final works had errors during the process because of communication missing between the company and suppliers and it took too much time to repair mistakes. The company needed to pay for production cost due to errors in artworks. The obsolete technology in the past made the work process between them so slow.

Nowadays, the company uses internet technology to contact everyone in real time. The company transfer data and information about advertising to suppliers for the film process in real time and also uses e-mail to check artwork before approving it. The new technology enhances the company to work better including closer and smoother relationships between company and suppliers. The rate of errors is reduced.

TBWA uses Ms Exchange as email software, Google mail, SQL, and Web base programming for both Mac and PC Users.

In turn, the suppliers also interact, communicate and transfer data via e-mail with the company to approve artwork before producing it.

IT evolution improved the relationship between the company and suppliers. It became into a closer relationship and it was easier to communicate.
Benefits of adopting IT with suppliers

As the company uses internet and e-mail as the main medium of interaction with suppliers, it improves work processes saving costs of communication. The company can approve artwork via e-mails that increases interaction between them being cheaper than telephone calling. The error rate is reduced, due to e-mail can represent both text and image in correct colors tone and sound as well. Moreover, e-mail provides the best functionality for employees to work and communicate with suppliers and customers in anyplace and anytime with real time response.

Risks of adopting IT with suppliers

The main barrier to adopt IT is the lack of commitment and cooperation from suppliers. Suppliers from small companies do not want to invest in IT infrastructure and to learn about new technology as well. Moreover, the difference of work processes with suppliers is a barrier for the company to adopt IT infrastructure to share information. The complexity and incompatibility of work processes, low level of trust and a weak relationship are the main barriers to adopt IT and start sharing data with suppliers.
4.2.5 Tractus (Thailand) Co., Ltd.

Company Background

The consulting services company provides professional services including startups, manufacturing facilities, marketing and sales and all functions that driven customer’s business to success. The company network consists of professional business consultants, research analysts, lawyers, manufacturers and engineers. (Tractus, 2008)

The effects of IT evolution in business relationships

The development of IT today enhances company’s communication to be easier and faster with suppliers and customers than before. The company uses web-based interaction, internet, e-mail and Skype as important intermediaries to communicate, share and transfer data with suppliers, customers and specialist teams outside the company. The real time response of information makes work process to be shorter because the company can make accurate decisions based on data systems.

The internet based systems improved internal work processes and reduced cycle times. To communicate with customers and suppliers the company started using web-based system, reducing communication costs.

The company can send business plans to customers via e-mail instead of travelling to many places for visiting them. It also reduces the cost of transportation, save time and increase customer’s satisfaction. Because of internet based systems, company and customers can check information via e-mail at everywhere and every time.

IT evolution influenced the relationship between the company and suppliers making it stronger. They built a closer relationship with each other. The company does not have so many suppliers due to the strong relationship and trust that they hold with the first suppliers. So, the company manages them more as partners than suppliers to get better benefits in long term. The company uses internet, e-mail to interact and communicate with each other and sometime also has conference with suppliers via Skype program. It reduces the cost of travelling to meet suppliers and customers.
Benefits of adopting IT with suppliers

IT has enhanced the relationship with suppliers bringing benefits as standardization of work processes. Due to the use of web-based systems as e-mail, Skype and internet to interact with suppliers, the company has reduced cycle time of activities and using Skype as a conference system instead of traveling to supplier’s place has helped to save costs. Moreover, the use of e-mail has increased work efficiency as the company can offer real time response to customer’s demand and make orders to suppliers on time. It has helped that the company keep a business relationship with just a few suppliers. The company can gain more benefits or advantages from suppliers because the company treats them as partners instead of just suppliers or competitors, becoming a stronger relationship between them and because of this, sometimes the company can get benefits from suppliers such as special prices.

Risks of adopting IT with suppliers

The most important factor of risk to adopt IT with suppliers is the incompatible processes in IT systems due to poor flexible functions in IT infrastructure today. Moreover, most of the suppliers are small companies that have a lack of IT knowledge, so the company needs to provide training to suppliers that increase costs when the adoption of IT starts.
Company Background

Company specialized in providing solutions for the manufacturing sector based on new processing technologies. The company offers the service of sales and distribution of equipment and supplies for the transformation process of all type of metals and special material and offers training in CAD-CAM software. (Alcedemexico, 2009)

The effects of IT evolution in business relationships

IT evolution enhanced the efficiency in business transactions, comparing to the past delivery services that often presented delays for the customers. Nowadays, IT infrastructure helps the company to interact and communicate with partners, suppliers and customers, integrating all data for planning before implementing and delivering equipment. After using IT to implement, collect and adjust data to prepare delivery schedule, it improved company’s services to be faster, increasing customer’s satisfaction and sales volume as well.

In the past, company paid so many bills for telephone calls to interact with suppliers and customers. Nowadays, the internet is an excellent medium that help the company to save costs of interaction with customers. The company can check raw material costs comparing prices with many other suppliers via internet and get the best price. In addition, the company is also using company’s website and e-mail to interact and sell products to customers. Suppliers, customers and company are getting benefits from IT evolution saving costs and time.

The company provides its own website to expand its distribution channel and allow the customers to search for information before contacting them.

The web-based provided by suppliers has increased the level of trust.

Benefits of adopting IT with suppliers

The most important factors that influence the company to adopt IT with suppliers are saving costs, reduce cycle times and improve management efficiency. The company also improved the
management of processes reducing delivery time and enhancing real time response with suppliers and customers using e-mails and internet as medium interaction. The company transfer and share data such delivery schedules to suppliers via e-mail, reducing communication costs and time cycle. The frequently interaction via e-mails with suppliers has enhanced the relationship to be stronger and closer than before; moreover, they use some special IT systems to improve internal management reducing errors rate in work processes such as delays of delivery schedule.

**Risks of adopting IT with suppliers**

The main risks of adoption of IT with suppliers are low level of trust in the relationship between them. The company does not want to share internal data outside boundaries. They still hesitate to use IT for sharing data with suppliers due to security of IT systems and low level of trust besides the difference in work processes and types of IT systems between them. Additionally the supplier’s commitment is an important factor to adopt IT
4.2.7 OMAX Corporation (USA)

Company Background:

OMAX Corporation is the leading provider of precision-engineered, computer-controlled, multi-axis (X-Y) abrasive jet systems for use in the manufacturing environment. (Omax, 2008)

The effects of IT evolution in business relationships

IT evolution affected business transactions. There was a change in the work process and relationships with business suppliers including customers. The evolution of IT improved the quality of communication and offering for the customers. The company can know customer’s demands related to the acquisition of new machines by web-based interaction. The company can answer in real time to new customer’s needs. At the same time, after getting an order from a customer the company can send the data and information to an internal department to manage price quotation and check prices of raw material. IT helps the company to save costs and time by using e-mails to interact and communicate with customers and suppliers instead of traveling to visit them.

Apart from that, the company provides its own website to expand its distribution channel and to get closer with customers. The customer can order and specify functions required for the new machines. The company can answer in real time to serve the customer’s demands increasing customer’s satisfaction and improving work process.

Nowadays, web-based system changed the way of communication with customers and suppliers and reduced time and costs.

Moreover, company is using special proprietary systems to improve their internal management to be more efficient.

Benefits of adopting IT with suppliers

As the company uses e-mail and web-based systems as a medium of interaction, the company gain benefits from IT not only from suppliers but also from customers. IT can improve customer’s satisfaction being a channel to create orders and communicate with the company via web site. The company can offer a real time response to customers demands. For suppliers, the
company uses e-mail to interact with them, reducing communication costs and improve work processes offering a faster service and improving management efficiency; moreover the company can contact suppliers more frequently to improve services and obtain a closer relationship.

However, the company still maintains and sometimes prefers face-to-face interactions with their partners to build confidence and trust between them.

**Risks of adopting IT with suppliers**

The different kind of IT infrastructure or incompatible systems between organizations is the main problem that affects the decision of the company to install new IT systems. The company has problems sharing data with suppliers due to the lack of trust that still exists in the relationship.
Summary review of the benefits and risks factors of IT adoption with suppliers identified by the seven companies

The following part summarizes the benefits and risks that the companies consider to adopt IT in the relationships with their suppliers.

The figure A1 represents a summary of the factors by company that influence the companies to adopt IT infrastructure.

The factor that has more influence to adopt IT is “Improving management efficiency” followed by “increasing interaction and communication” and “saving costs”.

**Table A1**: Factors to adopt IT with suppliers

<table>
<thead>
<tr>
<th>Benefit Factors</th>
<th>Acer</th>
<th>ALCE</th>
<th>AMSTD</th>
<th>Connel</th>
<th>Omax</th>
<th>TBWA</th>
<th>Tractus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing interaction and communication</td>
<td>H</td>
<td>HT</td>
<td>HT</td>
<td>H</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
</tr>
<tr>
<td>Improving management efficiency</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
</tr>
<tr>
<td>Competitive Strategy</td>
<td>HT</td>
<td>H</td>
<td>HT</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>HT</td>
</tr>
<tr>
<td>Reducing time cycle</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>HT</td>
</tr>
<tr>
<td>Saving cost</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
<td>H</td>
<td>HT</td>
<td>HT</td>
<td>H</td>
</tr>
<tr>
<td>Standardization of work process</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>HT</td>
<td>M</td>
<td>M</td>
<td>HT</td>
</tr>
<tr>
<td>Real time response</td>
<td>HT</td>
<td>H</td>
<td>HT</td>
<td>HT</td>
<td>H</td>
<td>H</td>
<td>HT</td>
</tr>
<tr>
<td>Obtaining stronger and closer relationship in business networks</td>
<td>HT</td>
<td>H</td>
<td>HT</td>
<td>HT</td>
<td>M</td>
<td>M</td>
<td>H</td>
</tr>
</tbody>
</table>
Table A2 represents the risk factors of using IT infrastructure between organizations. The main problem is the incompatible processes because of the different type of IT infrastructure. Moreover, some companies did not feel comfortable providing information sharing IT infrastructure due to the risk of security that it represents. Additionally, the commitment of suppliers is an important factor to gain trust in both sides: buyers and suppliers.

Table A2: Risks of adopting IT with suppliers

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Acer</th>
<th>ALCE</th>
<th>AMSTD</th>
<th>Connel</th>
<th>Omax</th>
<th>TBWA</th>
<th>Tractus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of sharing data via systems</td>
<td>NI</td>
<td>M</td>
<td>M</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
<td>M</td>
</tr>
<tr>
<td>Lack of suppliers commitment</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>HT</td>
<td>H</td>
</tr>
<tr>
<td>Lack of IT knowledge among suppliers</td>
<td>L</td>
<td>M</td>
<td>M</td>
<td>H</td>
<td>L</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Incompatible processes, applications or technology between organizations</td>
<td>H</td>
<td>HT</td>
<td>M</td>
<td>M</td>
<td>HT</td>
<td>HT</td>
<td>HT</td>
</tr>
</tbody>
</table>

Factors:

Highest (factor) = HT

High (factor) = H

Moderate (factor) = M

Low (factor) = L

No influence = NI
5 Analysis

Based on the conceptual framework and analyzing the empirical data of seven companies, it can be reviewed how the companies have changed these days the way businesses were made in the past influenced by IT evolution.

Summarizing what was stated in the literature part by Cheng, et al., (2010), Cheng, et al., (2006) Toni, et al., (1994) and Hansen (2009) the way the businesses were carried out before the internet era was based on:

- Individual activities
- Restriction of sharing information
- Independent relationships ignoring cooperative efforts
- Lack of integration
- Simple exchange of objects
- Adversarial relationships
- Commercial transactions based on price

According to these statements, nowadays the companies present many of these common characteristics before considering the adoption of Information Technology in the relationship with suppliers as an option to evolve their businesses:

Analyzing empirical data, initially, to communicate with partners, the companies used only handwriting records, telephone calls, fax and many face to face visits that increased the internal costs and time of response.

In Acer Company, the work processes were not integrated at all because of the existence of too many dependent activities that were developed individually for many members of the staff increasing time of processing. For example stock levels were checked piece by piece and orders to suppliers took so much time to elaborate. The existence of many activities and the lack of integration was a problem also for TBWA because it took too much time and resources to repair mistakes for the fact that the work processes were not incorporated with suppliers and business partners; besides the development of activities was affected also by the obsolete technology the company maintained.
Regarding work processes, in AMSTD Company the transaction flowed slowly because of the lack of real time response because the work processes were based on manually transactions having so many errors as in Connell Bro. Company in which data was still supported by papers instead of being recorded in a computer database. There was a totally lack of integration of information. Sharing information was more restricted and it was not perceived any kind of integration with partners affecting at the same time the flow of transactions between companies. (Hansen, 2009)

For ALCE Company in the past, having so independent relationships with suppliers caused delays in delivery services to the customers, as in OMAX Company because it was not to given a real time response to customer requirements and the costs increased when they have to travel to attend all the demands and make negotiations with suppliers.

Based on what was previous stated, a common factor that has influenced these companies to adopt new Information Technology in the relationships with suppliers is the lack of integration that is reflected on high costs for the company. Due to this, the first goal when the companies decided to use Information Technology to start collaborating with their partners was saving costs as is mentioned by Toni, et al., (1994).
From this point it can be seen how Information Technology evolution will start influencing the way the business were done in the companies based on the introduction of new developments. As is stated by Applegate (2007) Information Technology has an integration effect.

Companies started to achieve this integration effect by linking their processes reducing costs (Mclvor and Humphreys, 2004). TBWA Company integrates activities with suppliers sharing information in real time to avoid errors in artworks and reduce costs of repairing mistakes. Tractus company, improved the integration of work processes using internet based systems establishing a better communication with suppliers reducing communication costs.

With the evolution of technology, the companies discovered the benefits of adopting IT and started using it to link processes with their suppliers to increase the efficiency of their work processes. As is stated by Hansen (2009) the shift from adversarial transactional relationships towards cooperative, service-centered relationships was an important factor of business growth.

Damanpour (2001) stated that “making use of e-business technology enabled companies to lower transactions costs, reduce delivery times, and improve customers service” as is the case of ALCE de Mexico and OMAX, that based on the use of technology improved the communication with their suppliers; this improvement was reflected on the service the companies start offering to their customers reducing delivery times and attending customers demands in real time.

The internet radically changed the ways in which human networks operated and gave enormous power to business-to-business markets (Roy and Sivakumar, 2007). According to the findings, internet and web-based interactions become some of the most important technologies to communicate and connect companies with suppliers due to the low cost of investment.

Web technologies become part of the strategies in the companies (Michelino, et al., 2008) and the use of websites improved the integration of buyers and suppliers through electronic networks (Mclvor and Humphreys, 2004). Acer, AMSTD, Connell Bros, ALCE de Mexico and OMAX provide websites to increase market channels, interact with suppliers and offer new products and services on-line.

The evolution of buyer-suppliers relationships start moving in parallel with the evolution of technology when the companies started adopting IT in their relationships; as stated by Dede
(1989) “the workplaces started adopting different kind of technological developments as electronic databases, computer aided systems, word processors” and some companies started using information technology to improve internal processes, then the use of new developments was extended outside boundaries in the relationship with their suppliers, as happened with Connell Bros Company that started using ERP system to improve first work processes inside the company.

As new technology appears, there are important factors (benefits and risks) that influence the decision of the companies to start working with their suppliers using IT. These factors can lead to the companies to strength or to weak the relationship with their suppliers.

Information technology can provide many benefits at the same time to the companies, such as:

- **Cost reduction**

To interact and communicate with suppliers the companies in the past used letters, hand writing records, telephone calls, fax and face to face meetings increasing time of response and costs.

Being the main objective of IT to improve organizational efficiency reducing costs (Fang et al, 2006), the companies realized that the use of new technology would help them to save costs and to improve their processes outside their boundaries, so it started the interaction with customers and suppliers also via websites, using each time less telephone or fax. Acer company started to use bar code systems and send stock level information used internet-based transactions decreasing the costs of operation and communication comparing to the past because in old processes it was necessary to use many staff members to update inventory information of each piece in the warehouse and to keep interaction in real time with suppliers provoking delays in deliveries.

- **Reduction of inventory levels and shorter order cycle times**

The traditional methods of doing business were changed when enterprises started connecting with suppliers checking inventories across multiple locations through Internet support (Michelino, et al., 2008). After the development of bar code systems as Hansen stated (2009), more cooperative relationships started using co-managed inventory and sharing information in their work processes using Information Technology. Acer Company used many staff members to
check stock levels of the products. These products had different barcodes numbers for the company, suppliers and customers. Nowadays, the company has improved the method of checking stock levels by using barcode systems integrating all the information in just one barcode and improving the inventory process reducing the time of updating information. It is easier and accurate to track all the data.

To transfer data to suppliers that include stock level information is used an internet-based transaction or e-mail.

- **Better communication between organizations**

IT infrastructure has helped to increase the level of communication between partners. As Chan (2000) stated, internet allows more personalized services and improves interaction with suppliers. ALCE Company uses IT to collect and integrate all the data provided by partners, suppliers and customers to make plan proposals before implementing and delivery equipment on time. The level of communication that IT provides between the company and its suppliers make easier to collect and integrate information. IT has improved company’s services to be faster, increasing customer’s satisfaction and sales volume as well.

- **Support of strategic activities**

For American Standard B&K the interactions between the company and suppliers are easier using SAP Program. E2 open systems help the company to support the strategic activities as well: The transaction begins with a customer’s order or demand, the data is sent to the SAP program to calculate material requirement and to upload prices in the E2 open system, the suppliers then can download the company’s demand for material from the E2 open system daily, however, the approval is confirmed to suppliers by e-mail.

- **Increased flexibility and quality in production**

As Trkman et al., (2007) mentions the new combination of business processes enable better lead times, process execution and inventory costs. Information technology in American Standard B&K has helped them to update on time customer’s demands and accurate production forecasting, and also to support Just-In-Time (JIT) processes. The IT systems reduce error rates and time cycle, operation cost and working hours of employees.
The information is sharing in real-time improving the level and quality of service.

- **Data standardization**

In Connell Bros Company, using ERP systems all the data is shared across the company. As Michelino, et al., (2008) mentions strategic information reduces transferring times; so in Connell Bros Company the integration of data improves work processes due to the existence of one database that help managers to make rights decisions faster, improve all work processes and quality and increase customer’s satisfaction.

- **Better Management Information**

Connell Bros Company uses JD Edwards ERP as the data center of all branches and also Business Intelligence tools to generate management reports about sales volume, history sales and planning before making any decision improving the management of information.

- **Better Integration of Suppliers and Vendors**

Companies try to make their suppliers to have the same interest in the final customers. As in ALCE de Mexico, suppliers are well integrated with the company and because of this they have improve the delivery schedule for the customers offering more accurate dates.

- **Better Channel Partnership**

Information Technology improves communication with partners using applications such as email (Damanpour, 2001). For Connell Bros Company, using IT help them to communicate and interact better with customer and suppliers in order to transfer and receive data in real time and for the rest of the companies IT has been a common factor that has improved communication with suppliers compared to the past.
• **Better Market Understanding**

The seven companies through web based systems can review and compare different kinds of offerings and tendencies in the market according to customer selections. As an example ACER and Cornell use their websites to review and analyze customer’s preferences as Damanpour (2001) has mentioned the main functionalities of E-commerce transactions is automatically extract information about customers.

• **Expanded Geographical Coverage**

The companies have web-based systems to communicate with suppliers and to increase the market channel to offer products and services online to customers. With IT all companies have access to real information from any place and at any time (Damanpour, 2001).

According to the summary of findings, most of the companies adopt IT to improve management efficiency (See Table A1 in findings). So it is not only related to implement IT between the companies and their suppliers but also is related to the capabilities of the firms to manage the result of this adoption.

As an interesting factor, some companies that invested in IT infrastructure focused first on improving just internal processes and infrastructure to get internal integration (Connell and Acer Case) and it was until the companies begin to be more interested in suppliers and inter-organizational relationships when realized the benefit that could get from the collaboration using IT.

The companies in general recognize that with IT evolution it is possible to find every time new ways of transferring data, working on processes and doing business with their suppliers. Most of the companies interviewed are able to acquire and use new IT infrastructure to start doing business with their partners, so it can be perceived that companies and suppliers are aware of the necessity of improving their use of information technology between them to get the best benefits of the relationship.
The most important factor (risk) that affects the decision of the companies to adopt IT in the relationship with their suppliers is related to the Incompatible processes, applications or technology between organizations. IT capabilities can represent disadvantages in long term if it is not reviewed and analyze the different requirements before the interaction of activities between the company and suppliers.

But we can also analyze from this research that sometimes not all the companies are making full use of IT capabilities in the relationship with their suppliers. Suppliers from small companies do not have enough knowledge about the benefits that IT can bring in long term and have a perception that investing in IT infrastructure is unnecessary. As it can be reviewed for TBWA company case, the main barrier to adopt IT is the lack of commitment and cooperation from suppliers, because although the company is interested in acquire new IT infrastructure to interact with them, suppliers do not want to make any kind of investment in new IT infrastructure.

For American Standard B&K supplier’s co-operation and knowledge are also important factors for the company to take the decision of acquiring new IT infrastructure.

On the other hand, Tractus Company does not present the problem of lack of supplier’s commitment due to the strong relationship and trust that they hold with its first suppliers. The company manages the relationship more as partners than suppliers to get better benefits in long term. The risk that the company identified is related to the level of commitment but of new suppliers.

For some companies IT has reduced the need of face to face meetings. For others like OMAX is emphasized that it is necessary also to keep personal visits with partners to empower the level of collaboration in the relationship.

Another factor that was observed is that in order for the company to gain advantage of IT infrastructure, it is important to establish strong communication between company’s employees and suppliers. Employee’s skills and commitment are also important to implement a successful IT infrastructure. Employees need to understand the nature of new IT infrastructure and the way to use it to maximize the benefits. As Connell Company includes training programs for employees in order to get the best benefits and maximize the use of the new IT with the
suppliers. American Standard Company additionally includes training with suppliers to improve the knowledge of new IT investments and enhance the relationship between them.

Analysis also shows that all companies are still afraid of sharing information with their suppliers and partners. Sharing data via IT systems was not popular especially in business to business relationship in Thailand, due to the lack of trust environment. This is an important factor that is still affecting the way the businesses are developed between companies. As is stated by Carr (2004) companies still have reasons to keep some activities and information inside the control of the company, when the relationship with suppliers is not strong enough to permit them to establish a link to start sharing confidential information because of the different kind of incentives that each partner could have.
6 Conclusions

Information Technology evolution has changed the way firms operated in the past and it has been used for the companies mainly to improve collaboration with their partners increasing efficiency using different infrastructure and specialized systems. At the same time Information Technology has played an important role in business processes inside and outside the organizations, changing work processes and improving relationships first with suppliers and later reflected on customers most of the time in a positive way.

Before Internet, companies were very limited in the way they established business with their partners, but as the technology has evolved, it has also increased the ability for the companies to take advantage of new IT infrastructure to build better business relationships with suppliers because nowadays the firms cannot be isolated.

The lack of integration of processes, resources, information, activities, new developments, efforts and transactions is an important factor for the companies to take the decision of improving their relationships outside boundaries because the companies need to integrate personnel, suppliers and IT infrastructure to improve their business strategies. Additionally once Information Technology infrastructure influenced the relationship with suppliers, effectively manage this relation becomes a critical factor for the company to success.

According to the findings companies have identified several benefits implementing IT in their relationships with suppliers, being “Improving management efficiency” the most important factor. Nevertheless there are also drawbacks for the managers to decide adopt IT in their businesses, for example in this case “Incompatible processes, applications or technology between organizations” is a factor that still influences companies due to the complications that can represent start sharing work processes with suppliers.

Analyzing the needs the companies had in the past and the kind of activities that were affected in each company by the influence of IT; we deduced that one of the biggest benefits IT evolution has given to the companies is the ability to collaborate with their partners, and in this case with their suppliers has brought several benefits that position the companies in a competitive advantage in the market. This improvement in collaboration might have an effect not only in the business relationship but also in the offering to customers and in the business growth. However,
the level of integration with suppliers and the kind of information that will be shared should be analyzed regarding the impact that it could represent in long term for the company.

Moreover is also important to balance the use of Information Technology in a relationship with suppliers being necessary to keep also personal contact with them to maintain a productive relation and increase the level of trust.

Enhancing the benefits of adopting IT in the relationship of the companies with their suppliers and be careful with the management of the risks can help to better meet the company’s business objectives.

7 Future considerations.

There are some requirements that the companies expressed they would like to have in the future when decide the adoption of new IT infrastructure that could be helpful to consider for future research.

Summarizing the future requirements the most important factors stated for the companies in order of importance are:

- The companies need more flexible functions of IT infrastructure reducing the complexity of installation and maintenance.
- The companies hope that new technologies become easier to use, because it could help to save costs of training.
- The companies expect that the technology developers reduced the complexity of installation of new applications
- The companies need that the cost of investment of the most common applications could be affordable.
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- Atthapon Chaianan, Position: IT director, TBWA\Thailand
- Claudia B. A. Villavicencio, Position: Business owner, ALCE de México S.A de C.V
- Julada Thongsupa, Position: Systems coordinator, Tractus (Thailand) Co., Ltd.
- Miguel Cervantes, Position: Sales Manager, OMAX Corporation, USA
- Viwat Temsukthawil, Position: Department Head of System Accessories Division, Acer Computer (Thailand) Co., Ltd.
Appendix

1. Interview questionnaire

Part 1:

1. Do you think that the evolution and implementation of “Information Technology” in your company has contributed to the development of your business? Please mention some reasons to support your answer.

2. Could you mention how IT evolution has influenced your business, in this case your relation with your suppliers or partners, comparing “the past and present” experiences in your company?

3. What kind of IT systems do you use to interact, communicate and transfer data within your business network? How they work?

4. What are the benefit factors that influence your decision to adopt IT in your suppliers? (Please select a level that you consider for each option)

<table>
<thead>
<tr>
<th>Benefit Factors</th>
<th>Not Influence</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Highest</th>
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</thead>
<tbody>
<tr>
<td>Increasing interaction and communication</td>
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<tr>
<td>Improving management efficiency</td>
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<td>Competitive strategy</td>
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<td>Reducing time cycles</td>
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<td>Saving costs</td>
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<td>Standardization of work processes</td>
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<td>Real time responses</td>
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<tr>
<td>Obtaining stronger and closer relationships in the business network</td>
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</table>
Other reasons
Please specify…………………………
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5. What are the disadvantages/risks that your business faces when adopt IT with suppliers? (Please select a level that you consider for each option)

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<thead>
<tr>
<th>Risks of IT adoption</th>
<th>Not Influence</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
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<tbody>
<tr>
<td>Incompatible processes, applications or technology between organizations</td>
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<td>Lack of IT knowledge among suppliers</td>
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<td>Lack of suppliers commitment</td>
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<td>Risk of sharing data via systems (security)</td>
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<td>Other reasons</td>
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| Please specify…………………………
……………..                           |               |       |          |      |         |
6. Are you satisfied with IT infrastructure that you are currently using?

☐ Yes  ☐ No

7. Could you rate the requirement of IT infrastructure that you could need in the future?

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Not Influence</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Highest</th>
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<tbody>
<tr>
<td>The IT should be easier to use</td>
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<td>Reduction of complexity in the installation process</td>
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<td>Low cost of investment</td>
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<td>More flexible functions</td>
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<td>Others, Please specify ................................</td>
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8. How do you manage your IT systems with your suppliers to increase the efficiency in your company? (Example: Supporting training, consultant services, etc.)

9. Do you know if your suppliers use IT infrastructure to enhance the business transactions with their customers (in this case for example with your company)?

☐ Yes  ☐ No (skip to question 12)
10. If your answer for the last question is “yes”, what is the kind of IT infrastructure that they use to interact with your company? How it works?

11. Do you think the use of IT infrastructure with your suppliers will be useful and enhance business transactions to be more effective than before? Please give the reason to support your answer

12. Do you think that IT evolution in the last decades has improved and enhanced your relationship with your suppliers, becoming a stronger and closer relationship?

☐ Yes  ☐ No

Thank you for your participation and your time

Part 2: Personal Information

Name:..................................................................................................................

Position:............................................................................................................

Company:........................................................................................................