e-Commerce Adoption Models for Chilean Small and Medium Enterprises

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Abstract

In this research an e-commerce adoption methodology is proposed for Chilean small and medium enterprises (SME’s). 99% of all businesses in Chile are classified as SME’s and of these 82% are considered microenterprises. The proposed method includes a first stage of strategic business planning, a second stage of technological implementation and finally a stage of information management.

1. Introduction

The adoption and adaptation of information and communication technologies (ICT’s) offers a significant opportunity for reducing operational costs and reaching wider markets for Chilean SME’s (Subsecretaría de Economia, 2002). The competitive advantage of companies that effectively incorporate ICT into their business plan is so great that other firms might lose their commercial viability.

This research includes a study of Chilean SME’s to identify the perception of e-commerce held by the firms and the development of e-commerce in Chile. The factors inhibiting e-commerce adoption by Chilean SME’s are analyzed. E-commerce adoption models are studied in order to classify them for application to the local businesses. These activities lead to a proposal of a model to assist e-commerce adoption by Chilean SME’s.

Approximately 99% of Chilean business are of small or medium size and 82% are micro-businesses (Subsecretaría de Economia, 2002). According to this same report, 61% of Chilean business use ICT, which is far below the rates of more developed nations, but also well above the 42% which was reported for the year 2000. During this same period, small firms increased their use of ITC from 64% to 77%, while medium and large firms rose from 90% to 95%.

This study of 3134 Chilean firms with annual billing between USD60,000 and USD2,500,000 was performed from March – May 2002. According to the businesses surveyed, 55.9% use Internet to increase sales, 20.1% use Internet to reduce costs and 14.5% to improve productivity and control. In response to the question why Internet is not used, 47% replied that it is due to high costs, but 28.3% indicated a negative attitude towards Internet, principally due to a belief that it was not important to their business or for lack of understanding about its potential.

The theoretical background to this study will be presented, including adoption models and their applicability to Chilean SME’s.
2. e-Commerce adoption models

Information and communication technologies (ICT) will be considered to be the set of technologies including computing, telecommunications, multimedia and virtual reality. These technologies deliver information, tools for processing the information and communication channels for its delivery (Davenport, 2001). Electronic commerce (EC) is defined as the use of ICT to improve communications and transactions between persons and organizations, be they suppliers, clients, financial institutions or other (Watson, 1998). EC can be thought of as economic activities relating people and organizations via telecommunication networks based on electronic transmission of data, sound and images.

In this study we will consider EC adoption as the strategic incorporation of ICT to provide transactions between businesses (B2B) and between business and clients (B2C). The degree of adoption is the number of different activities affecting the business, while the type of adoption refers to whether the adoption is B2B or B2C.

The models of EC adoption will be classified into three complementary groups:

1. Models focusing on the user
2. Models focusing on the business implementation
3. Models focusing on the dynamic development of a functional platform

In the following sections these different models will be described and their application to Chilean SME’s discussed.

2.1. User oriented e-commerce adoption model, e-CAM

The first approach to be considered is the model focusing on the client or user of an EC system. Models of technology acceptance (TAM) have been based of the theory of perceived risk. The SME runs real and perceived risks when adopting technologies for implementing electronic commerce systems for business practices. We will use the term e-CAM, e-commerce adoption model, for the application of TAM to the EC environment. The e-CAM analyzes user attitude, intention and behaviour and predicts acceptance on the basis the theory of innovation diffusion (Rogers, 1995), using perceived risk, perceived ease of use and perceived usefulness. Perceived ease of use affects the probability of technology adoption in that complex systems are less likely to be accepted by users. Likewise perceived usefulness is an important factor since the client must view the on-line transaction as more or less useful in comparison with traditional commercial procedures.

The influence of perceived risk identifies four types of perceived risks during on-line transactions:

1. User privacy
2. Transactional security
3. Transaction integrity
4. User operational confidence

A potential client must feel complete confidence when conducting on-line transactions; the implementation of EC must be accompanied by the provision of tools and techniques to ensure user privacy, security and transaction integrity. A cultural tendency to purchase only items that the client can touch and feel has been identified as a significant limitation to EC adoption, as
opposed to societies where mail order catalogues might be an accepted merchandising channel (Subsecretaría de Economía, 2002).

e-CAM would suggest that the implementer of an EC system should ensure that clients have confidence in the performance of the site. An effective approach to generate confidence is uncertainty reduction (Amor, 1998). The system must ensure user security and privacy by means of data authenticity, integrity, correctness and privacy (Del Aguila, 2001). Confidence in the website is the antidote to perceived risk in a commercial transaction (Jarvenpaa, 2002). An on-line client will never have complete confidence during a purchase transaction since the items and funds are not transferred physically in view of the consumer. The businessperson implementing EC must maximize the basis of that confidence as a means of improving the EC opportunities.

The next type of EC adoption model focuses on the business, as opposed to the user oriented emphasis of the e-CAM.

### 2.2. Business oriented e-commerce adoption model

Business oriented e-commerce adoption models must take into account factors both internal and external to the organization (Ling, 2001).

#### 2.2.1. Internal factors

The internal organization of the business or institution must be shaped to ensure success for the venture (Larsen, 1998). Incorporation of new technology must have business and technical support. The computers, networking, server security must give the business the capacity to develop increased sales of products and services over Internet. EC specialists must be incorporated on the company staff to ensure support and service for internal and external users of the EC system.

The cultural conditioning in support of innovative practices is not present in the Chilean SME’s (Subsecretaría de Economía, 2002). SME’s should consider perceived relative advantages, compatibility, complexity, traceability and observability when evaluating the adoption of new technologies (Kalakota, 1996). Though 62.7% of Chilean SME’s have computers, only 41.8% have Internet connection, which indicates a lack of managerial support for technology diffusion. Only 12.6% of the SME’s have a Web page, which suggests a lack of a policy of innovation in the companies. The penetration of ICT correlates with the size of the company; 15.4% of the small firms implement ICT whereas 44.1% of the medium companies use ICT which indicates a lack of resources available for innovation. 26.2% of the SME’s don’t know what an Internet connection would do for them and they don’t have the tools necessary to take a decision regarding technology adoption.

The perceived relative advantage factor affecting EC adoption is currently not well expressed in the Chilean SME’s. 55% of the SME’s that have Internet connection use the access to search for information regarding their business. Only 18.4% of the firms recognize the advantage of EC for sale of products and services. Perceived adoption difficulty is an important factor limiting EC adoption by Chilean SME’s, since they generally don’t possess the capacity for technological decision making (Rogers, 1995).

The compatibility factor affecting EC adoption refers to the possibility of incorporating a new channel of commercialization into the current practice. Chilean SME’s are technically capable of
generating products and services, but their administrative procedures are deficient with regards to resource administration, which complicates EC adoption.

The cost of adopting EC is a relevant factor for small and medium firms. Since 40% of the small firms don’t even have desktop computers, these companies would have to contract outside assistance for EC adoption which would imply heavy external dependency as well as high costs. Medium sized firms uniformly have computers and a large percentage have some Internet connection. Due to the cost of connection, equipment, development and maintenance only ICT enabled organizations can consider EC adoption.

2.2.2. External factors

Various external factors also affect the method of EC adoption by SME’s. Small firms are quite susceptible to competitive pressures, especially in niche markets with few others involved in the market. The medium sized businesses, with more players in the market, are more adapted to the rigours of competition. Supplier pressure is also a factor in EC adoption. More than 30% of medium firms connect to Internet because their suppliers are Internet enabled (Subsecretaria de Economia, 2002). Over 55% of Chilean SME’s use Internet to obtain pricing information of their input materials.

Government agencies play an important role in Internet adoption for SME’s. The tax service, the national treasury, the customs office and many others all have extensive Internet services. These services are more efficient and simpler than the tradition, stand in line until it’s your turn, personal services, which are notoriously tedious. Financial institutions also make Internet banking simpler than the personalized service, and offer a wide range of transactions on-line 24 hours a day, 7 days a week.

2.2.3. Dynamic e-commerce adoption model (eMICA)

The eMICA EC adoption model (Burgess and Cooper, 2000) describes the evolution over time of web based services and functionality depending on the degree with which the business handles the transition to new technologies. The eMICA model differentiates three stages:

- Promotion
- Implementation
- Processing

Promotion is the initial stage of web development, with static information which serves mainly to promote and publicize the business offerings. Within this stage a first level is normally presented with the basic information about the company, its address, contact information and general information about the products and services offered. A second level is also presented where a richer variety of information is available on the web. This might include annual reports, e-mail contacts and other commercial information about the firm.

The second stage described with the eMICA model is when the company web site moves to a dynamic information system with a web front end. Within this stage, three levels are identified:

- A low level of interactivity characterized by on-line catalogues, links to detailed information and on-line registration forms.
• A medium level of interactivity with more complete product catalogues, on-line help for users and personalization as well as wider links to industry sites.

• A high level of interactivity where the site will include chat rooms, discussion forums, multimedia applications and dynamic newscasts.

The third stage identified in the eMICA model is where the web site has a functional maturity which permits on-line transactions. This requires a higher level of security than the previous stages as well as user identification. At this stage users will be able to purchase products and services across the web, maintain an individual profile and obtain personal profiles matching offerings to the individual needs.

The following section describes the methodological basis upon which the proposed EC adoption model is built.

3. Methodological basis

The relevant aspects of EC that may be considered when proposing an adoption methodology include the risks which dissuade a business from using EC, the strategic relationship between EC and traditional business and thirdly, how EC affects the relationships between suppliers and clients.

Some of the factors which dissuade businesses from adopting EC are:

• Low level of managerial support

• Lack of understanding of the relative advantages that EC can offer to the business

• Lack of strategic vision, the companies are completely occupied with survival and can not envision future directions

• Lack of qualified personal

• Generalized aversion to technological or procedural change

The generation of an EC strategy has various effects on the small or medium business. The general business objectives tend to be clarified. In fact, the business objectives must be clear to ensure a successful EC implementation. Managerial support for an EC initiative must be specific, well founded and open to new technological innovations. An EC support unit must exist, as opposed to being a sidelight for another business unit.

The relationship between an enterprise and its suppliers and clients is significantly affected by EC adoption. In order to take advantage of the efficiencies and market penetration that EC offers the business must generate confidence that its business procedures will work correctly and to protect the security and privacy of the users. The perceived risk of visiting an EC web site must be low; the EC adopter must:

• Protect the integrity of the site

• Guarantee the integrity of the data at the site

• Protect the content of data distributed over Internet from the site

• Protect the intellectual property of the material presented at the site
The factors which must be considered in providing these characteristics of an EC site are (Amor, 2000):

- Users’ identities must be authenticated
- Users must be authorized in addition to being authenticated
- Integrity of transactions and data must be ensured

A functional level model for EC adoption is proposed which describes the levels of functionality of a web site as a business establishes an Internet presence. The proposed model is based on the three levels of the eMICA (Burgess and Cooper, 2000) model.

The first level is experimental, where the web site is proposed (Kalakota, 2000). The site will have only static information, contact data, product descriptions and very simple navigation. The second level proceeds to a dynamic site, where the web site is the front end to an information management system. Users will input data through forms, data bases will be queried and the web site will become more complex. At this stage the benefits of EC should begin to become evident to management. Some business processes should begin to be automated and security should be confronted since client and supplier information will be passed over the web. New intermediaries will appear and new commercial conflicts are likely to become evident.

The third level is the integration of EC into all the activities of the company. Business processes will be automated and both EC and traditional forms will be integrated (Hartman and Sifonis, 2000). Transactions will be performed on-line; the shopping cart will appear. The back-end data base will be integrated both with the web site and the company resource management. Security will be an important element of both back and front-end data administration. At this level, the company should be generating significant benefits from the implementation of EC.

4. Proposed adoption methodology

The proposed structure of EC adoption for Chilean SME’s can be described through the following steps:

I) Awareness on the part of company management of the situation of the firm with regards to information management and technologies for communications and information processing. Management should be made aware of the possibilities of EC for the line of business in which they operate.

II) Analysis of the factors which affect the process of technological innovation, including the units internal to the company and external relations.

III) A strategic plan should be developed which include integration of EC to current processes and which propose new opportunities.

IV) The image of the company should be tuned for display across Internet.

V) An analysis should be performed of information needed to adapt the company structure for EC. The current information processing systems should be studied to ensure their integration with the EC system.
VI) Tools and processes should be developed to reduce perceived risk involved in on-line transactions as well as the previously mentioned security and privacy requirements for Internet activities.

VII) The structure of the company should be reviewed to ensure an adequate incorporation of EC units and managerial support for these units.

VIII) A transactional Internet presence should be implemented with real integration of EC processes with tradition processes. This presence should be accompanied with an analysis of the client-supplier life cycle.

IX) Feedback should be obtained to ensure that the previous steps are adequately implemented and updated according to new demands and opportunities.

This sequence of steps can be illustrated in the following diagram.
I. Management awareness

II. Internal and external factor analysis

III. Strategic plan developed

IV. Internet image tuned

V. Information management structure adapted for EC

VI. Risk reduction processes implemented

VII. Company structure tuned for EC

VIII. Transactional presence implemented

Step 1. Creation of a static web presence

Step 2. Automation of business processes

Step 3. Integration of EC within the business
5. Discussion and conclusions

The fundamental step in EC adoption is the managerial decision to proceed with the business plan. Once this decision has been made the following steps are methodological, and the success of the strategy depends on the quality of the implementation. As a spin-off of a decision to adopt EC as part of the business using the model proposed in this research, the company’s information management systems are upgraded and the business processes are automated. The data gathered with a complete EC plan can be transformed into information for strategic business orientation.

The general structure of the proposed functionally based model is a general transition from a static, promotional web presence to a dynamic and transactional front-end for an information management system. This transition requires participation by various business units, and evaluation of the technological innovation applicable to their operations. If the transition is well managed, the technological evaluation can provide more benefits to the business.

The conclusions from this research are focused on three areas: strategic planning for EC adoption, technological implementation and information management. Chilean SME’s generally do not give relative importance to strategic planning. This may be due to a lack of an innovative business culture in the country, and is a significant impediment in the search for socio-economic improvement. The medium sized firms that do develop strategic plans focus on marketing plans and do not consider generalized business integration. In this environment, the EC adoption model proposed in this research is a useful tool for those firms that decide to embark on a plan incorporating EC into their business plans.

Issues of technological implementation are confusing for the SME decision maker and Chilean SME’s do not have sufficient access to qualified personal to implement EC. Models such as the present proposed approach will not reduce the lack of capable technicians, however they do point the way to an efficient use of available human resources.

Governmental organizations that assist SME’s in Chile must be aware of the lack of information about the benefits of technological innovation in the area of EC and must communicate the possibilities to decision makers in SME’s. Academic institutions also have a responsibility to train implementers of EC technology to support SME’s. Given widely publicized information about the benefits of technological innovation, ICT implementation and EC; with sufficient technical education for EC implementation; and above all a cultural acceptance of the necessity of innovative business practices, Chilean SME’s will be able to improve their business efficiency and contribute to their society.

References


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