December 2003

An Instrument for Measuring the Effect of Trusted Electronic Interorganizational Relationships on Customer Loyalty

Assion Lawson-Body
University of North Dakota

Follow this and additional works at: http://aisel.aisnet.org/amcis2003

An Instrument for Measuring the Effect of Trusted Electronic Interorganizational Relationships on Customer Loyalty

Assion Lawson-Body
University of North Dakota
Assion_Lawsonbody@und.nodak.edu

Abstract

MIS literature has not adequately addressed the measurement of electronic commerce dimensions and activities. Measures are yet to be proposed to assess the effect of trusted electronic interorganizational relationships on customer loyalty. In this paper, we present the results of a study that was a first effort toward this end. The focus of this study is to develop an instrument for measuring four critical dimensions of electronic commerce: interorganizational relationships, trust, web site characteristics and customer loyalty. Data from 170 information technology (IT) firms were used to assess the measures, using the PLS (Partial Least Squares) techniques and SPSS software.

Keywords: Trust, loyalty, interorganizational relationships, Web sites

Introduction

Firms can adopt the possibilities offered by B2B e-commerce and Internet to redesign their interorganizational relationships (IOR) in order to increase customer loyalty. The Internet's web site is a wonderful opportunity to streamline, automate, and standardize many of a firm's relationships with suppliers, distributors, and partners (Porter 2001; Robbins and Stylianou 2003). The goal of IOR is to build customers' loyalty based on factors other than pure economics or products attributes (Bowen and Shoemaker 1998).

Trust may have an effect on the link between electronic IOR and customer loyalty because trust is precursor to customer loyalty. Trust can be achieved by providing the customer with valuable information using high quality web site characteristics.
Loyalty is the result of the effective combination between IOR factors, new information technology facilities such as web site characteristics and trust factors (Reichheld 2001). To gain the loyalty of customers via web site resources, you must use the technology to build lasting trusted long-term relationships with them (Reichheld 2001). Interestingly, however, few of the existing research have empirically tested the effect of trusted electronic IOR on customer loyalty. This may be explained by the absence of valid measures to assess the dimensions of electronic commerce activities. In view of the importance of high quality measures and of the role of construct and measure development in the emergent area of electronic commerce, in this paper, we report on the development and validation of instruments to measure the effect of trusted electronic IOR on customer loyalty.
This article consists of two main parts. First, a conceptual model explaining the impact of trust on the linkage between electronic IOR and customer loyalty will be presented and explored. The second part involves describing the development of the measures and the assessment of their validity, using SPSS and PLS.

Conceptual Constructs and Model

A consideration of the study's objective will help to identify its key constructs: the IOR construct will play the role of independent variables, customer loyalty will be the dependent variable, web site characteristics construct will be considered as the first group of moderating variables and trust will represent in the model, the second group of moderating variables. Each of them is discussed below.

Interorganizational Relationships (IOR)

IOR are built around interactions and can be characterized by a tension between autonomy and interdependence, between team loyalty and individuality, between competition and partnership, and between customization and personalization (Nouwens and Bouwman 1995).

The primary goal of interorganizational relationships is to let companies achieve a mutual loyalty. Then, an IOR is dependent upon empowerment, partnerships and personalization.

Empowerment

Empowerment generally refers to the process firms adopt to encourage and reward employees who exercise initiative and make valuable creative contributions (Evans and Laskin 1994), or do everything that is possible to help customers solve their problems.

Personalization

Clearly putting relationship to work properly involves much more than simply sending out personalized mail (Peppers, Rogers and Dorf 1999). The customer tells you of some value and you personalize your product or service to meet it (Peppers, Rogers and Dorf 1999).

Partnerships

Partnerships are created when suppliers work closely with customers and add desired services to their traditional product and service offerings (Evans and Laskin 1994). This means resale of your firm's products and services by your customers. It also means joint development of products and services with customers. To get effective partnership with customers, some suppliers create joint ventures with customers.

Loyalty Construct

The development of loyalty involves building and sustaining a relationship with a customer that leads to the customer's repeated purchases of products or services over a given period of time. For the purposes of this research, loyalty will be considered as the final result of effective trusted electronic IOR. Our purpose is to link loyalty to the emerging theory of IOR (Macintosh and Lockshin 1997). A final point to make is that the variable which has been chosen to measure the effectiveness of trusted IOR in this study is "customer loyalty."

"Web Site Characteristic" Construct Components

There is an existing need to investigate web site characteristics for effective B2B electronic commerce (Dholakia and Rego 1998; Chiu 2003). Characteristics of web sites range from simple, associatively linked collections of static hypertext documents to interactive, integrated, customizable solutions and agent-based negotiation support; and since the characteristics of web sites were initially developed to address the development of B2C transactions, they can also be effectively applied in B2B settings as well (Gebauer and Scharl 1999).

The web site characteristics components developed in this study are an adaptation of some of the web site characteristics presented by Gebauer and Scharl (1999). Because of the rapid evolution of the Internet, the web site characteristics have been updated to include the level of security on the Internet. Today, there are essentially three variables that encompass the construct of web site characteristics: the level of presence on the Internet, the level of interactivity on the Internet, and the level of security on the Internet.

The Level of Presence on the Internet

Managers face several challenges as they seek to determine the best way of establishing their firm's presence on the Web, mostly because of several characteristics of this medium (Dholakia and Rego 1998; Chiu 2003). Lombard and Ditton (1997) explained

that the concept of presence is central to the use of electronic commerce, and therefore to the usefulness and profitability of such new technologies as the Web. The degree to which a medium can produce seemingly accurate representations of objects, events, and people corresponds to the definition of the presence on the Internet used in this article.

The Level of Interactivity on the Internet

The use of the web site as an electronic catalog or, better yet, as a dynamic, interactive portal appears to be the most widespread concept (Joseph, Cook and Javalgi 2001; Robbins and Stylianou 2003). This interactivity concept is complex and multi-dimensional (Lombard and Ditton 1997). According to Rafaeli and Sudweeks (1997), like face-to-face exchange, computer-mediated exchange has the capacity of enabling high interactivity. For purposes of this study, the level of interactivity on the Internet refers to the extent to which organizations engage in online exchange with others without feeling affected by the constraints of distance and time.

The Level of Security on the Internet

The perception of unsatisfactory security on the Internet is one of the primary hindrances of IOR (Swaminathan, Lepkowska-White, and Rao 1999). Despite advances and endeavors in Internet security mechanisms, such as cryptography, authentication, confidentiality, integrity, non-repudiation, etc., companies are still concerned about using an impersonal transaction medium like the Internet for secure transactions (Swaminathan, Lepkowska-White, and Rao 1999). Although organizational acceptance of the risk of conducting transactions over the Internet is growing, it is still wavering. The literature depicts the results of some studies showing that companies are not as concerned about the security of electronic exchanges, but rather that the concern over security has decreased over the years, particularly with developments in Internet payment systems that ensure confidentiality (Swaminathan, Lepkowska-White, and Rao 1999). Abiding by those conclusions, organizations that are willing to do online businesses have to make concerted efforts to allay these fears by offering clear security guidelines to their partners.

Trust

According to Ganesan (1994), a key component of trust is the extent to which the customer believes that the vendor has intentions and motives that are beneficial to the customer and the vendor is concerned with creating positive customer outcomes (Jarvenpaa and Tractinski 1999) Trust is the belief that another can be relied upon with confidence to perform role responsibilities in a fiduciary manner--and is manifest in a willingness to voluntarily increase one's vulnerability to another (Smith 1997). Trust is a critical factor in any IOR in which the trustor does not have direct control over the actions of a trustee, and there are possible negative consequences of one party not fulfilling its promises (Jarvenpaa and Tractinski 1999). Similarly, Smith (1997) proposed a model in which an organizational trust is based on a dyad of trustor and trustee (Jarvenpaa and Tractinski 1999). Overall, most definitions of trust involve a belief that one relationship participant will act in the best interests of the other participant.

The Conceptual Model

The research model tries to demonstrate how the use of Web Site Characteristics such as level of presence, level of interactivity and level of security on the internet can support the formation and maintenance of IOR because they facilitate the way organizations partner, personalize and empower in order to create loyal customers. But trust is central to the development of relationships. So how can the theoretical contribution of trust be on the theoretical link among web site characteristics, IOR and customer loyalty? First of all, many authors argue that the construct of trust is an important element of long-term buyer-seller relationships in a business environment (Chow and Holden 1997). Also, customer loyalty is a relationship built on trust between the buyer and the seller (Bowen and Shoemaker 1998). Second, trust is not only a short-term
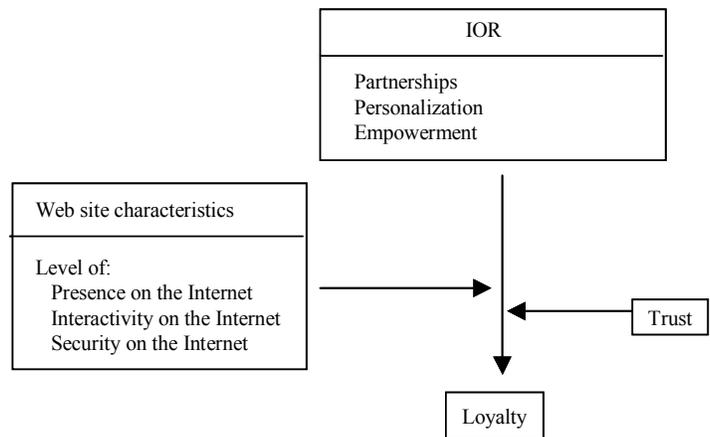

Figure 1. Research Model

issue but the most significant long-term barrier for realizing the potential of B2B electronic commerce on the Internet to customers (Jarvenpaa and Tractinski 1999). In fact, trust has a direct or indirect impact either on the web site characteristics or on the customer loyalty or on the IOR or on the relations among these three constructs.

Development of the Measures

The measures were developed according to the guidelines suggested by Churchill (1979), while the evaluation grid used to measure web site characteristic variables was mounted according to the guidelines offered by Kassarjian (1977). In order to follow the guidelines suggested by Churchill (1979), an exploratory study based on multiple case studies has been conducted. The results of these multiple case studies enabled us to refine the measures previously developed with the literature review. In total, management directors of eight companies which belong to the IT sector were asked to participate in the multiple case studies. A content analysis approach was used to analyze and process the data from the interviews. To help conduct the interviews an interview guide was used. It was an improvement of questionnaire's content validity. After all, the results of these multiple case studies enabled us to add items to the measures of the customer loyalty, the trust, the IOR and the Web site characteristic constructs.

Refinement Procedures

Measure of Customer Loyalty

The Dirichlet model offers a robust and parsimonious way of measuring customer loyalty (Bhattacharya 1997). The predictive capabilities of the Dirichlet model of loyalty were used as an input of the customer loyalty measures in this study. The results of the multiple case studies helped to refine the instrument. Then, the item "the average number of years during which the company maintains business relationship with its customers" was used to measure how long the company will keep contact with its customers. This number of years can fluctuate depending on the customer's needs and the type of products and services produced by the company. The higher the number of years, the greater the chance the company will establish customer loyalty. Another item used to refine the instrument is: "the percentage of the maintenance contracts that are being renewed." This item measures whether a company is able to renew its maintenance contracts with its customers or not. The companies, which are able to renew many of their maintenance contracts, are the ones that will establish customer loyalty. IT companies can use the maintenance contracts renewal as an argument to keep in touch with their customers.

Measure of Partnerships

Since the literature does not suggest measures to evaluate partnerships in the setting of electronic commerce, all items corresponding to the measure of this construct were built except one that was adapted from the description of the partnerships presented in the paper of Evans and Laskin (1994) which is: "in general, your firm builds partnerships with its customers." Therefore, a majority of the measures of the partnership construct comes from the result of the case studies. The item "resale of your firm's products and services by your customers" enables us to assess the level of collaboration between the companies and their customers in terms of joint advertising programs. The item "joint development of products and services with customers" is used to measure how the IT companies share their skills and knowledge with their customers. The item "creation of joint ventures with customers" enables us to verify how far the partnerships between two firms go. Finally, the last item "reference to your firm's products and services when customers sell their own products and services" will help to know whether or not the product and service sales of partners can benefit the IT companies.

Measure of Personalization

Among the authors that used instruments to measure the variable personalization, we can cite Mittal and Lassar (1996). The measure presented in this paper is an adaptation of measures already used by these two authors. However the items that have been selected from the measures of these authors have served as input to the development of a new instrument. Another source that enabled us to refine this instrument is the results from the case studies. The item «your firm manages its customer technique problems» let us know whether or not the company possesses multiple levels of resolving technical problems. The item «your firm assigns one salesperson to each customer» helps to verify if the same business representative takes care or negotiates with the same customer. The item «your firm develops or prepares specific products for specific customers» enables us to discover

the ability of the firm to propose a specific offer to its customers. The item «your firm sends customized mail to customers» is destined to measure the capacity of the firm to take into account the culture and habits of the customer when it writes a correspondence to be sent later to the customer.

Measure of Empowerment

The items that have played the role of input for the development of a new instrument in order to measure the variable Empowerment are: «your firm rewards employees who do their very best to solve customer problems» and «in general, your firm empowers employees with regards to customer relations ». These two items have been adapted from the study of Evan and Laskin (1994). They have been completed by other items obtained from the results of the case study. Thus the item «your firm has policies indicating to employees their degree of responsibility and authority in solving customer problems» indicates whether or not the employees are able to make decisions that they are not supposed to make. The items «your firm has a marketing training program for technical service employees» and «your firm has a technical training program for its representatives » indicate whether or not the firm has employees who possess multiple skills and knowledge.

Measures of Trust

In this section, we present the origin of the elements composing the interorganizational trust. Although there are many scales that measure trust available in the literature, no existing measure assessing this construct for electronic commerce was found. To measure interorganizational trust, we adapted the scales developed by Morgan and Hunt (1994) and the scales presented by Chow and Holden (1997). According to the first group of authors, it was essential that trust measures should capture its major facets of reliability, integrity, and confidence. The second group of authors assembled a representative set of possible items which had been used in past studies to measure trust such as: "this company can't be trusted, it's just too busy looking out for itself," "I have found that I can rely on this company to keep the promises that it makes," "this company is basically honest", and "despite what this company says, it will try to take advantage of me." All of these items were adapted, refined by the results of case studies and reformulated to conform with the electronic commerce context.

Measure of Web Site Characteristic Construct

In this study, the measure criterions were developed according to the instrument measuring web sites developed by Wang et al. (2001). The multiple case studies enabled us to refine the evaluation grid. Those items that helped in the refinement are discussed below.

The Level of Presence on the Internet

The item "the home page is presented in text and graphic version" assures that the web site is flexible, and then it can help the firm to have a durable relationship with its customers.

The item "the Web Site presents press releases" will evaluate if the firm is able to inform its customers about publications concerning its activities. It helps the companies that want to give information on their position compared to their competitors.

The Level of Interactivity on the Internet

The item "the Web Site shows the size of software to download" will permit the customers to evaluate their infrastructure capacity before downloading the products from the Web Site. The software products downloaded will enable customers to test the software they will order. The results from the software test will influence their purchase decision. This item shows whether companies are able to build a relationship with its customers before the products purchase.

The item "the Web Site contains a section accessible with a password only to customers" will indicate if companies are able to manage confidential information of their customers. The item is meant for checking the way companies personalize their relationship with their customers via Web Sites.

The item "the Web Site presents an email link" is meant for testing the companies' strategies developed to communicate with their customers. Companies that have a quality correspondence with their customers will easily build a one-to-one relationship with them.

The items that focus on the presence of forms in Web Sites are "order forms," "funds transfer, or payment forms," "forms to make research inside the firm Web Site," "registration forms in a Listserv" and "subscription forms to a discussion group." These forms enable us to know if companies interact with their customers to receive their comments, to enable them to give an order, to pay directly their transactions or to make funds transfer.

The Level of Security on the Internet

The item "you feel the web site is secure" explains how the web site is secured against threats like data intercepted, read or modified illicitly. The item "you feel safe in your transaction with the web site" demonstrates whether or not some of the security standards and protocols for the Internet are used to protect financial data and transactions. The item "the web site provides for the security of your transaction data and privacy" enabled us to verify whether or not the web site provides privacy or authentication.
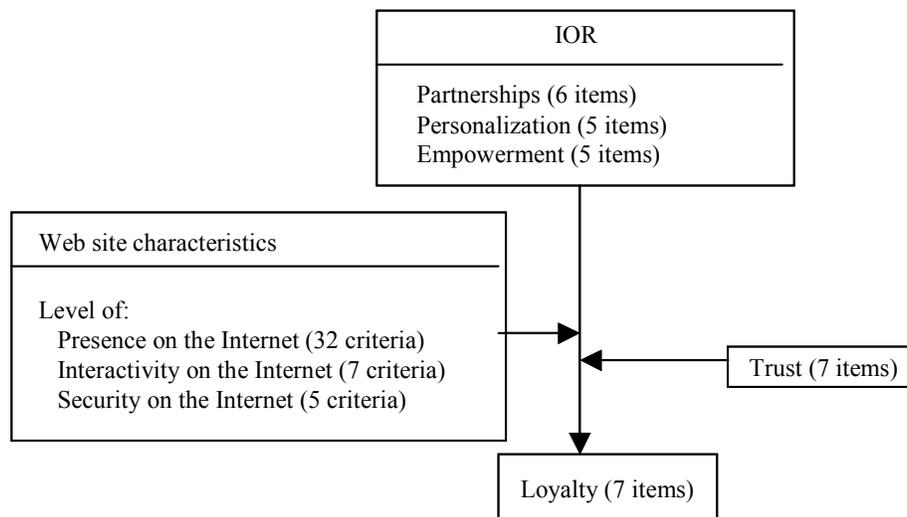
Conceptual Model with the Items

Figure 2. Research Model with the Items After the Refinement Procedures

Pre-Test of the Questionnaire

Further to the refinement a pretest was conducted in order to assess the face validity of the instrument. Face validity is the extent to which an instrument looks appropriate (Aubert 1994). Our refined questionnaires were extensively reviewed and evaluated, both by practitioners (the executive management directors of the IT companies) and by academics. From these evaluations, corrections and improvements were suggested and included in the measurement instrument.

Survey Procedures

After the face validity assessment or pretest, the questionnaires were sent electronically to the 1000 executive directors of small, medium, and large IT companies. These companies were chosen randomly from the web site of "Industry Canada": **http://strategis.ic.gc.ca.** Of these, 170 electronic responses, or 17%, were returned.

Validity and Reliability Assessment

In this section, we present the exploratory phase based on the Principal Components Analysis (PCA) (executed with SPSS) and the confirmatory phase dealing with the Confirmatory Factor Analysis (CFA) (executed with PLS).

Exploratory phase validity: Principal Component Analysis (PCA)

The researchers conducted an exploratory factor analysis to further examine the factor structure of the instrument (Wang et al 2001). Before identifying the factor structure of the electronic commerce constructs using factor analysis, a chi-square value of 11234.2 and significance level of 0.004 were obtained using Bartlett's sphericity test, which suggests that the intercorrelation matrix contains sufficient common variance to make factor analysis worthwhile.

The technique of exploratory factor analysis based on principal components method with varimax rotation was used to assess the measuring validity. This rotation was chosen because it allows the interpretation of the interest factors, and it is also the most used rotation technique in research. Several runs of SPSS were conducted before obtaining the results of this first analysis. At each run, four commonly employed decision rules were applied to identify the factors underlying the constructs: (1) using a minimum eigenvalue of 1 as a cutoff value for extraction; (2) deleting items with factor loadings less than 0.5 on all factors or greater than 0.5 on two or more factors; (3) a simple factor structure; and (4) exclusion of single item factors from the standpoint of parsimony. The iterative sequence of factor analysis and items deletion was repeated, resulting in a final instrument of 30 items representing five distinct factors. This analysis was interpreted as one factor for the construct "customer loyalty," one factor for the construct "trust" and three factors for the construct "IOR" (see Table 1a, Table 2a and Table 3a). The items thrown out due to poor loading after the PCA are presented in Table 1b, Table 2b and Table 3b.

**Table 1a. Exploratory Factor Analysis (Customer Loyalty) (Principal Components Method
with Varimax Rotation; Loading>=0.50)**

	Items	Loads
Factor 1 Loyalty	CML	0.794
	PSL	0.823
	SAL	0.789
	NRL	0.757
	YRL	0.772

**Table 1b. Exploratory Factor Analysis (Customer Loyalty)
(Items thrown out due to poor loading)**

Construct: Loyalty	
Factor 1 Loyalty	**Items**
	PRL
	RCL

Table 2a. Exploratory Factor Analysis (IOR)
(Principal Components Method with Varimax Rotation; Loadings ≥ 0.50)

IOR	Factor 1: Partnership	Factor 2: Personalization	Factor 3: Empowerment
RSP	0.847		
RPP	0.774		
CCP	0.766		
DCP	0.722		
MPPE		0.911	
PLPE		0.761	
ASPE		0.689	
PSPE		0.874	
REE			0.924
PEE			0.744
EEE			0.804
TTE			0.793

Table 2b. Exploratory Factor Analysis (IOR) (Items thrown out due to poor loading)

Construct: IOR	
	Items
Factor 1 : Partnership	PCP GBP
Factor 2 : Personalization	PTPE
Factor 3 : Empowerment	TME

Table 3a. Exploratory Factor Analysis (Trust) (Principal Components
Method with Varimax Rotation; Loading ≥0.50)

	Items	**Loads**
Factor 1 Trust	BLI PRM CBH CCT	0.774 0.961 0.933 0.819

Table 3b. Exploratory Factor Analysis (Trust) (Items thrown out due to poor loading)

Construct: Trust	
	Items
Factor 1 : Trust	DCA CCR CHI

Exploratory Phase Reliability: Cronbach's Alpha

Reliability was evaluated by assessing the internal consistency of the items representing each factor using Cronbach's alpha. SPSS software was used to assess the reliability of the measures in the exploratory phase. The results obtained from this analysis are presented in Table 4. Obviously, a reliability assessment has followed the Principal Components Analysis (PCA).

Table 4. Exploratory Phase Reliability Assessment

Factor	Cronbach's alpha
Loyalty	0.88
Trust	0.91
Personalization	0.89
Partnership	0.86
Empowerment	0.90

According to the guidelines established by Nunnaly (1978) for the interpretation of Cronbach's alpha for basic research, acceptable reliability coefficients must be higher than 0.6 (Aubert et al. 1994). These coefficients are satisfactory because their values are ranged between 0.86 and 0.91.

Confirmatory Factor Analysis, Construct Validity and Confirmatory Reliability

The rest of the development of the measuring instrument deals with the confirmatory study. Then, Confirmatory Factor Analysis, a confirmatory reliability assessment and Construct Validity (Convergent Validity and Discriminant validity) with PLS (Partial least square) were effected. To do this, results obtained from PCA (Principal Components Analysis) using SPSS were submitted to PLS software.

Results of this second analysis regarding the confirmatory phase indicated the identifying of one factor for the construct "customer loyalty," one factor for the construct "trust" and three factors for the construct "IOR." All items having a coefficient of Student's T (t value) more than 1.64 (P<=0.05) were conserved. The results of this analysis are presented in Table 5.

Confirmatory Phase Reliability: Rho

The table 6 presents the indicator of the reliability of a measure which is the Rho coefficient. It is the sum of the explained construct variance divided by the total variance (explained construct variance plus error variance). This coefficient is useful to assess the reliability of the measuring instrument at confirmatory level. Aubert and al. (1994) report the guidelines established by Nunnally (1978) for the interpretation of Cronbach's alpha may be applied to the Rho coefficient. It can be seen that all Rho coefficients are ranged between 0.82 and 0.90. This is considered very satisfactory.

Convergent and Discriminant Validity

If the loadings of all items within a factor are high it indicates convergent validity, and low on the other factors it indicates discriminant validity. The last column of Table 5 (AVE's column) shows the convergent validity assessment for each factor. To obtain these values, an averaged variance shared between each construct and its measure (Fornell and Larcker 1981) was used. According to Fornell and Larcker (1981), convergent validity coefficients should be higher than or equal to 0.50. We noticed that all convergent validity coefficients calculated for all factors in this study were higher than or equal to 0.50, confirming the conclusions of Fornell and Larcker (1981).

Discriminant and convergent validity assessments analysis are presented in Table 7. Discriminant validity is the extent to which a measure of a construct differs from measures of neighboring constructs (Fornell and Larcker 1981). It is the evaluation of variance shared between the different constructs. This shared variance is taken into account by a Covariance square (PHI square) between the constructs. To evaluate discriminant validity, Fornell and Larcker (1981) suggest a comparison between the average variance extracted (AVE) for each factor and the variance shared between the constructs. To complete this evaluation, we used the matrix of covariance of the constructs in which we replaced the diagonal with the square root of the AVE (underlined in Table 7). The numbers on the diagonal (underlined) are all much larger than the elements off the diagonal. From this analysis, the discriminant and convergent validity of the measures appeared to be satisfactory.

Table 5. Confirmatory Factor Analysis and Convergent Validity (AVE)

Items of factors	Weight	Loading (λi)	t value	AVE
Loyalty				0.56
CML	0.6684	0.7156	3.1164*	
PSL	-0.0448	0.0699	0.0160	
SAL	0.1442	0.4894	2.7680*	
NRL	0.9085	0.9645	3.8820*	
YRL	0.7887	0.7449	2.2401*	
Partnership				0.68
RSP	-0.0163	0.0494	0.1004	
RPP	0.6400	0.8884	1.8641*	
CCP	0.2980	0.6066	2.4009*	
DCP	1.2404	0.9407	3.4906*	
Personalization				0.66
MPPE	0.6700	0.7417	2.8080*	
PLPE	1.2236	0.8246	3.6486*	
ASPE	1.4248	0.7740	3.8984*	
PSPE	1.2770	0.9114	2.1471*	
Empowerment				0.70
REE	0.8403	0.7510	3.6002*	
PEE	0.4004	0.8895	3.7600*	
EEE	0.4959	0.8316	3.5650*	
TTE	0.5241	0.8840	3.2530*	
Trust				0.74
BLI	0.5461	0.8544	3.9441*	
PRM	0.8400	0.8994	3.3890*	
CBH	0.3249	0.8310	3.7600*	
CCT	-0.4431	0.0011	0.033	
				AVE= $\Sigma\lambda i^2/n$

*T-Student significant at 1.64 (P<= 0.05)

Table 6. Confirmatory Phase Reliability Assessment

Factor	Rho
Loyalty	0.82
Trust	0.89
Personalization	0.88
Partnership	0.86
Empowerment	0.90
	Rho = $(\Sigma\lambda i)^2/(\Sigma\lambda i)^2 + Var(\xi)$ Var $(\xi) = \Sigma(1-\lambda i^2)$.

Table 7. Matrix of Covariance Square (PHI square)

	Loyalty	Partnership	Empowerment	Personalization	Trust
Loyalty	**0.56**				
Partnership	0.102	**0.68**			
Empowerment	0.184	0.017	**0.70**		
Personalization	0.000	0.191	0.009	**0.66**	
Trust	0.111	0.000	0.008	0.104	**0.74**

The Web Site Evaluation Procedure

To measure the moderating variables, the evaluation grid mounted according to the guidelines offered by Kassarjian (1977) was used. Web site characteristics such as the level of presence on the Internet, the level of interactivity on the Internet and the level of security on the Internet were evaluated by two judges: the researcher himself and an MBA graduate student. The inter-judges reliability is the percentage of agreement amongst multiple judges who treat the same communication materials (Kassarjian 1977). The reliability assessment currently used is the agreement ratio of codage out of the total number of codage decisions (Kassarjian 1977). Therefore, each judge makes 44 decisions per company's web site (170 company's web sites in total), which adds up to a total of 7480 (44*170) decisions. The number 44 is equal to the number of criteria on the evaluation grid including the perceptions of the judges. Of these 7480 decisions, both judges agreed with 5610 decisions, which makes an average of 33 (5610/170) decisions per company. Both judges disagreed with 1870 decisions, which makes an average of 11 (1870/170) decisions per company's web site. The reliability inter-judges coefficient is 75%. Berelson (1952; cited in Kassarjian 1977) claimed a range located between 66% and 95% with a concentration at 90% for acceptable inter-judges reliability coefficients. The ratio of 75% appeared to be satisfactory.

Table 8. Results of the Web Site Evaluation

	Decisions made	Agreed Decisions	DisagreedDecisions	Inter-judges reliability coefficient
Total	7480	5610	1870	75%
Average	7480/170= 44	5610/170=33	1870/170=11	

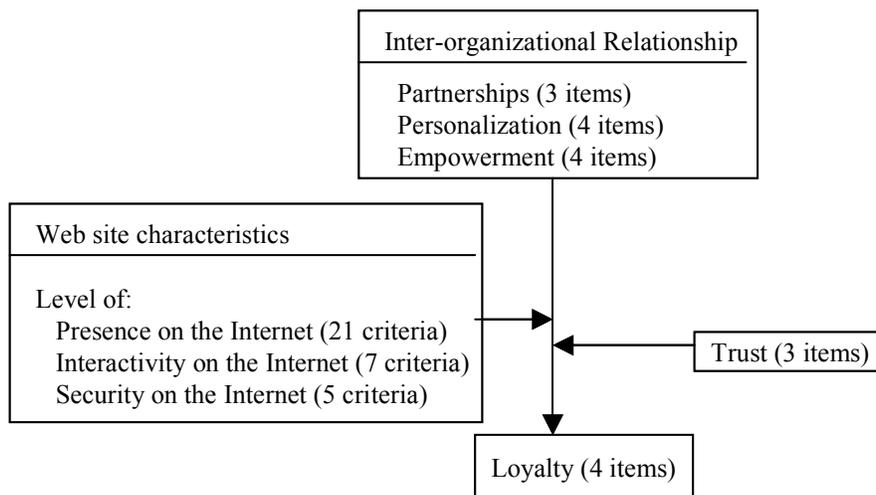## *Conceptual Model with the Final Items*

Figure 3. Research Model with the Items at the End

Conclusion

This paper proposed measures to assess the dimensions of electronic commerce activities. While more effort remains to be done to improve those measures, the results obtained are encouraging and satisfactory.

One part of the article deals with the presentation of the multiple case studies realized next to eight companies, which belong to the computer science sector. The goal of this study was to refine the questionnaire to improve its content validity. The thematic or content analysis was used to identify the principal themes often repeated in the interviews.

Another part of this article showed the questionnaire, which has been pre-tested by the practitioners and researchers. The evaluation grid of the web site characteristics has also been pre-tested by these same people. The final evaluation grid indicates adequate reliability inter-judges. IOR factors, trust and loyalty were assessed in the context of electronic commerce and these measures showed appropriate levels of reliability and validity. These measures have been tested with first generation statistical tools, such as SPSS. The use of PLS, a second generation tool, enabled further refinement and validation of these measures. Then, confidence in these instruments has been increased. The authors encourage practitioners and researchers to use the instrument for various electronic commerce applications.

References

Aubert, B., Rivard, S., and Patry, M. "Development of Measures to Assess Dimensions of IS Operation Transactions," ICIS, Vancouver, December 1994 (14-17), pp.13-26.

Bhattacharya, C. B. "Is your brand's loyalty too little, or just right? : Explaining deviations in loyalty from the Dirichlet norm," International Journal of Research in Marketing (14: 5), 1997, pp 421-435.

Bowen, J. T., and Shoemaker S. "Loyalty : A strategic Commitment," Cornell Hotel and Restaurant Administration Quarterly, February 1998, Cornell University.

Chiu, C.-M. "Toward integrating hypermedia and information systems on the web," Information and Management (40:3), 2003, pp. 165-175.

Chow, S., and Holden R. "Toward An Understanding of Loyalty: The Moderating Role Of Trust", Journal Of Managerial Issues (9:3), 1997, pp.275-298.

Churchill, G. A. "A Paradigm for Developing Better Measures of Marketing Constructs," Journal of Marketing Research (16:1), 1979, pp. 64-73.

Dholakia, U. M., and Rego L. "What makes commercial Web pages popular? An empirical investigation of Web page effectiveness," European Journal of Marketing (32:7/8), 1998, pp724-736.

Dick A. S., and Basu K. "Customer Loyalty: Toward an Integrated Conceptual Framework," Journal of the Academy of Marketing Science (22:2), 1994, pp. 99-113.

Evans, J. R., and Laskin, R. L. "The Relationship Marketing Process : A Conceptualization and Application," Industrial Marketing Management (23:5), 1994, pp. 439-452.

Fornell, C., and Larcker, D. "Structural Equation Models With Unobservable Variables and Measurement Error," Journal of Marketing Research, (18:1), 1981, pp.39-50.

Gebauer, J., and Scharl, A. "Between Flexibility and Automation: An Evaluation of Web Technology from a Business Process Perspective," Journal of Computer-Mediated Communication (5:2), 1999, Online.

Jarvenpaa, S. L., and Noam, T. "Consumer Trust in an Internet Store: A Cross-Cultural Validation," Journal of Computer-Mediated Communication (5:2), 1999, Online.

Joseph, V. B., Cook R. W., and Javalgi R. G. "Marketing on the Web : How Executives Feel, What Businesses Do," Business Horizons, (44:4), 2001, pp. 32- 40.

Kassarjian, H. H. "Content Analysis in Consumer Research," Journal of Consumer Research, (4:1), 1977, pp. 8-18.

Lombard, M. and Ditton, T. "At the Heart of It All: The Concept of Presence," Journal of Computer-Mediated Communication (3:2), 1997, Online.

Macintosh, G. and Lockshin, L. S. "Retail relationships and loyalty: A multi-level perspective," Inter.J. of Research in Marketing (14:5), 1997, pp. 487-497.

Mittal, B. and Lassar, W. "The role of personalization in service Encounters, " Journal of Retailing (72:1), 1996, pp.95-109.

Morgan, R. M. and Shelby D. H. "The Commitment-Trust theory of Relationship Marketing," Journal of Marketing (58:3), 1994, pp.20-38.

Nouwens, J. and Bouwman, H. "Apart Together In Electronic Commerce: The Use Of Information And Communication Technology To Create Network Organizations," Journal of Computer-Mediated Communication (1:3), 1995, Online.

Peppers, D., Rogers, M., and Dorf, B. "Is Your Company Ready For One-to-One Marketing," Harvard Business Review (1:3), 1999, pp. 151-160.

Porter, M. E. "Strategy and the Internet," Harvard Business Review, (79:3), 2001, pp. 63-78.

Rafaeli, S. and Sudweeks, F. "Networked Interactivity," Journal of Computer-Mediated Communication (2:4), 1997, Online.

Reichheld, F., F., "Lead for Loyalty," Harvard Business Review, (4), 2001, pp. 76-84.

Robbins, S. S. and Stylianou C. A. "Global corporate web sites: an empirical investigation of content and design," Information and Management (40:3), 2003, pp. 205-212

Smith, J. B. "Selling Alliances : Issues and Insights," Industrial Marketing Management (26:2), 1997, pp. 149-161.

Swaminathan, V., Lepkowska-White, E., and Rao, B. P. "Browsers or Buyers in Cyberspace? An Investigation of Factors Influencing Electronic Exchange," Journal of Computer-Mediated Communication (5:2), 1999, Online.

Wang, Y-S., Tang, T.-I., and Tang J-T. E. "An instrument for measuring customer satisfaction toward web sites that market digital products and services," Journal of Electronic Commerce Research (2:3), 2001, 19 pages.

Appendix: Definition Des Items

Construct	Loyalty
Items	Questions
YRL	The average number of years during which your firm maintains business relationships with its customers is:
PSL	The percentage of sales to regular customers (customers with whom your firm maintains business relationships) out of your firm's total sales is:
SAL	The average yearly revenue per regular customer is:
PRL	The percentage of revenues from regular customers out of your firm's total revenues is :
NRL	The number of your firm's regular customers is :
CML	Of the existing maintenance agreements, the percentage of these agreements that are being renewed is :
RCL	In general, your firm's customers repeat purchases of products and/or services.
Construct	Partnerships
PCP	Joint advertising programs with customers.
RSP	Resale of your firm's products and services by your customers.
DCP	Joint development of products and services with customers.
CCP	Creation of joint ventures with customers.
RPP	Reference to your firm's products and services when customers sell their own products and services.
GBP	In general, your firm builds partnerships with its customers.
Construct	Empowerment
REE	Your firm rewards employees who do their very best to solve customer problems.
PEE	Your firm has policies indicating to employees their degree of responsibility and authority in solving customer problems.
TME	Your firm has a relationship training program for technical service employees.
TTE	Your firm has a technical training program for customer service personnel and customer representatives.
EEE	In general, your firm empowers employees with regards to customer relations.
Construct	Personalisation
PTPE	Please indicate the percentage of technical problems which are resolved upon a customer's first request.
ASPE	Your firm assigns one salesperson to each customer.
PSPE	Your firm develops or prepares specific products for specific customers.
MPPE	Your firm sends customized mail to customers.
PLPE	In general, your firm personalizes the relationships that it maintains with customers.
Construct	Trust
BLI	This company can't be trusted, it's just too busy looking out itself
PRM	I have found that I can rely on this company to keep the promises that it makes
CBH	This company is basically honest
DCA	Despite what this company says, it will try to take advantage of me
CCT	In our relationship, this company cannot be trusted at times
CCR	In our relationship, this company can be counted on to do what is right
CHI	In our relationship, this company has high integrity

The items of the evaluation's grid

Level of presence on the Internet	
The home page is presented in text and graphic version	The web site presents the list of prices of products or services
There is a means indicating the number of people who visited the web site	The web site presents a documentation on products or services
There is a heading like "What's new, What's cool, News" on the web site	The web site presents the technical features or characteristics of products or services
Specify the different languages in which the web site is presented	The web site presents images and photos about the products
The web site provides information on customized products or services	The web site lists the different types of products and services
The web site provides information on innovative products or services	The Web Site shows the size of software to download
The web site provides information on digital products or services	The web site presents the firm's realizations
The web site provides information on physical products or	The web site presents the firm's partners
The web site presents press releases	The links are grouped according to a logical order (for example : by products, by division etc.)
The web site presents information on the upcoming seminars, conference and expositions in the expertise area of the firm	The web site provides convenient internal search engines for finding products or services or other information
The web site provides up-to-date information	Existence of the web site's map
The web site provides accurate information	The external links refer to the web site of customers and partners.
In general the web site presents an informational content on the firm	The output format is easy to read
The time to load pages and graphics is: (less than 5 seconds, between 6 and 10 seconds, between 11 and 15 seconds, between 16 and 20 seconds, and 21 seconds and more)	The web site is user friendly
In general the web site contains pages and graphics	
The level of security on the Internet	
The web site provides the personalized customer support to each customer	The web site provides for the security of your transaction data and privacy
The web site contains section accessible with a password only to customers	In general the web site is secure
You feel safe in your transaction with the web site	In general the web site contributes to the firm's presence on the Internet
Interactivity on the Internet	
The customer can consult data and information about its portfolio via the web site	The web site presents an e-mail link
The web site presents an ordered list of specific e-mail link to each contact employee of the firm	The web site presents an ordered list of specific e-mail link to each contact employee of the firm
The web site provides an order form	The web site provides a feedback form
The web site deals with your order fast enough	The web site presents a page of FAQ (frequent asked questions)
The web site provides a fund transfer order	The web site provides a form to subscribe to Listserv
The web site provides a form to subscribe to news group	The web site presents an option to easy the transactions with the firm
The web site provides a form to chat with other customers of the firm	In general the web site contributes to the interactivity capacity of the firm