CONSUMER'S AND MERCHANT'S CONFIDENCE IN INTERNET PAYMENTS

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Performing payment transactions over the Internet is becoming increasingly important. Whenever one interacts with others, he or she faces the problem of uncertainty because in interacting with others, one makes him or herself vulnerable, i.e. one can be betrayed. Thus, perceived risk and confidence are of fundamental importance in electronic payment transactions. A higher risk leads to greater hesitance about entering into a business relationship with a high degree of uncertainty; and therefore, to an increased need for confidence. This paper has two objectives. First, it aims to introduce and test a theoretical model that predicts consumer and merchant acceptance of the Internet payment solution by explaining the complex set of relationships among the key factors influencing confidence in electronic payment transactions. Second, the paper attempts to shed light on the complex interrelationship among confidence, control and perceived risk. An empirical study was conducted to test the proposed model using data from consumers and merchants in Slovenia. The results show how perceived risk dimensions and post-transaction control influence consumer's and merchant's confidence in electronic payment transactions, and the impact of confidence on the adoption of mass-market on-line payment solutions.

1. INTRODUCTION

As the number of virtual stores on the Internet has been growing at a tremendous rate and the increasing commercial activities conducted via the Internet can no longer be overlooked, performing payment transactions over the Internet is becoming increasingly important. Business to customer electronic

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commerce is about completing transactions between merchants and consumers via the Internet, an exchange of the consumer's money for the merchant's goods or services. An integral part of electronic commerce is electronic payment. "Electronic payment is a financial exchange that takes place online between buyers and sellers. The content of this exchange is usually some form of digital financial instrument (such as encrypted credit card numbers, electronic checks, or digital cash) that is backed by a bank or an intermediary, or by a legal tender" (Kalakota and Whinston, 1997: p. 153). Based on the analysis of economic influences of the Internet payment systems, Whinston et al. (1997) asserted that the Internet payment system is one of the critical factors supporting innovative processes in electronic commerce. Without suitable payment mechanisms, widespread electronic commerce is not viable. Most studies of the Internet payment services have been conducted in an exploratory manner. Consequently, there is clearly a lack of solid research models to guide future research in this area.

The present study is particularly concerned with the role of confidence toward performing payments via the Internet since the difficulty of building confidence is among the key obstacles to the take-off of Internet payments (Crocker and Stevenson, 1999). *Confidence* is a type of trust where *expectations* are based on abstract systems or social institutions. Adopted from the definition of trust (Luhmann, 1979), trust is defined here as one's expectation of another party's benign intentions based on the evaluation of another party's motives and character and one's expectation of another party's competencies based on the evaluation of another party's ability of a technically competent role performance. The key difference between trust and confidence is that whereas trust is vested in the *retailer or consumer behavior*, confidence is vested in the *probable outcome of one's own performance of e-payments*.

According to Giddens (1990), confidence comes from the development of faith in symbolic tokens (e.g. money) and expert systems. Whenever one interacts with others, he or she faces the problem of uncertainty because in interacting with others, one makes him or herself vulnerable, i.e. one can be betrayed. In the physical marketplace, the transacting parties rely upon a number of face-to-face mechanisms to build security and confidence. Such mechanisms are the physical presence at the merchant outlet and the possibility of touching and feeling the goods, the consumer's presentation of an identification and payment card and the use of a hand-written signature to conclude a purchase or a payment order.

However, in general, the Internet is thought to be an unreliable and open environment with a great number of anonymous users, and which, therefore, brings with it a number of growing risks linked to the use of on-line payment instruments. In relation to the vulnerability of the Internet, data highlight the following major electronic payment frauds that consumers and merchants face: risk of merchant malpractice, risk of identity and payment data theft, risk of misrepresentation, and risk of consumers fraudulently repudiating a transaction. Recent studies, Jarvenpaa et al. (1999), and Pavlou (2003), empirically showed a key role of risk perceptions in the business-to-customer electronic commerce environment. Thus, perceived risk and confidence are of fundamental importance in electronic commerce because a higher risk leads to greater hesitance about entering into a business relationship with a high degree of uncertainty; and therefore, to an increased need for other mechanisms, such as post-transaction control mechanisms, to build confidence. In sum, since confidence, perceived risk dimensions, and post-transaction control are essential in the electronic commerce environment, these constructs are integrated in this study.

This paper has two objectives. First, it aims to introduce and test a theoretical model that predicts consumer and merchant acceptance of the Internet payment solution by explaining the complex set of relationships among the key factors influencing confidence in electronic payment transactions. Second, the paper attempts to shed light on the complex interrelationship between confidence and perceived risk. Given the central role of payment transactions in both the economy and everyday life, the relevance of this research is also high for practice.

2. PRIOR RESEARCH AND LITERATURE REVIEW

In the physical marketplace, the transacting parties rely upon a number of face-to-face mechanisms through which they aspire to meet the requirements of *convenience* and *confidence*. These requirements are even more important for electronic payment systems since payments involve actual money and will be, therefore, a prime target for criminals. Recent data (Datamonitor, 2001) indicate that convenience and confidence (including security and privacy) are the most important factors affecting consumers' willingness to pay, and merchants' willingness to accept payments over the Internet. Easy registration, no need to download, acceptability, a user-friendly interface, ease of integration, and ease of use (see Neuman, 1996) are potential elements of a convenient payment system.

One can use the technology acceptance model (TAM) (Davis, 1989) to study and explicate the influence of these factors on electronic payment system acceptance. The present study focuses on confidence in electronic payment transactions. The difficulty of building confidence was among the key obstacles to the take-off of Internet payment systems (Crocker and Stevenson, 1999). Therefore, the study of the relationship between confidence and factors affecting confidence is needed to gain a better understanding of the on-line consumer and merchant behavior concerning Internet payment transactions.

In much of the research, it has been found that the main obstacle for electronic commerce development is fear related to the safety of the financial transaction via the Internet (Driscoll et al., 1997). Such a situation is more a consequence of people's perceptions and not so much of inadequate security mechanisms (Pavlou, 2001). The Internet payment system, like other payment systems, is a distributed socio-technical system, which requires a lot more than just a series of functional and standardized technical components in order to facilitate electronic commerce. Like other elements and subsystems of the modern socio-economic system in which business behavior is embedded, the abstract rules and "complete, well-specified, and carefully enforced administrative procedures" (Kling, 1978: p. 649) of the Internet payment system provide means of collective control of individuals' expectations and, thus, facilitate coordinated interaction between them.

Therefore, in addition to the security requirements, additional aspects such as protection and redress mechanisms need to be considered for secure electronic payment solutions in order to ensure consumer and merchant adoption. These mechanisms refer to the fact that trustors realize that trustees have short-term incentives for abusing trust, but that some long-term incentives for the trustee are under control through the Internet payment intermediary. We can consider these mechanisms as post-transaction control mechanisms because they are enforceable in the future after the abuse of trust. According to Das and Teng (1998), control has a direct effect on confidence in inter-organizational transactions.

Money as a medium, symbolizing the transfer of material resources, to a large extent works independent of whoever uses it (Luhmann, 1995). The confidence individuals have in the money is a precondition of the existence of a large and efficient economic system (Simmel, 1996). A stable monetary system produces that amount of confidence, which is necessary for modern socio-economic systems to function effectively and efficiently. Likewise, a stable Internet payment system is needed in order to produce that amount of

confidence, which is necessary for electronic commerce to function effectively and efficiently. Hence, confidence in electronic payments plays an important role in electronic commerce.

3. CONCEPTUAL MODEL AND RESEARCH HYPOTHESES

This research develops an integrated model that permits the assessments of the effects of key drivers of electronic payments acceptance. Figure 1 presents the proposed model and research hypotheses.

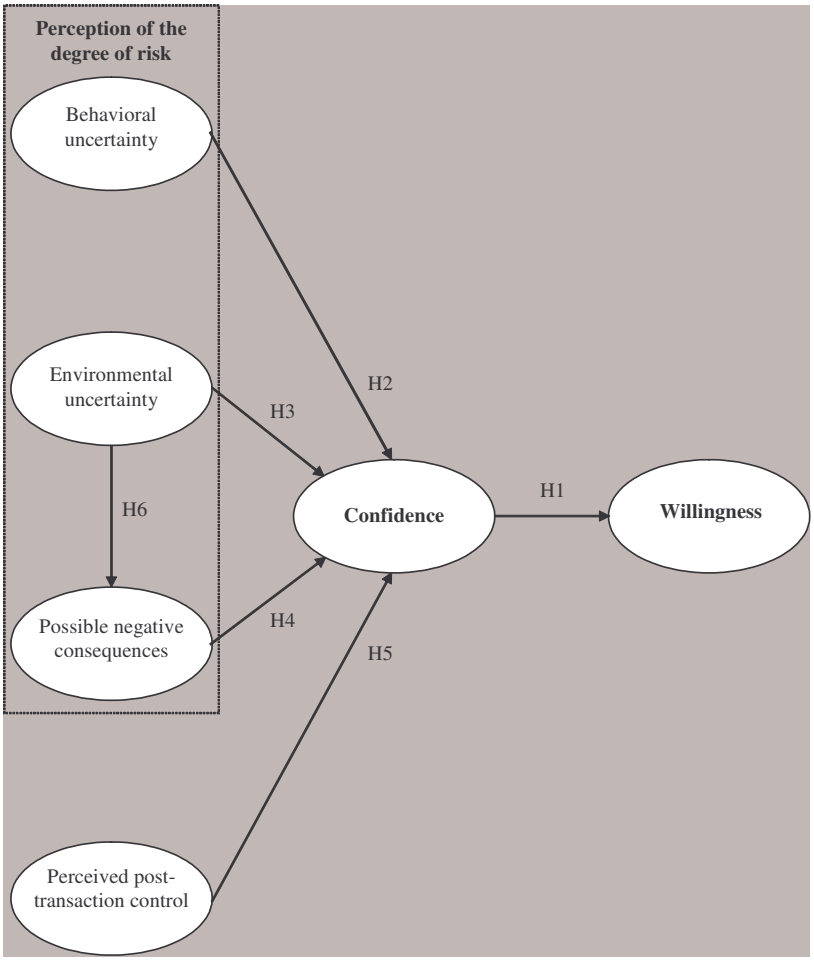

Figure 1. Research Model

3.1. Willingness to transact

The Internet payment system acts as an intermediary between consumers and merchants. "For electronic commerce to have a chance to meet the soaring expectations set in the press with regards to the Internet, efficient and effective payment services need to be established and accepted by businesses and consumers alike" (Whinston et al., 1997: p. 407). *Acceptance* is seen here as a construct which reflects the consumer's willingness to pay the merchant over the Internet, and the merchant's willingness to accept payment from the consumer over the Internet. The consumer's willingness to pay and the merchant's willingness to accept payment will, for the sake of brevity, henceforth be called *user's willingness to transact*.

Previous research has empirically shown that trust in an Internet store influences buyers' willingness to buy (Jarvenpaa et al., 1999); however, the relationship between trust and willingness was proposed to be mediated by risk perception. On the other hand, Gefen and Straub (2002), and Jarvenpaa and Tractinsky (1999) have established a direct effect of trust on consumers' purchase intentions. Moreover, Pavlou (2003) has empirically shown a direct and indirect - mediated by risk perception - effect of trust on consumers' intention to transact. Note that these studies have focused solely on the Web retailer (dyadic relationship), and were accordingly concentrated on trust in another party. The focus of the present study is the on-line payment transaction embedded in a broader socio-technical environment (Internet payment system), where confidence reflects trust in the system (Luhmann, 1988). Kini and Choobineh (2000) empirically showed a positive effect of trust in Web banking systems on system adoption. Hence, it is reasonable to expect a direct effect of confidence on the willingness to transact. Thus, the following hypothesis is proposed.

Hypothesis 1. *Confidence has a positive effect on the user's willingness to transact.*

3.2. Perceived risk and post-transaction control

One has to take a risk if he or she wants to transact and, consequently, is vulnerable to the other. Sitkin and Pablo (1992: p. 10) define risk as "a characteristic of decisions that is defined [in the paper] as the extent to which there is uncertainty about whether potentially significant and/or disappointing outcomes of decisions will be realized" and risk perception as "a decision maker's assessment of the risk inherent in a situation" (ibid.: p.12). This

definition is consistent with the concept of perceived risk most often defined by scholars as the perception of the *uncertainty* and *negative consequences* in interacting with others (see Slovic, 1987; Dowling and Staelin, 1994).

Users (consumers and merchants) may feel uncertain about transacting over the Internet because the consequences of payment transactions extend into the future. Uncertainty arises because future events are imperfectly anticipated, which will therefore mitigate expectations that vulnerabilities will not be exploited. Unfavorable circumstances can be perceived by people in different ways and are guided by indication of the uncertainty that might be associated with them. Negative consequences concerning electronic payment transactions are related to financial losses and include the following major risks: risk of merchant malpractice or fraud, risk of payment data theft, risk of misrepresentation and risk of repudiating a transaction.

The risk itself is a combination of two different categories of factors. First, the environmental risk is contextual and has its roots outside the relationship. Attackers can tamper with any part of an electronic payment service. They can exploit web applications and web services vulnerabilities, as well as any network security gaps. Payment data can be stolen for further fraudulent use by a fraud with unauthorized on-line access to merchant or bank servers, to consumer personal computers or to transactional data. These are technology-related risks (Ratnasingham and Kumar, 2000), which are reflected in environmental uncertainty. Second, behavioral risk, on the other hand, is formed within the relationship.

The consumer takes the risk because the other party may be a bogus merchant carrying out data capture, disappearing and charging unauthorized transactions. On the other hand, the merchant runs the risk that the consumer may deny having made the purchase and demand a refund even after he or she has received the goods or services.

This is a partner-driven risk, which is reflected in uncertainty about the partner's prospect behavior. Consequently, the perception of risk in a particular decision situation will include - in addition to the assessment of negative consequences - uncertainty concerning the behavior of the transacting party and uncertainty concerning the situational conditions outside the *dyadic* relation.

Perceived risk has been shown to inversely affect consumers' intention to transact with Web retailers (Featherman and Pavlou, 2002; Jarvenpaa and Tractinsky, 1999; Jarvenpaa et al., 1999; Pavlou, 2003). However, Gefen (2002)

found that the perceived risk with vendors has no significant effect on customer loyalty, which reflects the willingness to transact with a specific vendor. The above-proposed hypothesis is that confidence has a positive effect on the willingness to transact.

Accordingly, it is reasonable to assume that the relationship between the perceived risk and willingness to transact is not direct but mediated by confidence. Moreover, Kini and Choobineh (2000) empirically demonstrated a significant influence of risk - arising from activities - on trust in the web banking system. In sum, behavioral and environmental uncertainty, together with negative consequences, will diminish the expectation that vulnerabilities will not be exploited. Therefore, the following hypotheses are proposed.

Hypothesis 2. *Behavioral uncertainty has a negative effect on confidence.*

Hypothesis 3. *Environmental uncertainty has a negative effect on confidence.*

Hypothesis 4. *Possible negative consequences have a negative effect on confidence.*

While trusting behavior is always co-operative and benevolent behavior, co-operation on the other hand is not always based on interpersonal trust. There may be other reasons for co-operation because it does not necessarily include risk (Mayer et al., 1995), and can be secured by corresponding control mechanisms (Fukuyama, 1995; Luhmann, 1979), that is by procedures and protocols that monitor and control the successful performance of a transaction.

In addition, Das and Teng (1998) propose that confidence is influenced by control. Concerning on-line payment transactions, one can assume that rational users enter into a transaction if they believe something can be done, i.e. that some remedy or some kind of redress is available through third parties *after* the abuse of trust, to prevent them from incurring a permanent loss because of payment fraud.

According to Kini and Choobineh (2000: p.188-189), "the presence of situational cues that signal the low probability of harmful consequences or the guarantee of protection from negative consequences can go a long way in diminishing the effect of task risk". Situational cues can include provision of money-back guarantees and ensured backing by a reputed intermediary. Therefore, if expected losses from payment fraud are limited for the trustor and

potential future losses for the trustee are obvious and can be expected to be larger than the benefits if he or she abuses the trust, the trustor will be able to base confidence primarily on control. This is essentially the perception of post-transaction control, defined here as the extent to which the user believes that proper protection and redress mechanisms are in place, which are enforceable through a third party if payment fraud occurs. Accordingly, the following hypothesis is proposed.

Hypothesis 5. *Perceived post-transaction control has a positive effect on confidence.*

In addition, the perception of possible negative consequences increases with environmental uncertainty. Rational users are more willing to transact if they believe something can be done, that some remedy or some kind of redress is available through trusted third parties after the abuse of trust, to prevent them from incurring a permanent loss because of payment fraud. However, if fraud is committed by an unauthorized third party, there is no assurance that the identity of the abuser will be established and, hence, a doubt about the ability to successfully apply post-transaction control mechanisms will arise. Therefore, consumers and merchants will perceive negative consequences more likely to occur and, consequently, to be higher. Laurent and Kapferer (1985) have found and Verhage et al. (1990) confirmed a significant positive correlation between uncertainty and negative consequences. Therefore, the following hypothesis is proposed.

Hypothesis 6. *Environmental uncertainty has a positive effect on the perception of possible negative consequences.*

4. RESEARCH METHODOLOGY

Data to test the research hypotheses and model were drawn from a cross-sectional field study via a questionnaire developed for it. To be successful, the Internet payment system should reach a critical mass of consumers and merchants (Langdon et al., 2000). Therefore, two instruments were developed to address these concerns, one for consumers and the other for merchants. Data have been collected in Slovenia during May and June, 2002.

4.1. Sample and procedure

Considering that the main point of interest in the study is the impact of confidence on the adoption of on-line mass-market payment solutions, data

have not been collected from the general population. An implicit assumption for the field study was that only Internet users and firms with a home page would potentially adopt Internet payment solutions.

In order to get responses from consumers, a questionnaire was used and administered over the *Web*. Respondents were asked to take part in the on-line survey by means of a letter sent by email, together with user ID and password. Study respondents' email addresses were obtained via the Web site of a major bank in Slovenia. In January 2002, an on-line prize-winning game was carried out on the bank's Web site. A prize worth $25 was used as an incentive to increase participation. Internet users were directed to the prize-winning page using banner advertisements placed on home pages of local media companies. In accordance with the Slovenian legislation, only users agreeing to receive advertisements were included in the sample – a convenience sample. As a result, a possible selection bias cannot be entirely discounted.

Responses from merchants were drawn using a *post mail* questionnaire. As this study is interested in organizations selling goods or services to end consumers, the trading companies, having their own home page on the Internet, were investigated. The names and addresses of these companies were obtained from the Slovenian Chamber of Commerce and Industry Directory. For each company, a relevant person holding a managerial position in accounting or finance was identified.

Based on the above criteria, 1,889 Internet users and 346 companies were identified. Out of 1,889 e-mails sent to the Internet users, 143 e-mails were returned as undeliverable and 253 responses were obtained, representing a response rate of 13.4%.

Multiple responses from the same person were checked either by looking up IP addresses of the computers used for responding, as well as against some data, such as last name, address, and the time the respondent filled in the questionnaire. After the exclusion of multiple and unusable responses, the final sample counted 232 participants, a response rate of 12.3%.

A total of 346 questionnaires were sent via postal mail to company managers in charge of accounting or finance. Out of this number, 143 completed questionnaires were returned, resulting in a response rate of 41.3%. Out of the 143 completed questionnaires, 11 respondents identified themselves as holding clerical/secretarial positions. These 11 were excluded from the final sample, as their decision-maker role was likely to be insignificant.

This led to the final sample of 132 and a response rate of 38.2%. Such a sample size is generally accepted as being sufficient for performing a structural equation modeling analysis (Gefen et al., 2000).

4.2. Operational measures of study variables

The study of literature served as a basis for drawing a comprehensive picture of existing measurement scales for each of the examined constructs. Where measurement scales for constructs were not available, the guidelines set by Churchill (1995), Smith et al. (1996) and Straub (1989) were followed for developing and validating measurement instruments. The response options, anchored on a five-point Likert-type scale, ranging from (1) "strongly disagree" to (5) "strongly agree" were used.

Potential indicators were derived from published research articles that discussed or attempted to measure similar constructs. Based on three studies (Bhimani, 1996; Jarvenpaa et al., 1999; Salisbury et al., 1998), three indicators for possible negative consequences (PNC), four indicators for behavioral uncertainty (BU), and four indicators for environmental uncertainty (EU) were developed.

Similarly, perceived post-transaction control (PPTC) based on Tan and Teo (2000), confidence (CON) based on Doney and Cannon (1997) and Kovar et al. (2000), and willingness to transact (WILL) based on Ajzen and Fishbein (1980), Davis (1989) and Salisbury et al. (1998) were derived.

Although all items were motivated by previous empirical studies, the actual scales were developed by modifying these items to capture the context of this research. Therefore, the study literature was further complemented by several detailed discussions with four representatives of a major Slovenian bank. Four consumer and two merchant focus group discussions were organized as an additional source of inspiration for generating items.

Expert, as well as consumer and merchant pre-tests, led to considerable adaptations of item wording, sequence, and layout. Based upon the literature study, focus group discussions and pre-tests, a preliminary version of the instrument was generated. Subsequently, the instrument was refined by a pilot test.

The research model depicted in Figure 1 was tested using a covariance-based Structural Equation Modeling (SEM). SEM is a powerful second-

generation multivariate technique that facilitates the testing of psychometric properties of the scales used to measure unobservable variables (constructs) as well as to estimate the parameters of a structural model, i.e. the magnitude and direction of the relationships among the model variables (Bollen, 1989; Hair et al., 1998; Gefen et al., 2000) [1].

In this analysis, AMOS (Analysis for MOments Structures) 4.0 for Windows was used. The Maximum Likelihood (ML) function was used to estimate model parameters [2].

5. RESULTS

In order to assess the model, three tests were performed: overall model evaluation, measurement model evaluation, and structural model evaluation. Evaluating the overall model relates to assessing the overall goodness-of-fit for SEM [3].

The test of the measurement model includes the estimation of the unidimensionality and the composite reliability of the measures, as well as an examination of the convergent and discriminative validity of the research instrument [4].

Finally, the test of the structural model includes: (1) estimating the strength of path coefficients and whether the hypothesized relationships between constructs are significant, (2) checking whether all significant path coefficients are in hypothesized direction, and (3) calculating squared multiple correlations (SMC). SMC is used to assess the proportion of the explained variance in the endogenous latent variable, which can be accounted for by the antecedent latent variables (Bollen, 1989).

5.1. Overall model evaluation

It is necessary to first assess the overall goodness-of-fit for the structural equation model. Estimation of the model resulted in a good overall fit (χ^2 = 187.367, df = 126, p < .001; RMSEA = 0.046, P = 0.678; CFI = 0.994; NFI = .983; NNFI/TLI = 0.992; IFI = 0.994) and (χ^2 = 150.163, df = 126, p = 0.07; RMSEA = 0.038, P = 0.796; CFI = 0.995; NFI = 0.973; NNFI/TLI = 0.994; IFI = 0.995) for consumers and merchants respectively. Although the chi-square statistics for consumers is statistically significant (p < .001), this is not unusual with large sample sizes (Boyle et al., 1992; Doney and Cannon, 1997).

The ratios of chi-square to degrees of freedom are within the acceptable range for both consumers (1.487) and merchants (1.192). Further, consistent with the recommendation of Browne and Cudeck (1992), the values of RMSEA for consumers and merchants and corresponding significance levels of *p value for test of close fit* (P) suggest that this model could now be accepted on statistical grounds as well.

Although the chi-square value for the model is discouraging, the other indices suggest adequate overall fit, and therefore no modification of the model was made. It can be concluded that the model obtained adequate degrees of fit for both samples (Bagozzi and Yi, 1988).

5.2. The measurement model

The principal component analyses performed on all items showed that all items loaded on unique components for both samples. As a result, it can be concluded that unidimensionality for each of the constructs is obtained.

The results in Tables 1 and 2 for consumers and merchants show that the measures examined in this study are robust in terms of their composite reliability and convergent validity.

The composite reliability of the measures included in the model range from 0.82 to 0.94, and exceeds Bagozzi and Yi's (1988) minimum value of 0.60. This supports the reliability of the measures integrated in the hypothesized model. Further, convergent validity is supported because all loadings are highly statistically significant ($p < 0.01$) and the factor regression coefficients (R^2) exceed the recommended value 0.50 (Hildebrandt, 1987).

Table 1. Assessing the Measurement Model for Consumer Sample

Construct	Reliability of a scale[a]	AVE[b]	Indicator	λ	var. (ε_i)	R^2
Willingness	**0.84**	**0.64**	WILL1	0.90 "	0.36	0.81
			WILL2	0.93 **	0.25	0.86
			WILL3	0.82 **	0.70	0.67
Confidence	**0.92**	**0.79**	CON2	0.89 **	0.27	0.79
			CON3	0.91 **	0.20	0.83
			CON4	0.93 "	0.18	0.86
Possible negative consequences	**0.89**	**0.74**	PNC1	0.81 "	0.56	0.66
			PNC2	0.96 **	0.13	0.92
			PNC3	0.94 **	0.19	0.88
Behavioral uncertainty	**0.92**	**0.78**	BU1	0.86 "	0.46	0.74
			BU2	0.97 **	0.09	0.94
			BU3	0.95 **	0.16	0.90
Environmental uncertainty	**0.92**	**0.80**	EU1	0.87 "	0.29	0.76
			EU2	0.95 **	0.12	0.90
			EU3	0.90 **	0.21	0.81
Perceived post-transaction control	**0.82**	**0.60**	PPTC1	0.87 "	0.31	0.76
			PPTC2	0.88 **	0.35	0.77
			PPTC5	0.75 **	0.75	0.56

(") The value of the measurement loading fixed to 1.
(**) Significant at the $p < 0.01$ level
(λ) Standardized factor loading
(R^2) Factor regression coefficient

[a] Reliability = $(\Sigma\lambda_i)^2/((\Sigma\lambda_i)^2 + \Sigma \text{ variance } (\varepsilon_i))$
[b] AVE = $\Sigma\lambda_i^2/(\Sigma\lambda_i^2 + \Sigma \text{ variance } (\varepsilon_i))$

Table 2. Assessing the Measurement Model for Merchant Sample

Construct	Reliability of a scale[a]	AVE[b]	Indicator	λ	var. (ε_i)	R^2
Willingness	**0.92**	**0.80**	WILL1	0.91"	0.30	0.83
			WILL2	0.94**	0.17	0.88
			WILL3	0.95**	0.17	0.90
Confidence	**0.93**	**0.82**	CON2	0.91**	0.25	0.83
			CON3	0.95**	0.12	0.90
			CON4	0.93"	0.19	0.86
Possible negative consequences	**0.92**	**0.79**	PNC1	0.86"	0.46	0.74
			PNC2	0.95**	0.15	0.90
			PNC3	0.98**	0.08	0.96
Behavioral uncertainty	**0.94**	**0.84**	BU1	0.93"	0.21	0.86
			BU2	0.92**	0.21	0.85
			BU3	0.97**	0.09	0.94
Environmental uncertainty	**0.92**	**0.80**	EU2	0.94"	0.15	0.88
			EU3	0.87**	0.33	0.76
			EU4	0.94**	0.15	0.88
Perceived post-transaction control	**0.89**	**0.73**	PPTC1	0.88"	0.24	0.77
			PPTC4	0.84**	0.33	0.71
			PPTC5	0.90**	0.26	0.81

(") The value of the measurement loading fixed to 1.
(**) Significant at the $p < 0.01$ level
(λ) Standardized factor loading
(R^2) Factor regression coefficient

[a] Reliability = $(\Sigma\lambda_i)^2/((\Sigma\lambda_i)^2 + \Sigma \text{ variance } (\varepsilon_i))$
[b] AVE = $\Sigma\lambda_i^2/(\Sigma\lambda_i^2 + \Sigma \text{ variance } (\varepsilon_i))$

Finally, Tables 3 and 4 present the inter-correlations among the constructs. The square root of the Average Variance Extracted (AVE) of each construct is larger than its correlations with the other constructs. In addition, consistent with the recommendations of Fornell and Larcker (1981), AVE for all measures exceed 0.50 (see Tables 1 and 2), suggesting that there exists sufficient evidence of discriminative validity of all measures. In summary, the unidimensionality, convergent validity, reliability and discriminative validity of all measures for both samples are satisfactory.

Table 3. Inter-Construct Correlations for Consumer Sample (Diagonals Represent the Square Root of the AVE)

	Constructs	1	2	3	4	5	6
1.	**Environmental uncertainty**	**0.96**					
2.	**Behavioral uncertainty**	0.34	**0.96**				
3.	**Perceived post-transaction control**	-0.31	-0.23	**0.90**			
4.	**Possible negative consequences**	0.50	0.17	-0.16	**0.94**		
5.	**Confidence**	-0.56	-0.38	0.44	-0.42	**0.96**	
6.	**Willingness**	-0.37	-0.25	0.29	-0.28	0.66	**0.92**

Table 4. Inter-Construct Correlations for Merchant Sample (Diagonals Represent the Square Root of the AVE)

	Constructs	1	2	3	4	5	6
1.	**Environmental uncertainty**	**0.89**					
2.	**Behavioral uncertainty**	0.46	**0.92**				
3.	**Perceived post-transaction control**	-0.46	-0.19	**0.86**			
4.	**Possible negative consequences**	0.41	0.19	-0.19	**0.89**		
5.	**Confidence**	-0.62	-0.41	0.52	-0.47	**0.91**	
6.	**Willingness**	-0.30	-0.20	0.25	-0.23	0.49	**0.90**

5.3. Evaluation of the structural model

The results of the test of the structural model are presented in Figures 2 and 3 for consumers and merchants respectively. Both figures show standardized regression coefficients and their significance. The figures also show values for the squared multiple correlation (SMC), which is very similar to the R^2 in linear regression (Gefen et al., 2000). It shows the proportion of the explained variance in the endogenous constructs, which can be accounted for by the antecedent constructs (Bollen, 1989). The model, as a whole, explains 44% and

24% of the variance ($p < 0.01$) in the *willingness to transact* for consumers and merchants respectively. Furthermore, the results show a substantial SMC of 0.44 and 0.53 for consumers' and merchants' confidence in electronic payments, respectively.

Whereas all of the parameter estimates for the structural model have the expected signs, not all of them appear to be statistically significant. Figures 2 and 3 indicate that of 6 paths in the structural model, 6 for consumers and 5 for merchants are significant at the 0.05 level or lower.

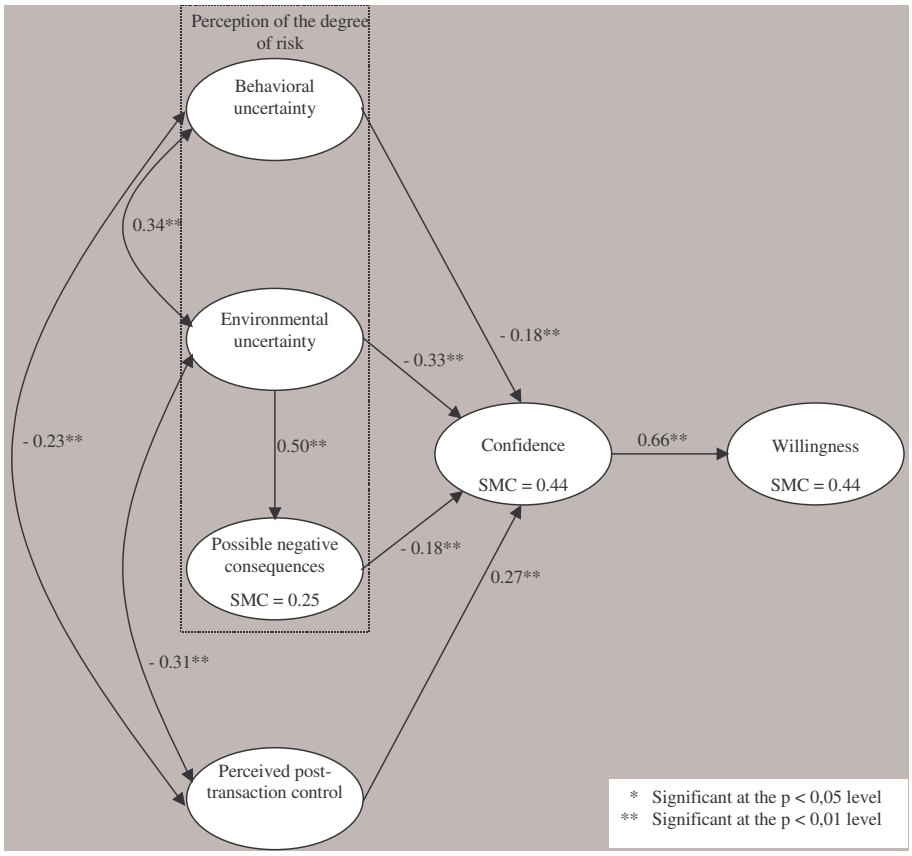

Figure 2. Covariance-based Structural Equation Modeling Results for Consumer Sample

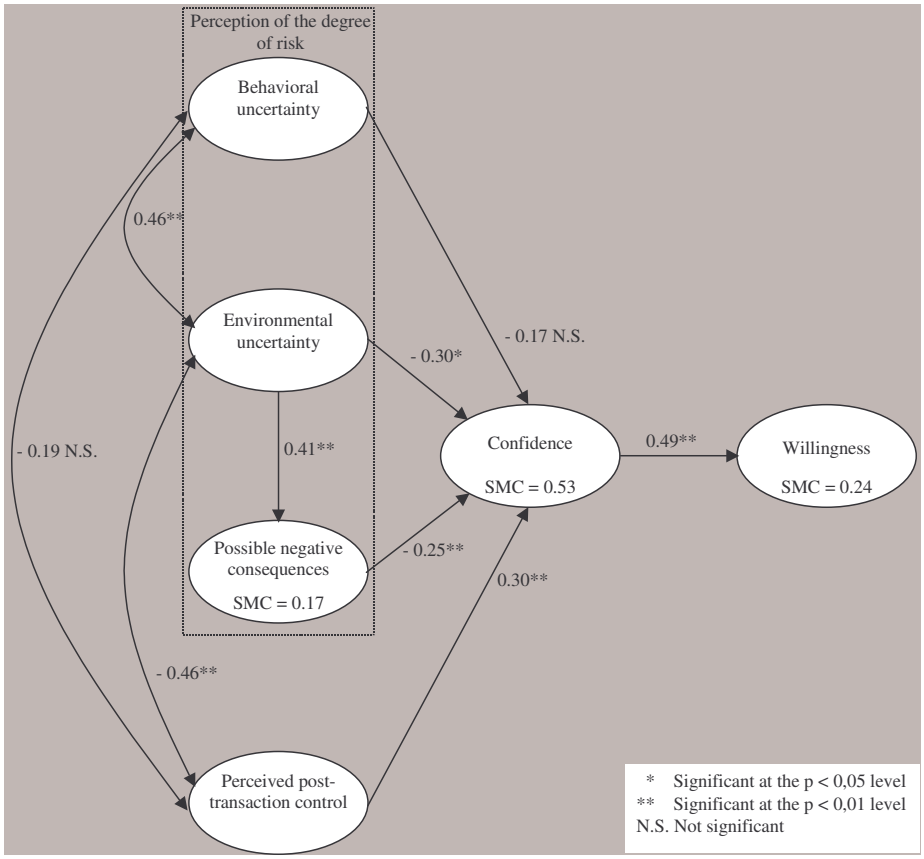

Figure 3. Covariance-based Structural Equation Modeling Results for Merchant Sample

6. DISCUSSION OF FINDINGS AND MANAGERIAL IMPLICATIONS

6.1. Discussion of findings

The first observation is that confidence reveals a significant and strong relationship with the willingness to transact (i.e. the consumer's willingness to pay and the merchant's willingness to accept payment) over the Internet for both samples (hypothesis 1). This is in line with existing literature on electronic commerce, recognizing that trust is a direct antecedent of transaction intentions (Pavlou, 2003) and purchase intentions (Gefen, 2000; Gefen and Straub, 2002).

However, it is important to note the difference between trust and confidence in the present study. Confidence is a type of trust where expectations are based on abstract systems or social institutions (Giddens, 1990). For example, when one relies on the stability of the value of money, one does not trust another person, but rather the functional elements - like a central bank - of the system. Therefore, we cannot talk about inter-personal trust but rather confidence or system trust. Trust here is vested, not in individuals, but in abstract capacities embedded in socio-technical structures which ensure the validity of commonly acceptable and accepted technical norms and social standards of codes of conduct. Participation in modern functional systems like electronic commerce or on-line payment systems is no longer a matter of intimate relations. Giddens (1990: p. 83) argues, "the nature of modern institutions is deeply bound up with the mechanisms of trust in abstract systems". He alludes that in modern societies the 'face less commitments' have an intense connection with the development of trust in abstract systems, i.e. confidence.

Interestingly, results reveal a complex interrelationship among perceived risk and confidence. While the existing literature proposes that trust is a causal predictor of perceived risk (Gefen, 2000; Mayer et al., 1995; Pavlou, 2003), the findings of this study moreover suggest that perceived risk dimensions may be causal predictors of confidence. The present study revealed that the components of perceived risk could predict consequences differently. Specifically, whereas results provide a strong support for the negative effects of environmental uncertainty (hypothesis 3) and possible negative consequences (hypothesis 4) on confidence for both samples, they provide support for the behavioral uncertainty impact on confidence (hypothesis 2) only for consumers. A possible explanation of these findings may be related to the situational conditions in which the consumer-merchant relation is embedded, and which, consequently, influence decision-making.

Whereas the consumer makes the decision to transact (i.e. to pay) over the Internet in the *spatial and temporal presence of the merchant* (the primary interface with an on-line merchant is information technology, a Web site) *and absence of the bank*, the merchant, on the other hand, makes the decision to transact (i.e. to accept payments) over the Internet in the *spatial and temporal absence of the consumer and presence of the bank*. Additionally, whereas the consumer makes a decision while transacting, the merchant has to accept a decision in advance – when making a payment acceptance contract with a bank - for all transactions. Therefore, it seems that structural conditions such as spatial and temporal presence/absence of actors moderate the relationships between perceived risk dimensions and confidence. However, future research

should examine the impact of the spatial and temporal presence/absence on these relationships before definite conclusions can be made.

It seems that the examination of the empirical separability of the components of perceived risk is an interesting and promising area for future research (see also Pavlou, 2003). Operationalizing perceived risk has resulted in many models, some of which are similar. Cunningham (1967) was one of the first to suggest a two-component model of perceived risk, which encompasses uncertainty and consequences. A major preoccupation of researchers is deciding how the various elements of perceived risk should be combined, i.e. should the basic components be multiplied or added. The two components are usually combined multiplicatively (Peter and Ryan, 1976). However, there are suggestions that uncertainty and negative consequences enter into calculations of perceived risk independently, rather than as their combined product (e.g. Slovic, 1987). In addition, Bettman (1973) and Horton (1976) report that their linear model is generally superior to the multiplicative model.

Although the results of the present study provide support for an additive model, future research is needed to explore the circumstances under which such a model might predict risk perception better than a multiplicative model. The work of Joag et al. (1990) revealed that when a decision has multiple plays, the multiplicative model fits better; in contrast, when a decision-maker has a single trial, the additive model fits better.

Furthermore, the results of the present study indicate a positive effect of environmental uncertainty on possible negative consequences for both samples (hypothesis 6). Moreover, this study reveals a significant positive correlation between behavioral and environmental uncertainty (0.34 for consumers and 0.46 for merchants). These findings suggest that future research should further examine the complex interrelationships among perceived risk dimensions and that a greater concern should perhaps be given to identifying the circumstances affecting interrelationships.

In addition, an important implication of this study is the integration of the perceived post-transaction control variable in the model. This study reveals beliefs about the possibility to sanction a trustee through a trusted third party after the abuse of trust and the conviction that proper protection and redress mechanisms are in place, which are enforceable through a third party if payment fraud occurs. The results of the present study show the important role of perceived post-transaction control. It has a significant positive effect on confidence (hypothesis 5). However, more research is needed to investigate the

perception of the formal post-transaction control and social post-transaction control for their distinctive implications for confidence. Whereas perceived post-transaction control, as defined in this study, is in itself a subjective assessment of formal control mechanisms which enable the monitoring of others by codified rules, goals, procedures, and regulations that specify desirable patterns of behavior, social control utilizes collectivity norms, values and cultures to motivate co-operation (Das and Teng, 1998).

In addition, whereas results of the present study indicate a significant negative correlation between perceived post-transaction control and environmental uncertainty for both samples, they reveal a significant negative correlation between behavioral uncertainty and perceived post-transaction control only for consumers. Therefore, future research should further examine the circumstances affecting interrelationships between perceived post-transaction control and perceived risk dimensions.

6.2. Managerial implications

This study, having identified the most central factors of consumers' and merchants' concerns about confidence in electronic payment transactions, suggests some implications for Internet payment service providers and on-line merchants. By carefully considering their approaches to the major dimensions of concern – confidence, risk and control – managers can identify underlying problems and take corrective actions as appropriate. First, given the importance of the consumer's and merchant's confidence in electronic payments, managers responsible for implementing new technologies may benefit from understanding at which level confidence is broken and why. The findings of this study show that perceived post-transaction control is essential for confidence in on-line payments. It reflects consumers' and merchants' subjective assessment of the possibilities to sanction a trustee through codified rules, procedures and regulations if an abuse of trust arises.

Therefore, it is essential for a payment intermediary to have a high reputation and be able to resolve a dispute through a fair, reliable and effective process. Disputes relate to problems such as non-delivery and unsatisfactory goods. They quite often concern payments either directly as a source of complaint or indirectly as a way of settling the complaint by means of a refund (Carblanc, 2000). Thus, protection and redress mechanisms for payment-related disputes are needed. For example, in credit card payment-related disputes, a charge-back protection mechanism enables consumers to claim a refund for a disputed transaction. This mechanism can be applied in cases of over-charging,

incorrect charging, charging without delivery, cancelled transactions and fraud. In addition to the protection mechanisms, there are redress mechanisms available, such as internal complaint handling, legal action options and alternative dispute resolution (Carblanc, 2000). However, limitations of the existing frameworks for consumer protection in the electronic commerce context, which is global, concerns the applicable law and jurisdiction in cases of consumer disputes arising from cross-border purchases because it was primarily designed for trade within national boundaries. In addition, issues such as the accessibility and cost of seeking redress in a foreign court of law for small claims render the legal options impractical. Therefore, novel mechanisms are required to promote a higher-level perception and consequently confidence in on-line payment transactions.

Finally, the effect of negative consequences on confidence suggests that consideration needs to be given to the value of transactions. Thus, it is important to provide consumers and merchants with flexibility in choosing a payment method. A flexible approach could take into account instances where existing payment methods, such as credit or debit card transactions, may not be sufficient to satisfy full on-line shopping requirements. Similarly, electronic purse cash payments may not be able to create the perception of adequate security for high-value transactions. Taking into account these needs early on will add to the overall efficiency of payment methods.

7. CONCLUSION

To resume, this study presents several new findings that enrich our understanding of the factors affecting consumers' and merchants' confidence in business-to-consumer electronic payment transactions and, consequently, their willingness to transact over the Internet. Before drawing definitive conclusions from these results, it is important to consider the study's limitation. Since study data have been collected from consumers and merchants using a questionnaire survey administered in Slovenia, future research should investigate the proposed model in different countries to enrich our understanding of cross-cultural effects on confidence in on-line payments.

Notes

[1] SEM embodies two inter-related models. The measurement model represents the relationships between the observed items and their expected latent variables measured by these items. The structural model represents the paths among a set of dependent and independent variables. Covariance-based SEM is best suited for

confirmatory research (Gefen et al., 2000). For more information on SEM, the interested reader is referred to Bollen (1989), Gefen et al. (2000), and Hair et al. (1998).

[2] Although ML is appropriate when the observed variables are known to be multivariate-normal, it is applicable even when the observed variables deviate from this assumption. It is recognized that maximum likelihood estimates are rather robust against moderate violations of the normality assumption providing the sample size is larger than 100 (Anderson and Gerbing, 1988). An additional issue relating to data is the problem of missing data. The sophisticated *full information maximum likelihood* procedure implemented in AMOS was used in this study for replacing individual missing values (Wothke, 1999).

[3] Although many guidelines have been suggested, no absolute test is available (Bollen, 1989; Bollen and Long, 1993; Hair et al., 1998). Goodness-of-fit measures can be classified into absolute fit measures and incremental fit measures. First, absolute fit measures assess the overall model fit for both structural and measurement models collectively (Bollen, 1989; Hair et al., 1998). Often used absolute fit measures are the chi-square test (χ^2), the ratio of chi-square to degrees of freedom (χ^2/df), the goodness-of-fit index (GFI), and the root mean square error of approximation (RMSEA). A good value for the chi-square is one that is not much larger than statistics' degrees of freedom. Hair et al. (1998) recommended that the ratio of χ^2 to degrees of freedom between 1 and 2 is adequate. The behavior of the χ^2 is very much a function of sample size and the model complexity. The RMSEA attempts to minimize the impact of sample size and to shift the researcher's focus from exact fit to approximate fit. Browne and Cudeck (1992) suggested RMSEA values between 0 and 0.05 imply a good approximate overall fit. The GFI can be considered as a measurement of the relative amount of variance and covariance in the data accounted for by the proposed model. Values above 0.90 are often considered to be evidence of a good model fit (Gefen et al., 2000). Second, incremental fit measures compare the proposed model to another, most often defined as a baseline model, in which all latent variables are assumed uncorrelated. Bentler's (1990) comparative fit index (CFI), Bentler and Bonnett's (1980) normed fit index (NFI), Tucker and Lewis' (1973) non-normed fit index (NNFI/TLI), and Bollen's (1989) incremental fit index (IFI) are the most widely used incremental fit indices. The proposed lower threshold for these indices in the literature is 0.90.

[4] Unidimensionality is an assumption underlying the calculation of reliability; therefore, it should be assessed for all multiple-indicator constructs before assessing their reliability (Hair et al., 1998). Unidimensional measures must load on only one construct, so that all association or covariance between the various measures is entirely mediated by the common factors. Convergence implies that all within-construct correlations are both high and of approximately the same magnitude. As with Cronbach alpha coefficient, construct reliability should be above 0.70 (Gefen et al., 2000). Convergent validity is supported when all loadings are statistically significant ($p < 0.05$) and when all squared factor loadings are above 0.50. This implies that standardized loadings should be greater than 0.70. In addition, convergent validity can be assessed in terms of the degree to which each item has a

higher loading on its assigned construct than on the other constructs. To assess discriminative validity, items associated with a latent variable must be examined to ensure they are not perfectly correlated. Further, a stronger test of discriminative validity would be assessed by checking that the Average Variance Extracted (AVE) of each construct is larger than its correlation with other constructs. AVE attempts to measure the amount of variance that a latent variable captures from its indicators relative to the amount due to measurement error (Fornell and Larcker, 1981). It is recommended that AVE should be greater than 0.50, meaning that 50% or more variance of the indicators should be accounted for (Hair et al., 1998).

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POVJERENJE KUPACA I PRODAVATELJA U PLAĆANJE PUTEM INTERNETA

Sažetak

Obavljanje transakcija putem Interneta sve više dobija na značaju. Kadgod pojedinac stupa u transakciju s drugim, suočava se s problem nesigurnosti, jer se u interakcijama javlja problem "ranjivosti" (mogućnosti prevare). Stoga su percepirane razine rizika i povjerenja od najvećeg značaja za elektroničke transakcije, jer viša razina rizika djeluje na veće oklijevanje pojedinca da stupi u nesiguran poslovni odnos, što, također, traži povećano povjerenje. Ovaj rad ima dva cilja. U njemu se prvo predstavlja i testira teorijski model koji predviđa stupanj u kome kupci i prodavatelji prihvaćaju plaćanje putem Interneta, i to na temelju složenog skupa odnosa između ključnih čimbenika elektroničkih transakcija. Nadalje, u radu se pokušava razjasniti problem složenog međudjelovanja između povjerenja, kontrole i percipirane razine rizika. Predloženi je model testiran empirijskom studijom, zasnovanom na podacima o slovenskim kupcima i prodavateljima. Njeni rezultati pokazuju koliko percipirane dimenzije rizika i post-transakcijska kontrola utječu na povjerenje kupaca i prodavatelja u mehanizme elektroničkog plaćanja, te koliki je utjecaj povjerenja na široko prihvaćanje on-line sustava plaćanja.