The Mediating Role of Perceived Risk when Buying Online

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Abstract: This paper aim is to assess if consumers' perceived risk can mediate the relationship between trust and consumers' intention to buy online. Several others studies indicate that perceived risk acts like a barrier to online buying adoption, while trust in the online vendors and the reliability of the online environment is an enhancer of consumers' intention to buy online. Two models were developed for the purpose of this study and Partial Least Squares (PLS) analysis was used on data collected from 98 respondents. Three variables were introduced in the model: perceived risk, perceived trust and consumers' intention to buy online. Each variable was formed as a formative latent variable using multi-items, measured on a 7 point Likert scale. The results of the first structural equation modeling indicate that trust is capable of explaining 44% of the variance in consumers' intention to buy online. Perceived risk was introduced in the second structural equation modeling and results indicate that it has a negative direct effect on consumers' intention to buy online. However, perceived trust is the sole variable capable of decreasing consumers' perceived risk. Thus, online vendors should put a great emphasize on creating a trustful environment for selling online goods and services.

Keywords: online buying behavior; mediating effect; PLS

JEL Classification: M31; L81

1. Introduction

Perceived risk has been identified in previous literature as being a main concern for both online shoppers and non-online shoppers (European Commission, 2011, p. 33). According to a recent survey of the European Commission, the biggest fear of EU citizens is the delivery of wrong or damaged goods or delays in delivery, 68% of the respondents indicating delivery issues as being a source of concern (European Commission, 2011, p. 33). Fear of having to return the product or repair faulty products was indicated by 57% of the respondents (European Commission, 2011, p. 33). However, security risk (theft of payment card details) and privacy risk (the

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misuse of personal data) were less concerning issues, indicated by 20% of the respondents and 21%, respectively.

Several studies show that performance risk or the fear of product malfunctioning or not functioning as expected, can only increase in online environment (Almousa, 2011, p. 25) as there is a temporal separation between ordering and gratification.

Moreover, when buying online consumers are not capable of touching, feeling, testing or trying the product before purchase, deprivations that contribute to an increased performance risk (Teo, 2006, p. 504; Pechtl, 2003, p. 156; Rudolph et al, 2004, p 70; Saprikis et al, 2010, p. 6; Lim, 2003, p. 225).

There are also issue regarding the delivery of the products bought online. Consumers fear that the products will be damaged during handling and transportation or that they will be delivered to another address. Consumers also fear that the delivery will be late or that there will be no delivery at all (Naiyi, 2004, p. 180).

Even though they have a lower importance, credit card fraud is also invoked as a perceived risk when buying online (Delafrooz et al, 2011, p. 75; Pechtl, 2003, p. 152; Rudolph et al, 2004, p. 70; Khalifa & Limayem, 2003, p. 237; Suki & Suki, 2007, p. 89; Saprikis et al, 2010, p. 6; Miyazako & Fernandez, 2001, p. 38; Suresh & Shashikala, 2011, p. 339).

The fear of intentional or unintentional misuse of privacy data has also proven to be a significant obstacle retaining consumers from buying online (Rudolph et al, 2004, p. 70; Suki and Suki, 2007, p. 89; Miyazako and Fernandez, 2001, p. 38).

However, in uncertain situations like online buying, perceived trust becomes a solution for risk concern. Trust has been defined in previous literature as being an assurance that the other party will not leverage upon the vulnerability of the buyer during and after a transaction (Wang, 2005, p. 109). But trust in online environment has not been attributed solely to online buyers. Online trust also implies trusting the online environment as a reliable and secure way of buying. (Kim et al, 2008, p. 545)

2. Perceived Risk and Perceived Trust

Perceived risk has been introduced into various models of consumers' adoption of online buying as consumers perceive a greater risk when buying online compared to the traditional way of buying (Eggert, 2006).

Perceived risk is a subjective perception of consumers (Jahankahani, 2009, p. 83) that has been validating as having a negative impact on both frequent online consumers' intention to buy online and non-online buyers' intention to adopt online buying (Kim et al, 2009, p. 555; Metehan & Yasemin, 2011, p. 90).

Trust has been previously studied in relation to many variables: attitude, intention and perceived risk. In relation to consumers' attitude towards buying online, trust has been validated as having a direct and positive effect (Dash & Saji, 2008, p. 43; Jarvenpa et al, 2000, p. 60; Buttner & Goritz, 2008, p. 44).

Previous studies indicate a direct and positive effect of trust on consumers' intention to buy online (Kim et al, 2008, p. 555; Chen et al, 2003, p. 689). Also, researchers found a negative direct relationship between trust and perceived risk (Dash & Saji, 2008, p. 43; Jarvenpa et al, 2000, p. 60).

3. Conceptual Model

According to the previous literature discussed above I propose the following conceptual model and hypotheses:

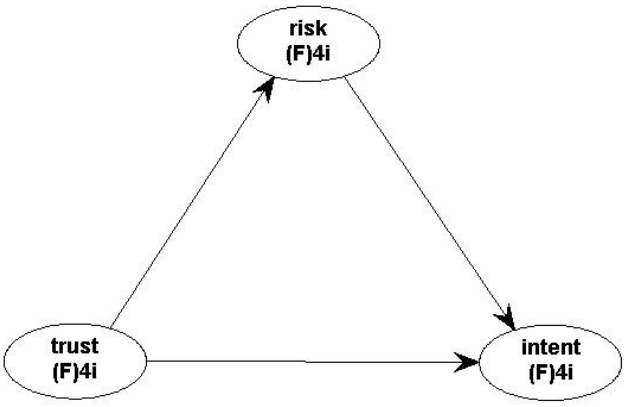

Figure 1. Conceptual model

- Hypothesis 1: Perceived trust will have a direct and positive effect on consumers' intention to buy online.

- Hypothesis 2: Perceived trust will have a direct and negative effect on perceived risk
- Hypothesis 3: Perceived risk will have a direct and negative effect on consumers' intention to buy online.
- Hypothesis 4: Perceived trust will mediate the relationship between perceived trust and consumers' intention to buy online.

According to Baron and Kenny framework for mediation analysis, mediation occurs when an independent variable X has an effect on the mediator M, which in turn affects an independent variable Y (Baron & Kenny, 1986).

4. Data Collection

Data was collected from Romanian online consumers that have previously bought online a product or a service by using a web-based survey, designed in LimeSurvey software tool and hosted on consumatorulonline.ro. For the purpose of this study, 98 valid responses were gathered.

5. Measurements

In order to measures the three latent variables, multiple items for each LV were employed as follows (see Table 1):

Table 1. Measurements

Latent Variable	Type	No. of items	Dimensions
Intention to buy online	First order formative	4	Intentions as expectations/plans/ wants/ stated intentions
Perceived trust	First order formative	4	Trust in online vendors / Trust in the security of the e-commerce websites
Perceived risk	First order formative	4	Performance risk/ Delivery risk/ Security risk/ Privacy risk

6. Data Analysis

Data analysis has two stages: first, the reliability and validity of the measurements were assessed; second, the mediating analysis was performed. Data analysis used WarpPLS 3. 0 software, a PLS-based structural equation modeling tool. WarpPLS generates stable results when analyzing small sample sizes lower than 100 and it also differentiates between formative and reflective latent variables (User Manual,

scriptwarp.com). Due to these considerations, WarpPLS is the most suitable SEM software for the purpose of this study.

7. Measurements Reliability and Validity

In table 2 are shown measurements' reliability indicators: composite reliability (CR), Cronbach Alpha and average extracted variance (AVE), following Bagozzi and Yi (1998) approach to assessing measurements' reliability.

Table 2. Measurements reliability

Construct	Composite reliability (CR)	Cronbach Alpha Coefficients	Average extracted variance (AVE)
Intention to buy online	0.924	0.891	0.753
Perceived trust	0.916	0.878	0.733
Perceived risk	0.918	0.881	0.737

As all indicators are above the accepted value of 0.7 (Hair et al, 1998; Nunally, 1978), we can conclude that measurements are reliable.

Table 3 shows the combined loadings and cross-loadings of all items in the study.

As items load more inside the latent variable they were defined to capture, we can state that the measurements have good convergent validity construct (Jewell, 2011).

Table 3. Measurements convergent validity

	Intention	Perceived trust	Perceived risk	SE	P value
I1	0.882	-0.119	-0.083	0.071	<0.001
I2	0.898	0.025	-0.003	0.07	<0.001
I 3	0.837	0.046	0.067	0.082	<0.001
I4	0.853	0.051	0.023	0.069	<0.001
PT1	-0.082	0.814	-0.018	0.082	<0.001
PT 2	-0.003	0.820	-0.145	0.083	<0.001
PT 3	0.022	0.914	0.062	0.071	<0.001
PT4	0.056	0.872	0.089	0.068	<0.001
PR1	-0.054	-0.128	0.824	0.09	<0.001
PR2	-0.147	0.148	0.831	0.077	<0.001
PR3	0.035	-0.054	0.902	0.073	<0.001
PR4	0.154	0.036	0.875	0.084	<0.001

Table 4 shows all the correlations between the latent variables (LVs) and the square roots of AVE on the diagonal axis.

As square roots of AVE for each LV is higher than any of the bivariate correlation involving the LV, I can state that the measurements have a good divergent validity (Fornell and Larcker, 1981).

Table 4. Latent Variables correlations and square root of AVE

	Intention to buy online	**Perceived trust**	**Perceived risk**
Intention to buy online	(0.856)	0.604	-0.498
Perceived trust	0.604	(0.868)	-0.509
Perceived risk	-0.498	-0.509	(0.859)

8. Mediating Analysis

The mediating analysis was conducted using Kock's approach (Kock, 2011):

- First, a model was build where perceived trust was hypothesized to have a direct and positive effect on consumers' intention to buy online
- Second, a model including all three variables was built as trust directly and positively influencing consumers' intention to buy online, trust directly and positively influencing consumers' perceived risk and finally, perceived risk directly and negatively influencing consumers' intention to buy online.

From the structural equation modeling analysis (Table 5) we can note that the path between the independent variable (perceived trust) and the dependant variable (intention to buy online) is significant at $p<0.001$ (the significance level used), with a path coefficient of 0.661.

Table 5. Path coefficient and its associated p value

	Intention to buy online	Perceived trust
Intention to buy online		0.661 ($p<0.001$)
Perceived trust		

Graphically, the relationship between the two variables can be represented:

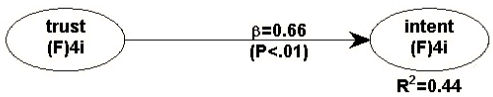

Figure 2. First SEM analysis

From the structural equation modeling analysis (Table 6) we can note that the path between the independent variable (perceived trust) and the mediator (perceived risk) is significant at p<0.001, with a path coefficient of -0.519.

Also, the path between the mediator (perceived risk) and the dependent variable is also significant at p<0. 001 with a path coefficient of -0. 406.

Table 6. Path coefficients and its associated p values

	Intention to buy online	Perceived trust	Perceived risk
Intention to buy online			
Perceived trust	0.446 (p<0.001)		-0.406 (p<0.001)
Perceived risk	-0.519 (p<0.001)		

Graphically, the relationship between the three variables can be represented:

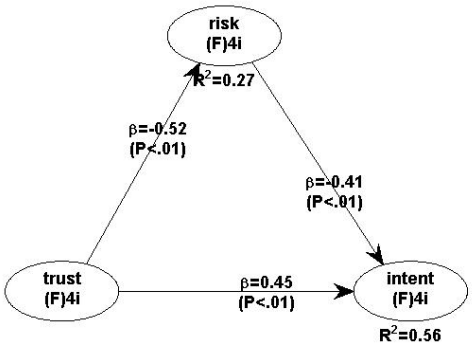

Figure 3. Second SEM analysis

In the second model, where the mediator is introduced in the model, the path between the mediator (perceived risk) and the dependent variable (intention to buy online) controls for the effect of the independent variable (perceived trust).

But, at a closer look at the second SEM analysis, we can note that the effect of trust on intention to buy online is still significant when the mediator is introduced in the model. Due to these considerations, this is the case of a partial mediation (Kock, 2011).

The effect of trust on consumers' intention to buy online have decreased from the previous SEM analysis, from a path coefficient of 0. 661 to a path coefficient of 0.446 at p<0.001. However, we could speak of a perfect mediation only if the effect of trust on intention to buy online would have been insignificant (Kock, 2011).

9. Conclusions and Implications

Trust is one of the main determinants of consumers' intention to buy online as indicated within the two structural equation modeling analyses.

Two dimensions of trust were captured by the latent variable: trust in the online vendor and trust in the reliability and security of the e-commerce platform. Two items were assigned to each dimension and respondents were asked to state their agreement with each of the affirmations. Consumers' beliefs regarding the extent to which they believe that the online vendors have their interest at hand and will not deceive them during or after the transaction were assessed. Second, their faith in the capability of the e-commerce platform for generating a reliable and secure purchase was assessed.

The first structural equation modeling analysis indicated that variances in trust are capable of explaining 44% in the variance of consumers' intention to buy online. The path coefficient between the two variables was 0.661 indicating a strong and positive relationship between the trust and intention.

This means that the more trust consumers have in the online vendor but also in the e-commerce platform, the greater is their intention to buy online.

In the second structural equation modeling analysis perceived risk was introduced in the model as a moderator between trust and consumers' intention to buy online.

Four dimensions of perceived risk were captured by the latent variable: performance risk, delivery risk, security risk and privacy risk (European Commission, 2011, p. 33). These dimensions were previously identified as forming perceived risk when buying online.

The second structural equation modeling analysis indicated that both variances in perceived risk and perceived trust accounts for 56% of the variance in consumers' intention to buy online. Perceived risk has a direct and negative effect on behavioral intention, with a path coefficient of -0.406. Those consumers perceiving a higher risk when buying online are less likely to buy online. Perceived risk acts as a barrier to the adoption of e-commerce.

The path between trust and perceived risk indicated a strong and negative effect of trust on perceived risk, with a path coefficient of 0.519. The more trust consumers have in the online vendor and the reliability and security of the e-commerce platform, the less risk concerns they experience.

Consumers must have faith that the vendor has their interest at hand and will not deceive them during or after the transaction. They must trust that the product bought online will perform as expected and it that it will be delivered as agreed.

Consumers must also trust that online buying is reliable and secure. Consumers' assign confidential data when they buy online. They share credit card information and personal data. The interception of such data by unauthorized people could harm the consumer. Trusting that the online vendor has secured the e-commerce platform against unauthorized access and that, under no circumstances, will he alienate or misuse consumers' personal information will decrease the perceived risk.

When perceived risk was introduced in the model, the influence of the trust on consumers' intention to buy online decreased.

If first SEM analysis indicated a path coefficient of 0.661, the second SEM analysis with risk as a mediator, indicated a path coefficient of 0.446. Thus, the positive impact of trust on intention was reduced due to the mediator effect.

The two SEM analyses indicated that perceived risk has a partially mediating effect between perceived trust and consumers' intention to buy online.

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