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PRIVACY RISK – NOT A RISK
FOR ROMANIAN ONLINE SHOPPERS?

Introduction

Perceived risk has been of interest for marketing researchers ever since Bauer discussed consumer behavior as a risk taking behavior. More specific and elaborate research began with Cox that separated perceived risk into two components: *amount at stake* and *favorable consequences*. Further work concentrated on defining perceived risk. A significant break-through can be attributed to Jacoby and Kaplan who divided perceived risk into five types of risk: *performance* or *product risk, financial risk, social risk, psychological risk* and *physical risk*. Roselius also talked about time risk.

Products that we use nowadays on a normal basis were considered forty years ago a source of risk for a consumer. Thus, it made sense for marketers to investigate perceived risk in connection with new product adoption. The microwave oven can be such an example. Launched in 1967, the microwave oven priced at US$495 ($3,450 in today's dollars) could have been seen as an important source of financial, performance and physical risk.

In present times, technology seems to be a primary source of perceived risk as far as new products are concerned. Consumer behavior has changed over time due to a process of learning and adaptation to new products. Although, not so new anymore, Internet can still be considered a new technology, especially as it is introduced in all areas of life. Shopping on the Internet is one case in which consumers have to adapt to a new way of life. Buying online can be a time saving activity, but in the same time can be a source of perceived risk influencing consumer behavior. Studies have shown that e-commerce adoption is influenced by perceived

risk. Moreover, the Internet has created new types of risks or redefined the existing ones. For instance, time risk in terms of e-commerce has become delivery risk and physical risk is not analyzed anymore as the process of buying online in itself cannot harm our health. A new type of risk emerged is security risk which refers to financial transactions made online. Privacy risk is another risk driven from the Internet – the risk of your personal data being stolen and used without your agreement.

1. Perceived risk. The concept

Perceived risk is a psychological construct that has been measured in many ways depending on the definition given by the researcher. Cox and Cunningham proposed a measure closer to the economics/mathematics view using measures of probability and amount at stake. Cox and Rich, Roselius and Jacoby & Kaplan considered that perceived risk is a multi-dimensional construct, each dimension being measured on the two levels previously mentioned. Mitchell suggested that a multi-item multi-dimensional construct could be more appropriate for perceived risk, without the inclusion of probabilities, which can be difficult for a consumer to estimate.

To have a more clear view of the dimensions, we present short descriptions of each type of risk:
- *Financial risk* is associated with paying a sum of money for a product which is later found not to comply with the promised value, it has faults or it does not work at all. Economic or financial risk is, according to experts, the component which has the most influence on the consumer.
- *Physical risk* refers to the fact that a product may affect the consumer while being bought or consumed. Unlike the past situation, we now talk about a risk associated with product characteristics and not with the purchase itself.
- *Functional* or *performance risk* arises due to the mismatch between product characteristics and expected performance.
- *Psychological risk* is mainly about the fact that the product does not match the consumer's personality, thus leading to a feeling of discomfort.
- *Social risk* resembles with the psychological one, but it differs in the fact that the consumer is no longer interested in matching the product with his own personality, but he is more interested in the way he is perceived by others.
- *Time risk* refers to the time assigned to making the purchase or the time lost in case of product faults and replacement or warranty issues.

In the context of technological development and adoption of Internet as an online shopping channel there are three other types of risk that can be also discussed here, specific to e-commerce:

- *Delivery risk* is associated with time risk, being the risk of getting the product with a delay or not getting the product at all.
- *Security risk* is more or less connected to the financial one. If financial risk discussed before referred to the probability of losing the money paid for a product because of product faults or low performance, security risk includes financial risk with a larger stake. When paying by credit card over the Internet the consumer risks losing all the money in his bank account as his personal information can be stolen by hackers.
- *Privacy risk* is sometimes called intimacy risk. E-shops usually register all personal data of their customers, not only the data they are willing to give when completing the purchase forms, but also data regarding their activity on the website, creating a profile for each customer. This wouldn't be such a big issue if the e-shops use the data only for their own interest, yet more frequently customer databases are sold to third parties, exposing consumers to unwanted advertising messages. The main dimensions of perceived risk are represented in Figure 1.
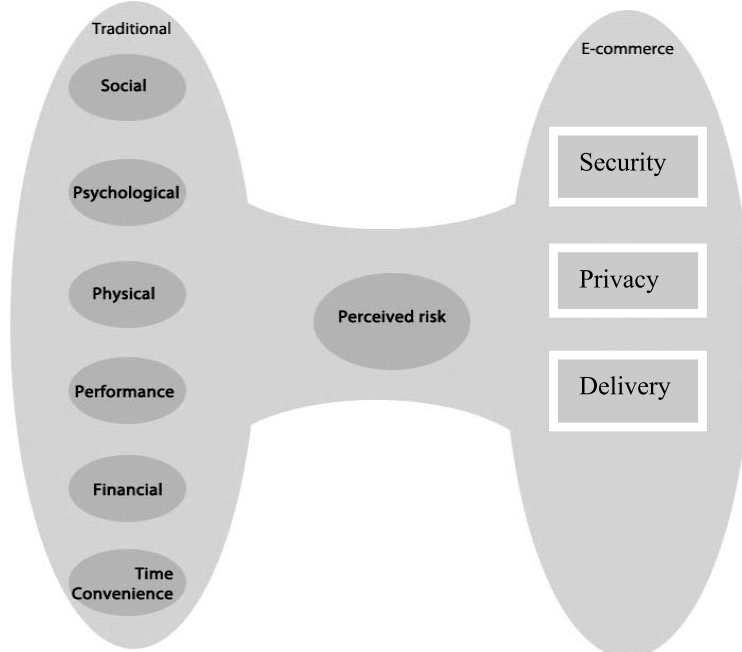

Figure 1. Dimensions of perceived risk

2. Methodology

The study was done at an exploratory level on 123 business students. The choice of students as a sample is justified by the fact that they are known to be heavy users of online buying. The method employed was the survey and the questionnaire contained items which aimed to measure perceived risk and intention to buy online. The perceived risk scale was developed for the case of e-commerce using previous studies such as: Featherman & Pavlou, Forsythe et al., Crespo et al. 17 items were used from the scales developed in the previously mentioned studies to which we added 12 items acquired from 10 in-depth interviews. The need to add the extra 12 items is justified by the fact that the existing scales were built up in high income countries, whereas Romania is an emerging country and consumers may behave differently and feel other types of risks. In the end we obtained a 29 item construct to measure perceived risk with its dimensions: delivery (4 items), product (6 items), privacy (3 items), financial (8 items), psychological (4 items) and social risk (4 items). Intention to adopt e-commerce was assessed using a 4-item scale from Featherman and Pavlou. In order to rule out common method variance we randomized the items in the questionnaire. Moreover, we applied the one factor Harman test the check whether items load in more than one factor.

Psychometric properties for each construct were measured using Cronbach alpha and first order confirmatory factor analysis. Due to its multi-dimensional structure, perceived risk was measured with a second-order factor model.

3. Results

In order to compare the types of risk, we computed the averages for each construct representing a dimension of perceived risk. At a descriptive level, privacy risk is perceived at a higher level than financial risk, but delivery risk is the most important to Romanian consumers (Table 1).

Table 1

Descriptives

Specification	Mean	Std. Deviation
Delivery risk	4,1897	1,22294
Product risk	4,0393	1,03932
Privacy risk	4,0000	1,21241
Financial Risk	3,7927	,82059
Psychological	3,0650	1,28749
Social risk	2,5427	,94126

Further a correlation matrix was computed to gain a more clear view on the relationships between the types of risk perceived by consumers (Table 2). There is a very strong correlation between privacy risk and financial risk, as well as between product risk and delivery risk. A smaller, but significant correlation was found between privacy risk and psychological risk.

Table 2

Correlation matrix

Specification	Product Risk	Financial Risk	Privacy Risk	Delivery Risk	Social Risk	Psychological Risk
Product Risk	1	0,556**	0,437**	0,631**	0,243**	0,445**
Financial risk	0,556**	1	0,599**	0,447**	0,203*	0,306**
Privacy Risk	0,437**	0,599**	1	0,394**	,093	0,248**
Delivery Risk	0,631**	0,447**	0,394**	1	0,282**	0,397**
Social Risk	0,243**	0,203*	0,093	0,282**	1	0,460**
Psychological Risk	0,445**	0,306**	0,248**	0,397**	0,460**	1

In order to see the influence of perceived risk on buying intention and privacy risk contribution to this relationship, we advanced to testing psychometric properties of the constructs. First of all, we performed the one factor Harman test which showed that our study does not have problems with common method variance, items loaded on nine different factors.

Next, we tested reliability of the scales using Cronbach alpha (Table 3). Since this was an exploratory study, there were some constructs presenting lower reliability coefficients than the recommended level – a minimum of 0.7. Privacy risk registered an acceptable level of reliability, even if it was an exploratory study. Intention to buy, psychological risk, product risk and financial risk also had levels of Cronbach alpha within the thresholds defined by theory.

Table 3

Cronbach alpha values

Scale	Alpha	No. of items
Product Risk	0,766	6
Financial Risk	0,601	8
Privacy Risk	0,637	3
Delivery Risk	0,433	4
Social Risk	0,516	4
Psychological Risk	0,799	4
Intention to buy online	0,927	4

Delivery risk and social risk had Cronbach alphas lower than 0,6. For incipient stages of research values between 0,5-0,6 are acceptable. Thus, delivery risk was the only one that posed problems. We further analyzed delivery risk using Principal Component Analysis. Results showed that 4 items loaded in 2 components (Table 4). One item loaded alone in a second component that explained 20% of the variance.

Table 4

Component Matrix[a]

Specification	Component	
	1	2
Delivery risk 1	0,701	0,367
Delivery risk 2	0,747	-0,174
Delivery risk 3	-0,009	0,940
Delivery risk 4	0,755	-0,157

Reliability analysis for the delivery risk scale showed that by eliminating item 3 from the construct the Cronbach alpha increases from 0,433 to 0,568 (Table 5).

Table 5

Delivery risk items	Cronbach's Alpha if Item Deleted
Delivery risk 1	0,304
Delivery risk 2	0,204
Delivery risk 3	0,568
Delivery risk 4	0,292

After testing psychometric properties of the dimensions of perceived risk, we tested the multi-dimensional construct of perceived risk as a whole, respectively as a second-order factor model (Figure 1).

We used AMOS 17 to test the model and we obtained a low RMR, GFI and AGFI (Table 6) compared to recommended standards: GFI > 0,9; AGFI > 0,8 and RMR < 0,05.

The low goodness of fit index can be due to the small sample used and to the fact that the model has six dimensions, each dimension being defined by 3 to 8 items. This means that a high number of coefficients must be calculated and specialists recommend that in the case of 2-4 latent factors the sample should have at least 100 respondents, however Tabachnick and Fidell offer as a rule a minimum of 10 cases per parameter, which in our situation would mean at least 350 respondents.

Table 6

Goodness of fit coefficients

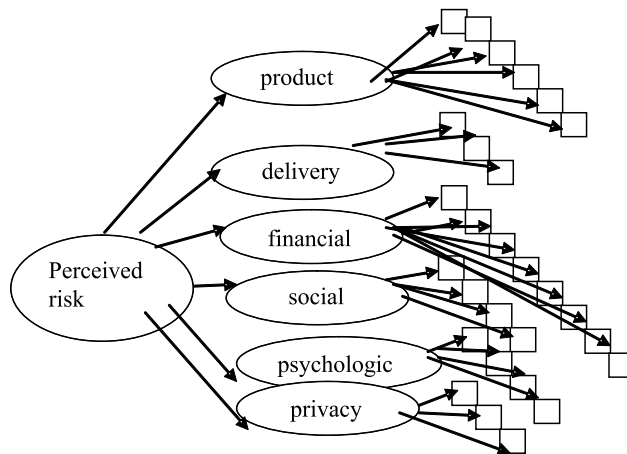| Model	RMR	GFI	AGFI
Default model	.221	.759	.714

Figure 1. Second-order factor model for perceived risk

Regression weights obtained by testing the second order factor model showed that privacy risk is the third most important dimension of perceived risk. However, due to a lack of goodness of fit these results have to be interpreted with caution (Table 7).

Because of the high number of parameters involved in testing a second-order factor model, we chose to use the first – order model for perceived risk, by averaging across dimensions and transforming latent dimensions of perceived risk and observed items represented by the average (Figure 2).

Table 7

Regression weights

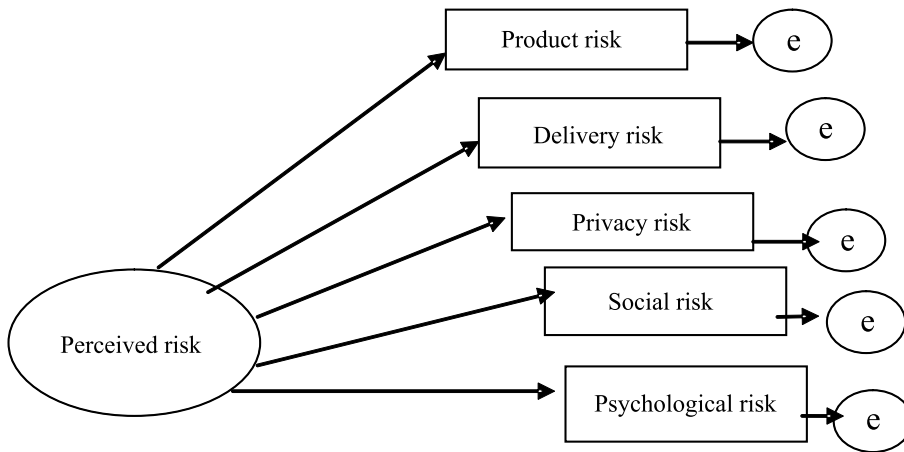| Specification			Estimate
Product risk	<---	Perceived risk	.892
Privacy risk	<---	Perceived risk	.787
Delivery risk	<---	Perceived risk	1.051
Psychological risk	<---	Perceived risk	.556
Social risk	<---	Perceived risk	.567
Financial risk	<---	Perceived risk	.817

Figure 2. Perceived risk first-order model

When testing the goodness of fit of the first-order model, results were favorable (Table 8).

Table 8

Goodness of fit for the first-order model

Model	RMR	GFI	AGFI	PGFI
Default model	.023	.992	.975	.331

Standardized regression weights of perceived risk dimensions were also computed. As seen in Table 9, privacy risk has the second lowest coefficient, which suggests that variation in perceived risk will determine a smaller variation in privacy risk compared to product risk or delivery risk.

Table 9

Standardized Regression Weights for perceived risk

Specification			Estimate
Product risk	<---	Perceived risk	.864
Financial risk	<---	Perceived risk	.631
Privacy risk	<---	Perceived risk	.510
Delivery risk	<---	Perceived risk	.734
Social risk	<---	Perceived risk	.307
Psychological risk	<---	Perceived risk	.517

The influence of perceived risk on buying intention was further tested using confirmatory factor analysis. Results prove that perceived risk negatively influences buying intention (–0,639) and that privacy risk has once again the second lowest contribution (0,484) – Table 10.

Table 10

Standardized Regression Weights Perceived risk and intention to buy

Specification			Estimate
Buying intention	<---	Perceived risk	-.639
Product risk	<---	Perceived risk	.817
Financial risk	<---	Perceived risk	.622
Privacy risk	<---	Perceived risk	.484
Delivery risk	<---	Perceived risk	.730
Social risk	<---	Perceived risk	.358
Psychological risk	<---	Perceived risk	.608

Conclusion

Privacy risk in e-commerce is highly perceived by Romanian consumers, being the third one as importance after product and delivery risk when averages are compared. However, results suggest that privacy risk is less important when perceived risk is analyzed as a second order model. When modeling the influence of perceived risk on buying intention, the hierarchy between risk dimensions changes and privacy risk becomes the second least important. In studies such as Featherman and Pavlou, privacy risk occupied an important place, usually above social, psychological and delivery risk. In Crespo privacy risk was the most important risk perceived as average, but the third least important when tested as a dimension of perceived risk for an Internet non-buyers sample or the second least important for an Internet buyers sample. It might seem that Romanian consumers are les

concerned by the privacy risk. However, the methodology employed in this study does not allow us to go further with conclusions and make comparisons with the above mentioned studies. The reason is that we cannot merely assume measurement equivalence of the scales used in the studies, since for the Romanian case the scale was adapted for local behavior. This is one limitation of our research, but it can be justified by the fact that the study did not aim for cross-cultural comparison analysis, but just for an exploratory analysis of e-commerce behavior and perceived risk in Romania. Another drawback is represented by the small-sized sample. First of all, the sample was a convenience sample and not a representative one. The size of the sample generated problems when performing confirmatory factors analysis. The study should be replicated on a larger sample to see if the results match what we found on the present sample.

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Summary

Online shopping has been intensively studied in connection with perceived risk, which is known to be a deterrent of e-commerce. Perceived risk in e-commerce is a multi-dimensional construct composed of several types of risks such as: financial risk, product risk, social risk, psychological risk, delivery risk and privacy risk. One of the dimensions of perceived risk that is worth investigating is privacy risk. Online shops, nowadays, register all the data of their buyers and set up client databases that sometimes are sold to third parties. Thus, personal data can be used without the buyers' approval and fraud is possible to happen. A serious threat is credit card data theft, whereas at a lower level of importance, the buyers can be spammed with unwanted offers that invade their privacy. The present study aims to determine the relative influence of privacy risk on intention to adopt e-commerce in comparison with other types of risk. To identify the influence of privacy risk on intention to adopt we used a structural equation model and confirmatory factor analysis.

Keywords: perceived risk, online shopping