Impact of Age on the Willingness to Disclose Personal Data in E-Shopping

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Abstract

E-shopping is an increasingly important way of purchasing among all age groups. However, buying online requires disclosing certain personal data which might be sensitive, especially – to older people. This is linked with their lower confidence in online technologies resulting in some degree of cyber fear. Indirectly, it makes older people rely on legal regulations that are passed to protect privacy online. Both, cyber fear and confidence with regulations are dependent on age, but have opposite impacts on the willingness to disclose personal data online. This makes it difficult to assess how age impacts the willingness to disclose personal data. The study approaches this issue from the standpoint of the social exchange theory. The model includes factors of trust and distrust (paranoia), and two types of social exchange.

Keywords: age, willingness to disclose data, social exchange theory

1. Introduction

E-shopping inevitably requires to disclose some personal data. Part of it is absolutely necessary in order to perform transactions, some other part may be omitted because it is needed only if a person prefers to register on a site to obtain extra benefits (faster interactions for the next purchase, a more convenient access, personalized offers, etc. (Hong, Chan, and Thong, 2019). However, the disclosure of personal data includes some elements of uncertainty that is approached differently, depending on individual propensity to trust or distrust in everything that is happening around (Barto and Guzman, 2018; Urbonavicius, 2020). The level of uncertainty may seem higher if a person feels not well regarding the internet technologies and processes, i.e. experiences the so called cyber fear. This may be partially offset by trusting formal privacy regulations or acquiring additional confidence as a result of social interactions with other people who experience similar feelings (Zimaitis, Degutis, and Urbonavicius, 2020).

There is an ongoing discussion on how personal interactions with information technologies may be linked with age. In the context of online activities, age reflects not only a simple demographic characteristic, but also it integrates a variety of personal experiences and contextual influences that, at different time periods, have been differently present for the population (Finch, 1986). Numerous studies have analyzed these issues linking them with the age groups or generations, diverse considerations regarding innovativeness, technology acceptance and many more aspects/factors (Heart & Kalderon, 2013; Rojas-Méndez, Parasuraman, and Papadopoulos, 2017). The impact of age is highly relevant in online shopping context, since the importance of online shopping is growing worldwide, and the proportion of older people is very significant in many societies (Hargittai, Piper, and Morris, 2019).

This study concentrates on filling in the research gap regarding the impact of age on the willingness to disclose personal data online in online shopping. The study deployed a theoretical basis of the social exchange theory (SET) that links trust factors with two types of social exchange: a reciprocal exchange and a negotiated exchange.

A reciprocal exchange occurs on the basis of mutual trust of the exchange participants, with little or no regulations from the outside sources. For instance, this type of exchange is happening in social networks, where the participants disclose personal data, opinions or experiences. The involvement in this type of interactions gradually increases trust in social exchanges, therefore it stimulates trust in the future. This might be the reason why a reciprocal exchange is positively linked not only with trust, but also with distrust: high levels of distrust or paranoia trigger a search for social interactions with similar peers in order to obtain a stronger confidence in personal beliefs and activities (Zimaitis et al., 2020).

The act of online purchasing where a person interacts with a company within a formally regulated framework may serve as an example of a negotiated social exchange. The exchange partners are not necessarily on equal position; a buyer, simply, has to provide certain personal data in order to make the transaction happen. On the other hand, this inequality might be partly compensated by the external legal regulations or formal procedures of companies that participate in online activities. If the consumers are aware of the external regulatory systems that supervise and control how the transaction that includes personal data disclosure is implemented, they might be more willing disclose their data in the negotiated exchange situations.

This study focuses on most common personal data disclosure situations present in marketing and e-commerce that represent the negotiated exchanges (King, 2018). The aim of this study is to analyse how the SET based model of the willingness to disclose personal data in online buying is influenced by the factor of age. The impact of age is assessed as a direct effect on the relevant

factors as well as the total effect on the willingness to disclose data. In addition to age, the model includes the key trait type antecedents: trust (propensity to trust) and distrust (paranoia). Cyber fear and the perceived regulatory efficiency are the two mediators in the context of e-commerce. Cyber fear integrates general distrust in technologies and its linkage with human age; the perceived regulatory efficiency reflects the perceptions towards the legal regulations of privacy online, including GDPR (Urbonavicius, Laurutyte, Zimaitis, and Skare, 2020). The variable of a reciprocal exchange (social media use integration) is included into the model because in the context of SET one form of a social exchange significantly impacts the other form of exchange (Molm, Whitham, and Melamed, 2012). As a result, the findings disclose novel insights into the willingness to disclose personal data online with regard to the buyers' age.

2. Literature Analysis

A theoretical background for this study is the social exchange theory (SET) that stems from the conceptual writings of George C. Homans (1961), Phillip Blau (1964) and Richard Emerson (1976). In the process of its evolution, this theory was used in business-to-business marketing (Lambe, Wittmann, and Spekman, 2001), service industry (Sierra & McQuitty, 2005), privacy-related behaviours and attitudes of consumers (Metzger, 2004; King, 2018). It also seems very applicable for modelling the willingness to disclose personal data online, since it refers to the two types of social behaviours widely found in online activities.

From its early stages, the SET developers made a distinction between *reciprocal* and *negotiated* exchange types (Levi-Strauss, 1969). A reciprocal exchange is based on a belief that other participants of the exchange will participate in the relations on similar terms and will respond by providing similar resources. Typically, these relations are continuous - the reciprocity and exchange relations are developed in the process of sequential exchange transactions (Molm, Takahashi, and Peterson, 2000). The resources exchanged may include various types of information, therefore a typical example of this type of exchange is the involvement in social media activities (Cheng et al, 2011). Here, no strict assurance or the regulations are present; the key driver of this exchange is the mutual trust among the participants (King, 2018).

In a negotiated exchange, the terms of an exchange are known to both the partners in advance; the majority of social exchanges that include economic activities are negotiated (Molm et al., 2000). Therefore personal information disclosure in e-commerce also belongs to a negotiated exchange: the information is collected by marketers in exchange for the offered benefits (access, convenience or monetary compensation in the form of discounts or bonuses) (Malgieri & Custers, 2018). The process of exchange is rather formalized by some form of permission to use personal data and is typically backed by the legal assurance systems. The perception regarding this assurance largely predetermines the willingness to disclose personal data (Hong et al., 2019).

Both types of the exchange are dependent on trust or distrust, and a disclosure of personal information largely depends on personal disposition regarding trust (Bansal, Zahedi, and Gefen, 2016). However, in negotiated exchange with a company, the buyer is often on unequal (weaker) terms, since providing at least some information is mandatory in order to have a planned transaction. This weakness is partly compensated by the buyer's reliance on formal regulations and his/her experience gained from other type of exchange (for instance, after being involved in social media activities). Therefore, the perceptions about the efficiency of regulations and the involvement in social media activities are two strong antecedents that positively impact the willingness to disclose personal data when buying online.

Additionally, online activities are dependent on one's familiarity with and feelings regarding the internet technologies. These are often analysed in the framework of technology acceptance within TAM or UTAUT models and their modifications (Im, Hong, and Kang 2011; Zhang & Lee, 2014; Agrebi & Jallais, 2015). Even though the negative side of it (technology avoidance, fear) has been analysed less frequently, in the context of online activities it is highly relevant (Saad et al., 2018; Khasawneh, 2018; Dinello, 2005).

The theoretical backgrounds mentioned above often include the dimension of human age as an independent or moderating factor that is linked with social interactions (Sherchan et al., 2013; Grabner-Krauter, 2009), trust and distrust (Szymczak et al., 2016) as well as the specifics of online activities (Aghasian et al., 2017). Therefore, a deeper analysis of the impact of age on the disclosure of personal data in online shopping stands on a solid theoretical background.

The social exchange theory envisions the importance of trust in both, the reciprocal and negotiated exchange behaviours (Imhoff & Lamberty, 2018). However, propensity to trust is stronger and more directly linked with the reciprocal exchange behaviour (Molm et al., 2000). In the negotiated exchange relations, trust is "amended" by the measures of assurance that may be imposed by legal and normative authorities that define, supervise, impose sanctions for violations of the terms of agreements (Yamagishi & Yamagishi, 1994). Therefore, in total, trust impacts the negotiated exchange behaviour in online purchasing, at a minimum, in two ways: with the mediation of the reciprocal exchange interactions and with the mediation of the perceptions about the assurance systems (including GDPR). In total, it is expectable that trust positively impacts the willingness to disclose personal data:

H1: The total effects of trust on the willingness to disclose personal data are positive.

There is little evidence on how the same process is impacted by the opposite factor, i.e. – distrust. The rational form of distrust is mainly measured by the low levels of trust and does not require a separate assessment. However, many activities include the irrational forms of distrust, and one of them is paranoia (Zimaitis et al., 2020; Jack & Egan, 2017). However, the trust-based logics may be applied in its effects regarding the exchange as well: distrust (paranoia) is supposed to interact with a reciprocal exchange and with the perceptions about the assurance systems. In terms of the use of IT technology, paranoia has to generate technology avoidance or fear. Therefore, cyber fear is supposed to be an additional mediation between distrust (paranoia) and the negotiated exchange behaviour in online shopping. In total, it is expectable that paranoia impacts the willingness to disclose personal data negatively:

H2: The total effects of paranoia on the willingness to disclose personal data are negative.

The main factor of this analysis is the impact of the human age on the willingness to disclose personal data in online shopping. With numerous different ways of reasoning, the overall conclusion is that older people are less active online, less willing to accept novel technologies and are more concerned about their privacy (Berner et al., 2011; Adams et al., 2009; Roos, 2018). This allows to develop the hypothesis:

H3: The total effects of age on the willingness to disclose personal data are negative.

However, a deeper analysis is required to assess the interactions between the age and other factors considered in the context of this particular analysis.

The common understanding regarding the interactions of older people with novel technologies suggest a negative type of this relation (Adams et al., 2009; van Deursen et al., 2011) The attitude with technologies might obtain a form of fear, and in this case the hypothesis is:

H4: Age positively impacts cyber fear.

On the other hand, older people are found to be more conservative and are likely to trust formal rules and regulations more than younger people (Adams et al., 2009). This allows to predict the interaction between age and the perceived regulatory effectiveness:

H5: Age positively impacts the perceived regulatory effectiveness.

However, many types of age-linked effects are not clear, since they are based on the complexity of accumulated experiences, beliefs and attitudes developed throughout lifetime. Since it is not possible to segregate all the influencing factors, age itself may serve as a proxy for all of them together. This allows to state:

H6: Age negatively impacts the willingness to disclose personal data directly.

3. Sample and Measures

The data were collected on the basis of an online survey. All the variables were measured with the use of scales successfully deployed in former studies.

More specifically, trust was measured on a 4-items 'Propensity to Trust' scale (Frazier, Johnson, and Fainshmidt, 2013); paranoia was measured on a modified (shortened) scale of Fenigstein and Vanable (1992), that was used in other studies (Gumley et al., 2011; Urbonavicius & Zimaitis, 2018; Zimaitis, et al., 2020). The reciprocal social exchange behaviour was measured with the 10-items social media use integration scale, used by Jenkins-Guarnieri et al. (2013). The negotiated social exchange was assessed by measuring the willingness to disclose personal data in online shopping. The preamble of the question specified the situation of a potential disclosure of personal data (when purchasing products online); the variable was measured on a shortened scale developed by Gupta, Iyer and Weisskirch (2010), later used by Robinson (2017). Cyber fear was measured on a 5-items scale following the study of Mason, Stevenson, and Freedman (2014). The perceived regulatory effectiveness was evaluated with a 3-items scale adopted from Lwin, Wirtz, and Williams (2007) with an additional mention of GDPR in one of the items. All the items were assessed on a 1 to 7 point Likert scale.

The data was collected in Lithuania using online self-administered survey; the sample 445 included respondents. Out of all the respondents, 25.6% were male and 74.4 % female. They belonged to two age groups: 16-49 (59.8%); 50 and over (40.2%). Since age is the key consideration in this study, prior to further analysis, t-tests for all the latent variables were performed between the two age groups (Table 1).

	Mean (below 50)	Mean (50 and above)	Mean difference	t	Sig. (2-tailed)
Trust (T)	3.9521	4.1775	-0.22545	-2.056	0.040
Paranoia (P)	2.4151	2.4396	-0.02448	-0.209	0.835
Social Media Use Integration (SMUI)	3.8042	3.9025	-0.09827	-0.647	0.518
Cyber Fear (CF)	3.6108	4.0051	-0.39426	-3.549	0.000
Perceived Regulatory Effectiveness (PRE)	3.8512	4.3785	-0.52733	-4.808	0.000
Willingness to Disclose Data (WTD)	4.5615	4.2006	0.36090	2.614	0.009

Table 1. Mean differences between two age groups

Levene's test for equality of variances was significant in the case of WTD, where the equal variances were not assumed; in all other instances, the equal variances were assumed.

This test was performed in order to pre-check the dependence of the latent variables on age. It confirmed that the means of the variables, expected to be dependent on age, were significantly different between groups: cyber fear, the perceived regulatory effectiveness and the willingness to disclose personal data. This allowed to proceed towards further analysis and to test the hypotheses.

4. Data Analysis

The exploratory factor analysis (Promax rotation, Maximum Likelihood extraction) was the first step towards the subsequent confirmatory factor analysis. Kaiser-Meyer-Olkin Measure of Sampling was adequate (0.765), Bartlett's Test of Sphericity showed approx Chi-Square of 3930.895 with df=231, p=0.000. The fit was appropriate: Chi-Square=310.452, df=114, p=0.000. The extracted 6 factors explained 579.68% of the variation with the cumulative initial Eigenvalues of 69.06%. The confirmatory factor analysis showed an acceptable fit of the model (CMIN/DF=1.320; p=0.002 TLI=0.980; CFI=0.984; RMSEA=0.027 (Byrne, 2010). This was achieved after reducing the items that measure the social media use integration to 6 items, paranoia to 3 items, cyber fear to 4 items and the willingness to disclose personal data to 5 items. Reliability and validity of the obtained scales were assessed by measuring the composite reliability (above 0.70, Bagozzi & Yi, 2012); according to Fornell-Larcker criteria (Fornell & Larcker, 1981), all the standardized factor loadings were above 0.50; the average variance extracted exceeded 0.50; the squared AVE values for each construct were greater than the correlation values of that construct. All these criteria were met (Table 2).

	Cronbach's Alpha	CR	AVE	CF	PRE	SMUI	WTD	P	T
Cyber Fear (CF)	0.789	0.792	0.562	**0.750**					
Perceived Regulatory Effectiveness (PRE)	0.795	0.796	0.565	0.024	**0.752**				
Social Media Use Integration (SMUI)	0.850	0.837	0.568	0.009	0.121	**0.753**			
Willingness to Disclose Data (WTD)	0.848	0.845	0.521	-0.139	0.071	0.179	**0.722**		
Paranoia (P)	0.769	0.770	0.527	0.192	0.160	0.285	0.080	**0.726**	
Trust (T)	0.864	0.859	0.603	0.024	0.184	-0.004	0.006	-0.280	**0.777**

Table 2. Validity and Reliability of the Constructs (CR – composite reliability, AVE – average variance extracted)

A common latent bias test came back positive (the difference in chi-square=54.8, the difference in df=22, p=0.000). Therefore, the variables were imputed including the presence of the common latent factor. The latent bias corrected model had an appropriate fit: CMIN/DF=1.164; p=0.073 TLI=0.990; CFI=0.993; RMSEA=0.020.

The structural model showed appropriate fit parameters: CMIN/DF=1.802; p=0.082; TLI=0.952; CFI=0.984; RMSEA=0.043. The model showed a set of the expected significant relations among the variables (Figure 1).

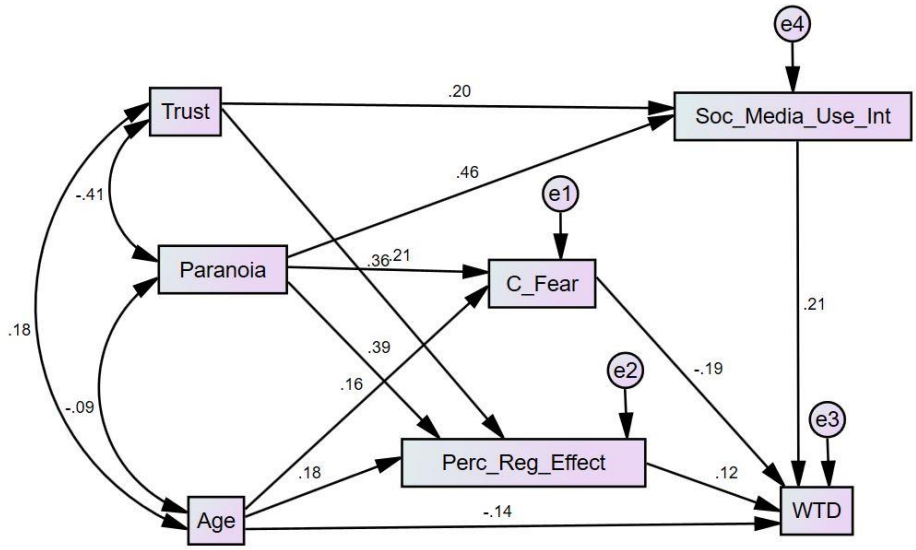

Figure 1. Structural model

The first three hypotheses were tested on the basis of a significance of total effects of trust, paranoia and age on the willingness to disclose personal data. After bootstrapping, H1 (the total effects of trust on the willingness to disclose personal data are positive) was confirmed, since standardized total effects of trust were β=0.085 with p=0.001. The total effects of paranoia on the willingness to disclose personal data were also significant, but positive: β=0.107; p=0.002. Hypothesis H2 predicted negative effects of paranoia, therefore H2 was rejected. H3 (the total effects of age on the willingness to disclose personal data are negative) was confirmed, β=-0.147; p=0.001.

The three other hypotheses tested the direct effects of age on cyber fear (H4), the perceived regulatory effectiveness (H5) and the willingness to disclose personal data (H6). All the three were confirmed, correspondingly: β=0.155; p=0.000; β=0.180; p=0.000; β=-0.140; p=0.003.

5. Discussion, conclusions and further research

An important finding of the study is that the model based on SET proved to be valid for the analysis of the willingness to disclose personal data in online shopping. As expected, a form of reciprocal exchange (social networking) significantly impacted the willingness to disclose data (a form of negotiated exchange). Trust had significant positive direct effects on reciprocal exchange, the perceived regulatory effectiveness and indirect effects on the willingness to disclose data (the negotiated exchange). The effects of paranoia differed from the expectations: the total effect of paranoia on the willingness to disclose personal data appeared to be positive. However, the result might be explained by analysing the effects of paranoia step-by-step.

First, paranoia positively influences cyber fear, as it is expected; cyber fear impacts the willingness negatively – again, as it is expected. However, paranoia positively influences the two factors that have positive impacts on the willingness to disclose personal data: these are the perceived regulatory effectiveness and the social media use integration. Though these effects are observed in some previous studies (Zimaitis, et al., 2020), the explanations of them, so far, have not been solid enough. It may be speculated that paranoid people are looking for their peers of a

similar type in social networks, and this makes the link between the factors positive. Moreover, it is very hard to comment on why paranoia links positively with the perceived regulatory effectiveness; the only similar finding was provided by Imhoff and Lamberty, 2018 who found that paranoia was not associated with low trust in the government (Imhoff & Lamberty, 2018).

The main attention of this study was the analysis on how age impacts the willingness to disclose personal data online in e-shopping. This aim has been achieved; it is obvious that age impacts the willingness negatively not only in all the modelled paths (direct, indirect) but also in total. It is proven, that age is positively linked to cyber fear. The study has also disclosed that age positively impacts the perception of regulation efficiency – this is understandable that more feared people are looking for a support of regulatory systems to protect their privacy. And, finally, it is observed that age itself has a direct negative impact on the willingness to disclose personal data. We suggest that in this case age should be understood not just a demographic parameter; it in a sense represents all the aggregated age-related factors that are not included into this specific model. We may only assume that a limited proficiency in using technologies, lower innovativeness and higher conservatism may be among them. This assumption puts ground for further studies that are suggested for considering these factors in a similar research.

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