

Willingness to Disclose Personal Information: How to Measure It?

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The study investigates a possibility of multidimensionality of a construct of willingness to disclose personal information (WTD). Willingness or unwillingness to disclose personal information has been a widely studied phenomenon as personal data is becoming increasingly important for many industries including marketing. Most of these studies treat the willingness to disclose personal information as a homogenous construct. In many cases it is measured by providing a number of personal information items and asking about the willingness to share them. Although recently there have been studies that find possible multidimensionality of the construct, most of them do not further elaborate this possibility. Therefore, we have adopted a scale used in many previous studies and made an attempt to test the hypotheses that would base the argument regarding the multidimensionality of this construct or even the possibility to consider several separate variables and constructs aimed at measuring the willingness to disclose personal data. This was achieved by using three antecedents of the willingness to disclose personal data – the perceived regulatory effectiveness, privacy awareness and disposition to value privacy – and comparing how they interact with different types of the willingness. This allowed to assess different relationship patterns between the antecedents and possible dimensions of the willingness to disclose personal information. We have employed Exploratory and Confirmatory Factor Analysis to check the homogeneity of the willingness to disclose personal information and Structural Equation Modelling to test the patterns of the relations. We have found that there is more than one separate dimension of WTD which means it could not be treated as a homogenous construct. Factorial analysis distinguishes three types of the willingness linked with three types of data: the willingness to disclose personal data that includes individual facts (profile data), social networking data and online browsing/purchasing data. The conclusion of multidimensionality is also supported by the differences in relationship patterns observed between the antecedents and the willingness to disclose personal information.

Keywords: *Online Privacy; Sharing Personal Data; Privacy Awareness; Privacy Value; Perceived Regulatory Effectiveness.*

Introduction

Predictive marketing based on consumer personal data analytics has become a common approach for many business companies and organizations around the world during the recent decades (Omer & Levin, 2015). More and more companies, both internet and offline based, are trying to collect personal data of their consumers or visitors in order to use it for a variety of analytical and/or communication purposes (Paine Schofield & Joinson, 2008). At the same time, consumers leave more and more personal information online (Boerman *et al.*, 2018) hoping to increase the usability, convenience of the website or get other benefits. Many businesses use personal information for personalization of services and messages (Boerman *et al.*, 2017; Estrada-Jimenez, 2017), be it advertising or political microtargeting.

Therefore, information privacy has become an increasingly important topic for academic research (Rohunen *et al.*, 2018), as it plays an important role in the online purchasing process (Cosar *et al.*, 2017). One of the major topics of this literature stream is about understanding what causes consumer willingness to disclose (WTD) personal information (Miltgen & Smith, 2015). One type of

antecedents is related with personal dispositions of consumers (e.g. their values (Anic *et al.*, 2018), personality traits (Bansal *et al.*, 2016), privacy attitudes and privacy experiences such as prior experience with privacy invasion (Malhotra *et al.*, 2004; Xu *et al.*, 2011), as well as cultural backgrounds (Gupta, Iyer, & Weisskirch, 2010; Robinson, 2017). Another type of antecedents under analysis is related to socio-demographic characteristics (Weinberger *et al.*, 2017), internet usage and habits (Akhter, 2014; Park, 2013). All these factors are based on personal characteristics of users. One more type of antecedents includes factors that could be named as situational factors, i.e. factors such as industry or company-specific variables, e.g. a general trust in the company or its reputation (Lwin *et al.*, 2007; Xu *et al.*, 2011). Situation-specific factors also include the perceived sensitivity, volume and relevance of information requested (Mothersbaugh *et al.*, 2012), familiarity with the website and/or vendor, and incentives such as rewards offered for data disclosure. So, generally, privacy-related constructs (including but not limited to the antecedents of disclosure behaviour) can be dispositional, that is, belong to or be impacted by an individual's pre-existing attitudes, beliefs, tendencies, knowledge and skills, or situational -

driven by context-dependent and “*situation-specific privacy constructs*” and their perceptions, e.g. related to a specific online company (Kehr *et al.*, 2015).

Even though the antecedents of WTD personal information have received a prominent attention from scholars, the consequent construct of WTD personal information has not been yet extensively studied. There are several different scales used to measure the construct of the WTD personal information.

Some authors have measured the WTD personal information in general, leaving for respondents to decide which specific data types and items might be requested (Kehr *et al.*, 2015; H. Li *et al.*, 2011; Y. Li, 2014; Schoenbachler & Gordon, 2002; Wakefield, 2013; T. Wang *et al.*, 2016) while other researchers have referenced only data categories, such as financial information, personal health information and other (Bansal *et al.*, 2016; Z. Wang & Liu, 2014). Malhotra *et al.* (2004) have used a rather simple and convenient 4 item scale to measure a general disposition to disclose personal information. However, one of the most common approaches tends to list specific data types/items and ask the respondents to evaluate their disclosure intention on an item-by-item basis (Gupta *et al.*, 2010; Heirman *et al.*, 2013; Malheiros *et al.*, 2013; Norberg *et al.*, 2007; Robinson, 2017; Treiblmaier & Chong, 2011; Walrave & Heirman, 2012). This approach goes back to the measurements used by Phelps *et al.* (2000) and Sheehan and Hoy (2000). Some of these authors treat the scale as a single dimension measure of WTD personal information (Robinson, 2017; Gupta *et al.*, 2010), while others find various dimensions and different behaviours of consumers related to them (Phelps, 2000, Heirman *et al.*, 2013). This is justified by an increasing number of instances when personal data can be disclosed on the internet and a growing number of data types as well as multiple ways of data transfer. Therefore, the question of whether the willingness to disclose personal data is a homogenous construct is challenged. It seems quite possible that the WTD personal data varies depending on the types of data to be disclosed and, consequently, various instances of the willingness should be studied individually.

The aim of this study is to test the possible multi-dimensionality of the willingness to disclose personal data (WTD) construct. Additionally, we aim to test the hypotheses on different types of relations between the tested antecedents and various types/dimensions of the WTD construct.

Theoretical Background

One of the first examples measuring the WTD construct in the modern commerce context was a study by Phelps *et al.* (2000). The researchers used a 16-item scale and asked respondents to evaluate their willingness to disclose each 16 types of data on a 4-point scale (from ‘always willing’ to ‘never willing’). Phelps *et al.* categorized 16 items into four groups: demographic characteristics, lifestyle, media usage habits and financial information. Nevertheless, this grouping was neither based on any type of statistical or other analytics, nor it was used for the subsequent analysis aimed to disclose their relations with antecedents or consequents. Therefore, although naming four groups of personal information, Phelps *et al.* (2000) treated the concept and the construct of WTD as a one-dimensional variable.

Gupta *et al.* (2010) examined consumer WTD in the US and India, adapted (shortened to 13 items) the scale used by Phelps *et al.* (2000) and deployed a 5-item scale to measure the willingness (from “not at all willing” to “very willing”). These researchers also treated the construct of the WTD as a homogenous unit.

The scales used by Gupta and Phelps were adapted by Robinson (2017) in his comparative study of Estonian and US consumers. He used a 7-item scale and expanded the list of items to 17, including the ones related to the internet and e-commerce. In his analysis, he also used 6 sub-indices: Contact Information, Payment Information, Life History Information, Work-Related Information, Online Account Information, Financial/Medical History Info. He has concluded that there are some differences between Estonia and the US regarding the terms of the willingness to disclose different types of personal data (Robinson, 2017). These categories may be considered as sub-dimensions of the willingness, but the author did not elaborate on the possibility that there might be more than one separate type of willingness and separate constructs for the measurement of WTD.

This step was done by Heirman *et al.* (2013) who studied the willingness to disclose personal data to an internet site. These researchers proposed 4 separate sub-constructs of WTD, namely: identity data, geographical information, contact data and profile data. They used a 7-item scale to measure the willingness to provide each item of personal data and, after conducting factor analysis, confirmed the existence of 4 dimensions of WTD. They have also proved that there are differences in how an antecedent variable (namely, trust) influences various dimensions of the willingness to disclose personal data.

In this study, we have attempted to modify the existing WTD scale towards modern realities and situations when an individual may express a certain degree of the willingness to disclose personal data. Simultaneously, we avoid situations where an individual has no choice in disclosing certain types of data such as the necessity to provide a credit card or other banking information in order to perform a transaction. This leads to three types of personal data that are disclosed in a variety of instances: (a) personal data that discloses the basic demographic and contact information; (b) personal data that discloses social interactions of a person (account of social networks, communication engines) and (c) personal data that disclosed online behaviours and is collected automatically, based on a single-time permission (such as browsing history, location tracking). The first two types of data are provided by a person, but differ in terms of whether the data are linked with the parameters of an individual versus his/her social interactions; the third type differs by the form of its collection (automatic) and represents behavioural patterns. Consequently, these items may help to assess the three different types of WTD.

The WTD may be considered both as a dispositional (attitudinal) and situational variable. In this study, the dispositional aspect is considered, thus the three forms of willingness have to be related with the antecedents that are also dispositional by their nature. The three dispositional antecedents – the privacy awareness, disposition to value privacy and perceived regulatory effectiveness (Xu *et al.*,

2008) – have been widely studied in the context of privacy concerns and WTD and are included in the current study.

Individuals might demonstrate different inclinations towards certain privacy behaviours and various levels of disposition to value privacy which can be related to a disposition to value privacy as an inherent need and trait which reflects the extent to which a person is inclined to maintain their personal information in private as much as possible “*across a broad spectrum of situations and persons*” (Xu *et al.*, 2008). The disposition to value privacy positively impacts online privacy concern and the perceived intrusive information gathering; a person who attributes higher value to his/her informational privacy is more likely to have a higher degree of serious concerns regarding personal data disclosure. The concerns of people with a high disposition to value privacy include issues not about the content of information, but also about how the personal data is collected, how it might be processed, i.e. some types of information gathering might be perceived as inappropriate and intrusive (Smith *et al.*, 2011; Xu *et al.*, 2008).

The disposition to value privacy is closely linked with one’s awareness of privacy practices (privacy awareness). This dispositional factor reflects how an individual is aware of company practices, regulatory policies and privacy-related matters in the society (Xu *et al.*, 2008). The awareness of privacy practices has been studied as an antecedent of disposition to value privacy and has been found to decrease the willingness to disclose personal information (Olivero and Lunt, 2004). Privacy has been generally considered as a natural right of individuals, both in theory and under national and international law (Smith *et al.*, 2011). Therefore, the regulatory aspect of a person’s privacy offline and online is important on societal and individual decision-making levels. The empirical findings support the importance of an individual’s perceptions regarding privacy regulation as a higher perceived effectiveness was found to decrease privacy concern (Miltgen & Smith, 2015) and to reduce the need for privacy protection behaviour (Lwin *et al.*, 2007; Miltgen & Smith, 2015). If consumers feel protected enough at a societal level, this reduces the need to put in individual efforts for privacy protection; people feel secure enough about the private data they provide (Miltgen & Smith, 2015).

Hypotheses

Based on previous studies by Phelps *et al.* (2010), Heirman *et al.* (2013), Robinson (2017) we assume that the willingness to disclose personal data is not a homogenous construct. We hypothesize that:

H1. The scale that measures the willingness to disclose personal data has more than one dimension.

We expect to find 3 dimensions of the willingness to disclose personal information: first – linked with the personal data that helps to identify a person and includes data items most frequently provided by an individual while browsing or purchasing online (name, address, e-mail, etc.); second – related to the information about an individual’s social networking (such as social account information) and the third – related with the information collected online automatically, once a permission is given (such as browsing history, location tracking, etc.). Correspondingly, this would mean three types of the willingness to disclose personal data: the willingness to

disclose personal data (individual facts, WTD_PD_IND), the willingness to disclose personal data about social interactions (WTD_PD_SOC) and the willingness to disclose personal data that is collected online (WTD_OD). All the three types of willingness are supposed to have certain relations with the analysed antecedents: disposition to value privacy (DTVP), perceived regulatory effectiveness (PReg) and privacy awareness (PAware).

The disposition to value privacy is the closest dispositional variable to the WTD. Xu *et al.* (2008) defined the disposition to value privacy as an inherent need and trait which reflects the extent to which a person is inclined to maintain his personal information private “*across a broad spectrum of situations and persons*”, thus it reflects the individual’s need to preserve his personal space, the importance put on his or her privacy and personal information. Xu *et al.* (2008) identified the disposition to value privacy as a “*cultural and personality characteristic*” and argues that the information disclosure decision depends on this trait. It has the most direct influence on the willingness to disclose personal information of all types because of its nature. Additionally, it may moderate the influences of other factors. Therefore, the hypothesis follows:

H2. The disposition to value privacy will have a direct negative influence on all the three dimensions of the willingness to disclose personal data.

The perceived regulatory effectiveness is linked with the situations where somebody perceives disclosing his/her personal information and relates this the regulations of various forms of legislation, with an expectation that this information is protected (Miltgen & Smith, 2015). The considered types of data most commonly include individual characteristics and behaviours. Therefore, the perceived regulatory effectiveness is supposed to directly influence the willingness to disclose contact and profile information and online data but will not necessarily be related to the disclosure of social networking information. The following hypothesis formulated:

H3. The perceived regulatory effectiveness will have a direct positive influence on the willingness to disclose personal data that include individual facts.

The awareness of privacy practices (privacy awareness) is a dispositional construct that reflects how an individual is aware of company practices, regulatory policies and privacy-related matters in the society (Xu *et al.*, 2008). The individuals who are highly aware of the issues are more likely to “*closely follow privacy issues, the possible consequences of a loss of privacy due to accidental, malicious, or intentional leakage of personal information, and the development of privacy policies*” (Xu *et al.*, 2008). The awareness of privacy practices has been found to be closely related with an individual’s disposition to value privacy: it has been modelled as an antecedent of a disposition to value privacy and has been found to enhance this disposition in the e-commerce context. However, interestingly, it did not affect a disposition to value privacy in the social networking context (Xu *et al.*, 2008). The privacy awareness is mainly linked with the disclosure of the information that reflects the individual demographic characteristics of a person. Therefore, it should only directly influence the willingness WTD_PD_IND:

H4. Privacy awareness will have a direct positive influence on the willingness to disclose personal data that include individual facts.

Measurement Scales and Survey

The survey data were collected in Lithuania by using CAWI survey and a self-administered questionnaire. The study included the scales that were developed and used in previous academic studies and that were demonstrating satisfactory reliability and validity. All the items were measured on a 1-7 Likert scale. A 3-item scale of disposition to value privacy was originally developed by Xu et al. (2008). They found Cronbach’s to be $\alpha=0.88$. Later it was adapted by Xu et al. (2011), Li (2014). The perceived regulatory effectiveness scale (3 items, $\alpha=0.83$) was taken from Lwin et al. (2007) with a minor change that includes GDPR as an example. The privacy awareness scale (3 items) was taken from Xu et al. (2008). Later it was also used by Xu et al. (2011) and showed a good reliability ($\alpha=0.865$). The willingness to disclose personal data was measured by a scale adopted from Gupta et al (2010) and Heirman et al. (2013) also used by Robinson (2017). It (with 14 items) showed a good reliability in earlier studies ($\alpha = 0.87$) and was the most relevant recent scale of this type (Robinson, 2017). In this study, the original list of items was reduced from 17 to 9 by removing those that were linked with entirely technical issues that would not be understood by general population. However, the scale was amended with 5 items of personal data that are collected online automatically (on user consent).

The survey sample consisted of 439 respondents ranging from 18 to 69 years of age; the age group of 18–22 represented 32.1 % of the respondents, those spanning 23–35 covered 33.0 %; those 36 or older represented the remaining 34.9 %. 25.1 % of the respondents were male and 74.9 % female. There were 54.9 % of the respondents with bachelor degree or lower education qualifications and 45.1 % with master or higher.

One item was removed from the willingness to disclose the personal data scale because of the high skewness (2.532) and kurtosis (5.799). All other items were included into the exploratory factor analysis (maximum likelihood; Promax rotation with Kaiser normalization). Kaiser-Meyer-Olkin measure of sampling adequacy was 0.877, Bartlett’s test of sphericity was significant (0.000), approx. Chi-square 7401.378 and $df=496$. The extracted factors explained 57.860 of the total variance. The dependent variable *willingness to disclose the personal data* appeared in three factors (see Table 1).

Table 1

Factor Loadings of Willingness to Disclose Personal Data (WTD)

	Factor		
	WTD_OD	WTD_PD_IND	WTD_PD_SOC
Full name		0.794	
Address		0.625	
Mobile phone		0.739	
E-mail		0.797	
Birthday date		0.459	
	Factor		
LinkedIn account			0.759

	Factor		
	WTD_OD	WTD_PD_IND	WTD_PD_SOC
Facebook account			0.653
Skype account			0.877
Internet browsing history and habits	0.754		
Geolocation data	0.635		
Online purchasing history and habits	0.926		
Information on searched goods	0.819		
IP address	0.543		
Means of the loadings:	0.735	0.683	0.763

The first extracted factor – the willingness to provide online data (WTD_OD) - included the data that are linked with online activities but does not have to be provided by a person. It is required just to give a permission to track/record this type of the data, while the further processes are going automatically without a direct intervention of the internet user. The reliability of this scale was 0.854. Two other factors represent personal data about the internet user. However, factor number 2 – the willingness to disclose personal data (individual facts, WTD_PD_IND) – includes the identification and demographic data of an individual, while factor number 3 the willingness to disclose personal data about social interactions (WTD_PD_SOC). The reliabilities of these scales were: 0.851 and 0.853, respectively. The reliability of scales that measured antecedents was also satisfactory: disposition to value privacy $\alpha = 0.835$; perceived regulatory effectiveness $\alpha = 0.746$; privacy awareness $\alpha = 0.829$; online privacy concern $\alpha = 0.901$;

A subsequent confirmatory factor analysis has been performed three times, with the same three same antecedents and each dependent variable separately. All the three models were robust and showed good fit (Table 2)

Table 2

Fit of the three Models (CFA)

	WTD_PD_IND	WTD_PD_SOC	WTD_OD
CMIN/DF	1.242	1.242	1.350
TLI rho2	0.991	0.991	0.988
CFI	0.993	0.993	0.991
RMSEA	0.023	0.023	0.028

On this basis, three causal models have been developed. In all the three instances, the presence of the common latent factor has been discovered, therefore the variables have been imputed considering its presence. All the three models demonstrated satisfactory fit (Table 3)

Table 3

Fit of the three Causal Models

	WTD_PD_IND	WTD_PD_SOC	WTD_OD
CMIN/DF	3.472	1.041	2.862
TLI rho2	0.941	0.999	0.965
CFI	0.990	1.000	0.994
RMSEA	0.075	0.010	0.065

This allowed to test the hypotheses.

Testing of the Hypotheses

The first hypothesis H1 (The scale that measures the willingness to disclose personal data has more than one dimension) was tested on the basis of an exploratory factor analysis (Table 1) and a subsequent confirmatory factor analysis. The average factor loadings (0.735, 0.683, 0.763) confirm the convergent validity, the correlations between factors (below 0.8) – discriminant validity (Table 4).

Table 4

Correlation among Factors

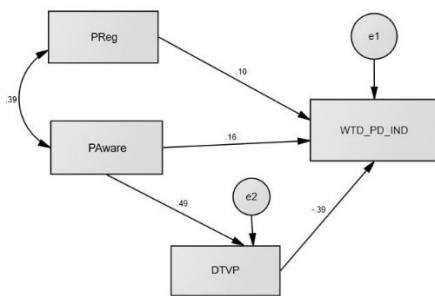
	WTD_PD_IND	WTD_PD_SOC	WTD_OD
WTD_PD_IND	1.000	0.523	0.509
WTD_PD_SOC	0.523	1.000	0.414
WTD_OD	0.509	0.414	1.000

Additionally, these three variables have a high reliability of their scales (Cronbach’s α above 0.85). All this indicates that the three types of the willingness can be measured as three separate variables and allows to confirm H1.

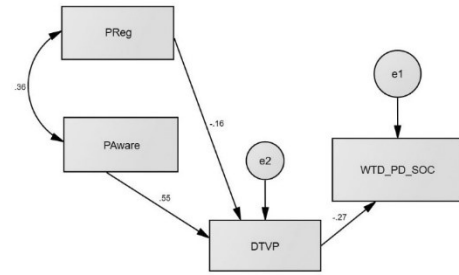
Hypothesis H2 (the disposition to value privacy will have a direct negative influence on all the three dimensions of the willingness to disclose personal data) is tested on the basis of all the three causal models by checking the significance of the relation between the disposition to value privacy and corresponding types of WTD. In all the cases $p=0.000$; WTD_PD_IND $\beta=-0.394$; WTD_PD_SOC $\beta=-0.273$; WTD_OD $\beta=-0.458$. Therefore, H2 is confirmed.

Hypothesis H3 (the perceived regulatory effectiveness will have a direct positive influence on the willingness to disclose personal data that includes individual facts) is tested on the basis of the causal model with the dependent variable WTD_PD_IND. In this case $\beta=0.097$; $p=0.045$. H3 is confirmed.

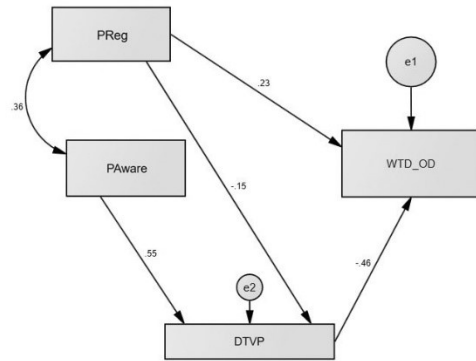
Hypothesis H4 (privacy awareness will have a direct positive influence on the willingness to disclose personal data that includes individual facts, the perceived regulatory effectiveness will have a direct positive influence on the willingness to disclose personal data that includes individual facts) is tested on the basis of the causal model with the dependent variable WTD_PD_IND. In this case $\beta=0.158$; $p=0.004$. H4 is confirmed.



(a)



(b)



(c)

Figure 1. Causal Models

Although it was not included in the hypotheses, we aimed to disclose that the three antecedents influence all the three types of WTD, but this happens in different ways. These different relation patterns are presented in three different causal models (Figure 1).

The presence of different relation patterns supports the hypothesis about multidimensionality of the WTD construct, which may trigger discussion even about three separate variables that perhaps describe three types of data to be disclosed. Willingness that is linked with each type of data is directly influenced by DTVP, but PReg and PAware have direct impact just on one type of WTD – the one that considers disclosure of personal (individual) data, WTD_PD_IND. PReg and PAware have no direct impact on WTD_PD_SOC, and only PReg has direct impact on WTD_OD. Additionally, the different nature of the three types of the WTD is visible from the remarkable differences of the total effects of the three antecedents (table 5)

Table 5

Standardized Total Effects

	PReg	PAware	DTVP
WTD_PD_IND	0.097	-0.036	-0.394
WTD_PD_SOC	0.043	-0.150	-0.273
WTD_OD	0.302	-0.251	-0.458

Discussion and Conclusions

The findings of the current survey support a previous research carried out by Heirman et al. (2013). Factor analysis shows that there is more than one dimension in the

willingness to disclose personal information construct. Heirman et al. (2013) found 4 separate dimensions while we found 3 dimensions instead of 4. Probably, the difference is due to a larger number of items used in a survey conducted by Heirman et al. (2013). As mentioned previously, Heirman et al. (2013) distinguish 4 groups of personal data (although it is not based on any statistical model): identity data, geographical information, contact data and profile data. We find slightly different dimensions based on factorial analysis, namely personal contact and profile information, social networking data and internet usage and purchasing online information. This partially reflects the dimensions found by Heirman et al. (2013). Obviously, the consumers perceive personal data as a heterogeneous phenomenon with all the consequences of this fact.

Not only the factor analysis shows multidimensionality of the WTD construct. T-test analysis shows that there is a significant difference between the average value of the three separate dimensions of willingness to disclose personal information. Test results (in both cases sig. <0.001) show that consumers are significantly more willing to disclose contact data and internet usage/purchasing information compared to social networking data. This supports the idea of difference in the perception of different types of personal information. It could be hypothesized that consumers perceive social networking data as more sensitive and intimate, therefore are consequently less willing to share it with others.

Further multidimensionality of WTD construct is supported by a different pattern of relationship between the antecedents and WTD. The disposition to value privacy has a negative relation with all the three dimensions of WTD, while the perceived regulatory effectiveness does not have any influence in case of social networking data (compared to a positive relationship in other two cases) and level of

privacy awareness has positive relation with willingness to disclose personal data only in case of personal contact data disclosure (compared to no relationship in other two cases). Again, it could be hypothesized that consumers do not think that social networks could be effectively regulated by national or EU laws and, therefore, even better regulatory perception does not have a positive effect on the willingness to disclose this type of data. A positive relationship between privacy awareness (i.e. interest in privacy issues) and the willingness to disclose personal contact information shows that probably more educated consumers understand that this type of data is less sensitive compared to other types.

In the cases when the perceived regulatory effectiveness and privacy awareness have no direct impact on WTD, these variables influence WTD indirectly, via mediation of the disposition to value privacy. Additionally, these two factors may have both direct and indirect effects on WTD. However, the most important observation is not the strength of these influences, but the existence of three different causal models when three types of WTD are considered. This allows to additionally state that these three types of WTD may be assessed and analysed separately, since they represent different aspects of willingness to disclose personal data.

The multidimensionality of WTD issue is worth further investigation, probably including more items of personal information into factorial analysis. It might provide even more than 3 or 4 possible dimensions of the construct. More than that, additional justification might help concluding that it is possible to consider not just dimensions, but separate constructs and variables. Based on an additional theoretical evidence, these could help to better understand consumers' habits of dealing with personal data.

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