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Privacy Trustworthiness and Users' Purchase  
Intentions**

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# Factors Influencing the Perceived Websites' Privacy Trustworthiness and Users' Purchase Intentions

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## Abstract

We created a model of factors influencing Internet users' trustworthiness perceptions and purchase intentions. Using focus group we calibrated the list of websites' attributes that represent those factors. Then we ran an online survey with 117 adult participants to validate the research model. We found that privacy (including awareness, information collection and control practices), security, and reputation (including background and feedback) have strong effect on trust and willingness to buy, while website quality plays a marginal role. While generally trustworthiness perceptions and purchase intention are positively correlated, in some cases participants were likely to purchase from the websites that they judged as untrustworthy. We discuss how behavioral biases, and decision-making heuristics may explain this discrepancy between perceptions and behavioral intentions. Finally, we analyze and suggest what factors, particular websites' attributes, and individual characteristics have the strongest effect on hindering or advancing customers' trust and willingness to buy.

## 1 Introduction

With development of World Wide Web and mobile technologies, electronic commerce has become a main driver of the digital economy. In 2016 e-commerce market achieved US\$322,171 million revenue in the U.S. (Statista, 2016), accounting for 8.1% of total U.S. sales and 15.8% growth with respect to retail e-commerce sales a year ago (DeNale and Weidenhamer, 2016). In Europe, about 296 million online shoppers generated €455.3 billion e-commerce revenue in 2015, demonstrating a 13.3% increase with respect to the previous year (Willemsen and van Welie, 2016). However, the full potential of e-commerce has not been reached yet, as only about 43% of the European adult population shop online (Ecommerce News Europe, 2016). Therefore, investigation of the

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factors that may help e-commerce to reach its full potential is of high demand and relevance.

One of the main issues related to e-commerce is management of extensive flows of information, containing terabytes of personal data. Large amount of transactions and interactions between customers and companies now occur via online platforms and mobile devices. Together with benefits and reduced costs for market players, companies, and customers, it implies risks that ranges from nearly harmless to significantly pernicious, including tracking of online behavior and location, intrusive marketing, data breaches, *etc.*

Since online shopping precludes disclosure of personal information (*e.g.*, name and surname, credit card details, email and shipping address, *etc.*), it inevitably creates privacy concerns for some consumers, which, in turn, negatively affect their behavioral intentions (Dinev and Hart, 2006; Taylor et al., 2009). For instance, 61% of surveyed Internet users refused to buy online due to privacy concerns (Ryker et al., 2002) and 64% did so because they were not sure about how their personal information would be used (Culnan, 2001). As the result, inability to address privacy concerns induces customers to limit their activity in the Internet (Hoffman et al., 1999; Arnott et al., 2007; Doolin et al., 2007; Poon, 2007) and, in particular, inhibits online shopping acceptance (George, 2004) and leads to multi-million-dollar losses in online sales (Odom et al., 2002).

Most economic exchanges have experience- or even credence-quality nature, *i.e.* the quality and risks cannot be assessed before a transaction happens, and sometimes it cannot be estimated even after a transaction took place. Therefore, engagement in economic exchanges requires trust (Tullberg, 2008). According to social exchange theory, trust is one of the main business assets (Zucker, 1986; Luo, 2002). As e-commerce presumes virtual buyer-seller interactions rather than real, trust gains an even more crucial role in online shopping context than in brick-and-mortar stores. Therefore, trust becomes an important factor that drives online purchase intentions (Jarvenpaa et al., 1999; Grazioli and Jarvenpaa, 2000; Bélanger et al., 2002; Bhattacharjee, 2002; George, 2002; van der Heijden and Verhagen, 2002; Corritore et al., 2003; Gefen et al., 2003; van der Heijden et al., 2003; Pavlou and Gefen, 2004; Bart et al., 2005; Wu and Chang, 2005; Flavián and Guinalíu, 2006; Zhou et al., 2007; Kim et al., 2008a, 2012; Tariq and Eddoudi, 2009; Chiu et al., 2010; Delafrooz et al., 2011; Islam et al., 2011; Al-Swidi et al., 2012; Ponte et al., 2015), and the lack of thereof prevents customers from completing e-commerce transactions (Wang et al., 1998; Furnell and Karweni, 1999; Hoffman et al., 1999; Gefen and Straub, 2000; Gefen, 2002; Grabosky, 2001; Grabner-Kraeuter, 2002; Lee and Turban, 2001; Pavlou, 2003; Kim et al., 2008a, 2011). For instance, NECTEC (2006) found that about 63% of online users prefer not to engage in online shopping due to lack of trust. Consumers are more likely to accept the perception of vulnerability when the website is trustworthy (Pavlou et al., 2006). Furthermore, the high level of trust propensity increases customers' satisfaction and positively influences repurchase intention (Chen et al., 2015) that may further improve online sales.

Therefore, privacy perceptions and trust are fundamental factors influencing

the success of business-to-customers e-commerce. A number of studies further demonstrated the negative correlation between privacy concerns and online trust in online shopping context (Cheung and Lee, 2000; Kim, 2001; Martin Jr et al., 2001; McKnight et al., 2000; Ngai and Wat, 2002; Malhotra et al., 2004; Eastlick et al., 2006; Van Dyke et al., 2007; Kim, 2008). For instance, consumers' privacy concerns were shown to decrease trust in vendor (Camp, 2002; Wu et al., 2012), while trust, in turn, reduces privacy concern (Milne and Boza, 1999; Taylor et al., 2009). Although Ponte et al. (2015) did not find the evidence of positive impact of perceived privacy on perceived trust in the presence of other, potentially stronger factors, providing privacy-friendly services may contribute to construction of good reputation and help to gain trust that is proved to be one of the core elements mitigating concerns related to online shopping (*e.g.*, Privacy and American Business, 2005; Culnan, 2001).

Academic literature recognizes the presence of privacy concerns as one of the main inhibitors and trust as one of the main facilitators of online shopping acceptance. Because users often judge the trustworthiness of companies' websites based on the inspection of surface elements (Kim and Benbasat, 2003), it is important to understand what cues influence users' beliefs about credibility of these firms, and how these beliefs affect their willingness to buy from the vendors' websites. Therefore, present study aims at investigating the antecedents of consumers' perceptions of companies' trustworthiness with respect to privacy and the impact of these perceptions on subsequent purchase intention.

We present a model that maps the influence of various websites' attributes about companies' practices on the consumers' perceptions of companies' trustworthiness with respect to privacy, and their impact on purchase intentions. Using focus group we calibrate and then empirically test the model in an online survey with 117 adult participants. We found that privacy (including awareness, information collection and control practices), security, and reputation (including background and feedback) have strong effect on trust and willingness to buy, while website quality plays a marginal role. Our results show positive correlation between trustworthiness perceptions and purchase intentions. However, while generally trustworthiness perceptions and purchase intention are positively correlated, in some cases participants were likely to purchase from the websites that they judged as untrustworthy. We further discuss how engagement in weighting risks and costs with expected benefits, behavioral biases, and decision-making heuristics may explain the discrepancy between perceptions and behavioral intentions found in our study. Finally, we analyze and suggest what factors, particular websites' attributes, and individual characteristics have the strongest effect on hindering or advancing customers' trust and willingness to buy.

The paper is organized as follows: section 2 reviews related literature, presents a research model and related hypotheses; section 3 describes methodology; section 4 provides analysis of the results and testing of the hypotheses; and section 5 summarizes findings and concludes.

## 2 Previous studies and proposed research model

### 2.1 Definitions and concepts

Electronic commerce represents a system of “consumer-oriented storefronts, business-to-business applications as well as behind-the scenes business functions like electronic payment systems and order management” (Conhaim, 1998; p. 13) and may take a form of business-to-consumer (B2C), business-to-business (B2B), and government-to-constituents (G2C). B2C e-commerce defines electronic business relationship between companies and individual consumers, B2B – between corporations, and G2C – between governments and different constituents (*e.g.*, firms, individuals, government agencies). In this study we focus on B2C e-commerce, defined as electronic business transactions conducted by a company electronically through its website directly to consumers.

Business models in electronic markets are vaguely divided into 2 categories: e-marketplaces (or online exchange, brokerage) and e-tailers (or online retailers, merchants, e-shops) (Timmers, 1998; Applegate, 2001; Rappa, 2003; Hong, 2015). E-marketplace plays an intermediary role between buyers and sellers, matching them and providing web-based transaction services based on a brokerage fee (*e.g.*, NASDAQ, e-Bay, Amazon.com, Taobao, Kayak, *etc.*). E-marketplaces often aggregate the products from multiple sellers. E-tailer, on the other hand, is a storefront of independent merchant, usually an online version of traditional store (*e.g.*, Apple Store, Nike.com, *etc.*). In our study we will focus on e-tailers, to avoid the potential confounding between the trustworthiness perceptions toward a product manufacturer and a website selling it.

Kim et al. (2008a) defines trust in an Internet vendor (including trust in the website itself, its brand, and a firm as a whole) as “a consumer’s subjective belief that the selling party or entity will fulfill its transactional obligations as the consumer understands them” (p. 545) <sup>1</sup>. Present study focuses on a particular type of trust that occurs with respect to companies’ privacy-related practices. We define *trust* with respect to information privacy in e-commerce context as a set of specific beliefs about another party not being engaged in opportunistic behavior such as selling, sharing, or other misusing of consumers’ personal information that positively influences an individual’s intention to conduct online transaction Preibusch (2013). Hence, *perception of trustworthiness* with respect to privacy, in our study, is a consumer’s belief about characteristic of a company and its website that reports the level of online trust with regard to treatment of her personal data. Our definition of trustworthiness perception is close to the notion of privacy assurance in Lowry et al. (2012), based on the works of Kim and Benbasat (2003) and Rifon et al. (2005). They define privacy assurance as an “attitude that reflects how strongly a customer feels that their

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<sup>1</sup>See Czepiel (1990); Beatty et al. (1996); Jarvenpaa et al. (1998); Ratnasingham (1998); Hoffman et al. (1999); Brynjolfsson and Smith (2000); Gefen (2000, 2002); Urban et al. (2000); McKnight and Chervany (2001); Bhattacharjee (2002); McKnight et al. (2002); Ba et al. (2003); Corbitt et al. (2003); Gefen et al. (2003); Pavlou (2003) for alternative definitions of trust in e-commerce context.

private information will be kept private by a website with which the customer is interacting” (Lowry et al., 2012, p. 756).

Some studies examined the positive relations between trust and willingness to provide personal information (*e.g.*, Hoffman et al., 1999; Cranor et al., 2000; Schoenbachler and Gordon, 2002; Bansal et al., 2015). Although personal information disclosure is usually a necessary step in online purchasing process (Ackerman et al., 1999) and may indirectly affect the likelihood of online transaction, in our study we focus directly on the willingness to make purchase as a measurement of behavioral intention. *Online purchase intention* is defined as a situation where a consumer is willing and intends to make an online transaction (Pavlou, 2003). Although one may argue that willingness to buy a product does not always translate in the real purchase, the theory of reasoned action (Ajzen and Fishbein, 1980; Featherman and Pavlou, 2003) and theory of planned behavior (Ajzen, 1985, 1991) states that transaction intentions are positively correlated with actual transaction behavior. Therefore, we believe that purchase intention is an acceptable and reliable measurement of behavioral intent in our study.

## 2.2 Research model and related hypotheses

A number of models were developed in order to understand what influences users’ online trust. For example, Cheskin and Archetype/Sapient (1999) report distinguishes six building blocks of trustworthiness: seals of approval, brand, navigation, fulfillment (including protection of personal information), presentation, and technology. Model in Corritore et al. (2003) consists of external and perceptual factors. External factors are related to thrusters (consumers), object (website), and situation (level of risk and control). Perceptual factors include perception of credibility, ease of use, and risk. Bart et al. (2005) point out the heterogeneity across websites categories and consumers’ characteristics and distinguish three main groups of antecedents of trust: consumer segment (demographics and personal characteristics), company’s category, and website’s characteristics.

Most of the trust models views trust as a general concept, while our study focuses on the trust with respect to privacy. Liu et al. (2005) proposed a privacy-trust-behavioral intention model that has the most relevant structure to the scope of our study. Empirical test of this model showed that privacy has a strong impact on users’ trust in ecommerce, which in turn influences their behavioral intentions. Similarly, Chen and Barnes (2007) showed that perceived usefulness, privacy, and security drive online initial trust, which then determines purchase intention. However, our model differs from the one in Liu et al. (2005) in several ways. First, we extend the number of privacy dimensions by including information collection, control, and awareness (Malhotra et al., 2004) instead of following the categorization of (FTC et al., 2000) fair information practices. Second, we separate security and privacy features. Third, we include website quality and company’s reputation that are shown to be the strong predictors of consumers’ trust. Finally, we focus on willingness to make a purchase as behavioral intention measurement, because it has the most direct economic effect

than websites visits, recommendations, or positive remarks about website.

Although we use our own model structure, we rely on the previous literature in choosing the factors for inclusion in the research model. Factors influencing the perception of companies' trustworthiness about service providing rather than information privacy (*e.g.*, shipment, ease of use, navigation, return policy, *etc.*) were not taken into consideration in this study as they are beyond the scope of the research question.

While trying to estimate the trustworthiness of transactional partners', individuals rely on three main criteria: reputation, performance, and appearance. Reputation is viewed as retrospective of past behavior, performance – as overview of actual practices and present conduct, and appearance – as self-presentation (Sztompka, 1999). Following this taxonomy of trustworthiness assessment criteria, we include four dimensions of antecedents of trust in our model: *privacy* and *security* (performance criterion), *website quality and visual appearance* (appearance criterion), and *reputation* (reputation criterion). We will now discuss each of the dimensions in detail.

### 2.2.1 At construct level

**Privacy** Most of the trust models comprise privacy and security as the main cogwheels for online shopping acceptance (Keisidou et al., 2011), for establishing reliable long-term loyal relationship between companies and customers, and as antecedents of trust (Yousafzai et al., 2005; Kim et al., 2008a; Escobar-Rodríguez and Carvajal-Trujillo, 2014; Ponte et al., 2015).

Privacy assurances are shown to decrease privacy concerns, and increase trust (McKnight et al., 2002; Liu et al., 2004, 2005; Pan and Zinkhan, 2006; Lauer and Deng, 2007; Wu et al., 2012) and behavioral intentions (Wang et al., 2004; Meinert et al., 2006; Hui et al., 2007; Peterson et al., 2007; Tsai et al., 2011). However, some studies showed insignificant (Wang et al., 2004; Metzger, 2006) and even negative (Arcand et al., 2007) effect of privacy policies on trust. Bansal et al. (2015) explain the contradictory nature of empirical evidence by the lack of attention to the level of privacy concerns as the factor mediating the effectiveness of the privacy assurance statements. Therefore, we include in our model the control variables that measure general level of privacy concerns.

Some factors included in our model are positive (*e.g.*, about transparency in providing information about privacy policies), while others are negative (*e.g.*, the prohibition to edit the list of permissions required during the installation of a mobile application) or even may have an unpredictably ambiguous effect on subjects' valuations (*e.g.*, when company asks a permission to use customer's current geographical location, on the one hand, it gives control to the user over this piece of information, but on the other hand, the intention to use geolocation *per sé* may raise a privacy concern). Therefore, we predict a significant influence of privacy-related practices on trustworthiness perceptions and purchase intention, but leave the sign of these relations open for exploration instead of imposing our personal opinion on that.

**H1a:** *Privacy-related practices have significant effect on trustworthiness perceptions.*

**H1b:** *Privacy-related practices have significant effect on purchase intentions.*

In categorization of privacy factors we follow the notion of Internet Users' Information Privacy Concerns (IUIPC) (Malhotra et al., 2004) by including *collection*, *control*, and *awareness* about privacy-related practices.

*Collection* considers the extent to which individual is concerned about the amount of personal data in possession of others relative to the perceived benefits and values. Collection is one of the main dimensions in concern for information privacy (CFIP) scale (Smith et al., 1996) as well. Information collection category include the aspects of business practices regarding the requirements and ways of the users' data collection, including deliberate information disclosure, take-it-or-leave-it (TIOLI) offers, and implicit inferences about users' characteristics from observed behavior, *e.g.*, via tracking technologies such as cookies.

*Control* is related to the consumers' freedom of choice and ability to actively control (*e.g.*, to approve, modify, opt-out, delete) their personal information (Caudill and Murphy, 2000). In the control dimension of our model we include the ability of users to grant permissions to the web services about access to the personal data, retention of the information, and freedom to choose a registration option.

Finally, *awareness* indicates a passive control over personal information through being informed and understanding of the privacy-related organizational practices. It is related to transparency about collection, storage, use, and sharing of the information. Clear and credible privacy policies are shown to be helpful in building trustful relationships between online vendors and consumers (Schoenbachler and Gordon, 2002). FTC et al. (2000) recommendations about fair information practices suggest to use notices and appropriate disclosures about data procedural fairness in order to meet ensure consumers' awareness. Therefore, we include privacy policy statements and notice about use of cookies as factors designed to enhance users awareness.

**Security** Security has been found a serious concern among online shoppers (Rao, 2002; Tsai and Yeh, 2010). Security perception indicates an extent of individual's beliefs that the website of online merchant is secure (Meskaran et al., 2013) against security threats. Security threats are "circumstances, conditions, or events with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service, and/or fraud, waste, and abuse" (Kalakota and Whinston, 1996). A number of studies include security system assurances into antecedents of trust perceptions (Ambrose and Johnson, 1998; Kini and Choobineh, 1998; Teo and Liu, 2007; Ponte et al., 2015) and purchase intentions (Meskaran et al., 2013). Following the studies of Hawk (2004); Efendioglu et al. (2005); Meskaran et al.



(2010, 2013), we also include a type of payment option as one of the antecedents of security perceptions.

**H2a:** *Security features have significant effect on trustworthiness perceptions.*

**H2b:** *Security features have significant effect on purchase intentions.*

Third-party assurance seals, which guarantee to the users that the visited website comply with the quality standards of particular operating practices and privacy policies, and ensure secure payment systems (*Shapiro, 1987; McKnight et al., 2002; Kim et al., 2004*), are strong predictors of security perceptions (Kimery and McCord, 2002; Furnell, 2004; Sharma and Yurcik, 2004; Jiang et al., 2008; Kim and Kim, 2011; Özpolat et al., 2013; Ponte et al., 2015) and credibility in relation to privacy (Xu et al., 2009; Lee and Cranage, 2011). However, the evidence on the effect of third-party seals on trust is contradictory (Özpolat et al., 2013): some empirical studies found a positive impact (Grazioli and Jarvenpaa, 2000; Miyazaki and Krishnamurthy, 2002; Rifon et al., 2005; Wakefield and Whitten, 2007; Yang et al., 2006; Hu et al., 2010), while others did not (Kovar et al., 2000; Bélanger et al., 2002; Mauldin and Arunachalam, 2002; Pennington et al., 2003; Bart et al., 2005; Hui et al., 2007; Kim et al., 2008a; Ray et al., 2011). Lowry et al. (2012) attribute such inconsistencies in empirical findings to a measurement error (indirect *versus* direct assessment of privacy assurance) and omitting of other important factors in the trust models. Supporting the finding in McKnight et al. (2002) he suggests website quality and brand image to have the strongest influence on privacy valuation. However, as Hoffman et al. (1999); Dayal et al. (2003), and Ovans (1999) argue, reputation and website features influence trust only after security concerns were addressed. We, therefore, test the relation between various factors in our model and control for the familiarity with certifying agencies and understanding of the technical security features.

Some studies include security features in the notion of privacy (Liu et al., 2005), or even use privacy and security interchangeably (Ray et al., 2011). Others view the effects of privacy and security aspects separately (*e.g.*, Jarvenpaa et al., 1999; Bélanger et al., 2002; Casalo et al., 2007b; Tariq and Eddaoudi, 2009; Delafrooz et al., 2011). For instance, Bélanger et al. (2002) found that security features have greater effect than privacy statements, because security is a more concrete concept, which is easier for users to understand, than privacy. Similarly, empirical studies in Pavlou and Chellappa (2001) and Kim et al. (2008b) showed the weaker effect of perceived privacy on trust compared to perceived security. Carlos Roca et al. (2009) argues that due to a better familiarity with security technologies, relative ease of recognition of its features (*e.g.*, certificates, encryption keys, password-composition requirements), and inclusion of some privacy guarantees in security assurance, perceived privacy has a lesser impact on trust for experienced users. Therefore, in our study we separate and compare the impact of privacy from the impact of security features, and control for the technical and Internet experience.

**Website quality and visual appearance** Although privacy and security policies, statements, and seals are designed to directly influence the privacy perceptions, they are shown to be more effective when combined with other, more peripheral cues, such as brand image and website quality (McKnight et al., 2002; Lowry et al., 2012). Websites’ design appeal is a course of attractiveness related to the visual presentation and structure of the website (Bansal et al., 2015) that signals website quality (Wells et al., 2011), expertise and professionalism, and develops trusting beliefs (Wakefield et al., 2004; Mayer et al., 2005; Dhamija et al., 2006). Fogg et al. (2001) considers aesthetics of the website as one of the important drivers of trust. Egger (2001) focuses on interface properties and design features, based on the assumption that consumers’ trust in online business starts to form even before any online interaction has taken place. In his model of trust for e-commerce, pre-interactional filters that antecede interface properties are followed then by informational content. Moreover, trusting beliefs are positively correlated with the absence of errors on a website (Bart et al., 2005), accurate, current, and complete information (Kim et al., 2005), and correct spelling, grammar, and syntax (Koehn, 2003).

Another reason why visual cues are important antecedents of trustworthiness perceptions is explained by the signaling theory. Poor website quality or slow performance does not enforce users’ beliefs that the company behind that website will do any better in privacy and security protection, or delivering services to customers (Bouch et al., 2000; Sillence et al., 2004; Bansal et al., 2015). Positive beliefs about firms’ reliability, integrity, and professionalism are also related to the amount of time, effort, and money that company has invested in development and maintenance of the high-quality website, which is expected to proliferate and have an effect on other, including privacy and security related, organizational practices (Dawar and Parker, 1994; Duncan and Moriarty, 1998; Schlosser et al., 2006; Ray et al., 2011).

Hence, based on the findings in previous research, we include in our model the aesthetical quality factors, such as professionalism of the general visual appearance of the website and presence of the broken links and typographical errors on it. As users tend to believe that online advertising follow the norms of the websites containing this ad (Stewart, 2003), we include the presence of suspicious banner ads as one of the aspects influencing the assessment of website quality as well.

***H3a:** Negative visual cues about websites quality negatively affect users’ trustworthiness perceptions.*

***H3b:** Negative visual cues about websites quality negatively affect users’ purchase intentions.*

**Firm’s reputation** Reputation (or store image), as the result of social evaluation and judgment, is a significant factor influencing the perception of website’s trustworthiness (Smeltzer, 1997; Jarvenpaa et al., 1998, 1999; Grazioli

and Jarvenpaa, 2000; Peszynski and Thanasankit, 2002; Yoon, 2002; Koufaris and Hampton-Sosa, 2004; Chen, 2006; Pavlou and Dimoka, 2006; Casalo et al., 2007a; Sillence et al., 2007; Song et al., 2007; Teo and Liu, 2007; Kim et al., 2008a; Meskaran et al., 2010) and purchase intentions (van der Heijden and Verhagen, 2002). Similarly to the visual appearance of the website, reputation of the company may serve as heuristic in signaling the reliability (Parasuraman et al., 1985; Dawar and Parker, 1994; Ganesan, 1994; Hosmer, 1995; Grazioli and Jarvenpaa, 2000; Gefen et al., 2003) and quality (Duncan and Moriarty, 1998) of the firm. Even though reputation is a primarily important antecedent of trust on the initial stages of the vendor-buyer interactions (Koehn, 2003), Ray et al. (2011) argues that it does not lose its role at the later stages of on-going relationship due to the credence-quality nature of privacy, *i.e.* the level of privacy is difficult to assess even after the transaction has taken place, and therefore, users need to perpetually rely on a combination of sources to build and maintain trust throughout their relationship with a vendor.

**H4a:** *Good reputation positively affects users’ trustworthiness perceptions.*

**H4b:** *Good reputation positively affects users’ purchase intentions.*

In our study reputation is comprised by two main components: firm’s *background*, and consumers’ *feedback* about the company and its products.

Earp and Baumer (2003) report that consumers expressed a higher willingness to disclose personally identifying and financial information to companies with well-known brand names. Brand image influences trust (Lowry et al., 2008). Familiarity in general has been shown as an important condition of trust in e-commerce (Luhmann, 1979; Bhattacharjee, 2002; Shim et al., 2004; Mollerling, 2006). It reduces uncertainty (Gefen et al., 2003), concerns (Gulati, 1995), and increase perceived security control (Ray et al., 2011). Display of the information about company on the website, especially related to its offline presence (*e.g.*, physical address, contact details), reduces the uncertainty about otherwise “faceless” e-commerce (Fogg et al., 2001; Kim and Benbasat, 2003; Mayer et al., 2005; Kuan and Bock, 2007; Bansal et al., 2015). The impact of using photographs on the websites as a mean of creating social presence perception has no univocal empirical evidence. While some studies found a positive effect (Steinbrück et al., 2002), others showed insignificant (Riegelsberger et al., 2003) or mixed results, and even considered photos as attempts to manipulate the consumers’ online trust (Riegelsberger and Sasse, 2002). Therefore, *background* aspects in our study include well-known brand name, the number of years in business, and information about company’s history, and names and photos of key people working there.

Jøsang et al. (2007) define reputation in e-commerce as a collective measure of trustworthiness based on referrals or ratings from members in a community. This definition is the closest to our notion of feedback. Customers’ feedback (Resnick et al., 2000; Koehn, 2003; Walczuch and Lundgren, 2004; Lowry et al., 2010), perceptions of social presence (Gefen and Straub, 2004; Hassanein and

Head, 2004; Cyr et al., 2007; Hess et al., 2009), and, in particular, word-of-mouth within social network (Kuan and Bock, 2007), and third-party assessments (*e.g.*, rating services Toms and Taves, 2004) were shown to increase trust. Therefore, our *feedback* category includes customers’ reviews, opinions in online social networks, and rating of the company in independent sources.

### 2.2.2 At item level

In selection of the items for the survey we primarily focus on their relation to the main factors influencing consumers’ attitudes that we will use later for the construction of indices. Analysis of the impact of these factors on trustworthiness perceptions and purchase intentions is the primary goal of this study. However, we are also interested in subtle differences between related aspects. For example, with respect to company’s ranking we are interested whether there is a difference between online and offline sources of this ranking, or whether there is difference between publishing customers’ reviews on the company’s own website or on the independent website, *etc.* Hence, we distinguish the following groups of related items: consumer feedback (FT/FP items 1, 2, and 5), ranking source (FT/FP 3 and 4), access conditions (LT/LP 4 and 5), source of information for recommendations (LT/LP 2 and 3), tracking (LT/LP 1 and 3), and app permissions (NT/NP 4 and 5). We will now discuss our predictions of difference in impact between the items within those groups.

**Consumer feedback** Online review credibility is positively related to the argument quality of reviews (Cheung et al., 2012). Unbiased pieces of information are more likely to be trusted (Sillence et al., 2004). Therefore, we predict that:

***H5a:** Customers’ feedback on independent websites has stronger impact on trustworthiness perceptions and purchase intentions than users’ reviews on the company’s own website.*

About 30% of favorable reviews are fraudulent (Liu, 2012) and authors of such manipulated opinions are often paid to promote companies and their products (Mayzlin, 2006; Hu et al., 2011b,a; Streitfeld, 2011; Kost, 2012; Tuttle, 2012). Consumers aware of opinion fraud may suspect overwhelmingly positive reviews to be fake. As consequence, a moderate amount of negative information in consumer review, as a proof of objectivity, increases its credibility (Crowley and Hoyer, 1994; Jensen et al., 2013). Such two-sidedness of exposure to both positive and negative aspects has been shown to have a bigger impact on belief change inducing fewer counterarguments and decreasing source derogation (Kamins and Assael, 1987; Kamins and Marks, 1988). However, in judgment and decision-making tasks individuals tend to rely more on negative information than on positive (Kanouse and Hanson Jr, 1987; Weinberger et al., 1981; Skowronski and Carlston, 1987; Herr et al., 1991; Feldman, 1966; Ahluwalia and Shiv, 1997). Metzger et al. (2010) found that users rely on negative reviews

more heavily than on positive ones, possibly because negative information is perceived as more instructive and useful than positive information (Maheswaran and Meyers-Levy, 1990; Ahluwalia, 2000). Negative reviews have been shown to have a greater impact on purchase intent as well (Weinburger and Dillon, 1980).

**H5b:** *Mixed (both positive and negative) customers’ feedback has less impact on trustworthiness perceptions and purchase intentions than only positive users’ reviews on the company’s own website.*

**Ranking source** When source is perceived as more reliable and expert on a topic, consumers tend to associate a higher level of credibility to the message content from such a source (Giffin, 1967; Pornpitakpan, 2004; Ko et al., 2005). Improved ability of online media to aggregate information better enhances the determination of credibility than the traditional authorities (Flanagin and Metzger, 2008). The study of (Johnson and Kaye, 1998, 2000) and focus group results in Metzger et al. (2010) showed that users perceive information found in online sources as more or at least equally credible as information in traditional sources. However, the “authority” heuristic (Hilligoss and Rieh, 2008; Sundar, 2008) suggests that users may perceive traditional sources of information as primary or official, and, therefore, develop a higher level of trust compared to the online ones. Traditional sources of information are believed to be unbiased and accurate (Mashek et al., 1997; Kioussis, 2001) due to established professional standards and social pressure (Finberg et al., 2002), while websites’ content is not always subject to editorial review and factual verification (Flanagin and Metzger, 2000), even though Klein (2000) claims that the standards of accuracy are the same for both types of media. Moreover, social presence model (Short et al., 1976) claims that people tend to select the communication media with the highest level of social presence. Since social presence is positively correlated with trust (Gefen and Straub, 2004; Hassanein and Head, 2004; Cyr et al., 2007; Hess et al., 2009), while new (*i.e.* electronic) media were found more suitable for the tasks requiring low social presence (Rice, 1993; Perse and Courtright, 1993), then, given the similar content in both sources, the offline source of information may gain a higher level of reliability and credibility than online one.

**H5c:** *Firm’s high rating in the traditional media has a stronger positive effect on trustworthiness perceptions and purchase intentions than high rating in online sources.*

**Access conditions** As TIOLI offers does not allow consumers to access or use the services without personal information sharing, some users have to provide false personal information (Phelps et al., 2001) or abandon the website (EPIC, 2000). Hence, users are expected to dislike TIOLI offers more compared to the

situations where they have more freedom in choosing the level of information disclosure.

***H5d:** Users have higher perceptions of trustworthiness and purchase intentions towards websites that allow access to its content without personal information provision compared to the websites that do not grant such permission.*

**Source of information for recommendations** Privacy concerns include tracking through cookies and browser history (Wang et al., 1998). Perceived risk related to the online behavioral tracking may negatively affect the long-run relationships between online sellers and buyers (Jai et al., 2013), especially when consumers are uninformed about such practices (Nowak and Phelps, 1995; Lanier Jr and Saini, 2008; Turow et al., 2009). For instance, websites often track users for the sake of data collection and its use for remarketing and targeting purposes, *i.e.* delivering advertising related to the previous searches or other online activities. Aguirre et al. (2015) found that click-through-rates are lower when data for personalized online advertising was collected in a covert (*vs.* overt) manner. This effect may be related to the sense of vulnerability. Therefore, we expect users to generally dislike covert information collection practices over proactive information provision.

***H5e:** Websites that explicitly ask to share information about tastes and preferences receive a higher score of trustworthiness perceptions and purchase intentions than those that implicitly collect such information using tracking technologies.*

**Tracking** The majority of users find targeted ads harmful, annoying, and “pushy”, however, they are more comfortable with the first-party than third-party tracking, which is related to the higher degree of trust to the tracking party (Melicher et al., 2015).

***H5f:** Third-party tracking has a more negative effect on trustworthiness perceptions and purchase intentions than first-party tracking.*

**App permissions** A finding about drop in click-through-rates after users have realized that information about them was collected without consent (Aguirre et al., 2015) provides evidence of the importance of both control over one’s data and awareness about practices involving processing of personal information. Taylor et al. (2009) argues that the level of control over personal information does not have a significant effect on trust, but mediates the negative relationship between privacy concerns and behavioral intentions.

**H5g:** *Trustworthiness perceptions about the web services that grant control over degree of personal information collection and willingness to purchase from them are higher than for the web services that do not provide such control.*

### 2.2.3 Covariates

Angst and Agarwal (2009) claim that more persuasive messages are required to affect the beliefs of highly concerned consumers. In accordance with Elaboration Likelihood Model (ELM) (Petty and Cacioppo, 1984; Sussman and Siegal, 2003), when assessing the trustworthiness, users, especially in their low-involvement and low-privacy concern state, tend to directly rely on the source credibility peripheral cues, such as reputation and visual design, instead of spending cognitive energy on effortful thinking (Taylor, 1981; Petty and Wegener, 1999; Bhattacharjee and Sanford, 2006; Wells et al., 2011; Bansal et al., 2015).

Although some studies showed that disposition to trust plays an important role in assessment of credibility (Gefen, 2000; Kimery and McCord, 2002; Kim and Benbasat, 2003; Salam et al., 2005; Teo and Liu, 2007; Lowry et al., 2008), others did not find a significant support of such relation (Koufaris and Hampton-Sosa, 2004; Ponte et al., 2015). Lee and Turban (2001) demonstrated a mediating effect of propensity to trust on the impact of website attributes.

Internet experience is positively correlated with trust towards e-commerce (Corbitt et al., 2003). However, Aiken and Boush (2006) found an inverted U-shape relationship, where trust increases at the early stages of using web and then starts to decline because of rising privacy and security concerns.

Based on the suggestions of the previous literature, we collected via survey the information about participants' socio-demographic characteristics, such as gender (Q3), age (Q4), whether they live in urban area<sup>2</sup>, source of income (Q10), monthly expenditures (Q11), technical<sup>3</sup> and Internet proficiency (Q13), online shopping preferences (Q17) and frequency<sup>4</sup>, privacy attitudes (including general privacy concern (Q22), willingness to provide personally identifiable information to website (Q27), experience of privacy invasion (Q32), and Westin's index (Q33, see Westin (1968)), and trust disposition<sup>5</sup>. Additionally we include questions designed to elicit the understanding of Extended Validation certificate (coded as 1 if subject provided a right explanation of what does EV certificate mean in Q20, 0 otherwise) and cookies (coded as 1 if subject provided a right explanation of what does web cookie mean in Q21, 0 otherwise), and number of the third-party assurance authorities (*e.g.*, TRUSTe, VeriSign, *etc.*) with which subject

<sup>2</sup>"Urban" index was coded as 1 if subject lives in a city with >10,000 habitants (*i.e.* if answered 3, 4, or 5 in Q9), 0 otherwise.

<sup>3</sup>"Technical proficiency" index was coded as 1 if subject knows at least one programming language (Q12), 0 otherwise.

<sup>4</sup>The "frequency of online purchases" index is computed using a single-factor measurement model whereby answers to question Q16 are modeled as ordered logit (Cronbach's alpha = 0.8854).

<sup>5</sup>The "trust disposition" index is computed using a single-factor measurement model whereby answers to Q45-Q47 are modeled as ordered logit and answers to Q48-Q49 are modeled as logit (Cronbach's alpha = 0.7696).

is familiar (Q18). We also included the number of connections in the primarily used online social network (Q35) and whether subject uses real or pseudonymous name there (Q36). In contrast to the models that consider consumers' personal characteristics as one of the dimensions directly influencing trust (*e.g.*, (Chen and Dhillon, 2003; Gefen et al., 2003; Kim and Benbasat, 2003; Bart et al., 2005; Ray et al., 2011)) we include them in analysis as covariates.

#### 2.2.4 The effects of cognitive heuristics and biases

Apart from the theories already mentioned (*e.g.*, ELM, social exchange and signaling theory, theory of reasoned action and planned behavior, *etc.*), the theory of bounded rationality (Simon, 1955) has a great potential in explaining the process that brings various factors into action to change the online trustworthiness perceptions. The notion of bounded rationality refers to the limitations imposed by the nature of human mind and exogenous conditions, and claims that individuals are constrained to make a decision using limited computational resources and time (Gigerenzer and Todd, 1999). This argument is further supported by *limited capacity model* (Lang, 2000) and *prominence-interpretation theory* of online credibility (Fogg, 2003) that argue that due to not infinite cognitive capacity individuals select only salient attributes for messages processing, which require an optimal level of cognitive effort to achieve a sufficiently efficient outcome (Pirolli, 2005). To reach that balance and make an adaptive choice people often employ cognitive heuristics (Hilligoss and Rieh, 2008; Sundar, 2008; Taraborelli, 2008; Metzger et al., 2010). Although such mental shortcuts and rules-of-thumb sometimes result in biased decisions (Tversky and Kahneman, 1975), more cognitively demanding information-processing strategies are shown to be equally (Gigerenzer and Todd, 1999; Gladwell, 2007) or even less effective in attempt to make a perfectly rational decision due their complexity.

The results of focus group in Metzger et al. (2010) identify four heuristics used by consumers in assessment of online credibility and relevant to our study: reputation (or authority), endorsement (conferred credibility), consistency, and expectancy violation. The *reputation heuristic* is based on the consumers' tendency to rely on familiar sources and alternatives rather than on unrecognized ones (Gigerenzer and Todd, 1999). People driven by that heuristic in our study may attribute a higher level of trustworthiness to a website that carries products with reputable names, or to a company that operates in business for many years and have a description of its history on the website. Alternatively, reputation heuristic may be a product of the *authority heuristic*, which suggests that degree of being an official authority or source of information is an important criterion of credibility assessment (Hilligoss and Rieh, 2008; Sundar, 2008). In our study the deployment of authority heuristic may be triggered by the presence of independent third-party seals, security features, such as icon of Extended Validation certificate compliance and trusted payment facilitators (*e.g.*, PayPal). Moreover, it may indirectly enhance the effect of the presence of key staff members' names and photos on the company's website, providing a proof of existence of real people behind the intangible web interface.



The *endorsement heuristic* (Hilligoss and Rieh, 2008) or *conferred credibility* (Flanagin and Metzger, 2008) is related to the confirmation bias and consensus (or “bandwagon” (Sundar, 2008)) heuristic (Chaiken, 1987), under which people perceive a source of information as trustworthy without scrutinizing the content if others already trust it. Projecting the observations in Metzger et al. (2010) on our study, we expect endorsement heuristic to have an impact on credibility perceptions through the reliance on consumers’ feedback and reviews, online and offline ratings, and recommendations from friends in online social network. The impact of the latter factor is additionally supported by the liking/agreement heuristic (Chaiken, 1987) that suggests that individuals tend to believe that people they like possess the correct beliefs and to agree with their opinions.

The *consistency heuristic* predicts that information, which is similar across various sources, is supposed to be credible (Metzger et al., 2010). Our study does not presume cross-validation of information. However, in case it did, the consistency heuristic could increase the effectiveness of feedback if reviews on company’s website and independent forums, or online and offline ratings coincided. This proposition can be addressed in the future research.

Thus, the first three heuristics are related to the notion of social proof (Cialdini, 1993), or social confirmation: if other users trust, use, and recommend some website, then one can also perceive it as trustworthy. However, such strategy is not perfect, as it may lead to misconception between credibility and popularity (Metzger et al., 2010), and in certain cases, to erroneous reliance on fraudulent information from manipulated opinions and fake reviews (Mayzlin, 2006; Hu et al., 2011b,a; Streitfeld, 2011; Kost, 2012; Tuttle, 2012).

Finally, the *expectancy violation heuristic* arises in the situations where websites’ content does not conform to the users’ expectations (Metzger et al., 2010) and as consequence of arousal, distraction, and increased attention to the violation (Burgoon et al., 2007) reduces the perceived trustworthiness of that website. The “unexpected” situations may happen. In our study the effect of this heuristic may be illustrated by the situation when website quality and design do not match the standards and norms (*e.g.*, presence orthographic and typographic errors, broken links, suspicious banners, *etc.*), or when website provides some unsolicited information or services not requested by the user (or what Sundar (2008) calls intrusiveness heuristic), for instance, company’s products appearing on the unrelated websites, notifications about use of cookies, presence of the third-party websites links’, tracking, social network recommendations, remembering of the users’ personal information, such as shipping address, credit card details, or login and password.

Appendix B graphically represents the proposed research model and related hypotheses. In our survey we asked people to consider each statement independently from other statements as if each item was describing a new company and to a full extent (*i.e.* nothing else beyond the information in a particular statement is known about each company). We did it to avoid the interaction effects and to elicit not the overall credibility perception towards a company and its website that possess a number of potentially contradictory characteristics but to assess a level of credibility attributed to each aspect separately. Therefore,

although we grouped various aspects into distinct factors, these factors are not independent when considered together for an overall assessment of company’s credibility or willingness to purchase from its website. For instance, we expect inter correlation between privacy and security and reputation, where fair practices regarding users’ personal information contributes to the perception of how reputable this company is. At the same moment, reputable company is expected to aim at maintaining its reputation with respect to users’ personal data as well, and therefore to deploy high privacy and security standards. Similarly, a company with good reputation is expected to care about its image, and as website is a one of the channels for communication of brand image, such company is expected to exert efforts in creating a high quality website, while well designed website provides users with positive signals about reputation of the company as a whole. In contrast, website with poor quality raises doubts about professionalism of the people who built it, including their ability to ensure fair data collection and secure storage of this data, and therefore, creates concerns about privacy and security protection. The discussion can be extended to the correlation between the effects of certain factors on trustworthiness perceptions and purchase intention. Sub-constructs may be correlated as well. For example, user may experience lower concern about data collection if he is aware about how this information will be processed and if he is given control over his information. The lack of or doubts about company’s background may be mitigated by positive reviews from other customers, etc. Moreover, we expect positive correlation between trustworthiness perceptions and purchase intentions, so that users, who developed a perception of trust towards a company, will be more willing to purchase a product or service from its website.

**H6:** *Trustworthiness perceptions are positively correlated with purchase intentions.*

Thus, we aim to test the influence of four main factors (security, privacy, reputation, and website quality) on trustworthiness perceptions and on purchase intentions, and to compare the magnitude of impact of certain aspects in particular. We will then test inter correlations among those factors, and the relation between trust and willingness to buy. Finally, we will run the robustness check with respect to individual characteristics.

## 3 Methodology

### 3.1 Data collection

Based on the related literature, we made a preliminary selection of the attributes and discussed them during two focus group sessions. The least prominent factors were sorted out. Then we ran an online survey with 117 participants among Mobile Territorial Lab (MTL) community about trustworthiness perceptions and purchase intention on the elaborated list of 32 statements about firms’

characteristics and the aspects of their websites (hereinafter, *items*). The advantages of running the survey with MTL community members include low costs and wider demographic profile compared to a student pool usually used for academic research and criticized for being not representative of the general population. Finally, we collected responses about demographics, prior Internet experience, online shopping acceptance, technological literacy, privacy attitudes and concerns, and trust disposition through exit questionnaire (appendix C) and used them as control variables in statistical analysis.

### 3.1.1 Focus group

As a preparatory stage for the survey two focus group sessions were conducted in December 2014 in the Cognitive and Experimental Economics Laboratory (CEEL), the University of Trento, Italy. During these roughly one-hour sessions a group of six students (in the first session) and of seven students (in the second session) were asked in interactive setting about their perceptions, opinions, beliefs, attitudes, concerns, and habits towards e-commerce and privacy online. Participants were free to express their opinion and talk with other members. However, following the rules and principles of the focus group technique, a moderator (prof. Luigi Mittone) and assistant (Alisa Frik) administrated the discussion.

Participants expressed fairly high level of privacy concerns (“I’m not famous, but I’m concerned about my personal life and information”). Although one participant said: “Who cares about privacy nowadays!” others found the topic “relevant” and as “one of the most important”, “fundamental”, and “central arguments of the Internet use”. In general, participants seemed to be quite pessimistic about the current state of privacy and called it “utopian” and “disappearing” concept.

As examples of privacy violations (personally experienced or known from other sources) participants mentioned hacking attacks on email services, iCloud, Playstation store, Twitter and Ebay platforms, PayPal and Yahoo password databases; Facebook behavioral targeted advertising and tracking of browser activity; consequences of losing mobile phone (access to personal files and accounts by unknown person, sending embarrassing messages and photos on behalf of the victim, *etc.*). As the reaction to instances of privacy violations online, the majority of participants described their discomfort, anger, irritation, fear, anxiety, and embarrassment, while the rest admitted their preparedness to such consequences (“I would not be surprised”, “One should expect that”), perception of control over their data and ability to protect themselves from such violations (“It would be partially my fault, I should have protected my privacy”).

As barriers of online shopping acceptance respondents indicated hazard of fraud, fishing, identity theft, data misuse, and general absence of trust. This observation proves the relevance of perceptions of trust to online shopping behaviors and necessity of examining the issue in details.

After the discussion several statements were added to the list, *e.g.*, about password creation requirements, friends’ evaluation and opinion about the firm

via a special widget incorporated into website’s design as social network is gaining more weight in the seller-buyer communications. Some statements were corrected and clarified. For example, the statements about positive feedback raised a discussion about their source and nature. Participants appeared skeptical about the fact that company has only positive feedback, suspecting it in falsification of reviews or deleting unpleasant ones. Thus, we included three different items to reflect the distinction: (1) about positive reviews on the company’s own website, (2) about positive reviews on independent websites and forums, and (3) about the presence of both positive and negative reviews about the company on its website.

Based on the results of focus group the list of 32 statements about firms’ attributes was developed. Qualitative results obtained in focus groups confirmed the relevance of the topic, while discrepancy among participants’ opinions and attitudes proved the necessity of in-depth investigation of the issue.

### 3.1.2 Survey

The survey was designed to capture perception about normatively appropriate privacy attitudes rather than personal opinions about the issue through incentivized elicitation method (Krupka and Weber, 2013). Participants were explicitly explained that the best strategy is to answer what they believe the majority of participants would choose rather than express a personal opinion about the argument. This method permits to elicit attitudes as durable and socially held judgments.

Subjects were asked to read the list of statements (appendix A) about attributes of the firms and their websites (the order of items was randomized across participants). Firms were assumed to be retailers of homogeneous products and services hypothetically present on the online market. Each statement described the company completely, so that participants did not need to guess or imagine other characteristics beyond the provided description.

## 3.2 Measurements

After reading each statement, participants answered two questions on 12-point Likert scale. The response categories were assorted into 6 groups as it is shown in table 1.

After collection of the responses one statement and the related question were chosen at random. The score and category chosen by the majority of survey respondents were determined. Participants’ who chose the “most popular” response for the picked item entered the raffle and 10 “winners” were chosen at random. They received a USB flash drive of 32 or 16 Gb (with a market price of 20 or 13 Euro, respectively) depending on whether they assigned an exact score or only a category as in the majority of respondents.

Statistical analysis of the result of the survey is presented in the next section.

Table 1: Survey questions

| How trustworthy with respect to privacy the Web site of this company appears to the majority of other people, in your opinion? |       | How it is likely that other people will purchase products and services from the Web site of this company, in your opinion? |       |
|--|-------|--|-------|
| Category   | Score | Category   | Score |
| Very untrustworthy   | 1-2   | Very unlikely  | 1-2   |
| Untrustworthy  | 3-4   | Unlikely   | 3-4   |
| Somewhat untrustworthy   | 5-6   | Somewhat unlikely  | 5-6   |
| Somewhat trustworthy   | 7-8   | Somewhat likely  | 7-8   |
| Trustworthy  | 9-10  | Likely   | 9-10  |
| Very trustworthy   | 11-12 | Very likely  | 11-12 |

## 4 Results

We tested the research model using two-step structural equation modeling (SEM), where in the first stage we developed and evaluated the measurement model, and in the second stage we developed and evaluated the full structural model (Gerbing and Anderson, 1988). First, we ran SEM estimations on groups of items as endogenous observed variables and predicted the indices for sub-constructs as latent variables. Then we ran SEM estimations using predicted values of sub-constructs as endogenous observed variables, surveyed demographic characteristics and other covariates as exogenous observed variables, and predicted the indices for T and P as latent variables. Appendix F summarizes the information about SEM path estimation. For the assessment of goodness of fit, we used absolute and incremental fit indices. Absolute fit indices include root mean squared error of approximation (RMSEA) and standardized root mean squared residual (SRMR), while incremental fit indices include comparative fit index (CFI) and Tucker-Lewis index (TLI). The conventionally acceptable values of RMSEA and SRMR should be  $\leq 0.08$ , while the values of CFI and TLI are considered acceptable if  $\geq 0.90$  (Browne et al., 1993; Hu and Bentler, 1999; Hair et al., 2010). Appendix G shows that the research model achieved the satisfactory level of goodness of fit.

Appendix D summarizes the main statistics on measurements of trustworthiness perception and purchase intention by item. The highest evaluations of trustworthiness perception and purchase intention were assigned to the items ensuring privacy and security practices adoption, third-party certificates and high ratings in media, together with company’s reputation, background, and variety of secure payment options. The lowest scores were assigned to the hypothetical websites that have low quality of content and design, are involved in the connections with third parties or actively try to encourage users to connect various accounts with the company’s website, store users’ personal details with or

without consent, and offer recommendations based on the personal information about user.

Large standard deviation and variance may be related to the lack of participants' attention to the task, considerable diversity of opinions on the matters, or to the fact that the "collective perceptions" regarding web-based concepts are not mature enough yet due to fairly "young" and highly dynamic environment of the Internet, diversity in the level of technological literacy and intrinsic individual characteristics.

#### 4.1 Reliability and validity

For the assessment of reliability we carried out confirmatory factor analysis with Varimax rotation. Using the Kaiser extraction criterion we retained only factors with eigenvalue  $> 1$  for each construct. The resulting factor loadings were high (0.54-0.91); degree of uniqueness was within acceptable level of  $< 0.6$  (0.18-0.6), for all items except LT1, QT1/QT3, QP1/QP3 (appendix E). Internal consistency of the resulting indices was good, Cronbach's  $\alpha > 0.7$  (0.84-0.93), except for the website quality. Therefore, appendix E demonstrates that the reliability of the measurement model is sufficient for all constructs and sub-constructs except website quality.

We tested two types of validity for the analysis of unidimensionality: convergent and discriminant validity. Convergent validity defines the extent to which each item converges to measures of other items that theoretically should be related. According to Hair et al. (2010) convergent validity exists if standardized factor loadings of each scale item is  $> 0.7$ , average variance extracted (AVE) is  $> 0.5$ , and composite reliability (CR) is  $> 0.7$ . Appendix F shows that all constructs except QT satisfy these criteria demonstrating sufficient convergent validity.

Discriminant validity defines the extent to which an item diverges from other items that theoretically should not be related. The discriminant validity exists if AVE exceeds the shared variance measured as squared correlation for each pair of constructs and sub-constructs (Fornell and Larcker, 1981; Hair et al., 2006; Bove et al., 2009). Appendix F and H show that this criterion is not satisfied for all pairs of constructs and sub-constructs and that privacy, security, and reputation indices, including feedback and awareness, are often highly correlated. It suggests including the covariance between them in the path estimation model.

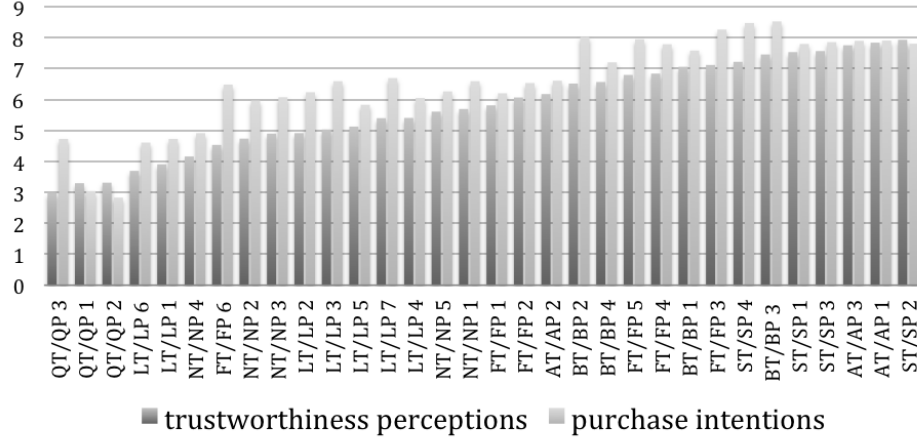
#### 4.2 Relationship between trust and purchase intention

The results indicate significant positive relationship between trustworthiness perceptions and purchase intentions<sup>6</sup>, at the aggregate level (*i.e.* between T and P) and at the sub-construct level (*i.e.* between ST and SP, QT and QP, *etc.*) as suggested by correlation and covariance coefficients (appendix H). This finding

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<sup>6</sup>Pairwise correlation coefficients for each item are also positive and significant on 0.01 level and vary between 0.59 and 0.88 with average of 0.74.

Figure 1: Mean values of trustworthiness perceptions and purchase intentions Likert scale scores by item



supports the hypothesis 6 about positive relationship between trustworthiness perceptions and purchase intentions.

Generally, positive correlation means that participants would be more likely to purchase from a trustworthy website and less likely to purchase from untrustworthy website. However there were some cases where valence of perception and behavioral intention were misaligned: participants rated some companies as untrustworthy with respect to personal information, but still were likely to purchase from them. Such misalignments of perceptions and behavioral intentions provide evidence for so-called “privacy paradox”, *i.e.* the occasional inconsistency and disagreement between self-reported high level of privacy concerns and privacy-undermining behavior (Spiekermann et al., 2001; Berendt et al., 2005; Chellappa and Sin, 2005; Acquisti and Gross, 2006; Barnes, 2006; Norberg et al., 2007; Acquisti et al., 2016).

Figure 1 shows the distribution of ratings for trustworthiness perceptions and purchase intentions by item.

About 2.83% of the times participants reported negative intentions to buy from a website regardless of its positive value of trustworthiness. For example, privacy policy and password-composition requirements on the company’s website (AT/AP items 1 and 3, and ST/SP 2) do not make participants necessarily more likely to purchase from the website even though it is perceived as trustworthy. This may be related to the fact that privacy is one of the factors influencing purchasing intention but not the most important driver of purchasing decision. In contrast, 14.3% of the times participants reported positive intentions to buy from the website to which they assigned a negative value of trustworthiness. This was particularly common for the BT/BP 3, LT/LP 2, 3, and 7, NT/NP 2 and 3, FT/FP 6, meaning that presence of the famous brands, widget from

social network sites, possibility to access the website using social network account (so called “social login”), request of permission to access the geographical location or of the information about tastes and preferences, inferring of such information using tracking technologies, and remembering the user’s address for future deliveries have no or negative effect on perception of trustworthiness, however, it positively affects the purchase intention.

Most of the above-mentioned factors that trigger positive purchasing intention but negative trustworthiness perception offer privacy-invasive approaches to improve or speed up shopping experience. Thus, the misalignment observed in our survey may be related to the calculation of the credibility expectations that involves weighting of the expected costs and benefits implied by the decision to trust (Sztompka, 1999; Lane and Bachmann, 1998). Similar calculative approach was documented in privacy domain as “privacy calculus” (Laufer and Wolfe, 1977; Culnan and Armstrong, 1999; Dinev and Hart, 2006). However, people often fail to perform such calculation, for example due to *immediate gratification* (or *present*) *bias*, which refers to the individuals’ preference for short-term returns (Anderson, 1971; O’Donoghue and Rabin, 2000), and *discounting* future costs and benefits (Laibson, 1994; O’Donoghue and Rabin, 2001; Jehiel and Lilico, 2010). In this perspective, website that offers the services that facilitate the online shopping process but are not privacy-friendly (*e.g.*, remembering of the personal details, recommendation systems based on behavior tracking) may generate a high willingness to buy even in the presence of low trustworthiness perception with respect to one’s privacy, because the result of purchasing transaction occurs immediately, while outcome of the risks related to privacy untrustworthiness are uncertain in magnitude, value, probability, and time (John, 2016).

Consumers engage in e-commerce with a primary goal to purchase a product or service online, not to protect their personal information. Therefore, prominence-interpretation theory (Fogg, 2003) and low salience of the privacy-related factors with respect to shopping-related factors in the moment of purchasing decision process provide further explanation to the observed phenomenon. Moreover, in uncertain situations people tend to rely on contextual cues (Acquisti, 2004; John et al., 2011). Websites are usually in control of such cues, as they decide on the website design, choice architecture, content, and structure of the information presented to the user. As websites’ primary goals are related to business outcomes, they may firstly highlight the shopping benefits, and draw less attention to (or even deliberately drive it away from) the potential privacy concerns and issues. In this case subjects are more likely to give a larger weight to the evidently and saliently presented benefits of a certain feature of online shopping experience rather than elaborate and assign the values to the potential risks that the decision may entail in privacy domain in the future.

Yet another explanation of why calculus may fail is related to the assumption of rational decision-making about trustor-trustee symmetry, while trust relationship between online vendors and consumers in reality is often asymmetric. Therefore, as predicted in Weber et al. (2004), with increase in dependency of trustors on trustees, the former (in our case consumer) decreases cognitive



effort and information search required to assess credibility accurately, positively judges ambiguous information, and is inclined to engage in initial trust. In other words, as online ecommerce relationship often takes the form of take-it-or-leave-it offer, consumers have only limited decision options, while companies are in charge of creating and offering such options. For instance, a company can decide how much and what information to request from the user in exchange for providing the access to its mobile application. Even though the company asks the permission to access some personal information, the resulting outcome is conditioned on the user's consent. Therefore, if consumer does not allow the access to requested information, she does not have the access to a service the company provides. If the minority of the companies employed the invasive permission settings, users would have an opportunity to deny the access to their personal information and choose another company that provides similar services without requirement to reveal extensive amount of personal data. But proliferation and acceptance of invasive permission settings as a common business practice often leaves consumers without a choice (apart from saying "yes" or "no" to the use of a service) and, therefore, raises the user-website asymmetry in which users are more dependent on the conditions created by the websites than the latter are dependent on the consumers' choices. This situation makes users engage in initial trust if they want to use a certain service discounting some concerns that may accompany such a decision.

Moreover, combination of various factors is a tradeoff *per sé*. In our experiment we asked subjects to consider each factor independently, but real-life decisions are influenced by a simultaneous impact of a number of factors and their interaction effects. Consider for example, a website that requests some personal information in order to create an account and remembers a credit card number for future transactions but imposes strict password-composition requirements, ensures compliance with privacy regulations, and demonstrates security certificates. Request of personal information may create a privacy concern, but compliance with the privacy regulations and strict password-composition requirements mitigate them, by ensuring consumers that the information he provides will be treated fairly and securely. Similarly, remembering of the credit card details may be useful for faster future check out process, but may raise the security concern. Presence of the security certificate mitigates such concern by ensuring consumer that the provided credit card details will be stored securely and protected from unauthorized access or use. Therefore, negative and positive aspects mitigate each other and the final decision and purchase verdict depend on the outcome of this interaction.

As a result of behavioral and cognitive biases discussed above consumers sometimes are willing to make a purchase from a website that is engaged in privacy invasive practices but facilitates or encourages purchasing process. This might explain why in certain situations, especially when the primary goal with which consumer enters the online space is purchase and not privacy protection, consumers make decisions not in favor of the latter. Thus, one should not rely on trust-related factors as the main predictors of sales, however, he should consider important mediating effect of trustworthiness perceptions on purchase intention.

In the next section we will discuss what factors in particular are more or less influential on the consumers' choices.

### 4.3 Factors influencing trust and purchase intentions

#### 4.3.1 At sub-construct level

Standardized path coefficients (table 7 in appendix F) suggest that all sub-constructs have significant effect on trustworthiness perceptions and purchase intentions on the 0.001 level, except for the quality of website. QT appears to have the smallest effect on trust, yet significant on 0.05 level. QP does not influence significantly purchase intentions. Therefore, our findings provide the support of H1, H2, and H4 for both trustworthiness perceptions and purchase intentions, and for H3 regarding the effect on trust.

As shown in appendix D, on average, websites' compliance with security regulations (ST and SP) results in the highest positive estimations of trustworthiness perceptions and purchase intentions, followed by awareness about employed privacy practices (AT and AP), company's background (BT and BP), and feedback (FT and FP). Poor website quality (QT and QP) leads to the lowest negative estimation of trustworthiness perceptions and purchase intentions, followed by the collection (LT and LP) and control (NT and NP) over personal information.

Therefore, companies with positive feedback and background appear to consumers as more trustworthy and elicit higher willingness to purchase from their websites. Moreover, ensuring consumers' awareness about security and privacy protection, by providing informational notices (*e.g.*, about use of cookies or practices related to collection, storage, sharing, and use of personal data), demonstrating the prove of compliance with privacy and security protection standards and regulations approved by independent authorities (such as Extended Validation certificates, privacy seals, *etc.*), enforcing password-composition requirements further improves users' trustworthiness perceptions and purchase intentions. At the same moment invasive practices of data collection and providing to users the limited control over this information (or poor communication of such control opportunities) lead to consumers' negative assessment of trustworthiness and subsequent purchase intentions. Although insufficient investment of time, money, and effort in the website design and low attention to the content quality do not have a significant direct impact on willingness to purchase, it may have an indirect effect through negatively influence trustworthiness perception, because of the correlation between trust and purchase intention demonstrated earlier.

In line with the low discriminant validity and high correlation indices, the covariance between some pairs of sub-constructs in our model is also significant (table 8 in appendix H), for instance, between LT and BT, FT, NT; FT and NT; NP and FP, LP. This means that the company collecting users' personal information will be perceived as more trustworthy if it provides to the users control over the collected information, or has positive reputation, including positive

background and feedback from other consumers. Similarly, practices involving collection of users' information (for example, for feeding the recommendation system, or for using the credit card details and shipping address for future orders and transactions) will increase purchase intentions more if it will be accompanied by the control over collected information. Such control may further enhance the positive effect of consumer feedback on trustworthiness perceptions and willingness to purchase.

Therefore, in order to build trust and increase consumers' purchase intentions companies should pay more attention to the way they present information about their reputation, including background, customer feedback and reviews, privacy- and security-related practices, and protection means. Moreover, they need to ensure a satisfactory level of the quality of this information, together with website content and visual appeal. Firms should grant users more control over their information, including traditional forms of consent or permission management, ability to modify/delete private data or deny the access to personal information, and also by providing a choice among alternative ways to access the website content (*i.e.* not only in exchange for the personal information, but also on "freemium" or subscription basis for a small fee that allows avoiding private data collection, for example). We will now analyze in detail what practices tested in our survey are more effective in building trustful and effective buyer-seller relationships.

#### 4.3.2 At item level

In selection of the items for the survey we primarily focused on their relation to the main factors influencing consumers' attitudes that we later used for construction of the indices. Analysis of the impact of these factors on trustworthiness perceptions and purchase intentions is the primary goal of this study. However, we were also interested in subtle differences between related aspects, therefore we included pairs or small groups of closely related items for some of these elements rather than choosing only one item that would represent a certain aspect. For example, with respect to company's ranking we were interested whether there is a difference between online and offline sources of this ranking, or whether there is difference between publishing customers' reviews on the company's own website or on the independent website, etc. Hence, we distinguish the following groups of related items: consumer feedback (items FT/FP 1, 2 and 3), ranking source (item FT/FP 3 and 4), access conditions (LT/LP 4 and 5), source of information for recommendations (item LT/LP 2 and 3), app permissions (NT/NP 4 and 5). We will now discuss the difference between impacts of the items within those groups.

**Consumer feedback** Although one might find presence of solely positive feedback about the company on its website (FT/FP 5) subjective or suspect of fake reviews, on average, participants assigned a higher rating of trustworthiness and purchase intentions to such companies compared to the firms that have

both positive and negative feedback (FT/FP 1 and 2)<sup>7</sup>. For the latter condition, having reviews on the company’s own website (FT/FP 2) is not statistically different from such reviews on independent websites or forums (FT/FP 1) in terms of building trust and increasing purchase intentions<sup>8</sup>. Therefore, regardless of the fact that solely positive feedback is often fraudulent subjects tend to trust it more than a mixture of positive and negative reviews. Although it is easier for companies to manipulate reviews on their own websites than on the independent forums, subjects do not seem to trust the latter ones more. Hence, our results support H5b but not H5a.

**Ranking source** The source of information about elevated position of the company matters for purchase intention, but not for trustworthiness perceptions<sup>9</sup>. Namely, high rating of the company in traditional media (FT/FP 3), such as TV and radio, results in a higher willingness to purchase from its website with respect to the companies which high ranking was acknowledged in online media sources (FT/FP 4). This finding suggests that respondents’ willingness to purchase tend to rely on traditional media more than on online channels as the source of information about company’s ratings and reputation. This may be because users are more experienced and familiar with traditional media, and feel more confident in relying on those sources. Moreover, the content published in traditional media is more likely to go through editorial review and approval (Johnson and Kaye, 2000). Hence, H5c is supported for purchase intentions but not for trustworthiness perceptions.

**Access conditions** The subtle difference between items LT/LP 4 and LT/LP 5 is that the latter describes a more strict access policy not allowing users to view the website’s content without registration, while the former permits visualization of the content without sharing personal details and requests registration only when customers decide to place an order. However, average scores on both trustworthiness perceptions and purchase intentions for the websites with restricting access conditions did not significantly differ from the websites employing more privacy-friendly practices<sup>10</sup>, providing no support for H5d. This

<sup>7</sup>Tests of the difference between (a) FT1 and FT5: t-test  $\Pr(|T| > |t|) = 0.00$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.00$ . Statistical power = 0.83; (b) FP1 and FP5: t-test:  $\Pr(|T| > |t|) = 0.00$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.00$ . Statistical power = 0.97; (c) FT2 and FT5: t-test:  $\Pr(|T| > |t|) = 0.00$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.01$ . Statistical power = 0.55; (d) FP2 and FP5: t-test:  $\Pr(|T| > |t|) = 0.0000$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.00$ . Statistical power = 0.96. N=117.

<sup>8</sup>Tests of the difference between (a) FT1 and FP2: t-test  $\Pr(|T| > |t|) = 0.15$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.13$ . Statistical power = 0.13; (b) FP1 and FP2: t-test:  $\Pr(|T| > |t|) = 0.10$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.06$ . Statistical power = 0.16. N=117.

<sup>9</sup>Tests of the difference between (a) FT3 and FT4: t-test  $\Pr(|T| > |t|) = 0.14$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.18$ . Statistical power = 0.12; (b) FP3 and FP4: t-test:  $\Pr(|T| > |t|) = 0.03$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.03$ . Statistical power = 0.24. N=117.

<sup>10</sup>Tests of the difference between (a) LT4 and LT5: t-test  $\Pr(|T| > |t|) = 0.21$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.25$ . Statistical power = 0.12; (b) LP4 and LP5: t-test:  $\Pr(|T| > |t|) = 0.39$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.14$ . Statistical power = 0.09. N=117.

finding may be related to the fact that restricting access conditions are a common practice nowadays and thus does not raise strong concerns. Most online vendors require customers to create accounts on their websites. Such accounts not only help sellers to monitor customers' activity, but also allow consumers to keep track of their own transactions, save and compare products in the cart, save personal information (*e.g.*, credit card details and shipping address) for future transactions *etc.* Therefore, consumers may perceive benefits from registering on a certain website that in some cases outweigh corresponding privacy concerns.

**Source of information for recommendations** In contrast to our expectations that transparency regarding how the information about consumers' tastes and preferences is collected will be granted with a higher level of trustworthiness perception and willingness to buy, explicitly asking people about their preferences (item LT/LP 2), on average, did not result in different trustworthiness and purchase intentions scores than using of obscure tracking technologies to gather such information about users (item LT/LP 3)<sup>11</sup>, providing no support for H5e. However, generally, the trustworthiness perceptions scores were negative for both items. Therefore, we can conclude that respondents equally dislike the collection of the information about their tastes and preferences, no matter implicitly or explicitly.

**App permissions** In support of H5g, providing an opportunity to edit at least partially the list of permissions before installation of the company's mobile application (NT/NP 5) significantly improves both the trustworthiness perception and purchase intention compared to the "take-it-or-leave-it" offer (NT/NP 4)<sup>12</sup>. Moreover, allowing users to modify app permissions is able to even alter the sign of purchase intentions, *i.e.* while respondents said to be unlikely to purchase from an app that inevitably accesses their personal data, providing a chance to edit the access permissions at least partially resulted in a positive willingness to make a purchase. Therefore, companies may benefit from enforcing privacy-friendly policies, not only on their websites but also in their mobile applications.

Besides the general effects of certain factors, such as reputation, security, privacy, and website design, we emphasize the importance of how these factors are then implemented. Appendix I summarizes the results of hypotheses testing. Our results suggest companies to pay close attention to the way they design and implement their practices. For example, in order to build with customers the trustworthy relationships, which then positively affect purchase intentions,

<sup>11</sup>Tests of the difference between (a) LT1 and LT3: t-test  $\Pr(|T| > |t|) = 0.00$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.00$ . Statistical power = 0.99; (b) LP1 and LP3: t-test:  $\Pr(|T| > |t|) = 0.00$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.00$ . Statistical power = 0.9995. N=117.

<sup>12</sup>Tests of the difference between (a) NT4 and NT5: t-test  $\Pr(|T| > |t|) = 0.00$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.00$ . Statistical power = 0.99; (b) NP4 and NP5: t-test:  $\Pr(|T| > |t|) = 0.00$ ; Wilcoxon rank-sum test:  $\text{Prob} > |z| = 0.00$ . Statistical power = 0.96. N=117.

companies should try to avoid negative feedback, not through the review manipulation and fraud but through service improvement and consumers' needs satisfaction. Regarding the platforms, both independent forums and brand websites are effective in building trust. Firms should also enhance users' privacy and provide control over their personal information, for example through introduction of the privacy-friendly policies and editable lists of access permissions, and limiting collection of the users' personal data, either explicitly asking for it, or through opaque tracking technologies, such as cookies, algorithmic recommendation systems, *etc.* Although Internet media is gaining power, overtaking and sometimes even substituting offline channels in ability to build reputation and trust, companies should not forget to sustain and promote their image in traditional media, as it has a stronger influence on purchase intentions according to our results.

#### 4.4 Robustness check

As a robustness check we controlled for the respondents' individual characteristics by introducing surveyed variables as observed exogenous covariates in the second stage of structural equation model estimation. In our model we assume that individual characteristics directly affect the latent variables that represent subjects' trustworthiness perceptions and purchase intentions.

The results show that females and older subjects tend to have a lower level of trustworthiness perceptions, while those who use real names rather than pseudonyms in Facebook are more disposed to trust. The latter observation suggests that the use of real identity in social networks may serve as a proxy for low privacy concern or high general trust disposition, which was found a significant predictor of trust in Gefen (2000); Kimery and McCord (2002); Kim and Benbasat (2003); Teo and Liu (2007). However, the number of connections (friends) in Facebook is negatively correlated with T and P. Although a big number of online social network connections may signal low privacy concern, it may actually decrease the level of users' trust as the audience to which one's personal information and activity is exposed gets larger.

Number of years that subject use Internet is another factor that positively influence both trustworthiness perceptions and purchase intentions. This factor reflects elevated familiarity and experience with the Internet and is related to the enhanced adoption of e-commerce. Carlos Roca et al. (2009) argue that experienced Internet users may be more familiar with security technologies and therefore feel more comfortable about trusting the websites and shopping online. Our result is in line with Corbitt et al. (2003) that found Internet experience to be positively correlated with trust.

Subjects whose source of income is less independent and reliable (*i.e.* part-time job or spouse's support *versus* full-time job) tend to have lower trustworthiness perceptions and, not surprisingly, lower purchasing intentions.

In contrast to our expectations, subjects' knowledge of programming languages as a proxy for technical skills, preference of online shopping *versus* offline, its frequency, and personal experience of privacy invasions did not have a

significant effect on trust. Neither did the level of monthly expenditures, online shopping preferences and frequency has an impact on purchase intentions.

Direct measure of general privacy concern and Westin’s privacy index both show that privacy-concerned subjects are less likely to trust the websites and buy from it. This finding further supports our claim about important relation between privacy, trust, and purchase intentions, suggesting companies to pay rigorous attention to customers concerns and ensure their personal information protection.

We observed that although almost half of the respondents recognized a symbol of websites’ compliance with the Extended Validation certificate, only 72% of them understood correctly what this certificate means<sup>13</sup>. This misalignment may indicate potential misconceptions and misbeliefs about privacy and security signals. Qualitative analysis of the responses show that these misconceptions include the expectations that a website with a green padlock in the URL address bar will require registration for access or will constantly guard privacy of the users. Moreover, familiarity with privacy seal authorities, recognition of the Extended Validation certificate’s green padlock and the actual understanding of its meaning did not significantly affect T and P. This findings are in line with previous research, which shows that although the website possessing independent certificates in reality are more likely to be untrustworthy than uncertified websites (Edelman et al., 2006), users tend to follow heuristics and shortcuts in relying on these assurances without verification of authenticity and not always understanding the meaning (Rifon et al., 2005; LaRose and Rifon, 2007), because according to signaling theory, in assessment of credence quality consumers may directly rely on cues (Zeithaml, 1988; Schlosser et al., 2006; Tang et al., 2008) even when they are not credible or interpretable (Duncan and Moriarty, 1998; Rao et al., 1999; Ray et al., 2011).

Similarly, 41% of the participants misunderstand the concept of web cookies. The respondents’ explanations about meaning of this term range from “treats and sweets” to “informative windows”, “users’ feedback sent to the website to guarantee monitoring of the use”, “files that permit a faster access to the Internet”, and “some form of advertising”. Some respondents called Web cookies “spies” and “garbage” that may be justified if considered metaphors. One of the respondents correctly drew the connection between cookies and subsequent receiving of targeted advertising, but erroneously concluded that one must enable cookies in order to avoid privacy invasion.

These findings suggest that the level of “privacy literacy” and awareness is still relatively low and requires consumer education. Misunderstanding may lead to the distortion of consumers’ expectations and subsequent exploitation of such beliefs for fraudulent or malicious purposes. Therefore, these findings suggest further examination of the issue. Improvement of communication of privacy and security related information to the consumers is showed to be important not only for policy makers and privacy advocates but also beneficial for the

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<sup>13</sup>Note that participants had access to various sources of information during the survey and had opportunity to find and submit the correct explanation. Therefore, those shares of correct answers reflect the lower bound.

business as enhanced trust contributes to increase in purchase intention.

## 4.5 Description of the subject pool

We distributed our survey to the Mobile Territorial Lab community members. This community has been created by Telecom Italia SKIL Lab and used as experimental environment for human-behavior analysis and interaction studies. The members of the community were selected and recruited among representative population of Italian mobile and Internet users. In contrast to most academic studies based on the students' responses we ran the survey with adults, representative of Italian Internet users population. Moreover, our sample is also representative of the European online shoppers population (Reinecke, 2015)<sup>14</sup>. Appendix C summarizes the statistics about demographics and responses to the final questionnaire. 89% of the respondents are 35+ years old with 63% of the respondents being women, and the female respondents are on average younger than the male respondents<sup>15</sup>. 36% of respondents have only secondary education and 55% have bachelor or master degree, mostly in formal sciences, followed by social and humanity sciences. 77% of the subjects lived for the most part of their lives in cities with 10,000+ inhabitants. 94% has full- or part-time jobs as the main source of income.

Nine respondents out of ten use Internet since more than 5 years, on average for about 19 hours a week. Figure 2 in appendix J summarizes frequency of use of the Internet for various purposes.

Eighty eight percent of respondents (which corresponds to 93% of males and 85% of females) use the Internet for online shopping (35% often and 53% sometimes), although slightly less than a half prefers to buy from a physical store rather than online. Most commonly respondents make online purchases for up to 500 Euro at least once a year (figure 3 in appendix J).

Sixty three percent of the respondents do not know any programming language, while 18% know at least one and other 18% know 2-3 programming languages.

Seven out of ten respondents are familiar with at least one certificate authority or agency that focuses on ensuring compliance with the security and privacy regulations.

Generally, 44% of the subjects found it difficult to answer the survey. It may be related to the number of the items to be evaluated, each on two distinct constructs. Reducing the number of items and separating the tasks of evaluating trustworthiness perception and purchase intention in between-subject design could reduce the respondents' fatigue and improve the reliability of metrics.

Sixty-eight percent of the respondents are concerned about their online privacy; however, other 28% appeared to be rather indifferent, with remaining

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<sup>14</sup>53-74% of 25-74 year-old EU-28 Internet users bought or ordered goods or services for private use over the Internet in 2014 (with negative relationship between age and percentage of online shoppers). 47% of those online shoppers have low education, 65% have medium education, and 78% have high education; 70% are employed.

<sup>15</sup>T-test:  $p=.0338$  and Wilcoxon signed-rank test  $p = 0.04$ .



4% being unconcerned. However, according to the Westin's Privacy Segmentation Index almost half of the respondents were classified as unconcerned, with equal division of the rest between pragmatists and fundamentalists (27% each). Among various Internet issues the highest level of concern was assigned to the group related to privacy (62% are concerned about online activities being monitored and about personal information being stolen (77%) or misused (80%)), followed by concern about pornography being too accessible (76%), about receiving too many unsolicited email (56%). In response privacy concerns participants admitted to refuse or leave, on average, almost every second website requesting personal information (figure 4 in appendix J). The alternative strategy of providing false information is less common and is used on average only in 10% of the times.

Underlining motives of refusal or providing falsified information can be combined into 3 main groups:

- privacy concerns: as an important reason for 93% of the respondents is the request of particularly sensitive information, lack of information about how personal data will be used (for 89%), the value of personal information exceeding the value that user would receive from the website (for 88%), and concerns about personal data being intercepted or stolen (for 82%);
- trustworthiness: bad reputation of the company (for 93%), lack of trust (for 91%) or familiarity (for 88%); and
- unsolicited correspondence: SMS (89%), email (79%), mail (75%).

Moreover, general preference to be anonymous was an important reason of refusal for 73% of the respondents, too much time required to fill out the forms (for 63%), and finally, lack of familiarity about how the technology works (for 54%).

A third of respondents personally experienced incidents of unauthorized use of their personal information by a company and almost a half (42%) - of privacy invasions.

Sixty seven percent of participants are not willing to provide personally identifiable and demographic information to websites while 19% feel indifferent about that. Almost two thirds would not provide it for the marketing purposes even in exchange for monetary incentives. Information about tastes and preferences are ready to share with websites a slight majority of the participants (38%), while 28% are indifferent about that. 69% would trade this information for marketing purposes if compensated. However, 80 to 90 percent of the respondents voluntarily revealed in the survey the names of their favorite books or films, sports and hobbies, even though it was irrelevant for the study information and questions were optional, i.e. could have been skipped without answer. It is possible that respondents draw a potential benefit of revealing preferences to the marketers that can target the relevant offers to them, while personally identifiable information seem to be less relevant for the marketing purposes and even raise a concern about price discrimination among savvy users.

A third of the respondents do not have a profile in social networks. Among those who have at least one account, Facebook is the most popular (37%), followed by Google + (12%), Twitter (6%), and Instagram (7%). A quarter of the respondents actively use 2 or more social networks. Since Facebook is the most popular social network among our respondents, we will further analyze this population: 56% of our Facebook users have no more than 100 connections on the website, and 15% have 100-200 or 300-500 connections. While 59% are convinced that their Facebook account is private and only friends can see it, this might be not entirely true, since some pieces of information, for example, name and profile picture are visible to the public. Taken into account that 94% of our respondents use real name, 69% use real photo and other 10% use their real photo with other people, the actual situation may not meet the users' expectations about their privacy on Facebook. Given that 32% never changed their settings while other 32% changed them only right after the registration, the situation seems even less optimistic from privacy prospective.

Finally, based on the "trust disposition" index, on average, our participants appear to be rather trustful than not trustful.

## 5 Conclusion

Based on previous research and the results of two focus group sessions we created a list of websites' attributes and tested their impact on users' purchase intentions and perceptions of trust with respect to privacy through a survey with 117 adult respondents.

First, we found that privacy, security, and reputation factors strongly affect trustworthiness perceptions and purchase intentions, while website quality plays a smaller role in building trust and has no effect on willingness to buy. On average, the websites with enhanced security, transparency regarding consumer privacy, and positive background and feedback deserved positive trustworthiness perceptions and purchase intentions scores, while practices related to personal information collection and control, and poor website quality raised concern regarding websites' trustworthiness and lowered the average willingness to buy from them. Intuitively, while privacy- and security-related aspects influence in the first place the perceptions of trustworthiness with respect to privacy, more shopping-relevant cues, such as selection of products with reputable names and payment options, are strong predictors of purchase intention. However, some factors, *e.g.*, firms' background and rating in media, are important mediators for both constructs. Although we asked participants to evaluate each item independently from other items, we eventually found positive correlation among some factors, which suggest the companies to design the multifaceted complex approach of trust relationships with customers.

Second, we found positive relation between trust and purchase intentions. It means that generally participants were more likely to purchase from a trustworthy website and less likely to purchase from untrustworthy website. This finding draws an attention of companies to the importance of building trustful

and privacy-friendly relationships with their customers. However, in some cases participants that rated the companies as untrustworthy were still likely to purchase from their websites. This misalignment may be related to a tendency of expected benefits to outweigh the potential privacy costs resulting in willingness to make a purchase from a website that is engaged in privacy invasive practices. In other words, when a website offers a functionality that is expected to improve or facilitate online shopping process, but at the same time raises privacy concern, users' decision to trust and make a purchase from this website depends on whether benefits will eventually exceed costs, or *vice versa*. As individuals tend to discount future outcomes and to prefer short-term returns, immediate and evident benefits of improved shopping experience (which is also the main goal of engaging in e-commerce) may outweigh uncertain potential future privacy costs (which is a by-product of online interactions rather than a primary component). Moreover, privacy-related aspects may be presented on the website in a less salient way than shopping-related features, further enhancing underestimation of the weight of privacy components in the calculus of a final outcome of a decision. Finally, asymmetric structure of the relationship between online seller and buyer put the latter in a position, which requires the latter to engage in initial trust accepting some risks in order to carry out a transaction. Such situations may force consumers to accept "take-it-or-leave-it" offer regardless concerns related to this decision.

Our findings suggest that leveraging the factors that positively influence trustworthiness perceptions may help companies to build trust that, in turn, affects consumers' purchase intention. First of all, companies should ensure security of their websites and, importantly, communicate the created level of security to the customers, for example, by introducing strong password-composition requirements and safe payment options, and demonstrating the compliance with security standards. Second of all, companies should pay great attention to the privacy-related issues, limit the collection of user data to the well-defined and user-friendly scope, be transparent about collection, storage, use, and sharing of this data, and give users control over their personal data. The forms of control should also evolve and improve over time together with the development of related technology and legislation. Companies should exert an effort in creating positive reputation, including presentation of the information about company's background, real people behind the website, allowing users to leave their feedback and respond to their concerns and questions. Firms, especially not well-known ones, should invest time, money and effort in creating a good-quality website which contains accurate and up-to-date information, as in situations of uncertainty visual appeal becomes an important peripheral cue and quality of the content signals the quality of the company itself.

Third, we found that participants trusted and wanted to purchase from the websites with solely positive feedback more than from the websites with mixed (both positive and negative) reviews, no matter whether it is published on the company's own website and on independent websites. Therefore, companies should pay attention to the customer negative feedback, try to solve the issues to achieve a higher level of consumer satisfaction and to publicly answer to

the negative comments in order to maintain reputation. Respondents trusted online and offline source of companies' rankings in a similar way, however, the traditional sources appeared to have a greater impact on willingness to purchase. Therefore, companies should not forget to sustain their reputation in traditional media, even though the online sources of information are getting more and more popular nowadays. Our results suggest to limit or avoid tracking of customers' data, especially the third-party one, as users dislike it even more than first-party tracking. Moving away from "take-it-or-leave-it" offers and granting consumers with more control and choice is expected to benefit trust relationships and increase purchase intentions.

Finally, we found that people that use real name in Facebook rather than a pseudonym and experienced in using Internet, generally tend to trust the web-sites more, while females, older subjects, people with less independent source of income (*i.e.* without full-time job), higher levels of privacy concerns, and larger number of connections ("friends") in Facebook are less disposed to trust. Similarly, less independent source of income, privacy concerns, and number of Facebook connections negatively affect purchase intentions, while Internet experience has a positive effect. Technical skills, the amount of monthly expenditures, frequency and preferences of online shopping, trust disposition, personal experience of privacy invasion, familiarity with privacy assurance agencies, Extended Validation icon, and understanding of the concepts of cookies and security certificates do not have significant effect on trust and willingness to purchase.

Moreover, we observed a relatively low level of "privacy literacy" among our respondents, as 30 to 40 percent of subjects have demonstrated misunderstanding of the basic privacy and security concepts. Such misconceptions may distort users' expectations, lead to inefficient communications of the information, and cause economic or psychological harm. For example, the website that saliently present a notification about use of cookies may be perceived as less trustworthy than the one that hide it or collect information silently. Alternatively, users that think that cookies are essential for a faster access to the Internet, as one of our subjects pointed out, they may enable cookie storage without fully understanding the consequences it will have on their privacy. Improvement of communication of the privacy- and security-related information to the consumers is important not only for policy makers and privacy advocates but also beneficial for the business since the enhanced trust contributes to the increase in purchase intentions.

The present study has some limitations. First, it is based on the self-reported answers about hypothetical companies. Although it provides theoretical model and useful empirical insight about the factors influencing trustworthiness perceptions and purchase intentions, lab or field experiment with real e-commerce websites will further improve the external validity, accuracy of results, and allow testing interaction effect among various factors. Second, we used willingness to buy as a measurement of behavioral intentions, while future research may analyze the effect of proposed factors on real website visits, purchasing behavior, and repeated purchases.

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## A Questionnaire items

| Construct | Sub-construct | Variable                    |                     | Item   |
|-----------|---------------|-----------------------------|---------------------|--|
|           |               | Trustworthiness perceptions | Purchase intentions |  |
| Security  |               | ST                          | SP                  |  |
|           |               | ST1                         | SP1                 | The Company has published assurances from independent third parties and their icons on Website   |
|           |               | ST2                         | SP2                 | The Company has a password-composition policy, i.e. it imposes requirements for password creation on its Website (e.g., length, obligatory including of numbers and letters of different register, etc.) |
|           |               | ST3                         | SP3                 | Green padlock icon is present in the location bar to the left of the Web address verifying that the Company's Website uses Extended Validation certificate   |
| Privacy   | Collection    | ST4                         | SP4                 | Several payment options are available on the Website of the Company (like credit cards, PayPal, Web wallets, bank transfer, etc.)  |
|           |               | PT                          | PP                  |  |
|           |               | LT                          | LP                  |  |
|           |               | LT1                         | LP1                 | Notifications, banners and ads about products you searched once on the Company's Web site appear when you are visiting other Website   |
|           |               | LT2                         | LP2                 | In order to recommend products/services that you can be interested in, the Company's Website asks about your tastes and preferences  |
|           |               | LT3                         | LP3                 | In order to recommend products/services that you can be interested in, the Company's Website uses specific technologies to track your behavior and figure out your preferences                           |

*continued on next page*

| Construct | Sub-construct | Variable                    |                     | Item  |
|-----------|---------------|-----------------------------|---------------------|---|
|           |               | Trustworthiness perceptions | Purchase intentions |   |
|           |               | LT4                         | LP4                 | The Company allows an access to the content of its Website without registration but requires to provide some personal information in order to place an order and purchase products and services from it |
|           |               | LT5                         | LP5                 | The Company requires to provide some personal information in order to get an access to its Website and contents   |
|           |               | LT6                         | LP6                 | The details of user's credit card are remembered by the Company's Website for future purchases  |
|           |               | Lt7                         | LP7                 | The user's address is remembered by the Company's Website for future deliveries   |
|           | Control       | NT                          | NP                  |   |
|           |               | NT1                         | NP1                 | The Company's Website (not browser) asks you to remember your login and password in order to enter quickly next time you will visit it without necessity to type  |
|           |               | NT2                         | NP2                 | The Company's Website asks your permission for using you current location   |
|           |               | NT3                         | NP3                 | The Company's Website allows you registration via other Web sites (e.g., sign up through linking Facebook or Google profile)  |
|           |               | NT4                         | NP4                 | The Company's Website's mobile application can't be installed without permission to access some information (e.g., location, device model, profile, activity history, etc.)                             |
|           |               | NT5                         | NP5                 | The Company's Website's mobile application can't be installed without permission to access some information but you are allowed to partially edit the list of permissions                               |

*continued on next page*

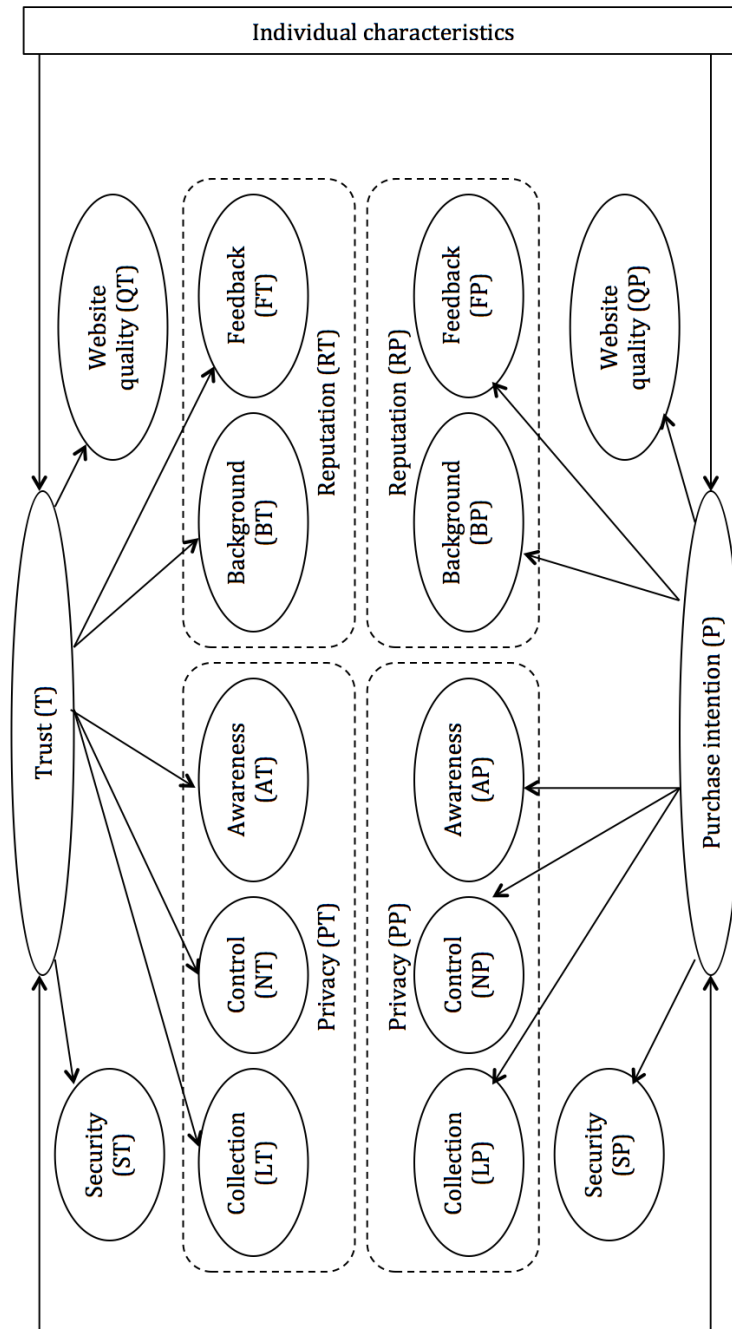
| Construct  | Sub-construct | Variable                    |                     | Item   |
|------------|---------------|-----------------------------|---------------------|--|
|            |               | Trustworthiness perceptions | Purchase intentions |  |
| Reputation | Awareness     | AT                          | AP                  | The Company's Website clearly explains how customer's information is going to be used and how it will be shared with other companies and third parties |
|            |               | AT1                         | AP1                 |  |
|            |               | AT2                         | AP2                 |  |
|            |               | AT3                         | AP3                 |  |
|            | Background    | RT                          | RP                  | Key names and photos of real people behind the Company's Website are shown   |
|            |               | BT                          | BP                  |  |
|            |               | BT1                         | BP1                 |  |
|            |               | BT2                         | BP2                 |  |
|            | Feedback      | BT3                         | BP3                 | The Company's Website carries products/services with reputable brand names   |
|            |               | BT4                         | BP4                 |  |
|            |               | FT                          | FP                  | The Company runs business and has its Website for many years   |
|            |               | FT1                         | FP1                 |  |
|            |               | FT2                         | FP2                 | The background of the Company (history from establishing to nowadays) is described on its Website  |
|            |               | FT3                         | FP3                 |  |
|            |               | FT4                         | FP4                 | The Company has both good and bad feedback, positive and negative reviews from other users and customers on independent Websites and forums            |
|            |               |                             |                     |  |
|            |               |                             |                     | The Company has both good and bad feedback, positive and negative reviews from other users and customers on its Website                                |
|            |               |                             |                     |  |
|            |               |                             |                     | The Company has a high ranking in traditional media (TV, radio, printed editions, etc.)  |
|            |               |                             |                     |  |
|            |               |                             |                     | The Company has a high ranking in online sources (like BizRate, Consumer reports Online eRatings, etc.)  |
|            |               |                             |                     |  |

*continued on next page*

| Construct       | Sub-construct | Variable                    |                     | Item   |
|-----------------|---------------|-----------------------------|---------------------|--|
|                 |               | Trustworthiness perceptions | Purchase intentions |  |
| Website quality |               | FT5                         | FP5                 | The Company has good feedback and positive reviews from other users and customers on its Website   |
|                 |               | FT6                         | FP6                 | There is a widget on the Company's Website that tells you which people with whom you are friends on Facebook like this Company and its products/services |
|                 |               | QT                          | QP                  |  |
|                 |               | QT1                         | QP1                 | The visual appearance and manner of the Company's Web site is not professional (amateur looking)   |
|                 |               | QT2                         | QP2                 | The Company has broken links and typographical errors on its Website   |
|                 |               | QT3                         | QP3                 | The Company's Website has suspicious banners, ads and links to third party unrelated Websites  |

*end of table*

## B Research model



## C Final questionnaire and summary statistics

1. What do you think was the purpose of the experiment? (Max 200 words)
2. How difficult was it for you to make a decision? (1= Not Difficult at All (7%), 2 = Not Very Difficult (49%), 3 = Somewhat Difficult (39%), 4 = Very Difficult (5%))
3. What is your gender (1 = Male (37%), 2 = Female (63%))
4. What is your age? (1 = < 18 years (0%), 2 = 18-25 years (0%), 3 = 26-30 years (1%), 4 = 31-35 years (10%), 5 = 36-40 years (44%), 6 = > 41 years (45%))
5. What is your field of study? (1= Social Sciences (Economics, Sociology, Law, etc.) (29%); 2 = Technical sciences (Informatics, Engineering, Architecture, etc.) (32%), 3 = Medical sciences (Medicine, Nursing, Pharmaceuticals, etc.) (2%), 4 = Humanities and Arts (Literature, Languages, Arts, etc.) (23%), 5 = Natural Sciences (Chemistry, Physics, Mathematics, etc.) (14%), 6 = Education science and pedagogics (0%), 7 = Agriculture (Agriculture, Veterinary, etc.) (0%), 8 = Other Applied Sciences (specify) (0%)).
6. What is the highest level of education you have completed up to now? (1 = High school diploma or less (36%), 2 = Secondary school (17%), 3 = Bachelor's Degree (38%), 4 = Master's Degree (7%), 5 = Doctoral degree (3%), 6 = Other (specify) (0%))
7. What is your nationality? (1= Italian (99%), 2 = Other (1%))
8. Did your parents complete their secondary education? (1 = None of my parents completed secondary education (26%), 2 = Only one of my parents completed secondary education (37%), 3 = Both parents completed secondary education (37%))
9. Where did you live for most part of your life? (1 = Village with < 1 000 inhabitants (7%), 2 = Town with 1,000 – 10,000 inhabitants (16%), 3 = City with 10 001 – 100,000 inhabitants (32%), 4 = City with 100,000 – 1,000,000 inhabitants (43%), 5 = Big city with population > 1 million inhabitants (2%))
10. What is your main source of income? (1 = Job (full-time) (67%), 2 = Job (part-time), 3 = Scholarship (27%), 4 = Parents (5%), 5 = Spouse (1%), 6 = Other relatives or members of family (0%), 7 = Bank loan (0%), 8 = Other (specify) (0%))
11. How much do you spend every month? (including food, clothes, rent, utilities (heating, water), education, entertainment, etc.) (1 = < 500 Euro (2%), 2 = 501-800 Euro (21%), 3 = 801-1200 Euro (32%), 4 = 1201-2000 Euro (31%), 5 = > 2000 Euro (15%), 6 = Prefer not to answer (0%))



12. Which programming language are you able to use (more than one answer is allowed)? (1 = Java / Java Script, 2 = C / C++, 3 = Python, 4 = Ruby, 5 = Matlab, 6 = HTML, 7 = R, 8 = I do not know any programming language, 9 = Other<sup>16</sup>)
13. Since how many years are you using Internet? (1 = Less than 1 year (0%), 2 = 1-2 years (2%), 3 = 3-5 years (7%), 4 = 5-8 years (11%), 5 = More than 8 years (80%))
14. How many hours do you spend online per week? (Mean = 17.96; sd = 15.26; min = 0; max = 70)
15. How often do you use the Internet for each of the following purposes<sup>17</sup>:
  - (a) Entertainment
  - (b) Educational
  - (c) Work-related research
  - (d) Personal finance (banking, stock trading)
  - (e) Current events (news, sports, weather)
  - (f) Travel-related (research, reservations)
  - (g) Product information gathering
  - (h) Making purchases from online merchants
  - (i) Communicating with others (chat/email/Social Network)
  - (j) Other (specify)
 (1 = Often; 2 = Sometimes; 3 = Never)
16. How often do you buy products/services online that cost<sup>18</sup>:
  - (a) Less than 50 Euro
  - (b) 50-100 Euro
  - (c) 101-300 Euro
  - (d) 301-500 Euro
  - (e) 501-1000 Euro
  - (f) More than 1000 Euro

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<sup>16</sup>63% of respondents do not know any programming language. Respondents who knew at least one, on average, know 2 programming languages.

<sup>17</sup>Using single-factor measurement model we computed two indices: a) an index of using Internet for utilitarian purposes (mean = -6.32e-09; sd = 0.15, min = -0.33; max = 0.28; Cronbach's alpha = 0.4625) based on the responses about the use of Internet for educational, work-related, personal finance, and product-information gathering purposes; and b) an index of using Internet for hedonic purposes (mean = 1.66e-09; sd = 0.19, min = -0.42; max = 0.30; Cronbach's alpha = 0.6110) based on the responses about the use of Internet for entertainment, current events, travel-related, making purchases, and communication purposes.

<sup>18</sup>Using single-factor measurement model we computed an "Online shopping frequency" index (mean = -2.29e-09; sd = 0.56, min = -0.37; max = 3.30; Cronbach's alpha = 0.8854) based on the responses.

(1 = Never; 2 = Once a year; 3 = Several times a year; 4 = Once a month; 5 = Several times a month; 6 = Once a week; 7 = Several times a week )

17. "I prefer to buy products and services from physical store rather than online". (1 = I totally disagree (10%), 2 = I somewhat disagree (47%), 3 = I somewhat agree (31%), 4 = I totally agree (12%))
18. What agencies that specialize on users' online privacy and security are you familiar with? More than one answer is allowed. (1 = VeriSign (44% are familiar), 2 = Entrust (15%), 3 = TRUSTe (35%), 4 = BBBOnline (Better Business Bureau Online) (1%), 5 = AIPC Webtrust (1%), 6 = WebAssured (8%), 7 = Pretty Good Privacy (6%), 8 = Thawte (8%), 9 = Other (specify) (29%)<sup>19</sup>)
19. Do you recognize the label that represents the compliance of the web site with the Extended Validation certificate? (1 = No (55%), 2 = Yes (45%))
20. Please, explain what does the Extended Validation certificate mean? (1 = specify; 2 = I do not know what it is<sup>20</sup>)
21. Please, explain what do cookies mean? (1 = specify; 2 = I do not know what it is<sup>21</sup>)
22. Are you concerned about your privacy online? (1 = Not concerned at all (6%), 2 = Somewhat unconcerned (28%), 3 = Somewhat concerned (56%), 4 = Very concerned (10%))
23. Rate your level of concern over the following Internet issues<sup>22</sup>:
  - (a) It's too hard to use
  - (b) It's too hard to find what I want
  - (c) Someone could be monitoring what I do online
  - (d) It's too expensive Pornography is too easily accessible
  - (e) It's too cluttered
  - (f) It's too slow
  - (g) I get too much junk eMail
  - (h) My personal information will be stolen
  - (i) Someone will misuse the personal information I give them
  - (j) Information will be censored

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<sup>19</sup>Sixty-nine percent of the respondents were familiar with 1 agency, 20% - with 2 agencies, 8 % - with 3 agencies, 3 % - with 4 agencies, and 1% - with 5 agencies.

<sup>20</sup>55% of the respondents understood the meaning of EV certificate correctly.

<sup>21</sup>69% of the respondents understood the meaning of cookies correctly.

<sup>22</sup>Using single-factor measurement model we computed an index of privacy being a motivation for concern related to the use of Internet (mean = -1.69e-09; sd = 0.39, min = -1.1; max = 0.52; Cronbach's alpha = 0.7820) based on the responses about statements 3, 9 and 10 of the Q23.

(k) Other (specify)

(1 = Not at all concerned; 2 = Somewhat unconcerned; 3 = Somewhat concerned; 4 = Very concerned)

24. If asked to provide personal information, how often (in percentage) do you refuse to give the requested personal information / leave the web site? (mean = 45.09%; sd = 31.18; min = 0%; max = 100%)

25. If you do provide personal information to web sites, how often (in percentage) do you provide false information (if at all)? (mean = 9.77%; sd = 16.26; min = 0%; max = 90%)

26. If you have refused to disclose personal information or given falsified information, how important to you were the following issues<sup>23</sup>:

(a) I am unfamiliar with how the technology works

(b) I am unfamiliar with the company/individual running the site

(c) The company/individual running the site does not have good reputation

(d) I don't trust the company/individual running the site

(e) The site does not disclose how they plan to use my information

(f) The value I will receive from the site is not worth the information I give

(g) I generally prefer to be anonymous

(h) They asked for particularly sensitive pieces of information

(i) I am concerned that the information will be intercepted or stolen

(j) It takes too much time to fill out the forms

(k) I am concerned I will receive junk mail if I give my home address

(l) I am concerned I will receive junk email if I give my email address

(m) I am concerned I will receive junk SMS/calls if I give my (mobile) telephone number

(n) Other (specify)

(1 = Not one of my reasons; 2 = Not very important; 3 = Somewhat important reason; 4 = Very important reason)

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<sup>23</sup>Using single-factor measurement model we computed two indices: a) an index of privacy concern being a reason for not providing or providing falsified information (mean = 0.008; sd = 0.47, min = -1.97; max = 0.49; Cronbach's alpha = 0.7980) based on the responses about statements 5-9; and b) an index of trust issues being a reason for not providing or providing falsified information (mean = -0.003; sd = 0.41, min = -1.68; max = 0.28; Cronbach's alpha = 0.9015) based on the responses about statements 2-4 in Q26.

27. How willing are you to provide personally identifiable information and demographics to web sites? (1 = Not willing at all (3%), 2 = Not very willing (63%), 3 = I am indifferent (19%), 4 = I would not mind (11%), 5 = Very willing (3%))
28. Would you be more willing to provide personally identifiable information and demographics for online advertising purposes if the website compensated you for your information? (1 = No (62%), 2 = Yes (38%))
29. How willing are you to provide information about your tastes, interests and preferences without personal identification to web sites? (1 = Not willing at all (5%), 2 = Not very willing (28%), 3 = I am indifferent (28%), 4 = I would not mind (30%), 5 = Very willing (9%))
30. Would you be more willing to provide personal information about your tastes, interests and preferences for online advertising purposes if the website compensated you for your information? (1 = No (31%), 2 = Yes (69%))
31. Have you personally experienced incidents whereby your personal information was used by some company or e-commerce website without your authorization? (1 = No (66%), 2 = Yes (34%))
32. Have you personally been the victim of what you felt was an invasion of privacy? (1 = No (57%), 2 = Yes (43%))
33. Please indicate to which extent you (dis)agree with the following statements<sup>24</sup>:
  - (a) Consumers have lost all control over how personal information is collected and used by companies
  - (b) Most businesses handle the personal information they collect about consumers in a proper and confidential way
  - (c) Existing laws and organizational practices provide a reasonable level of protection for consumer privacy today
 (1 = Strongly Agree; 2 = Somewhat agree; 3 = Somewhat disagree; 4 = Strongly disagree)
34. If you are a member of an online social network, which do you use the most actively? (more than one answer is allowed) (1 = Facebook (56% use it), 2 = Google + (19%), 3 = Twitter (9%), 4 = My Space (0%), 5 = Instagram (10%) 6 = Other (specify) (9%), 7 = I am not a member of any online social network (29%))

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<sup>24</sup>We computed a Westin's Privacy index (Westin, 1968): 1 = Unconcerned (0-1 privacy concerned answers); 2 = Pragmatists (2 privacy concerned answers); 3 = Fundamentalists (3 privacy concerned answers). Statement 1 of Q33 was reversed coded.

35. How many connections do you have on Facebook? (1 = < 50 (20%), 2 = 51-100 (15%), 3 = 101-200 (9%), 4 = 201-300 (4%), 5 = 301-500 (9%), 6 = 501-700 (1%), 7 = 701-1000 (1%), 8 = 1001-2000, 9 = > 2000 (0%), 10 = I do not have a profile on Facebook (39%))
36. What do you use as your user name in Facebook? (1= Real name (57%), 2 = Pseudonym, and nobody knows who I am in real life (3%), 3 = Pseudonym, but everybody knows who I am in real life (0%), 4 = I do not have Facebook account (39%))
37. What do you use as profile picture in your primary social network? (1 = Real photo of me (42%), 2 = Real photo of me with other person/people (6%), 3 = Photo of other person or celebrity (1%), 4 = Photo/image of non human being (5%), 5 = No photo at all (4%), 6 = I do not have a Facebook account (39%), 7 = Other (3%))
38. What are your privacy settings on Facebook? (1 = Public. Everybody can get access to my profile and read my entries (7%); 2 = Private. Only my friends can get access to my profile and read my entries (36%); 3 = My profile and entries are mostly public and partially private (3%); 4 = My profile and entries are mostly private and partially public (12%); 5 = I have different accounts for public and private entries (0%); 6 = I do not have a Facebook account (39%); 7 = Other (please describe in details) (3%))
39. Did you ever change your privacy settings on Facebook? (1 = Never (20%); 2 = I changed privacy settings on Facebook immediately after registration (20%); 3 = I changed privacy settings on Facebook several times (20%); 4 = I changed privacy settings on Facebook after someone misused my personal information (1%); 5 = I do not have a Facebook account (39%); 6 = Other (please describe in details) (0%))
40. What is your favorite movie? (1 = Specify (85%); 2 = I do not wish to say (15%))
41. What is your favorite book? (1 = Specify (82%); 2 = I do not wish to say (18%))
42. What is your favorite sport? (1 = Specify (89%); 2 = I do not wish to say (11%))
43. What is your hobby? (1 = Specify (91%); 2 = I do not wish to say (9%))
44. Imagine that 2 people do the same job in the same company. Both have the same qualification, but the person A works more productively than person B. Is it fair that person A gets a larger remuneration? (1 = Yes, it's fair (94%); 2 = No, it's unfair (6%))

45. “In general, one can trust people ...” (1 = I totally agree (4%); 2 = I somewhat agree (43%); 3 = I somewhat disagree (50%); 4 = I totally disagree (3%))
46. “Nowadays one cannot rely on anyone ...” (1 = I totally agree (7%); 2 = I somewhat agree (67%); 3 = I somewhat disagree (23%); 4 = I totally disagree (3%))
47. “When dealing with strangers it’s better to be careful before trusting them...” (1 = I totally agree (11%); 2 = I somewhat agree (52%); 3 = I somewhat disagree (37%); 4 = I totally disagree (0%))
48. Do you think that the majority of people... (1 = “... would exploit you if they had an opportunity ...” (45%); 2 = “... would try to be fair to you ... “ (55%))
49. Do you think that people most of the times... (1 = “... try to be considerate of others” (72%); 2 = “... follow their own interests” (28%)<sup>25</sup>)

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<sup>25</sup>Using single-factor measurement model we computed a “trust disposition” index based on the responses to Q45-49 (mean = 2.13e-09; sd = 0.42; min = -0.91; max = 0.83; Cronbach’s alpha = 0.7582).

## D Summary statistics of values

Table 2: Summary statistics of values of trustworthiness perception

| Variable | Mean | Median | Std. Dev. | Variance | Min | Max |
|----------|------|--------|-----------|----------|-----|-----|
| QT3      | 2.97 | 3      | 1.98      | 3.92     | 1   | 11  |
| QT1      | 3.30 | 3      | 1.85      | 3.43     | 1   | 10  |
| QT2      | 3.31 | 3      | 2.17      | 4.70     | 1   | 12  |
| LT6      | 3.69 | 3      | 2.66      | 7.05     | 1   | 11  |
| LT1      | 3.91 | 4      | 2.31      | 5.33     | 1   | 10  |
| NT4      | 4.16 | 4      | 2.64      | 6.96     | 1   | 12  |
| FT6      | 4.53 | 4      | 2.63      | 6.93     | 1   | 12  |
| NT2      | 4.74 | 4      | 2.65      | 7.03     | 1   | 12  |
| NT3      | 4.90 | 5      | 2.60      | 6.76     | 1   | 12  |
| LT2      | 4.92 | 5      | 2.57      | 6.59     | 1   | 11  |
| LT3      | 5.03 | 4      | 2.64      | 6.99     | 1   | 11  |
| LT5      | 5.13 | 5      | 2.66      | 7.05     | 1   | 12  |
| LT7      | 5.40 | 5      | 2.73      | 7.44     | 1   | 12  |
| LT4      | 5.41 | 6      | 2.74      | 7.49     | 1   | 12  |
| NT5      | 5.61 | 6      | 2.66      | 7.06     | 1   | 12  |
| NT1      | 5.69 | 6      | 2.82      | 7.94     | 1   | 12  |
| FT1      | 5.81 | 6      | 2.41      | 5.81     | 1   | 12  |
| FT2      | 6.07 | 6      | 2.53      | 6.42     | 1   | 12  |
| AT2      | 6.18 | 6      | 2.84      | 8.06     | 1   | 12  |
| BT2      | 6.52 | 6      | 2.73      | 7.47     | 1   | 12  |
| BT4      | 6.57 | 6      | 2.65      | 7.02     | 1   | 12  |
| FT5      | 6.80 | 7      | 2.77      | 7.68     | 1   | 12  |
| FT4      | 6.84 | 7      | 2.87      | 8.26     | 1   | 12  |
| BT1      | 7.06 | 7      | 2.90      | 8.38     | 1   | 12  |
| FT3      | 7.12 | 7      | 2.82      | 7.93     | 1   | 12  |
| ST4      | 7.22 | 7      | 3.01      | 9.06     | 1   | 12  |
| BT3      | 7.46 | 8      | 2.80      | 7.84     | 1   | 12  |
| ST1      | 7.53 | 8.5    | 3.12      | 9.72     | 1   | 12  |
| ST3      | 7.57 | 8      | 2.81      | 7.87     | 1   | 12  |
| AT3      | 7.75 | 8      | 3.04      | 9.26     | 1   | 12  |
| AT1      | 7.84 | 8      | 2.91      | 8.50     | 1   | 12  |
| ST2      | 7.93 | 8.5    | 2.85      | 8.15     | 1   | 12  |

Table 3: Summary statistics of values of purchase intentions

| Variable | Mean | Median | Std. Dev. | Variance | Min | Max |
|----------|------|--------|-----------|----------|-----|-----|
| QP3      | 2.83 | 2      | 2.06      | 4.26     | 1   | 12  |
| QP1      | 3.04 | 3      | 1.85      | 3.43     | 1   | 10  |
| QP2      | 3.26 | 3      | 2.30      | 5.27     | 1   | 12  |
| LP6      | 4.61 | 4      | 3.13      | 9.80     | 1   | 12  |
| LP1      | 4.73 | 5      | 2.54      | 6.47     | 1   | 11  |
| NP4      | 4.92 | 5      | 2.82      | 7.94     | 1   | 12  |
| LP5      | 5.83 | 6      | 2.74      | 7.49     | 1   | 12  |
| NP2      | 5.97 | 6      | 2.78      | 7.73     | 1   | 12  |
| LP4      | 6.05 | 7      | 2.92      | 8.51     | 1   | 12  |
| NP3      | 6.08 | 6      | 2.78      | 7.71     | 1   | 12  |
| FP1      | 6.20 | 6      | 2.64      | 6.95     | 1   | 12  |
| LP2      | 6.24 | 6      | 2.79      | 7.79     | 1   | 12  |
| NP5      | 6.26 | 6      | 2.74      | 7.51     | 1   | 12  |
| FP6      | 6.48 | 6.5    | 2.98      | 8.87     | 1   | 12  |
| FP2      | 6.53 | 6      | 2.72      | 7.41     | 1   | 12  |
| NP1      | 6.59 | 7      | 2.91      | 8.47     | 1   | 12  |
| LP3      | 6.59 | 7      | 2.83      | 8.00     | 1   | 12  |
| AP2      | 6.61 | 7      | 2.87      | 8.22     | 1   | 12  |
| LP7      | 6.69 | 7      | 2.97      | 8.83     | 1   | 12  |
| BP4      | 7.20 | 7      | 2.47      | 6.08     | 1   | 12  |
| BP1      | 7.58 | 8      | 2.68      | 7.20     | 1   | 12  |
| FP4      | 7.79 | 8      | 2.87      | 8.25     | 1   | 12  |
| SP1      | 7.80 | 8      | 3.19      | 10.16    | 1   | 12  |
| SP2      | 7.81 | 8      | 2.77      | 7.70     | 1   | 12  |
| SP3      | 7.86 | 8      | 2.80      | 7.82     | 1   | 12  |
| AP3      | 7.90 | 8.5    | 2.84      | 8.09     | 1   | 12  |
| AP1      | 7.91 | 8      | 2.82      | 7.93     | 1   | 12  |
| FP5      | 7.95 | 9      | 3.07      | 9.45     | 1   | 12  |
| BP2      | 8.03 | 8      | 2.77      | 7.68     | 1   | 12  |
| FP3      | 8.26 | 9      | 3.00      | 9.02     | 1   | 12  |
| SP4      | 8.47 | 9      | 3.02      | 9.14     | 1   | 12  |
| BP3      | 8.53 | 9      | 2.68      | 7.21     | 1   | 12  |



## E Confirmatory factor analysis of the measurement model

Table 4: CFA of the measurement model of trustworthiness perception

| Construct | Sub-construct | Variable | Factor loading | Uniqueness | Cronbach's $\alpha$ |
|-----------|---------------|----------|----------------|------------|---------------------|
| Security  |               | ST       | -              | -          | 0.8952              |
|           |               | ST1      | 0.7607         | 0.4213     |                     |
|           |               | ST2      | 0.8676         | 0.2473     |                     |
|           |               | ST3      | 0.7988         | 0.3619     |                     |
|           |               | ST4      | 0.8263         | 0.3172     |                     |
| Privacy   | Collection    | PT       | -              | -          | 0.8688              |
|           |               | LT       | 0.8808         | 0.2243     |                     |
|           |               | LT1      | 0.5403         | 0.7081     | 0.8569              |
|           |               | LT2      | 0.6878         | 0.5269     |                     |
|           |               | LT3      | 0.7007         | 0.5091     |                     |
|           |               | LT4      | 0.6884         | 0.5261     |                     |
|           |               | LT5      | 0.7830         | 0.3869     |                     |
|           |               | LT6      | 0.6496         | 0.5780     |                     |
|           |               | LT7      | 0.6924         | 0.5206     |                     |
|           | Control       | NT       | 0.8562         | 0.2669     | 0.8415              |
|           |               | NT1      | 0.8548         | 0.2693     |                     |
|           |               | NT2      | 0.6850         | 0.5308     |                     |
|           |               | NT3      | 0.7157         | 0.4878     |                     |
|           |               | NT4      | 0.6448         | 0.5842     |                     |
|           |               | NT5      | 0.8113         | 0.3417     |                     |
|           | Awareness     | NT6      | 0.7032         | 0.5055     | 0.8615              |
|           |               | AT       | 0.6990         | 0.5114     |                     |
|           |               | AT1      | 0.6876         | 0.5271     |                     |
|           |               | AT2      | 0.8604         | 0.2597     |                     |
|           |               | AT3      | 0.7949         | 0.3681     |                     |
|           |               | AT4      | 0.7417         | 0.4498     |                     |

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Table 4: CFA of the measurement model of trustworthiness perception

| Construct           | Sub-construct | Variable | Factor loading | Uniqueness | Cronbach's $\alpha$ |
|---------------------|---------------|----------|----------------|------------|---------------------|
| Reputation          | Background    | RT       |                |            | 0.9094              |
|                     |               | BT       | 0.8744         | 0.2354     | 0.9030              |
|                     |               | BT1      | 0.8743         | 0.2357     |                     |
|                     |               | BT2      | 0.8268         | 0.3164     |                     |
|                     |               | BT3      | 0.8518         | 0.2745     |                     |
|                     | Feedback      | BT4      | 0.7742         | 0.4007     |                     |
|                     |               | BT5      | 0.8525         | 0.2733     |                     |
|                     |               | FT       | 0.8744         | 0.2354     | 0.8990              |
|                     |               | FT1      | 0.8743         | 0.2357     |                     |
|                     |               | FT2      | 0.7830         | 0.3869     |                     |
|                     |               | FT3      | 0.7273         | 0.4711     |                     |
|                     |               | FT4      | 0.8488         | 0.2795     |                     |
|                     |               | FT5      | 0.6288         | 0.6047     |                     |
|                     |               | FT6      | 0.7950         | 0.3679     |                     |
|                     |               | FT7      | 0.8447         | 0.2864     |                     |
| Website quality     | QT            |          |                | 0.6458     |                     |
|                     | QT1           | 0.4686   | 0.7805         |            |                     |
|                     | QT2           | 0.6943   | 0.5180         |            |                     |
|                     | QT3           | 0.5821   | 0.6611         |            |                     |
| <i>end of table</i> |               |          |                |            |                     |

Table 5: CFA of the measurement model of purchase intentions

| Construct | Sub-construct | Variable | Factor loading | Uniqueness | Cronbach's $\alpha$ |
|-----------|---------------|----------|----------------|------------|---------------------|
| Security  |               | SP       | -              | -          | 0.9030              |
|           |               | SP1      | 0.7419         | 0.4497     |                     |
|           |               | SP2      | 0.8297         | 0.3116     |                     |
|           |               | SP3      | 0.8263         | 0.3173     |                     |
| Privacy   |               | SP4      | 0.8642         | 0.2531     |                     |
|           |               | PP       | -              | -          |                     |
|           |               | LP       | 0.8671         | 0.2481     |                     |
|           |               | LP1      | 0.6758         | 0.5432     |                     |
|           | Collection    | LP2      | 0.7736         | 0.4015     | 0.8748              |
|           |               | LP3      | 0.7250         | 0.4744     |                     |
|           |               | LP4      | 0.7247         | 0.4748     |                     |
|           |               | LP5      | 0.7093         | 0.4969     |                     |
|           |               | LP6      | 0.6419         | 0.5880     |                     |
|           |               | LP7      | 0.6875         | 0.5273     |                     |
|           |               | NP       | 0.8048         | 0.3523     |                     |
|           |               | NP1      | 0.8027         | 0.3557     |                     |
|           |               | NP2      | 0.6973         | 0.5137     |                     |
|           |               | NP3      | 0.7415         | 0.4502     |                     |
|           |               | NP4      | 0.6251         | 0.6093     |                     |
|           |               | NP5      | 0.7797         | 0.3921     |                     |
|           | Awareness     | NP6      | 0.7301         | 0.4670     |                     |
|           |               | AP       | 0.7428         | 0.4482     | 0.8598              |
|           |               | AP1      | 0.7377         | 0.4558     |                     |
|           |               | AP2      | 0.8675         | 0.2474     |                     |
|           |               | AP3      | 0.7884         | 0.3784     |                     |
|           |               | AP4      | 0.7343         | 0.4608     |                     |

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Table 5: CFA of the measurement model of purchase intentions

| Construct           | Sub-construct | Variable | Factor loading | Uniqueness | Cronbach's $\alpha$ |
|---------------------|---------------|----------|----------------|------------|---------------------|
| Reputation          | Background    | RP       |                |            | 0.9334              |
|                     |               | BP       | 0.9058         | 0.1796     | 0.9113              |
|                     |               | BP1      | 0.9059         | 0.1794     |                     |
|                     |               | BP2      | 0.8440         | 0.2877     |                     |
|                     |               | BP3      | 0.8236         | 0.3216     |                     |
|                     | Feedback      | BP4      | 0.8471         | 0.2824     | 0.8785              |
|                     |               | BP5      | 0.8418         | 0.2913     |                     |
|                     |               | FP       | 0.9058         | 0.1796     |                     |
|                     |               | FP1      | 0.9059         | 0.1794     |                     |
|                     |               | FP2      | 0.7214         | 0.4796     |                     |
|                     |               | FP3      | 0.6891         | 0.5252     |                     |
|                     |               | FP4      | 0.7841         | 0.3852     |                     |
|                     |               | FP5      | 0.6604         | 0.5639     |                     |
|                     |               | FP6      | 0.7635         | 0.4170     |                     |
|                     |               | FP7      | 0.8069         | 0.3489     |                     |
| Website quality     | QP            |          |                | 0.6895     |                     |
|                     | QP1           | 0.5677   | 0.6777         |            |                     |
|                     | QP2           | 0.7473   | 0.4416         |            |                     |
|                     | QP3           | 0.5594   | 0.6871         |            |                     |
| <i>end of table</i> |               |          |                |            |                     |

## F Structural equation model estimation results

Table 6: Measurement model SEM estimation results

| Latent variable    | Item variable | Stand. path coefficient | p-value | AVE   | CR    | R-sq <sup>26</sup> |
|--------------------|---------------|-------------------------|---------|-------|-------|--------------------|
| Security           | ST            | ST1                     | 0.757   | 0.681 | 0.895 | 0.573              |
|                    |               | ST2                     | 0.892   |       |       | 0.795              |
|                    |               | ST3                     | 0.816   |       |       | 0.666              |
|                    |               | ST4                     | 0.830   |       |       | 0.689              |
|                    | SP            | SP1                     | 0.740   | 0.680 | 0.894 | 0.548              |
|                    |               | SP2                     | 0.841   |       |       | 0.708              |
|                    |               | SP3                     | 0.831   |       |       | 0.690              |
|                    |               | SP4                     | 0.880   |       |       | 0.774              |
| Privacy Collection | LT            | LT1                     | 0.579   | 0.448 | 0.849 | 0.335              |
|                    |               | LT2                     | 0.739   |       |       | 0.547              |
|                    |               | LT3                     | 0.705   |       |       | 0.498              |
|                    |               | LT4                     | 0.609   |       |       | 0.371              |
|                    |               | LT5                     | 0.753   |       |       | 0.566              |
|                    |               | LT6                     | 0.553   |       |       | 0.306              |
|                    |               | LT7                     | 0.719   |       |       | 0.516              |
|                    | LP            | LP1                     | 0.709   | 0.488 | 0.869 | 0.503              |
|                    |               | LP2                     | 0.806   |       |       | 0.650              |
|                    |               | LP3                     | 0.733   |       |       | 0.537              |
|                    |               | LP4                     | 0.616   |       |       | 0.379              |
|                    |               | LP5                     | 0.708   |       |       | 0.502              |
|                    |               | LP6                     | 0.583   |       |       | 0.340              |
|                    |               | LP7                     | 0.713   |       |       | 0.509              |
|                    | Control       | NT                      | NT1     | 0.523 | 0.844 | 0.351              |
|                    |               |                         | NT2     |       |       | 0.522              |
|                    |               |                         | NT3     |       |       | 0.451              |
|                    |               |                         | NT4     |       |       | 0.769              |
|                    |               |                         | NT5     |       |       | 0.522              |
|                    |               | NP                      | NP1     | 0.511 | 0.838 | 0.355              |
|                    |               |                         | NP2     |       |       | 0.579              |
|                    |               |                         | NP3     |       |       | 0.445              |
|                    |               |                         | NP4     |       |       | 0.661              |
|                    |               |                         | NP5     |       |       | 0.514              |

*continued on next page*

Table 6: Measurement model SEM estimation results

| Latent variable | Item variable | Stand. path coefficient | p-value | AVE   | CR    | R-sq <sup>26</sup> |
|-----------------|---------------|-------------------------|---------|-------|-------|--------------------|
| Awareness       |               |                         |         |       |       |                    |
| AT              | AT1           | 0.976                   | 0.000   | 0.707 | 0.887 | 0.952              |
|                 | AT2           | 0.709                   | 0.000   |       |       | 0.503              |
|                 | AT3           | 0.817                   | 0.000   |       |       | 0.667              |
| AP              | AP1           | 0.955                   | 0.000   | 0.688 | 0.867 | 0.913              |
|                 | AP2           | 0.707                   | 0.000   |       |       |                    |
|                 | AP3           | 0.808                   | 0.000   |       |       | 0.652              |
| Reputation      |               |                         |         |       |       |                    |
| Background      |               |                         |         |       |       |                    |
| BT              | BT1           | 0.856                   | 0.000   | 0.702 | 0.904 | 0.732              |
|                 | BT2           | 0.850                   | 0.000   |       |       | 0.723              |
|                 | BT3           | 0.765                   | 0.000   |       |       | 0.585              |
|                 | BT4           | 0.876                   | 0.000   |       |       | 0.767              |
| BP              | BP1           | 0.850                   | 0.000   | 0.722 | 0.912 | 0.722              |
|                 | BP2           | 0.839                   | 0.000   |       |       | 0.704              |
|                 | BP3           | 0.856                   | 0.000   |       |       | 0.732              |
|                 | BP4           | 0.855                   | 0.000   |       |       | 0.731              |
| Feedback        |               |                         |         |       |       |                    |
| FT              | FT1           | 0.771                   | 0.000   | 0.610 | 0.903 | 0.595              |
|                 | FT2           | 0.722                   | 0.000   |       |       | 0.522              |
|                 | FT3           | 0.789                   | 0.000   |       |       | 0.623              |
|                 | FT4           | 0.863                   | 0.000   |       |       | 0.745              |
|                 | FT5           | 0.859                   | 0.000   |       |       | 0.739              |
|                 | FT6           | 0.660                   | 0.000   |       |       | 0.435              |
| FP              | FP1           | 0.700                   | 0.000   | 0.554 | 0.880 | 0.489              |
|                 | FP2           | 0.615                   | 0.000   |       |       | 0.378              |
|                 | FP3           | 0.755                   | 0.000   |       |       | 0.569              |
|                 | FP4           | 0.854                   | 0.000   |       |       | 0.730              |
|                 | FP5           | 0.814                   | 0.000   |       |       | 0.662              |
|                 | FP6           | 0.704                   | 0.000   |       |       | 0.495              |
| Website quality |               |                         |         |       |       |                    |
| QT              | QT1           | 0.504                   | 0.000   | 0.452 | 0.696 | 0.254              |
|                 | QT2           | 0.903                   | 0.000   |       |       | 0.815              |
|                 | QT3           | 0.535                   | 0.000   |       |       | 0.287              |
| QP              | QP1           | 0.556                   | 0.000   | 0.517 | 0.743 | 0.309              |
|                 | QP2           | 1.000                   | 0.000   |       |       | 1.000              |
|                 | QP3           | 0.492                   | 0.000   |       |       | 0.242              |

*end of table*

Table 7: Structural model SEM estimation results

| Latent variable | Item variable                          | Stand. path coefficient | p-value | AVE   | CR    | R-sq <sup>27</sup> |  |  |
|-----------------|--|-------------------------|---------|-------|-------|--------------------|--|--|
| Trust (T)       | ST                                     | 0.899                   | 0.000   | 0.618 | 0.912 | 0.808              |  |  |
|                 | QT                                     | 0.224                   | 0.039   |       |       | 0.050              |  |  |
|                 | BT                                     | 0.905                   | 0.000   |       |       | 0.819              |  |  |
|                 | FT                                     | 0.863                   | 0.000   |       |       | 0.745              |  |  |
|                 | AT                                     | 0.869                   | 0.000   |       |       | 0.755              |  |  |
|                 | NT                                     | 0.744                   | 0.000   |       |       | 0.553              |  |  |
|                 | LT                                     | 0.771                   | 0.000   |       |       | 0.595              |  |  |
|                 | <b>Control variables:</b>              |                         |         |       |       |                    |  |  |
|                 | Q3: Female                             | -0.054                  | 0.000   |       |       |                    |  |  |
|                 | Q4: Age                                | -0.214                  | 0.019   |       |       |                    |  |  |
|                 | Q9: Urban                              | 0.021                   | 0.828   |       |       |                    |  |  |
|                 | Q10: Income source                     | -0.230                  | 0.019   |       |       |                    |  |  |
|                 | Q11: Spending                          | -0.065                  | 0.498   |       |       |                    |  |  |
|                 | Q12: Programming languages             | 0.070                   | 0.489   |       |       |                    |  |  |
|                 | Q13: Internet experience               | 0.233                   | 0.022   |       |       |                    |  |  |
|                 | Q16: Online shopping frequency         | 0.040                   | 0.698   |       |       |                    |  |  |
|                 | Q17: Online shopping preference        | -0.073                  | 0.480   |       |       |                    |  |  |
|                 | Q18: Familiarity with privacy agencies | 0.014                   | 0.889   |       |       |                    |  |  |
|                 | Q20: Correct explanation for EV        | -0.136                  | 0.157   |       |       |                    |  |  |
|                 | Q21: Correct explanation for cookies   | 0.038                   | 0.703   |       |       |                    |  |  |
|                 | Q22: General privacy concern           | -0.170                  | 0.053   |       |       |                    |  |  |
|                 | Q27: Willingness to reveal PII         | 0.059                   | 0.553   |       |       |                    |  |  |
|                 | Q32: Privacy invasion                  | -0.041                  | 0.690   |       |       |                    |  |  |
|                 | Q33: Westin's privacy index            | -0.174                  | 0.065   |       |       |                    |  |  |
|                 | Q35: Number of Facebook connections    | -0.599                  | 0.000   |       |       |                    |  |  |
|                 | Q36: Name in Facebook                  | 0.376                   | 0.006   |       |       |                    |  |  |
|                 | Q49: Index of trust disposition        | -0.027                  | 0.789   |       |       |                    |  |  |

*continued on next page*

Table 7: Structural model SEM estimation results

| Latent variable        | Item variable                          | Stand. path coefficient | p-value | AVE   | CR    | R-sq <sup>27</sup> |
|------------------------|--|-------------------------|---------|-------|-------|--------------------|
| Purchase intention (P) | SP                                     | 0.942                   | 0.000   | 0.664 | 0.925 | 0.887              |
|                        | QP                                     | 0.126                   | 0.296   |       |       | 0.016              |
|                        | BP                                     | 0.929                   | 0.000   |       |       | 0.863              |
|                        | FP                                     | 0.910                   | 0.000   |       |       | 0.829              |
|                        | AP                                     | 0.902                   | 0.000   |       |       | 0.814              |
|                        | NP                                     | 0.761                   | 0.000   |       |       | 0.580              |
|                        | LP                                     | 0.810                   | 0.000   |       |       | 0.656              |
|                        | <b>Control variables:</b>              |                         |         |       |       |                    |
|                        | Q3: Female                             | 0.011                   | 0.819   |       |       |                    |
|                        | Q4: Age                                | -0.136                  | 0.129   |       |       |                    |
|                        | Q9: Urban                              | -0.075                  | 0.422   |       |       |                    |
|                        | Q10: Income source                     | -0.191                  | 0.052   |       |       |                    |
|                        | Q11: Spending                          | -0.042                  | 0.651   |       |       |                    |
|                        | Q12: Programming languages             | 0.090                   | 0.358   |       |       |                    |
|                        | Q13: Internet experience               | 0.289                   | 0.002   |       |       |                    |
|                        | Q16: Online shopping frequency         | 0.031                   | 0.751   |       |       |                    |
|                        | Q17: Online shopping preference        | -0.132                  | 0.183   |       |       |                    |
|                        | Q18: Familiarity with privacy agencies | 0.012                   | 0.904   |       |       |                    |
|                        | Q20: Correct explanation for EV        | -0.091                  | 0.357   |       |       |                    |
|                        | Q21: Correct explanation for cookies   | -0.008                  | 0.936   |       |       |                    |
|                        | Q22: General privacy concern           | -0.187                  | 0.028   |       |       |                    |
|                        | Q27: Willingness to reveal PII         | 0.112                   | 0.237   |       |       |                    |
|                        | Q32: Privacy invasion                  | 0.044                   | 0.660   |       |       |                    |
|                        | Q33: Westin's privacy index            | -0.152                  | 0.094   |       |       |                    |
|                        | Q35: Number of Facebook connections    | -0.459                  | 0.002   |       |       |                    |
|                        | Q36: Name in Facebook                  | 0.174                   | 0.196   |       |       |                    |
|                        | Q49: Index of trust disposition        | -0.039                  | 0.696   |       |       |                    |

*end of table*



## G Goodness of fit test results

|                   | Absolute fit indices       |                             | Incremental fit indices  |                             |
|-------------------|----------------------------|-----------------------------|--------------------------|-----------------------------|
|                   | RMSEA                      | SRMR                        | CFI                      | TLI                         |
| Acceptable values | $\leq 0.08$                | $\leq 0.08$                 | $\geq 0.90$              | $\geq 0.90$                 |
| Source            | Browne<br>et al.<br>(1993) | Hu and<br>Bentler<br>(1999) | Hair<br>et al.<br>(2010) | Hu and<br>Bentler<br>(1999) |
| Measurement model |                            |                             |                          |                             |
| Security          | 0.057                      | 0.029                       | 0.994                    | 0.989                       |
| Collection        | 0.084                      | 0.082                       | 0.958                    | 0.941                       |
| Control           | 0.108                      | 0.073                       | 0.955                    | 0.924                       |
| Awareness         | 0.080                      | 0.016                       | 0.996                    | 0.982                       |
| Background        | 0.076                      | 0.028                       | 0.989                    | 0.979                       |
| Feedback          | 0.105                      | 0.055                       | 0.953                    | 0.928                       |
| Website quality   | 0.026                      | 0.031                       | 0.999                    | 0.997                       |
| Structural model  | 0.082                      | 0.092                       | 0.922                    | 0.893                       |

## H Correlation and covariance matrices

Table 8: Covariance matrix

|    | ST       | QT       | BT       | FT       | AT       | NT       | LT       | SP     | QP     | BP    | FP      | AP    | NP       | P        |
|----|----------|----------|----------|----------|----------|----------|----------|--------|--------|-------|---------|-------|----------|----------|
| ST |          |          |          |          |          |          |          |        |        |       |         |       |          |          |
| QT | -0.052   |          |          |          |          |          |          |        |        |       |         |       |          |          |
| BT | 0.067    | -0.054   |          |          |          |          |          |        |        |       |         |       |          |          |
| FT | 0.197    | -0.058   | 0.307    |          |          |          |          |        |        |       |         |       |          |          |
| AT | 0.125    | -0.005   | -0.025   | 0.177    |          |          |          |        |        |       |         |       |          |          |
| NT | 0.089    | 0.058    | 0.141    | 0.328*** | 0.098    |          |          |        |        |       |         |       |          |          |
| LT | 0.200    | 0.070    | 0.348**  | 0.426*** | 0.459    | 0.459*** |          |        |        |       |         |       |          |          |
| SP | 1.023*** |          |          |          |          |          |          |        |        |       |         |       |          |          |
| QP |          | 0.909*** |          |          |          |          |          | 0.072  |        |       |         |       |          |          |
| BP |          |          | 0.707*** |          |          |          |          | -0.193 | 0.049  |       |         |       |          |          |
| FP |          |          |          | 0.402*** |          |          |          | -0.168 | 0.080  | 0.203 |         |       |          |          |
| AP |          |          |          |          | 0.801*** |          |          | -0.153 | 0.030  | 0.143 | 0.063   |       |          |          |
| NP |          |          |          |          |          | 0.529*** |          | -0.136 | 0.035  | 0.241 | 0.323** | 0.082 |          |          |
| LP |          |          |          |          |          |          | 0.365*** | -0.172 | -0.007 | 0.147 | 0.319*  | 0.093 | 0.456*** |          |
| T  |          |          |          |          |          |          |          |        |        |       |         |       |          | 0.931*** |

\*p-value &lt;0.10; \*\*&lt;0.05; \*\*\*&lt;0.01

Table 9: Correlation matrix

|    | ST       | QT       | AT        | NT       | LT       | FT        | BT       | SP       | QP       | AP       | NP       | LP       | FP       | BP    |
|----|----------|----------|-----------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-------|
| ST | 1.000    |          |           |          |          |           |          |          |          |          |          |          |          |       |
| QT | 0.122    | 1.000    |           |          |          |           |          |          |          |          |          |          |          |       |
| AT | 0.835*** | 0.105    | 1.000     |          |          |           |          |          |          |          |          |          |          |       |
| NT | 0.630*** | 0.256*** | 0.578***  | 1.000    |          |           |          |          |          |          |          |          |          |       |
| LT | 0.640*** | 0.365*** | 0.620***  | 0.790*** | 1.000    |           |          |          |          |          |          |          |          |       |
| FT | 0.796*** | 0.286*** | 0.768***  | 0.685*** | 0.786*** | 1.000     |          |          |          |          |          |          |          |       |
| BT | 0.830*** | 0.155*   | 0.753***  | 0.664*** | 0.727*** | 0.852***  | 1.000    |          |          |          |          |          |          |       |
| SP | 0.949*** | 0.124    | 0.777***  | 0.551*** | 0.539*** | 0.717***  | 0.760*** | 1.000    |          |          |          |          |          |       |
| QP | 0.057    | 0.922*** | 0.110     | 0.155*   | 0.290*** | 0.256***  | 0.103    | 0.077    | 1.000    |          |          |          |          |       |
| AP | 0.844*** | 0.137    | 0.914***  | 0.512*** | 0.539*** | 0.716***  | 0.734*** | 0.876*** | 0.105    | 1.000    |          |          |          |       |
| NP | 0.675*** | 0.200**  | 0.551***  | 0.747*** | 0.622*** | 0.6013*** | 0.604*** | 0.697*** | 0.154*   | 0.643*** | 1.000    |          |          |       |
| LP | 0.655*** | 0.308*** | 0.564***  | 0.525*** | 0.712*** | 0.649***  | 0.610*** | 0.683*** | 0.262*** | 0.660*** | 0.805*** | 1.000    |          |       |
| FP | 0.800*** | 0.251*** | 0.7208*** | 0.513*** | 0.607*** | 0.808***  | 0.712*** | 0.847*** | 0.235**  | 0.818*** | 0.736*** | 0.803*** | 1.000    |       |
| BP | 0.861*** | 0.166*   | 0.7457*** | 0.562*** | 0.587*** | 0.776***  | 0.880*** | 0.890*** | 0.125    | 0.851*** | 0.727*** | 0.728*** | 0.866*** | 1.000 |

\*p-value &lt;0.10; \*\*&lt;0.05; \*\*\*&lt;0.01

## I Summary of the hypotheses test results

| Hypothesis | Description  | Result   |
|------------|--|--|
| H1a        | Privacy -> Trust:<br>AT -> T<br>NT -> T<br>LT -> T               | Supported (p< 0.001)<br>Supported (p< 0.001)<br>Supported (p< 0.001)                         |
| H1b        | Privacy -> Purchase intentions:<br>AP -> P<br>NP -> P<br>LP -> P | Supported (p< 0.001)<br>Supported (p< 0.001)<br>Supported (p< 0.001)                         |
| H2a        | Security -> Trust:<br>ST -> T                                    | Supported (p< 0.001)   |
| H2b        | Security -> Purchase intentions:<br>SP -> P                      | Supported (p< 0.001)   |
| H3a        | Website quality -> Trust:<br>QT -> T                             | Supported (p< 0.05)  |
| H3b        | Website quality -> Purchase intentions:<br>QP -> P               | Not supported  |
| H4a        | Reputation -> Trust:<br>BT -> T<br>FT -> T                       | Supported (p< 0.001)<br>Supported (p< 0.001)   |
| H4b        | Reputation -> Purchase intentions:<br>BP -> P<br>FP -> P         | Supported (p< 0.001)<br>Supported (p< 0.001)   |
| H5a        | FT1 > FT2<br>FP1 > FP2   | Not supported<br>Not supported   |
| H5b        | FT1 < FT5<br>FT2 < FT5<br>FP1 < FP5<br>FP2 < FP5                 | Supported (p< 0.001)<br>Supported (p< 0.001)<br>Supported (p< 0.001)<br>Supported (p< 0.001) |
| H5c        | FT3 > FT4<br>FP3 > FP4   | Not supported<br>Supported (p< 0.05)   |
| H5d        | LT4 > LT5<br>LP4 > LP5   | Not supported<br>Not supported   |
| H5e        | LT2 > LT3<br>LP2 > LP3   | Not supported<br>Not supported   |
| H5f        | LT1 < LT3<br>LP1 < LP3   | Supported (p< 0.001)<br>Supported (p< 0.001)   |
| H5g        | NT4 < NT5<br>NP4 < NP5   | Supported (p< 0.001)<br>Supported (p< 0.001)   |

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| Hypothesis          | Description                  | Result               |
|---------------------|------------------------------|----------------------|
| H6                  | Trust ~ Purchase intentions: |                      |
|                     | T ~ P                        | Supported (p< 0.001) |
|                     | AT ~ AP                      | Supported (p< 0.001) |
|                     | NT ~ NP                      | Supported (p< 0.001) |
|                     | LT ~ LP                      | Supported (p< 0.001) |
|                     | ST ~ SP                      | Supported (p< 0.001) |
|                     | QT ~ QP                      | Supported (p< 0.001) |
|                     | BT ~ BP                      | Supported (p< 0.001) |
|                     | FT ~ FP                      | Supported (p< 0.001) |
| <i>end of table</i> |                              |                      |

## J Subject pool characteristics

Figure 2: Heat map: distribution of the participants' responses about frequency of use of the Internet for various purposes

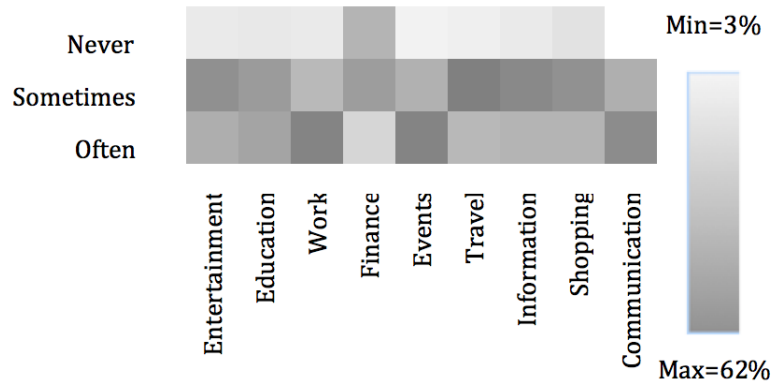


Figure 3: Heat map: proportions of the participants' responses about frequency of purchases from online vendors

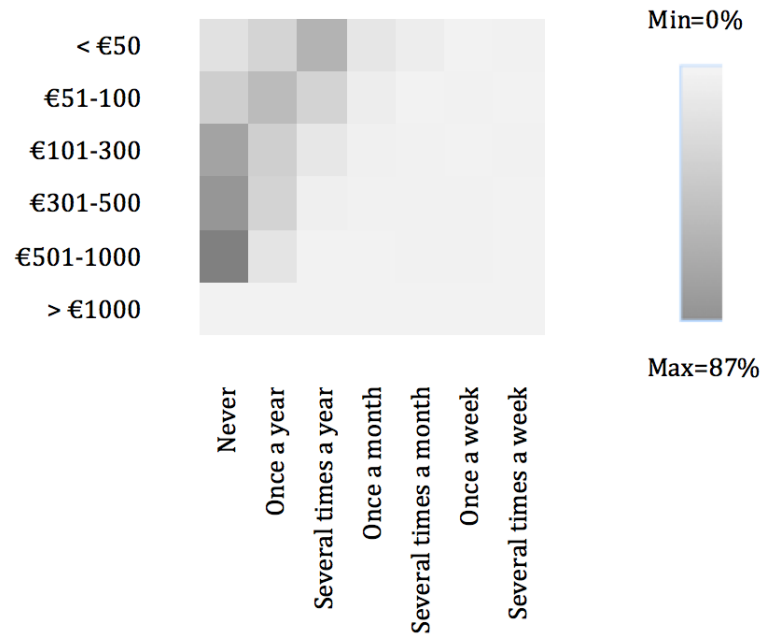




Figure 4: Distribution of the answers about % of the times participants refused to provide personal information or left the website

