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**Mestrado em Gestão de Informação**

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## **Assessing the impact of e-commerce on individual performance**

Integrating information system's success measures and overall trust

Ana Martins Loureiro

Dissertation presented as partial requirement for obtaining the Master's degree in Information Management

**NOVA Information Management School**  
**Instituto Superior de Estatística e Gestão de Informação**

Universidade Nova de Lisboa

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**ASSESSING THE IMPACT OF E-COMMERCE ON INDIVIDUAL  
PERFORMANCE: INTEGRATING INFORMATION SYSTEM'S SUCCESS  
MEASURES AND OVERALL TRUST**

por

Ana Martins Loureiro

Dissertation presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization in Marketing Intelligence

**Advisors:** Professor Tiago André Gonçalves Félix de Oliveira

Professor Carlos Tam Chuem Vai

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The individual performance outcome behind e-commerce (in submission in an international journal).

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## RESUMO

O comércio eletrônico tem vindo a transformar a forma como adquirimos bens e serviços. Desde experiências de compra excepcionais a serviços de apoio ao cliente insígnies, passando por sistemas de segurança e pagamento integrados, fazer compras *online* nunca foi tão simples. Dentro desta realidade, onde uma compra pode estar a uma distância de apenas 3 cliques, quais são os verdadeiros benefícios para os clientes? Este estudo pretende preencher a lacuna existente na literatura sobre a relação entre comércio eletrônico e performance individual, bem como contribuir para o desenvolvimento de um novo modelo de pesquisa que integre medidas de sucesso de sistemas de informação e comportamento do consumidor, neste caso medido em termos de confiança global. Os dados recolhidos de 437 questionários sustentam o modelo de pesquisa proposto. Os resultados refletem que a qualidade total e a confiança global são fatores explicativos do uso e da satisfação do utilizador no contexto do comércio eletrônico, tendo, conseqüentemente, impactos na performance individual. Os resultados refletem ainda que, quanto maior o uso e a satisfação do utilizador, maior a performance individual dos clientes. Esperamos que o estudo contribua para enriquecer o conhecimento sobre a importância de considerar fatores tecnológicos e comportamentais para aumentar o sucesso do comércio eletrônico. Por último, são apresentadas e discutidas as contribuições deste estudo, tanto para o universo académico como para o universo empresarial.

## PALAVRAS-CHAVE

Comércio eletrônico; sistemas de informação; modelo de DeLone & McLean; confiança global; performance individual

## **ABSTRACT**

E-commerce is changing the way we buy. From amazing flow experience to outstanding customer support, all with integrated security and payment systems, shopping online has never been so easy. But what exactly are the benefits for individuals within these magic 3-click distance purchases? This study aims to fill in the extant gap in the literature about the relationship between e-commerce and individual performance, as well as contributing to a new consistent research model that integrates information systems success dimensions and user behaviour in the form of trust. Data collected from 437 questionnaires provide strong support for the research model. Results show that overall quality and overall trust are important to explain use and user satisfaction in the context of e-commerce, which further leads to individual performance. Our findings indicate that a higher level of use and user satisfaction increase individual performance. We expect that this study can enrich the understanding of the importance of considering both technological and behavioural factors to increase the success of e-commerce. Implications for theory and practice and suggestions for future research are also discussed.

## **KEYWORDS**

E-commerce; information systems; DeLone & McLean model; overall trust; individual performance



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## ABBREVIATIONS AND ACRONYMS LIST

<b>AVE</b>	Average variance extracted
<b>B</b>	Benevolence
<b>C</b>	Competence
<b>CA</b>	Cronbach's alpha
<b>CR</b>	Composite reliability
<b>D&amp;M</b>	DeLone & McLean
<b>I</b>	Integrity
<b>IP</b>	Information performance
<b>IQ</b>	Information quality
<b>IS</b>	Information Systems
<b>OT</b>	Overall trust
<b>SD</b>	Standard deviation
<b>SQ</b>	System quality
<b>SVQ</b>	Service quality
<b>U</b>	Use
<b>US</b>	User satisfaction
<b>UX</b>	User Experience

# 1 INTRODUCTION

E-commerce has grown from a trend to a fact. The dynamics of customer demands and technological innovation have mitigated barriers and narrowed the line between offline and online commerce. Nowadays, e-commerce is part of our shopping routines, from groceries to gadgets. Half of the world population has an internet connection today (International Telecommunication Union, 2017). Ten years ago it was less than 1%. As internet usage grows, so does the potential for online purchases. Recent research conducted by the Global Web Index (published by We Are Social Ltd & Hootsuite Inc, 2018) found that 63% of Portuguese respondents had searched on the web for a product or service to purchase in the past 30 days, and 39% admitted having bought a product or service online. This percentage increases to 75% when referring to world power countries with the highest e-commerce penetration rate, such as China and the United States (Global Web Index, 2017).

In a quest for customer motivations and drivers behind online shopping, we conducted research in order to identify the relationship between e-commerce and individual performance, building on the work of DeLone and McLean (2004). In a call for integrated theories (Mahfouz, 2009) and taking into consideration previous studies on the influence of trust in e-commerce (Pavlou, 2003), we propose a research model combining DeLone and McLean's (1992) Information Systems (IS) success model and overall trust.

DeLone and McLean's (D&M) model is one of the most cited models in the literature of IS and has been extensively applied to several contexts in the field of IS. Recent researchers studied the impact of D&M success measures on digital libraries (Xu & Du, 2018), on mobile banking (Tam & Oliveira, 2016), and on e-learning (Cidral, Oliveira, Di Felice, & Aparicio, 2017; Mohammadi, 2015). McKnight et al. (2002) studied trust according to several approaches and different beliefs, before refining the research on trust to a main factor that Chen and Dhillon (2003) called "overall trust". Overall trust is supported by three trust dimensions – competence, integrity, and benevolence – and has been used in recent years. More recently, overall trust was applied by Oliveira, Alinho, Rita, and Dhillon (2017) in modelling and testing trust dimensions in e-commerce, by Wu, Chen, and Chiu (2016) in defining key drivers of online impulse purchasing, and by Zhang, Cheung, and Lee (2014) when moderating the effect of inconsistent reviews on consumers' online shopping decisions.

This study examines individual performance outcomes in e-commerce transactions by addressing three main contributions. First, we test the role of system, information, and service quality in e-commerce use and user satisfaction. As these three factors measure the success of the system as a whole, we find considerable importance in analysing their contributions for better management of e-commerce platforms (e.g., flow experience when exploring a website, information accuracy, and customer support). Second, we focus on individual performance as a consequence of use and user satisfaction. If a customer and/or user understands e-commerce as a means of improving shopping efficacy and, consequently, self-efficacy (e.g., time savings), that customer's intention to repurchase will presumably increase. Hence, individual performance should be a major concern for decision makers working with e-commerce. To the best of our knowledge, individual performance is an outcome seldom reported in the literature. Finally, we identify the role of trust effect on e-commerce use, user satisfaction and its impact on individual performance – a relationship that has not yet been analysed in the field of IS success. As a behavioural characteristic, trust is a very personal and unexpected factor, and therefore difficult to characterize. Practitioners must

acknowledge that trust may be of great importance in the specific context of e-commerce, due to its less personal and controllable online environment. Strategies to mitigate risk and increase trust should rely on competence, integrity, and benevolence.

This paper is organized in seven main chapters, including the introduction. Through a review of the literature in chapter two, background on e-commerce adoption and post adoption is provided. In chapter three, a research model is proposed, supported by hypotheses. The research methodology and findings are presented in chapters four and five, followed by the key findings of the study and further discussion. In this study we use “user” and “customer” interchangeably to refer to online buyers. Online buyers are considered both technology users and e-commerce customers (Koufaris, 2002).

## 2 LITERATURE REVIEW

### 2.1 DELONE & MCLEAN INFORMATION SYSTEMS SUCCESS MODEL

DeLone and McLean's (1992) IS success model is amongst the most widely used for evaluating the degree of IS success (Teo, Lee, Chai, & Wong, 2009) because of its comprehensiveness and utility, which have drawn the attention of many IS researchers (DeLone & McLean, 2016; Bossen, Jensen, & Udsen, 2013; Urbach, Smolnik, & Riempp, 2009). D&M identified known definitions of IS success and classified them into six dimensions: (1) system, (2) information quality, (3) system use, (4) user satisfaction, (5) individual impact, and (6) organizational impact. The theory states that system quality and information quality have a positive impact on system use and user satisfaction and, together, these factors influence individual performance.

Despite the fact that the original model was a widely cited framework in the IS literature, throughout the years many researchers have tested and challenged DeLone and McLean's (1992) model which led the authors to a deep revision of IS theories and an improved model extension was suggested one decade later (DeLone & Mclean, 2003). The updated model has adapted to the reality of IS in general, and to e-commerce in particular. In fact, according to DeLone and Mclean (2003), the updated IS success model is especially useful for developing comprehensive e-commerce success measures, since its six dimensions summarize e-commerce success metrics previously identified in the literature.

The primary change of this revisited model is the contribution of service quality to strengthen overall quality, now composed of system, information, and service quality. Since the importance of the quality of the service was shown to be an important measure taking into consideration the growth of customers' expectations regarding service levels provided, we focus on the potential of this added construct to support our research. The final success variable has also changed in an attempt to demonstrate a wide and more accurate definition of impact measures, grouping both individual and organizational impacts in a new construct named "net benefits", i.e., by using the system the user will achieve certain benefits. DeLone and McLean (2003) stated that future research should address the actors who will benefit from the analysis. In the context of this study, net benefits are measured from the individual's perspective of performance. Few other researchers have studied the impact of this construct on IS success.

System quality refers to the adaptability, availability, reliability, response time, and usability of a system *per se*, i.e., it refers to the technical characteristics of the system whereas information quality refers to the content visible in the system (DeLone & Mclean, 2003). Information quality is measured in terms of relevance and security, if it is easy to understand, and if the information is complete. To close the system characteristics trio, the new construct service quality brings a fresh insight about customer experience in terms of assurance, empathy, and responsiveness of the system and its service support team. On the other hand, the analysis of customer interactions with systems, use, or intention to use is based on the nature of use, navigation patterns, number of site visits, and number of transactions executed. User satisfaction is measured taking into consideration customer perceptions of system use, such as repeat purchases, repeat visits and user opinions (surveys). Finally, individual performance is described by Sonnentag and Frese (2005) as the act of accomplishing tasks at a high level of proficiency or ease. Therefore, individual performance is

measured in terms of cost savings, expanded markets, incremental additional sales, reduced search costs, time savings, task performance, and task productivity (DeLone & Mclean, 2003).

Several studies have undertaken empirical investigations on IS success by using the D&M model. The success of the model was tested in several realities, such as digital libraries (Xu & Du, 2018), online group-buying (Hsu, Chang, Chu, & Lee, 2014; Wang, Wang, & Liu, 2015), e-learning (Cidral et al., 2017; Mohammadi, 2015), mobile banking (Tam & Oliveira, 2016), consumer intentions in online shopping (Chen & Cheng, 2009), eGovernment systems (Wang & Liao, 2008), and user-developed applications (McGill, Hobbs, & Klobas, 2003).

## **2.2 TRUST IN E-COMMERCE**

Unlike the offline environment, online shopping leads to customer uncertainty since they are not able to touch, feel, or try the product they are purchasing (Bowen & Bowen, 2015), which seems to be a major concern when using e-commerce. Uncertainty, or lack of trust, may become an important aspect for a consumer's decision-making while purchasing online, depending on the degree of incomplete information associated with the product (Luo, Ba, & Zhang, 2002). Therefore, uncertainty has been considered an inextricable factor in understanding trust (David Gefen, Benbasat, & Pavlou, 2008) and one of the main barriers to e-commerce (Luo et al., 2002).

Being trustworthy is one of the first of a digital brand's problems perceived by consumers. Several researchers have studied trust contributions to online business success (Lu, Yang, Chau, & Cao, 2011; Kim, Kim, & Shin, 2009; Flavián, Guinalú, & Gurrea, 2006; Koufaris & Hampton-Sosa, 2004). The trust of consumers in online purchasing is significantly related to the credibility of the web vendor (Javed & Khan, 2014). Along with trust and credibility of the vendor, technology ease comprehends one of the main factors that drive online shopping (Gefen, Karahanna, & Straub, 2003).

Trust does not have a single definition; it is rather defined by a few factors that can contribute to changes in trust perceptions. McKnight et al. (2002) studied trust according to several approaches and different beliefs, before refining the research according to a construct with three dimensions, based on competence (previous ability), integrity, and benevolence (Bhattacharjee, 2002). Later on, Chen & Dhillon (2003) defined this three-dimensional construct as overall trust.

Competence is the ability of a seller to keep promises made to customers, i.e. keep customers' expectations such as handling sales transactions on the internet, providing excellent service, and having expertise on the market. Integrity is the level in which the seller acts consistently and in a reliable and honest manner. Benevolence is the capacity of a seller to act in the customers' best interest, doing the best to help customers (Gefen, 2002; Palvia, 2009).

We use overall trust, an item measured by these three trust dimensions – competence, benevolence and integrity – to study the role of trust in e-commerce and its effect on individual performance outcomes. Since McKnight et al. (2002), and Chen and Dhillon (2003), the number of studies using overall trust has grown substantially. Overall trust literature varies from online impulse purchasing (Wu et al., 2016), online shopping reviews (Zhang et al., 2014), B2C e-marketplaces (Hong & Cho, 2011), to e-commerce impacts (Oliveira et al., 2017; Palvia, 2009; D. Gefen & Straub, 2000).



### **2.3 INTEGRATING IS SUCCESS MEASURES AND OVERALL TRUST**

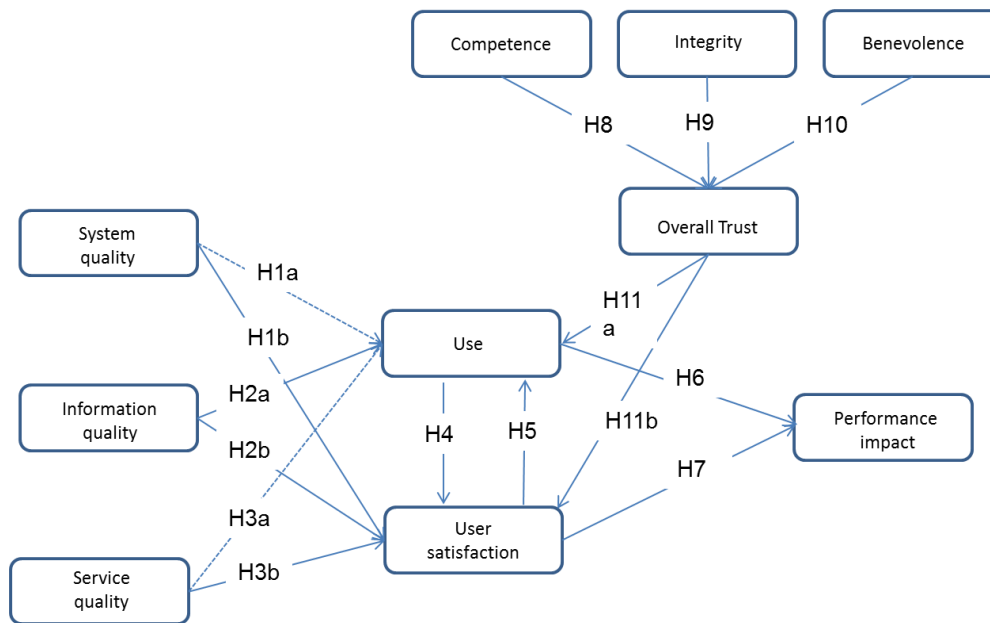
Many researchers have addressed the importance of online consumer behaviour on e-commerce (Koufaris, 2002). Others are concerned with the technical characteristics of IS. A growing part is searching for insights about the relationship of web design and the use of e-commerce platforms (Skadberg & Kimmel, 2004; Luo et al., 2002). As we can see, research concerning IS, in general, and e-commerce, in particular, has two major approaches; adoption and technology use (Wu et al., 2016). On the other hand, most researchers have focused on the understanding of online customer behaviour, mainly adoption and purchase behaviours. Little research has been done to explore post-adoption behaviour such as individual performance.

The fact that online customers can be considered purchasers of products/services as well as users of web-based technologies (Wu, 2013), and their behaviour is different when shopping in a web-based environment (Beldad, De Jong, & Steehouder, 2010), encouraged us to draw attention to such aspects in our study. We considered integrating characteristics of human behaviour and IS theory an important complement to the study of e-commerce usage and individual performance impacts. Additionally, a major area of future research involves an integrated approach, combining complementary constructs from various relevant theories, in an attempt at unification (Mahfouz, 2009), yet few researchers are studying this.

The D&M (2004) model has been used to study the importance of IS in e-commerce success, but research merging the D&M model and trust in e-commerce is still scant. Thus, the primary contribution of this study is to combine trust, a customer behaviour variable, and IS success constructs into a model whose final outcome is individual performance, a dimension still quite unknown in the field of e-commerce transactions. Together, these dimensions will improve our knowledge of the relationship between e-commerce and individual performance.

### 3 RESEARCH MODEL

Today, e-commerce is demanding a growing protagonism not only in business in general but also in academic research. As stated above, in our study we combine trust, one of the e-commerce main success drivers (Matthew & Lee, 2001), and the measures of the D&M updated model. The research model we propose addresses the effect of individual performance based on technological characteristics and online consumer behaviour characteristics (trust). Figure 1 presents the proposed model of this study.



**Figure 1** - Research model

#### 3.1 IS SUCCESS MEASURES

The quality of an e-commerce platform is described by DeLone and Mclean (2003) as its capacity of adaptability, availability, reliability, usability, and response time. System quality measures satisfaction (Lilien, Rangaswamy, Van Bruggen, & Starke, 2004) and is based on technical characteristics such as system features and quality features (Urbach & Müller, 2012). In the case of e-commerce, the system must provide simplicity during a transaction in order to ensure customer satisfaction (Guo & Poole, 2009; Zhang et al., 2014), as any faltering step during the transaction would have a negative impact on the customer’s perceptions of system quality. System functionality, then, contributes to a better user experience (Pavlou, Liang, & Xue, 2007) and thus, to user satisfaction. These premises are consistent with the D&M model (2003), which suggests that system quality has a positive influence on use and user satisfaction of e-commerce. Based on this, we propose the following hypotheses:

*H1a: System quality (SQ) has a positive influence on use of e-commerce.*

*H1b: System quality (SQ) has a positive influence on the user satisfaction of e-commerce.*

Information is everything that is visible to the user, from content to design. The quality of information disposal regarding the seller, quality certificates and seals, accurate product/service

descriptions, payment and shipment details, and other customers' reviews, can increase the users' perceptions of satisfaction when using an e-commerce platform. Indeed, Bennett (1983) suggested that the information provided by a system has an impact on the user's satisfaction. Later, Wixom and Todd (2005) and Xu et al. (2013) tested the connection between information quality and user satisfaction and found significant results. Information quality is then claimed as an antecedent of user satisfaction in IS research. In turn, user satisfaction can influence the user's willingness to revisit the website or gather more information about it (Skadberg & Kimmel, 2004), which translates into willingness to use. A good fit between information quality and use can increase feelings of enjoyment and satisfaction by the user (M. Koufaris, 2002; Wind & Rangaswamy, 2001). Therefore, we propose the following hypotheses:

*H2a: Information quality (IQ) has a positive influence on use of e-commerce.*

*H2b: Information quality (IQ) has a positive influence on user satisfaction of e-commerce.*

System quality is a critical factor for the success of e-commerce (Zhang et al., 2014; Zeithaml, Rust, & Lemon, 2001). In fact, and as with information quality, Wixom and Todd (2005) and Xu et al (2013) also found significant results regarding the connection between service quality and user satisfaction in IS use. In their study, Wixom and Todd suggest that service quality also influences the use of IS. Thus, a key to increasing user satisfaction on e-commerce is to provide high level service quality. As to the influence of service quality on the use of e-commerce, our experience points to customer reviews, complaints, and compliments about previous experiences with the service provided by a certain online company as having an impact on use. We can do a quick exercise and think about a rich experience with previous e-commerce activity versus a poor experience. Presumably, intentions to use will be higher in the rich experience case. Based on the arguments above, we postulate the following hypotheses:

*H3a: Service quality (SVQ) has a positive influence on use of e-commerce.*

*H3b: Service quality (SVQ) has a positive influence on user satisfaction of e-commerce.*

One particularity of the D&M IS success model is the mutual influence between use and user satisfaction. In this research we study the interrelated link between use and user satisfaction and their influence on individual performance. Literature on use and user satisfaction has defined factors that tend to increase user satisfaction such as enjoyment (Jarvenpaa & Todd, 1997), online user experience, control, self-efficacy (Koufaris, 2002), and user familiarity (Chen & Hung, 2010), which may have a positive influence on use. On the other hand, an experience that does not meet the user's expectations can adversely affect future use (Goodhue and Thompson, 1995), defining user satisfaction as the opinion of the user about a specific IS s/he uses (Doll & Torkzadeh, 1988). As for individual performance, earlier studies (Morris & Venkatesh, 2000; Igbaria & Tan, 1997; Goodhue et al., 1995; Davis, 1989) suggested a positive effect of IS use on individual performance, i.e., the better the experience the better the individual performance impact. Theoretically, use is a significant predictor of performance impact. Individuals who interact with a system deeply are more likely to use the features of the system that are most relevant for their tasks, further improving performance outcomes (Kane & Alavi, 2008). If the user is satisfied, the degree of confidence, effectiveness, and efficiency when completing a task in IS is also high (Katsanos, Tselios, & Avouris, 2010), and thus individual performance increases. In the context of e-commerce, we expect the relationship between

use and user satisfaction and the influence on individual performance to be similar to the D&M proposed model (1992) and to the literature. Hence, it is hypothesized that:

*H4. Use (U) affects user satisfaction of e-commerce.*

*H5. User satisfaction (US) affects use of e-commerce.*

*H6. Use (U) of e-commerce platforms influences individual performance.*

*H7: User satisfaction (US) of e-commerce platforms influences individual performance.*

### **3.2 DIMENSIONS OF TRUST AND OVERALL TRUST**

According to Verhagen, Meents, and Tan (2006), users may not exclusively be affected by the characteristics of a website, but also by the perceptions of sellers. Customers develop trust and engagement if components of trust – competence, integrity, and benevolence – are addressed (Palvia, 2009) by sellers. Hence, perceptions toward an e-commerce platform, such as competence, integrity, and benevolence, positively influence the overall trust of the user. Looking at the online environment, online customers face a high level of uncertainty as compared to traditional customers (Wu, 2013), since there is no physical interaction with products or the seller. The relationship between trust and satisfaction has been tested in previous studies (Fang, Chiu, & Wang, 2011; Shiau & Luo, 2012; Y. Wang & Lin, 2006). Trust is a strong predictor of satisfaction (Shiau & Luo, 2012) and also has an influence on use (Gefen, 2000). Accordingly, the following hypotheses were defined:

*H8: Competence (C) has a positive influence on overall trust.*

*H9: Integrity (I) has a positive influence on overall trust.*

*H10: Benevolence (B) has a positive influence on overall trust.*

*H11a. Overall trust (OT) in an e-commerce platform affects the use of e-commerce.*

*H11b. Overall trust (OT) in an e-commerce platform affects the user satisfaction of e-commerce.*

## **4 METHODS**

### **4.1 MEASUREMENT INSTRUMENT**

Data were collected by questionnaire in order to test the proposed research model. All constructs' items were based on well-established studies found in the literature related to IS success, individual performance, and trust, and adapted to fit the context of e-commerce.

Measurement items for information systems metrics known as information quality (IQ), system quality (SQ), and service quality (SVQ) were adapted from Urbach et al. (2010). Validated measures for trust, namely trusting beliefs – competence (C), integrity (I), and benevolence (B) – and overall trust (OT), were adapted from Gefen (2002) and Palvia (2009). Items for constructs related to customer interactions with e-commerce, namely intention to use/use (U) and user satisfaction (US), were also taken from Palvia's unified model for e-commerce relational exchange (Palvia, 2009). Most items regarding the dependent variable individual performance (IP) were also adapted from Urbach et al. (2010), excluding job related items, due to the lack of context for the present study. On the other hand, since individual performance does not have a single definition, but rather consists of several different measures, additional items were added in order to strengthen the content of this construct. As stated above, DeLone and McLean (2003) explain individual performance in terms of cost savings, expanded markets, incremental additional sales, reduced search costs, time savings, task performance, and task productivity. The items added (PI3 and PI5) will bring about new insights, mainly on the perspective of increased individual performance perceived by expanded markets and/or cost savings. The measurement items for all the constructs and their respective literature sources are listed in Appendix A.

All items were set in an existing validated seven-point Likert scale with anchors ranging from strongly disagree (1) to strongly agree (7). The questionnaire was developed in two languages, English and Portuguese, using an online survey tool powered by surveymonkey.com.

### **4.2 DATA COLLECTION**

A pilot questionnaire was sent by e-mail to a small group of the population, in order to test the chosen item's validity to build the questionnaire. Respondents could complete the questionnaire only if they had ever purchased products or services online. In order to gather the largest number of responses there was a need to clarify the term e-commerce as a wide concept applicable to both business and commercial transactions, involving not only the transfer of money over the Internet, but also the transfer of information. The first 47 complete responses were successfully tested, and therefore no items were dropped from the questionnaire, leading to a massive sharing of the questionnaire during the week after the pilot. A total of 629 responses were collected that week, 437 of which were considered to be complete and therefore valid for statistical analysis, resulting in a response rate of 70%. To address potential threats to validity, common method bias was checked with the help of the marker variable technique (Lindell & Whitney, 2001; Malhotra, Kim, & Patil, 2006). The observed variance of 2.31% in the data set show no significant common method bias.

The final sample then comprises 437 individuals with prior online purchasing experience, 264 females (60%), and 173 males (40%). As a curiosity, it is worth to mention that only 24 individuals

admitted that they had never bought products or services online, which represents a minor percentage (4%) of the total responses collected, and illustrates the expansion of e-commerce use today. The mean age of the respondents is 30 years old, the youngest respondent being 18, and the oldest 75. Regarding the highest level of education completed, the majority of respondents have a master's (44%) or a bachelor's (39%) degree, followed by high school graduates (9%) and respondents having a doctoral degree (7%).

Gender		Age		Education	
Female	264 (60.4%)	<25	148 (33.9%)	Below High School	1 (0.2%)
Male	173 (39.6%)	25-30	150 (34.3%)	High School	38 (8.7%)
		31-35	33 (7.6%)	Bachelor	172 (39.4%)
		36-40	20 (4.6%)	Master's degree	193 (44.2%)
		41-50	23 (5.3%)	Doctorate degree	32 (7.3%)
		>50	63 (14.4%)	NA	1 (0.2%)

**Table 1** - Sample description (n = 437)

## 5 DATA ANALYSIS AND RESULTS

Data analysis was conducted applying structural equation modelling (SEM). Since the sample of 437 respondents agrees to the minimum sample size for using partial least squares (Hair, 2014), the two models were estimated using partial least squares (PLS) approach. PLS analyses structural equation models, combining measurement and structural models, which enables measurement errors of the observed variables to be analysed as an integral part of the model, and factor analysis to be combined in one operation with hypothesis testing (Gefen & Straub, 2000). Since the proposed model in this research was never tested before, PLS-SEM use may endorse our findings: first, because it is considered to be a compelling method to estimate the structural model (Henseler, Ringle, & Sinkovics, 2009; Reinartz, Haenlein, & Henseler, 2009), second due to its support for theory development (Hair, Ringle, & Sarstedt, 2011) in an exploratory research level, and third to identify key constructs (Hair, 2014) for the context of e-commerce and individual performance. Finally, PLS-SEM has been increasingly applied in IS (Chin, Marcolin, & Newsted, 2003), marketing, and business research (Henseler et al., 2009). The method was applied with the help of SmartPLS 3 software (Ringle, Wende, & Becker, 2015).

### 5.1 MEASUREMENT MODEL

To ensure a good fit, the research instrument was tested for consistency and reliability. Internal consistency defines the consistency of the results delivered in a test and is measured based on the correlations between different items in the same test. PLS internal consistency was measured by verifying if composite reliability (CR) and Cronbach's alpha (CA) of all the constructs are above 0.7. Being the upper bound of internal consistency reliability (Hair, Hult, Ringle, & Sarstedt, 2016), composite reliability (CR) results are greater than 0.8, demonstrating that the model has good internal consistency. As for the lower bound of internal consistency reliability, we considered the value of Cronbach's alpha coefficients. According to Fornell and Larcker (1981) and (Hair et al., 2009), alpha coefficients between 0.7 and 0.8 are considered acceptable coefficients; alpha coefficients higher than 0.8 are good coefficients, and alpha coefficients higher than 0.9 become excellent coefficients. As shown in Table 2, the majority of the constructs have alpha coefficients higher than 0.8; only use (CA=0.80) and individual performance (CA=0.75) have coefficients below 0.8 but still in the interval of acceptable coefficients.

Table 2 also shows the average variance extracted (AVE). AVE was used to test convergent validity, i.e., if the items of the constructs converge toward the same variance (Hair et al., 2009). AVE values are higher than 0.5, thus guaranteeing convergent validity.

Construct	SQ	IQ	SVQ	U	US	IP	C	I	B	OT
SQ	<b>0.95</b>									
IQ	0.72	<b>0.95</b>								
SVQ	0.60	0.55	<b>0.96</b>							
U	0.42	0.44	0.38	<b>0.89</b>						
US	0.51	0.50	0.46	0.60	<b>0.93</b>					

IP	0.40	0.40	0.31	0.44	0.49	<b>0.87</b>				
C	0.55	0.52	0.53	0.58	0.69	0.47	<b>0.93</b>			
I	0.53	0.54	0.58	0.45	0.56	0.42	0.62	<b>0.95</b>		
B	0.38	0.38	0.46	0.50	0.50	0.39	0.61	0.58	<b>0.95</b>	
OT	0.41	0.44	0.40	0.53	0.56	0.46	0.61	0.58	0.64	<b>0.91</b>
<b>AVE</b>	0.80	0.67	0.82	0.54	0.79	0.51	0.72	0.78	0.76	0.75
<b>CR</b>	0.94	0.92	0.95	0.85	0.92	0.84	0.91	0.94	0.93	0.90
<b>CA</b>	0.91	0.90	0.93	0.80	0.86	0.75	0.87	0.91	0.89	0.84
<b>Mean</b>	6.09	5.68	5.85	5.61	6.04	5.88	5.89	5.85	5.62	5.78
<b>SD</b>	0.95	1.02	1.19	0.94	1.01	0.89	0.98	1.19	1.19	1.13

Legend: SQ – System quality; IQ – Information quality; SVQ – Service quality; U – Use; US – User satisfaction; IP – Information performance; C – Competence; I – Integrity; B – Benevolence; OT – Overall trust; AVE - Average variance extracted; CR - Composite reliability; CA – Cronbach’s alpha; SD – Standard deviation

**Table 2** - Average variance extracted, square root of AVE and correlations between constructs, composite reliability, Cronbach’s alpha, mean, and standard deviation

To assess discriminant validity, we first observed loadings and cross loadings. All loadings showed higher values than their corresponding cross loadings (see Appendix B). Second, we verified if the square root of AVE is higher than the correlation between constructs (Fornell & Larcker, 1981). Table 2 shows that the square root of AVE is higher than the correlations between constructs. Finally, as seen in Table 3 and according to the new criterion for assessing discriminant validity (Henseler, Ringle, & Sarstedt, 2015), the Heterotrait-Monotrait (HTMT) ratio correlations are below 0.9, thereby confirming the presence of discriminant validity.

Construct	SQ	IQ	SVQ	U	US	IP	C	I	B	OT
SQ										
IQ	0.80									
SVQ	0.65	0.60								
U	0.43	0.47	0.40							
US	0.58	0.57	0.52	0.68						
IP	0.47	0.48	0.37	0.54	0.60					
C	0.62	0.60	0.59	0.66	0.79	0.58				
I	0.58	0.60	0.63	0.46	0.63	0.51	0.70			
B	0.42	0.43	0.50	0.57	0.57	0.47	0.69	0.65		
OT	0.47	0.50	0.45	0.59	0.66	0.59	0.71	0.66	0.74	

Legend: SQ – System quality; IQ – Information quality; SVQ – Service quality; U – Use; US – User satisfaction; IP – Information performance; C – Competence; I – Integrity; B – Benevolence; OT – Overall trust

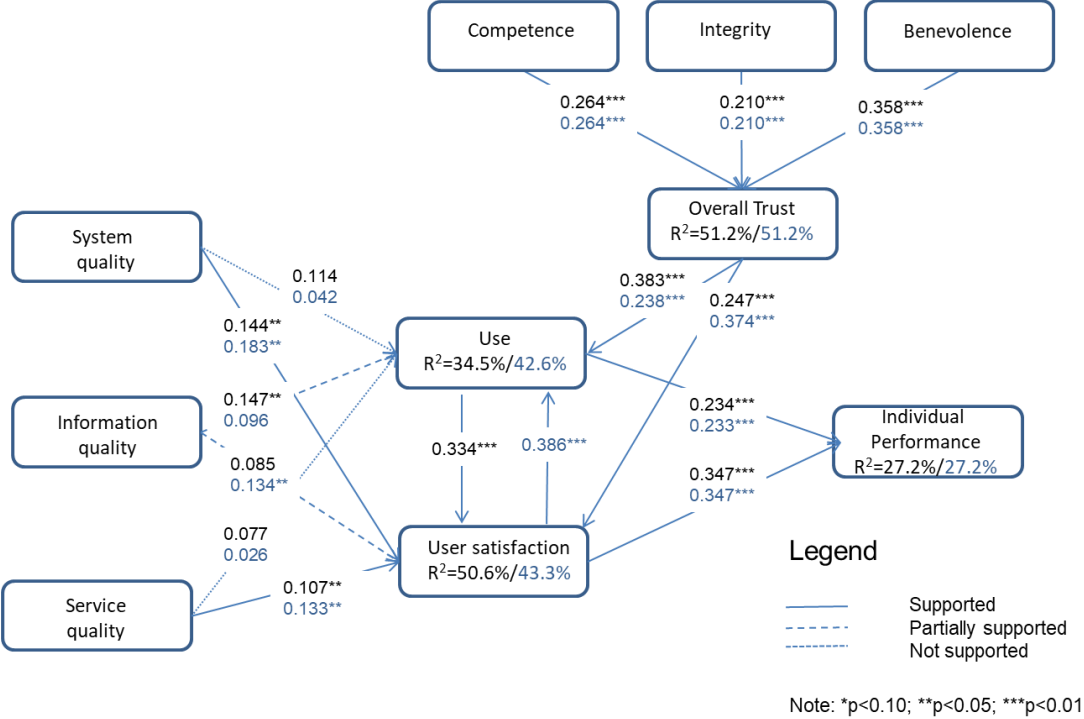
**Table 3** - Heterotrait-Monotrait (HTMT) ratio

## 5.2 STRUCTURAL MODEL AND HYPOTHESIS TESTING

The D&M IS success model has a mutual influence between use and user satisfaction. Due to this mutual influence, we had to test two different structural models. A model with bootstrapping T-



statistics was performed using 5000 replicates (Hair et al., 2014) to test the validity of the hypothesized model and to estimate path coefficients. Figure 2 shows both models and the testing results: model 1 assumes that the influence is from use to user satisfaction, as stated in hypotheses H4 (results on the upper path coefficients); on the other hand, model 2 assumes that the influence is from user satisfaction to use, according to hypothesis H5 (results on the lower path coefficients).



**Figure 2 - Results summary**

The model explains 34.5% (in model 1) and 42.6% (in model 2) of the variation in the use of e-commerce. User satisfaction ( $\tilde{\beta} = 0.386$ ,  $p < 0.01$  in model 1) is statistically significant in explaining use, which endorses hypothesis H5. Information quality ( $\tilde{\beta} = 0.147$ ,  $p < 0.05$ ) is statistically significant in explaining use in model 1, thus partially supporting hypothesis H2a. System quality and service quality are not statistically significant in explaining use in models 1 and 2, and thus supporting hypotheses H1a and H3a are not supported. Overall trust ( $\tilde{\beta} = 0.383$ ,  $p < 0.01$  in model 1 and  $\tilde{\beta} = 0.238$ ,  $p < 0.01$  in model 2) is statistically significant in explaining use in both models, hence supporting hypothesis H11a.

Regarding user satisfaction, the model explains 50.6% (in model 1) and 43.3% (in model 2) of the variation in the user satisfaction of online shopping platforms. Use ( $\tilde{\beta} = 0.334$ ,  $p < 0.01$ ) is statistically significant in explaining user satisfaction, which supports hypothesis H4. System quality ( $\tilde{\beta} = 0.144$ ,  $p < 0.05$  in model 1;  $\tilde{\beta} = 0.183$ ,  $p < 0.05$  in model 2) and service quality ( $\tilde{\beta} = 0.107$ ,  $p < 0.05$  in model 1;  $\tilde{\beta} = 0.133$ ,  $p < 0.05$  in model 2) are statistically significant in explaining user satisfaction in both models, supporting hypotheses H1b and H3b. Information quality ( $\tilde{\beta} = 0.134$ ,  $p < 0.05$ ) is statistically significant in explaining user satisfaction in model 1, thus partially supporting hypothesis H2b. Overall trust ( $\tilde{\beta} = 0.247$ ,  $p < 0.01$  in model 1;  $\tilde{\beta} = 0.374$ ,  $p < 0.01$  in model 2) is

statistically significant in explaining user satisfaction in both models, hence supporting hypothesis H1b.

The structural model explains 51.2% of the variation in overall trust. All three trust dimensions have significant influence in explaining overall trust, competence ( $\hat{\beta} = 0.264$ ,  $p < 0.01$ ), integrity ( $\hat{\beta} = 0.210$ ,  $p < 0.01$ ), and benevolence ( $\hat{\beta} = 0.358$ ,  $p < 0.01$ ), thereby supporting hypotheses H8, H9, and H10. Online shopping platforms that show integrity, competence, and benevolence increase users' perceptions of trust toward that platform.

Finally, the model explains 27.2% of variance in individual performance. Use ( $\hat{\beta} = 0.234$ ,  $p < 0.01$ ) and user satisfaction ( $\hat{\beta} = 0.347$ ,  $p < 0.01$ ) are significant antecedents of individual performance, suggesting that use and user satisfaction regarding online shopping play an important role in user individual performance. Consequently, hypotheses H6 and H7 are supported.

In conclusion, on a total of 15 hypotheses, 11 (73.3%) are supported, 2 (13.3%) partially supported, and 2 others (13.3%) not supported.

## 6 DISCUSSION AND CONCLUSIONS

The great majority of the hypotheses were supported, achieving an acceptance rate of 86.7% (hypotheses supported plus partially supported). Hypotheses tests' results are summarized in Table 4.

Use is explained by IQ, OT, and US. Model 1 (in which use influences user satisfaction) explains 34.5% of the variation in the use of e-commerce, whereas model 2 (in which user satisfaction influences use) explains 42.6%. User satisfaction is explained by SQ, IQ, SVQ, OT, and U. The variation of US on e-commerce is explained by 50.6% in model 1 and 43.3% in model 2. These results are consistent with comparable studies (Aparicio, Bação, & Oliveira, 2016; Tam & Oliveira, 2016; Urbach et al., 2010). Overall quality (service, information, and system quality) has a positive effect on user satisfaction, which reinforces that user satisfaction acts as a critical determinant of the success of IS (Doll & Torkzadeh, 1988; DeLone & McLean, 1992). Of the three IS success metrics, IQ is the only that explains e-commerce use in our study, as hypotheses H1a and H3a were not supported. These hypotheses were also consistent with findings of earlier research (Aparicio et al., 2016; Tam & Oliveira, 2016; Urbach et al., 2010). In the context of e-commerce, the importance of system and service quality may depend on the goal of use (Gefen & Straub, 2000). If use is perceived as research, maybe system and service quality are not important, whereas if use means purchase, system and service quality may play a more important role. Use may also be explained by other IT-related factors, for example, constructs of TAM or UTAUT models that are not addressed in our study. However, use is strongly predicted in terms of behavioural factors. Palvia (2009) underlined the importance of trust on the attitude toward e-commerce use.

As expected, variation of overall trust is explained in 51.2% of the cases by trust dimensions (competence, integrity, and benevolence). The results demonstrate that OT is a determinant factor of e-commerce use and user satisfaction. Trust reduces risk and uncertainty and motivates customers to use e-commerce (Wu & Li, 2017). Theoretically, trusting customers sense higher levels of satisfaction and are more willing to engage with e-commerce (Palvia, 2009). Our research model shows results that are consistent with previous studies related to the effects of overall trust on use and user satisfaction (Oliveira et al., 2017; Hong & Cho, 2011; Palvia, 2009; Gefen, 2002).

The remaining hypotheses derived from the D&M model is supported. The model successfully predicts individual performance. This confirms the Delone and Mclean (2004) theory that individuals perceive benefits from e-commerce systems. Given our results, we assume that e-commerce can increase individual performance by increasing productivity when searching for products and services, purchasing products that would not be available in a an area nearby, and save by obtaining discounts or comparing prices that would not be available offline (Urbach et al., 2010).

This study provides contributions to the field of e-commerce with overarching theoretical and managerial implications to IS/IT and marketing approaches.

Hypotheses	Dependent variable	B (model 1/ model 2)	Hypotheses test	R <sup>2</sup>
	Use			<b>34.5%/ 42.6%</b>
H1a: SQ -> U		0.114/ 0.042	not supported	
H2a: IQ -> U		0.147**/ 0.096	partially supported	
H3a: SVQ -> U		0.077/ 0.026	not supported	

H5: US -> U	0.386***	supported	
H11a: OT -> U	0.383***/ 0.238***	supported	
<b>User satisfaction</b>			<b>50.6%/ 43.3%</b>
H1b: SQ -> US	0.144**/ 0.183**	supported	
H2b: IQ -> US	0.085/ 0.134**	partially supported	
H3b: SVQ -> US	0.107**/ 0.133**	supported	
H4: U -> US	0.334***	supported	
H11b: OT -> US	0.247***/ 0.372***	supported	
<b>Overall trust</b>			<b>51.2%/ 51.2%</b>
H8: C -> OT	0.264***/ 0.264***	supported	
H9: I -> OT	0.210***/ 0.210***	supported	
H10: B -> OT	0.358***/ 0.358***	supported	
<b>Individual performance</b>			<b>27.2/ 27.2%</b>
H6: U -> IP	0.234***/ 0.234***	supported	
H7: US -> IP	0.347***/ 0.347***	supported	

Legend: SQ – System quality; IQ – Information quality; SVQ – Service quality; U – Use; US – User satisfaction; IP – Information performance; C – Competence; I – Integrity; B – Benevolence; OT – Overall trust

**Table 4** - Parameters estimates, hypotheses, and R<sup>2</sup>

## 6.1 THEORETICAL IMPLICATIONS

Our main theoretical contribution is the research model proposed. The model presents an integration of D&M IS success model with overall trust, in an attempt to test whether or not the success of IS, and subsequent impacts on individual performance, do not depend solely on system characteristics, or are complemented by behavioural characteristics. To the best of our knowledge, no earlier study tested this relationship at an individual level.

The results suggest that 20 years later the D&M model is still a strong model to explain user satisfaction in IS. However, we found small implications on use. Future research should introduce new predictors of use to enhance theoretical explanations. Perceptions of use may be different if use is classified differently. Gefen (2000) studied different approaches of use in IT, such as intention to use and intention to inquire. The first refers to willingness to purchase in that transactions must require higher performance of all factors, since they involve i) spending money and providing personal data to a system and ii) if the customer chooses to buy online, the shopping experience as a whole must overcome the offline experience. If the intention is to inquire, IS measures may have less impact since the user's main focus is only searching. In this scenario, the main driver is more likely to be the information provided, since the main goal is information seeking. As a matter of fact, our results support this idea since information quality is the only IS quality measure that explains use. We pay special attention to improvements on use since it was the less predicted factor and can be examined differently in the future.

Our results also confirm earlier research on the impact of trust on U and US. The study provides more understanding on customer behaviour toward e-commerce. Higher levels of trust increase e-commerce use, user satisfaction, and lastly individual performance. Lower levels of trust may become a barrier to e-commerce. Such barriers can be mitigated by emphasizing perceptions of competence, integrity, and benevolence.

From a theoretical point of view, our model presents a valuable basis for IS success studies, which can be applied to a variety of IS contexts, as DeLone and Mclean (2003) hypothesized. Furthermore, by focusing on individual performance, this study enhances future research on

individual performance outcomes of IT-enabled tasks. We hope our findings support further studies on individual performance, an area still quite unexplored in the field of IS.

## **6.2 MANAGERIAL IMPLICATIONS**

We believe this study provides managerial implications for the paths decision-makers may follow to increase information systems' success on the e-commerce business. Findings suggest that managers should pay extra attention to the role of overall quality and overall trust in e-commerce user satisfaction and to the role of information quality and overall trust in boosting e-commerce use.

The results of this study highlight the importance of information quality as the IS factor that customers value most in e-commerce. Information quality increases if the customer perceives the amount of information available about the product and transaction procedures is sufficient and useful (Hsu et al., 2014). Managers must draw a framework in which all the relevant aspects of information are considered. For example, price, characteristics (e.g., size and material), payment methods, delivery, returns, and refunds are relevant information on products and services.

Although SQ and SVQ were found to be not significant when explaining use, managers should be sensitive to both dimensions since they can have implications on user satisfaction. The new demanding customer, with increased access to information across many connected devices, underlines the importance of omnichannel integration to marketers and planners. The quality of the system should concern omnichannel navigation, speed, and ease of use. In sum, managers should focus on user experience development. Consistent with our results, which found that system quality explains user satisfaction, a recent study conducted by Forrester (Hogan & Laufer, 2016) found that user experience design is the ultimate source of competitive advantage, since it helps to increase user satisfaction and might yield conversion rates up to 400%.

Service quality must provide a high level of responsiveness and competence through customer support (Sun, Teh, & Chiu, 2012). Fostering contact between seller and customer is an emerging concern, as seen in all new means of online customer service, that is gaining visibility in e-commerce websites, like the example of chatbots and live chats. Users have great expectations. They expect a seamless, compelling, and emotionally satisfying user experience. Simple details such as time wasting or lack of necessary information can negatively influence performance expectancies (Sykes & Venkatesh, 2017).

Ways to increase interaction between e-commerce and customers should be considered by managers, for example, investing in teams specialized in designing a better customer journey. When online sellers make efforts to interact with customers, customers' perceptions of competence, integrity, and benevolence tend to increase and, consequently, trust increases (McKnight & Chervany, 2001). A trusting consumer is more likely to engage in a transaction, such as purchasing, cooperating or sharing information (Palvia, 2009; McKnight & Chervany, 2001), thus increasing use, user satisfaction, and individual performance.

In sum, managers must access the above-mentioned implications, keeping in mind that use, user satisfaction, and individual performance are explained by different theories. That is, improving service quality per se, for instance, will not be sufficient to improve individual user performance.

Factors have to be used in a multidimensional approach. We hope researchers will consider this study to promote user-system interactions.

### **6.3 LIMITATIONS AND FURTHER RESEARCH**

Even though the present study might have potential implications in the context of e-commerce, some limitations must be acknowledged. The main limitation pertains to the sample. First, the study took place in a single country, Portugal, a country with a low level of e-commerce maturity as compared to the average Western European countries. Second, it is known that all the respondents have had at least one online shopping experience, but there was no narrowing down of the sample in terms of frequency of use/purchasing. Also, the respondents' age ranged from 18 to 75. In both cases, responses can be influenced either by lack of familiarity with e-commerce, or by individual perceptions. For instance, younger users may have different perceptions of trust and performance than older users. In sum, we consider our findings generalizable enough; however, they lack some support in terms of sample representativeness. Another limitation is the design of the study. It is important to keep in mind that this is a cross-sectional study about a reality that changes at a fast pace. Constant improvements in technology will certainly change customers' behaviour over time.

## 7 CONCLUSION

E-commerce penetration has been growing at a fast pace. Technology improvements and customer expectations have contributed to this phenomenon. Research on e-commerce is critical to understand its success. IS researchers have deeply examined the user-system relationship in an attempt to enhance performance outcomes. We argue that IT characteristics such as overall quality (SQ, IQ, and SVQ) play an important role on IS success but so too do trust perceptions. Building on recent literature on IS and trust, we develop a model integrating the D&M model and overall trust, a three dimensional construct explained by competence, integrity, and benevolence. The research model was empirically tested based on a sample of 437 individuals from Portugal. Our model explains 27.2% of variation in individual performance, due to e-commerce U and US. Findings also explain the importance of SQ, IQ, SVQ, and OT on e-commerce success. This research has theoretical and managerial implications, since e-commerce's protagonism is increasing in both academia and industry. Our study points to particular factors that should be carefully analysed when designing e-commerce services. Several limitations were identified, suggesting improvements for future research.

## 8 REFERENCES

- Aparicio, M., Bação, F., & Oliveira, T. (2016). An e-learning theoretical framework. *Educational Technology and Society*. <https://doi.org/www.jstor.org/stable/jeductechsoci.19.1.292>
- Beldad, A., De Jong, M., & Steehouder, M. (2010). How shall I trust the faceless and the intangible? A literature review on the antecedents of online trust. *Computers in Human Behavior*, 26(5), 857–869. <https://doi.org/10.1016/j.chb.2010.03.013>
- Bennett, J. L. (1983). *Building Decision Support Systems*. (John L. Bennett, Ed.). Addison-Wesley.
- Bhattacharjee, A. (2002). Individual Trust in Online Firms: Scale Development and Initial test. *Journal of Management Information Systems*. <https://doi.org/Article>
- Bossen, C., Jensen, L. G., & Udsen, F. W. (2013). Evaluation of a comprehensive EHR based on the DeLone and McLean model for IS success: Approach, results, and success factors. *International Journal of Medical Informatics*, 82(10), 940–953. <https://doi.org/10.1016/j.ijmedinf.2013.05.010>
- Bowen, G., & Bowen, R. (2015). Offline and Online Brand Trust Models: Their Relevance to Social Media. *Journal of Business and Economics*, 6(1), 102–112. [https://doi.org/10.15341/jbe\(2155-7950\)/01.06.2015/010](https://doi.org/10.15341/jbe(2155-7950)/01.06.2015/010)
- Chen, C.-J., & Hung, S.-W. (2010). To give or to receive? Factors influencing members' knowledge sharing and community promotion in professional virtual communities. *Information & Management*, 47(4), 226–236. <https://doi.org/10.1016/j.im.2010.03.001>
- Chen, C. W. D., & Cheng, C. Y. J. (2009). Understanding consumer intention in online shopping: A respecification and validation of the DeLone and McLean model. *Behaviour and Information Technology*, 28(4), 335–345. <https://doi.org/10.1080/01449290701850111>
- Chen, S. C., & Dhillon, G. S. (2003). Interpreting Dimensions of Consumer Trust in E-commerce. *Information Technology and Management*. <https://doi.org/10.1023/a:1022962631249>
- Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/ Adoption Study. *Information Systems Research*, 14(2), 189–217. <https://doi.org/10.1287/isre.14.2.189.16018>
- Cidral, W. A., Oliveira, T., Di Felice, M., & Aparicio, M. (2017). E-learning success determinants: Brazilian empirical study. *Computers and Education*, (February), 0–1. <https://doi.org/10.1016/j.compedu.2017.12.001>
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease Of Use, And User Acceptance. *MIS Quarterly*, 13(3), 319–339. <https://doi.org/10.2307/249008>
- Delone, W. H., & Mclean, E. R. (2004). Measuring e-Commerce Success: Applying the DeLone & McLean Information Systems Success Model. *International Journal of Electronic Commerce*. <https://doi.org/1086-4415/2004>



- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems / Spring*, 19(4), 9–30. <https://doi.org/10.1073/pnas.0914199107>
- DeLone, W. H., & McLean, E. R. (2016). Information Systems Success Measurement. *Foundations and Trends® in Information Systems*. <https://doi.org/10.1561/29000000005>
- DeLone, W., & McLean, E. (1992). The Quest for the Dependent Variable. *Information Systems Research*, 3(1), 60–65. <https://doi.org/10.1287/isre.3.1.60>
- Doll, W., & Torkzadeh, G. (1999). The measurement of end-user computing satisfaction. *MIS Quarterly*. <https://doi.org/10.14569/IJACSA.2014.050120>
- Fang, Y.-H., Chiu, C.-M., & Wang, E. T. G. (2011). Understanding customers' satisfaction and repurchase intentions: An integration of IS success model, trust, and justice. *Internet Research*.
- Flavián, C., Guinalú, M., & Gurrea, R. (2006). The role played by perceived usability, satisfaction and consumer trust on website loyalty. *Information & Management*, 43(1), 1–14. <https://doi.org/10.1016/J.IM.2005.01.002>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*.
- Gefen, D. (2000). E-commerce: the role of familiarity and trust. *Omega*, 28(6), 725–737. [https://doi.org/10.1016/S0305-0483\(00\)00021-9](https://doi.org/10.1016/S0305-0483(00)00021-9)
- Gefen, D. (2002). Reflections on the dimensions of trust and trustworthiness among online consumers. *ACM SIGMIS Database*, 33(3), 38–53. <https://doi.org/10.1145/569905.569910>
- Gefen, D., Benbasat, I., & Pavlou, P. (2008). A Research Agenda for Trust in Online Environments. *Journal of Management Information Systems*, 24(4), 275–286. <https://doi.org/10.2753/MIS0742-122240411>
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in Online Shopping: An Integrated Mode. *MIS Quarterly*, 27(1), 51–90. <https://doi.org/10.1017/CBO9781107415324.004>
- Gefen, D., & Straub, D. (2000). The relative importance of perceived ease of use in IS adoption: a study of e-commerce adoption. *Journal of the Association for Information Systems*.
- Global Web Index. (2017). Chinese Internet Users are Biggest Online Shoppers. Retrieved March 10, 2018, from <https://blog.globalwebindex.net/chart-of-the-day/chinese-internet-users-are-biggest-online-shoppers/>
- Goodhue, D. L., Thompson, R. L., & Goodhue, B. D. L. (1995). Task-Technology Fit and Individual Performance. *MIS Quarterly*, 19(2), 213–236. <https://doi.org/10.2307/249689>
- Guo, Y. M., & Poole, M. S. (2009). Antecedents of flow in online shopping: A test of alternative models. In *Information Systems Journal* (Vol. 19, pp. 369–390). <https://doi.org/10.1111/j.1365-2575.2007.00292.x>

- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Multivariate Data Analysis*. New Jersey.
- Hair, J. F., Hult, G., Ringle, C., & Sarstedt, M. (2016). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *The Journal of Marketing Theory and Practice*, 19(2), 139–152. <https://doi.org/10.2753/MTP1069-6679190202>
- Hair Jr, J. F., Sarstedt, M., Hopkins, L., & G. Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM): an emerging tool in business research. *European Business Review*. <https://doi.org/10.1108/EBR-10-2013-0128>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling, 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of Partial Least Squares Path Modeling in International Marketing. *Advances in International Marketing*, 20(2009), 277–319. [https://doi.org/10.1016/0167-8116\(92\)90003-4](https://doi.org/10.1016/0167-8116(92)90003-4)
- Hogan, A., Laufer, D., Truog, D., Willsea, W., & Birrell, R. (2016). *The Six Steps For Justifying Better UX*. Cambridge, Massachusetts.
- Hong, I. B., & Cho, H. (2011). The impact of consumer trust on attitudinal loyalty and purchase intentions in B2C e-marketplaces: Intermediary trust vs. seller trust. *International Journal of Information Management*, 31(5), 469–479. <https://doi.org/10.1016/j.ijinfomgt.2011.02.001>
- Hsu, M. H., Chang, C. M., Chu, K. K., & Lee, Y. J. (2014). Determinants of repurchase intention in online group-buying: The perspectives of DeLone & McLean in success model and trust. *Computers in Human Behavior*, 36, 234–245. <https://doi.org/10.1016/j.chb.2014.03.065>
- Igbaria, M., & Tan, M. (1997). The consequences of information technology acceptance on subsequent individual performance. *Information and Management*. [https://doi.org/10.1016/S0378-7206\(97\)00006-2](https://doi.org/10.1016/S0378-7206(97)00006-2)
- International Telecommunication Union (ITU). (2017). *ICT Facts and Figures 2017*. Geneva. Retrieved from <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf>
- Jarvenpaa, S. L., & Todd, P. A. (1997). Is there a future for retailing on the Internet? In *Electronic marketing and the consumer*.
- Javed, A., & Khan, S. (2014). Consumer Perceptions of Brand Trust Online of Clothing in Karachi: A Case Study of Gul Ahmed, 1(1), 61–72. <https://doi.org/10.20547/jms.2014.1401105>
- Kane, G. C., & Alavi, M. (2008). Casting the net: A multimodal network perspective on user-system interactions. *Information Systems Research*. <https://doi.org/10.1287/isre.1070.0158>
- Katsanos, C., Tselios, N., & Avouris, N. (2010). Evaluating website navigability: Validation of a tool-based approach through two eye-tracking user studies. *New Review of Hypermedia and*

- Multimedia*, 16(1–2), 195–214. <https://doi.org/10.1080/13614561003605179>
- Kim, H., Kim, T. (Terry), & Shin, S. W. (2009). Modeling roles of subjective norms and eTrust in customers' acceptance of airline B2C eCommerce websites. *Tourism Management*, 30(2), 266–277. <https://doi.org/10.1016/j.tourman.2008.07.001>
- King, A. W., & Zeithaml, C. P. (2001). Competencies and firm performance: Examining the causal ambiguity paradox. *Strategic Management Journal*. [https://doi.org/10.1002/1097-0266\(200101\)22:1<75::AID-SMJ145>3.0.CO;2-I](https://doi.org/10.1002/1097-0266(200101)22:1<75::AID-SMJ145>3.0.CO;2-I)
- Koufaris, M. (2002). Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research*, 13(2), 205–223. <https://doi.org/10.1287/isre.13.2.205.83>
- Koufaris, M., & Hampton-Sosa, W. (2004). The development of initial trust in an online company by new customers. *Information & Management*, 41(3), 377–397. <https://doi.org/10.1016/J.IM.2003.08.004>
- Lilien, G. L., Rangaswamy, A., Van Bruggen, G. H., & Starke, K. (2004). DSS effectiveness in marketing resource allocation decisions: Reality vs. perception. *Information Systems Research*. <https://doi.org/10.1287/isre.1040.0026>
- Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, 86(1), 114–121. <https://doi.org/10.1037//0021-9010.86.1.114>
- Lu, Y., Yang, S., Chau, P. Y. K., & Cao, Y. (2011). Dynamics between the trust transfer process and intention to use mobile payment services: A cross-environment perspective. *Information & Management*, 48(8), 393–403. <https://doi.org/10.1016/J.IM.2011.09.006>
- Luo, J., Ba, S., & Zhang, H. (2002). The effectiveness of online shopping characteristics and well-designed websites on satisfaction. *Hong Kong Physiotherapy Journal*, 20(1), 32. [https://doi.org/10.1016/S1013-7025\(09\)70031-4](https://doi.org/10.1016/S1013-7025(09)70031-4)
- Mahfouz, A. Y. (2009). Contemporary Information Systems Alternative Models to TAM : A Theoretical Perspective. *Handbook of Research on Contemporary Theoretical Models in Information Systems*, (April 2007), 229–241. <https://doi.org/10.4018/978-1-60566-659-4.ch013>
- Malhotra, N. K., Kim, S. S., & Patil, A. (2006). Common Method Variance in IS Research: A Comparison of Alternative Approaches and a Reanalysis of Past Research. *Management Science*, 52(12), 1865–1883. <https://doi.org/10.1287/mnsc.1060.0597>
- Matthew, K. O., & Lee, E. T. (2001). A Trust Model for Consumer Internet Shopping. *International Journal of Electronic Commerce*, 6(1), 75–91. <https://doi.org/10.1080/10864415.2001.11044227>
- McGill, T., Hobbs, V., & Klobas, J. (2003). User-developed applications and information systems success: A Test of DeLone and McLean's model. *Information Resources Management Journal*. <https://doi.org/10.4018/irmj.2003010103>

- McKnight, D. H., & Chervany, N. L. (2001). What trust means in e-commerce customer relationships: An interdisciplinary conceptual typology. *International Journal of Electronic Commerce*, 6(2), 35–59. <https://doi.org/10.1080/10864415.2001.11044235>
- McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: An integrative typology. *Information Systems Research*. <https://doi.org/10.1287/isre.13.3.334.81>
- Mohammadi, H. (2015). Investigating users' perspectives on e-learning: An integration of TAM and IS success model. *Computers in Human Behavior*, 45(July), 359–374. <https://doi.org/10.1016/j.chb.2014.07.044>
- Morris, M. G., & Venkatesh, V. (2000). Age Differences in Technology Adoption Decisions: Implications for a Changing Work Force. *Personnel Psychology*, 53(2), 375–403. <https://doi.org/10.1111/j.1744-6570.2000.tb00206.x>
- Oliveira, T., Alinho, M., Rita, P., & Dhillon, G. (2017). Modelling and testing consumer trust dimensions in e-commerce. *Computers in Human Behavior*, 71, 153–164. <https://doi.org/10.1016/j.chb.2017.01.050>
- Palvia, P. (2009). The role of trust in e-commerce relational exchange: A unified model. *Information and Management*. <https://doi.org/10.1016/j.im.2009.02.003>
- Pavlou, P. A. (2003). Consumer Acceptance of Electronic Commerce : Integrating Trust and Risk with the Technology Acceptance Model. *International Journal of Electronic Commerce*, 7(3), 69–103. <https://doi.org/10.1.1.86.7139>
- Pavlou, Liang, & Xue. (2007). Understanding and Mitigating Uncertainty in Online Exchange Relationships: A Principal-Agent Perspective. *MIS Quarterly*, 31(1), 105. <https://doi.org/10.2307/25148783>
- Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of Research in Marketing*, 26(4), 332–344. <https://doi.org/10.1016/j.ijresmar.2009.08.001>
- Ringle, C., Wende, S., & Becker, J. (2015). Ringle, Christian M., Wende, Sven, & Becker, Jan-Michael. (2015). SmartPLS 3. Bönningstedt: SmartPLS. Retrieved from <http://www.smartpls.com>. Retrieved from.
- Shiau, W. L., & Luo, M. M. (2012). Factors affecting online group buying intention and satisfaction: A social exchange theory perspective. *Computers in Human Behavior*. <https://doi.org/10.1016/j.chb.2012.07.030>
- Skadberg, Y. X., & Kimmel, J. R. (2004). Visitors' flow experience while browsing a Web site: Its measurement, contributing factors and consequences. *Computers in Human Behavior*, 20(3), 403–422. [https://doi.org/10.1016/S0747-5632\(03\)00050-5](https://doi.org/10.1016/S0747-5632(03)00050-5)
- Sonnentag, S., & Frese, M. (2005). Performance Concepts and Performance Theory. In *Psychological Management of Individual Performance*. <https://doi.org/10.1002/0470013419.ch1>

- Sun, H., Teh, P. L., & Chiu, A. (2012). An empirical study on the websites service quality of Hong Kong small businesses. *Total Quality Management and Business Excellence*.  
<https://doi.org/10.1080/14783363.2012.704273>
- Sykes, T. A., & Venkatesh, V. (2017). Research article explaining post-implementation employee system use and job performance: impacts of the content, *41*(3), 917–936.
- Tam, C., & Oliveira, T. (2016). Understanding the impact of m-banking on individual performance: DeLone & McLean and TTF perspective. *Computers in Human Behavior*.  
<https://doi.org/10.1016/j.chb.2016.03.016>
- Teo, T., Lee, C. B., Chai, C. S., & Wong, S. L. (2009). Assessing the intention to use technology among pre-service teachers in Singapore and Malaysia: A multigroup invariance analysis of the Technology Acceptance Model (TAM). *Computers and Education*.  
<https://doi.org/10.1016/j.compedu.2009.05.017>
- Urbach, N., & Müller, B. (2012). The Updated DeLone and McLean Model of Information Systems Success. In *Information Systems Theory: explaining and predicting our digital society, Vol. 1* (Vol. 28, pp. 1–14). <https://doi.org/10.1007/978-1-4419-6108-2>
- Urbach, N., Smolnik, S., & Riempp, G. (2009). The State of Research on Information Systems Success. *Business & Information Systems Engineering*. <https://doi.org/10.1007/s12599-009-0059-y>
- Urbach, N., Smolnik, S., & Riempp, G. (2010). An empirical investigation of employee portal success. *Journal of Strategic Information Systems*, *19*(3), 184–206.  
<https://doi.org/10.1016/j.jsis.2010.06.002>
- Verhagen, T., Meents, S., & Tan, Y. H. (2006). Perceived risk and trust associated with purchasing at electronic marketplaces. *European Journal of Information Systems*.  
<https://doi.org/10.1057/palgrave.ejis.3000644>
- Wang, W. T., Wang, Y. S., & Liu, E. R. (2015). The stickiness intention of group-buying websites: The integration of the commitment-trust theory and e-commerce success model. *Information and Management*, *53*(5), 625–642. <https://doi.org/10.1016/j.im.2016.01.006>
- Wang, Y., & Lin, F. R. (2006). Trust and risk evaluation of transactions with different amounts in Peer-to-Peer E-commerce environments. In *Proceedings - IEEE International Conference on e-Business Engineering, ICEBE 2006*. <https://doi.org/10.1109/ICEBE.2006.102>
- Wang, Y. S., & Liao, Y. W. (2008). Assessing eGovernment systems success: A validation of the DeLone and McLean model of information systems success. *Government Information Quarterly*, *25*(4), 717–733. <https://doi.org/10.1016/j.giq.2007.06.002>
- We Are Social Ltd, & Hootsuite Inc. (2018). *Digital in 2018 in Southern Europe*. Retrieved from <https://pt.slideshare.net/wearesocial/digital-in-2018-in-southern-europe-part-1-west-86864268>
- Wind, J., & Rangaswamy, A. (2001). Customerization: The next revolution in mass customization. *Journal of Interactive Marketing*, *15*(1), 13–32. <https://doi.org/10.1002/1520->

- Wixom, B. H., & Todd, P. (2005). A Theoretical Integration of User Satisfaction and Technology Acceptance. *Information Systems Research*, 16(1), 85–102.  
<https://doi.org/10.1287/isre.1050.0042>
- Wu, I. L. (2013). The antecedents of customer satisfaction and its link to complaint intentions in online shopping: An integration of justice, technology, and trust. *International Journal of Information Management*, 33(1), 166–176. <https://doi.org/10.1016/j.ijinfomgt.2012.09.001>
- Wu, I. L., Chen, K. W., & Chiu, M. L. (2016). Defining key drivers of online impulse purchasing: A perspective of both impulse shoppers and system users. *International Journal of Information Management*, 36(3), 284–296. <https://doi.org/10.1016/j.ijinfomgt.2015.11.015>
- Wu, Y.-L., & Li, E. Y. (2017). Marketing Mix, Customer Value, and Customer Loyalty in Social Commerce: A Stimulus-Organism-Response Perspective. *Internet Research*.  
<https://doi.org/10.1108/IntR-08-2016-0250>
- Xu, F., & Du, J. T. (2018). Factors influencing users' satisfaction and loyalty to digital libraries in Chinese universities. *Computers in Human Behavior*, 83, 64–72.  
<https://doi.org/10.1016/J.CHB.2018.01.029>
- Xu (David) Jingjun, Benbasat, I., & Cenfetelli, R. T. (2013). Integrating service quality with system and information quality: an empirical test in the e-service context. *MIS Quarterly*, 37(3), 777–794.
- Zeithaml, V. A., Rust, R. T., & Lemon, K. N. (2001). The Customer Pyramid: Creating and Serving Profitable Customers. *California Management Review*. <https://doi.org/10.2307/41166104>
- Zhang, K. Z. K., Cheung, C. M. K., & Lee, M. K. O. (2014). Examining the moderating effect of inconsistent reviews and its gender differences on consumers' online shopping decision. *International Journal of Information Management*.  
<https://doi.org/10.1016/j.ijinfomgt.2013.12.001>

## **9 APPENDIX**

### **9.1 APPENDIX A – SURVEY ITEMS**

Information quality (Urbach et al., 2010)

INFQ1 - The information provided by the e-commerce platform is useful

INFQ2 - The information provided by the e-commerce platform is understandable

INFQ3 - The information provided by the e-commerce platform is interesting

INFQ4 - The information provided by the e-commerce platform is reliable

INFQ5 - The information provided by the e-commerce platform is complete

INFQ6 - The information provided by the e-commerce platform is updated

Service quality (Urbach et al., 2010)

SERQ1 - The customer service team is always highly willing to help whenever I need support with the e-commerce platform

SERQ2 - The customer service team provides special attention when I experience problems with the e-commerce platform

SERQ3 - The customer service team provides services related to the e-commerce platform at the promised time

SERQ4 - The customer service team has sufficient knowledge to answer my questions with respect to the e-commerce platform

Use (Palvia, 2009)

IP1 - I would feel comfortable buying product/service information from this e-commerce platform

IP2 - I would feel comfortable seeking product/service information from this e-commerce platform

IP3 - I would feel comfortable receiving free product/service information from this e-commerce platform

IP4 - I would feel comfortable providing information to this e-commerce platform in order to receive customized service

IP5 - I would feel comfortable developing a valuable relationship with this e-commerce platform

User satisfaction (Palvia, 2009)

US1 – I did the right thing when I decided to use this e-commerce platform

US2 - I am very pleased with making purchases from this e-commerce platform

US3 - I would recommend this e-commerce platform to a friend

Competence (Gefen, 2002; Palvia, 2009)

C1 - I believe this e-commerce platform has the ability to handle sales transactions on the Internet

C2 - I believe this e-commerce platform has sufficient expertise to do business on the Internet.

C3 – I believe this e-commerce platform knows how to provide excellent service

C4 – I believe this e-commerce platform understands the market it works in

Integrity (Gefen, 2002; McKnight et al., 2002; Palvia, 2009).

I1 - I believe this e-commerce platform will not overcharge me during sales transactions

I2 - I believe this e-commerce platform is honest to its customers.

I3 - I believe this e-commerce platform acts sincerely in dealing with customers

I4 - I believe this e-commerce platform would keep its commitments

Benevolence (Gefen, 2002; Palvia, 2009)

B1 - I believe this e-commerce platform would act in my best interest

B2 - If I required help. I believe this e-commerce platform would do its best to help me

B3 - I expect this e-commerce platform's intentions are benevolent

B4 - I expect this e-commerce platform is well meaning

Overall Trust (Palvia, 2009)

OT1 - I like to trust this e-commerce platform

OT2 - I find this e-commerce platform trustworthy

OT3 - I like the reliability of this e-commerce platform



Individual Performance (Urbach et al., 2010)

PI1 – E-commerce enables me to accomplish tasks more quickly

PI2 – E-commerce makes it easier to accomplish tasks

PI3 – E-commerce allows me to find products/services I would not find in my surroundings (new item)

PI4 – E-commerce increases my productivity

PI5 – E-commerce allows me to save money (new item)

## 9.2 APPENDIX B – FACTOR LOADINGS AND CROSS LOADINGS

	SQ	IQ	SVQ	U	US	IP	C	I	B	OT
SQ1	<b>0.87</b>	0.65	0.48	0.40	0.48	0.38	0.51	0.49	0.36	0.40
SQ2	<b>0.89</b>	0.65	0.53	0.35	0.43	0.33	0.46	0.46	0.32	0.35
SQ3	<b>0.89</b>	0.61	0.56	0.38	0.45	0.37	0.49	0.46	0.32	0.36
SQ4	<b>0.90</b>	0.64	0.54	0.37	0.45	0.36	0.52	0.46	0.35	0.36
IQ1	0.57	<b>0.84</b>	0.42	0.42	0.46	0.35	0.46	0.47	0.32	0.35
IQ2	0.61	<b>0.88</b>	0.45	0.41	0.44	0.35	0.44	0.46	0.31	0.35
IQ3	0.45	<b>0.65</b>	0.33	0.36	0.34	0.31	0.42	0.32	0.36	0.34
IQ4	0.61	<b>0.83</b>	0.49	0.31	0.39	0.32	0.41	0.46	0.31	0.40
IQ5	0.62	<b>0.84</b>	0.51	0.33	0.40	0.30	0.40	0.44	0.27	0.36
IQ6	0.65	<b>0.84</b>	0.49	0.30	0.41	0.33	0.41	0.45	0.28	0.33
SVQ1	0.51	0.47	<b>0.89</b>	0.33	0.41	0.28	0.47	0.52	0.40	0.38
SVQ2	0.54	0.46	<b>0.92</b>	0.35	0.41	0.25	0.50	0.49	0.45	0.39
SVQ3	0.55	0.52	<b>0.91</b>	0.33	0.44	0.27	0.47	0.53	0.39	0.33
SVQ4	0.55	0.53	<b>0.90</b>	0.36	0.42	0.33	0.49	0.54	0.40	0.34
U1	0.37	0.36	0.29	<b>0.82</b>	0.48	0.38	0.44	0.40	0.42	0.46
U2	0.51	0.48	0.43	<b>0.80</b>	0.61	0.42	0.55	0.53	0.43	0.53
U3	0.14	0.20	0.14	<b>0.63</b>	0.31	0.24	0.33	0.14	0.30	0.25
U4	0.13	0.17	0.17	<b>0.67</b>	0.30	0.19	0.34	0.14	0.32	0.25
U5	0.21	0.26	0.23	<b>0.73</b>	0.38	0.30	0.40	0.23	0.33	0.31
US1	0.40	0.43	0.35	0.54	<b>0.86</b>	0.44	0.59	0.47	0.45	0.50

US2	0.50	0.48	0.46	0.55	<b>0.93</b>	0.44	0.64	0.53	0.48	0.52
US3	0.46	0.42	0.43	0.51	<b>0.86</b>	0.41	0.60	0.47	0.41	0.48
IP1	0.33	0.30	0.23	0.29	0.40	<b>0.74</b>	0.35	0.27	0.25	0.31
IP2	0.39	0.38	0.32	0.37	0.43	<b>0.83</b>	0.41	0.40	0.36	0.38
IP3	0.27	0.27	0.21	0.27	0.33	<b>0.59</b>	0.32	0.31	0.24	0.33
IP4	0.19	0.21	0.17	0.32	0.26	<b>0.70</b>	0.30	0.23	0.27	0.32
IP5	0.22	0.24	0.16	0.33	0.27	<b>0.68</b>	0.27	0.27	0.24	0.32
C1	0.51	0.47	0.42	0.51	0.59	0.40	<b>0.82</b>	0.51	0.48	0.50
C2	0.44	0.42	0.43	0.52	0.58	0.38	<b>0.88</b>	0.47	0.50	0.51
C3	0.51	0.46	0.48	0.49	0.62	0.42	<b>0.85</b>	0.60	0.55	0.56
C4	0.41	0.42	0.47	0.45	0.55	0.39	<b>0.83</b>	0.53	0.52	0.50
I1	0.42	0.47	0.45	0.37	0.44	0.36	0.49	<b>0.81</b>	0.44	0.47
I2	0.46	0.47	0.52	0.39	0.50	0.37	0.54	<b>0.90</b>	0.52	0.50
I3	0.48	0.47	0.54	0.43	0.51	0.40	0.61	<b>0.92</b>	0.58	0.56
I4	0.50	0.50	0.53	0.40	0.51	0.36	0.56	<b>0.90</b>	0.52	0.52
B1	0.34	0.33	0.40	0.43	0.42	0.28	0.52	0.48	<b>0.85</b>	0.55
B2	0.38	0.35	0.44	0.40	0.50	0.35	0.53	0.58	<b>0.85</b>	0.53
B3	0.30	0.32	0.39	0.44	0.43	0.34	0.55	0.46	<b>0.90</b>	0.57
B4	0.31	0.32	0.35	0.47	0.40	0.37	0.52	0.51	<b>0.88</b>	0.58
OT1	0.26	0.24	0.25	0.44	0.40	0.35	0.44	0.37	0.54	<b>0.83</b>
OT2	0.43	0.49	0.41	0.46	0.54	0.43	0.55	0.60	0.53	<b>0.87</b>
OT3	0.36	0.39	0.37	0.47	0.51	0.42	0.59	0.53	0.59	<b>0.90</b>

Legend: SQ – System quality; IQ – Information quality; SVQ – Service quality; U – Use; US – User satisfaction; IP – Information performance; C – Competence; I – Integrity; B – Benevolence; OT – Overall trust