The individual performance outcome behind e-commerce: Integrating information systems success and overall trust

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Abstract

Purpose – This study examines the relationship between e-commerce and individual performance.

Design/methodology/approach – We apply a research model that integrates information systems success dimensions and user behaviour in the form of trust. The empirical approach was based on an online survey questionnaire of 437 individuals from Portugal.

Findings – The results reveal 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.

Originality/value – We integrate information systems success dimensions and overall trust to understand the significance of e-commerce individual performance. We expect our results to enrich the understanding of the importance of considering both technological and behavioural factors to increase the success of e-commerce.

Keywords: E-commerce; DeLone and McLean model; Overall trust; Individual performance; Use of information systems; User satisfaction.

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1. Introduction

E-commerce has grown from a trend to a fact. The dynamics of customer demand 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 purchasing 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 and 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 to 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 the context of Business-to-Consumer (B2C) e-commerce. E-commerce enables users to purchase products or services more efficiently and effectively and thus offers many advantages for individuals, such as time savings and ease of performing transactions, thereby enhancing the well-being of the user. Accomplishing a task at a high level of proficiency or ease can be a source of performance, bringing feelings of mastery and pride. Poor accomplishment and outright failure in achieving one's goals might be a source of dissatisfaction or even general feelings of shame (Sonnentag and Frese, 2002). Sonnentag and Frese (2002) link the research on individual performance to the research on work-related well-being. They discuss if and how well-being and performance are empirically related and argue, especially, that self-regulation might account for such a relationship. 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. There are several reasons for including overall trust in the context of e-commerce, such as making consumers comfortable to use the e-commerce platform (Sharma and Lijuan, 2015), increasing the loyalty and intention to repeat purchase (Kim and Peterson, 2017), customer satisfaction can be achieved when customers feel contented about placing orders via e-commerce (Elbeltagi and Agag, 2016).

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 and Du, 2018), on mobile banking (Tam and Oliveira, 2016; Tam and Oliveira, 2017), and on e-learning (Cidral, Oliveira, Di Felice, and 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, Alhinho, 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. The

integration of the D&M model and overall trust, each one focuses on a certain perspective, which can hardly be embraced in its entirety and variety of possible situations by a particular model, these are offset and complemented by combining the various models. The combination of the D&M model and overall trust is useful for understanding the impact of individual performance and IS discipline. For example, a weakness of the D&M model is the lack of consideration of how trust influences use and user satisfaction on e-commerce. On the other hand, overall trust does not include various dimensions of the D&M model. The convergence of both improves our understanding of e-commerce use and individual performance.

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 a seldom reported outcome in the literature. Motivated by this research gap, we provide further insights on individual performance in the post-admission phase. Finally, we identify the effect of the role of trust 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 subjective factor, and therefore difficult to characterise. 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 organised in seven main sections, including the introduction. Background on e-commerce adoption and post-adoption are provided through a review of the literature in section two. A research model, supported by hypotheses, is proposed in section three. The research methodology and findings are presented in section 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 as both technology users and e-commerce customers (Koufaris, 2002).

2. Literature Review

2.1. DeLone and 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, and Wong, 2009) because of its comprehensiveness and utility, which have drawn the attention of many IS researchers (DeLone and McLean, 2016; Bossen, Jensen, and Udsen, 2013; Urbach, Smolnik, and 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) organisational 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 an in-depth revision of IS theories and an improved model extension was suggested one decade later (DeLone and Mclean, 2003). The updated model has adapted to the reality of IS in general, and 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 summarise 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 also suffered a change in an attempt to demonstrate a wider and more accurate definition of impact measures, grouping both individual and organisational 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 context or frame of reference of the research. In the context of this study, net benefits are measured from the individual's perspective of performance.

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 and Mclean, 2003). Information quality is measured in terms of relevance and security, if it is easy to understand, and if the information is complete. In order to close the system characteristics trio, the construct service quality brings a fresh insight into 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, intention to use, is based on the nature/diversity of e-commerce use of product/service information, such as buying, seeking, receiving, providing, and developing a valuable relationship with an e-commerce platform. User satisfaction is measured taking into consideration customer perceptions of system use, such as repeat purchases, repeat visits and user opinions (surveys). According to DeLone and McLean (2004), user satisfaction is measured in terms of use of an e-commerce system and should cover the entire customer experience cycle from information retrieval through to purchase, payment, receipt, and service. The measures were primarily designed to measure user satisfaction by means of information quality, system quality, and service quality (DeLone and McLean, 2003). User satisfaction can be achieved when customers feel contented about placing orders via e-commerce (Elbeltagi and Agag, 2016). Finally, individual performance is described by Sonnentag and Frese (2002) 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, additional incremental sales, reduced search costs, time savings, task performance, and task productivity (DeLone and 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 and Du, 2018), online group-buying (Hsu, Chang, Chu, and Lee, 2014; Wang, Wang, and Liu, 2015), e-learning (Cidral et al., 2017; Mohammadi, 2015), mobile banking (Tam and Oliveira, 2016; Tam and Oliveira, 2017), consumer intentions in online shopping (Chen and Cheng, 2009), eGovernment systems (Wang and Liao, 2008), and user-developed applications (McGill, Hobbs, and 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 and Bowen, 2015), which seems to be a significant 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, and Zhang, 2012; Samira, Turel, and Yuan, 2017). Therefore, uncertainty has been considered an inextricable factor in understanding trust (David Gefen, Benbasat, and Pavlou, 2008) and one of the main barriers to e-commerce (Luo et al., 2012).

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, and Cao, 2011; Kim, Kim, and Shin, 2009; Flavián, Guinalíu, and Gurrea, 2006; Koufaris and Hampton-Sosa, 2004). The trust of consumers in online purchasing is significantly related to the credibility of web vendors (Javed and Khan, 2014). Along with the trust and credibility of the vendor, technology ease comprises one of the main factors that drive online shopping (Gefen, Karahanna, and Straub, 2003).

Trust does not have a single definition; it is instead 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 (Bhattacherjee, 2002). Later on, Chen and 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, reliably, and honestly. 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, one dimension 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 and Cho, 2011), to e-commerce impacts (Oliveira et al., 2017; Palvia, 2009; D. Gefen and 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 between web design and the use of e-commerce platforms (Skadberg and Kimmel, 2004; Luo et al., 2012). 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.

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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, and Steehouder, 2010), encouraged us to draw attention to such aspects in our study. We considered integrating characteristics of human behaviour and IS theory a critical 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 DeLone and McLean (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. Each model focuses on a certain perspective, which can hardly be embraced in its entirety and the variety of possible situations by a particular model (Abugabah and Sanzogni, 2010). Each model has strengths and weaknesses, and these are offset and complemented by combining the various models. The D&M and Trust models complement each other, meaning that their combination is useful for understanding the influence of individual performance and IS discipline. Moreover, weaknesses in the two models can be compensated for by connecting them with each other. For example, the D&M model's weakness is the lack of consideration of how well trust influences use and user-satisfaction.

On the other hand, Trust models do not include system quality, information quality, or service quality toward e-commerce use and user-satisfaction. The convergent constructs of both models improve our understanding of e-commerce use and user-satisfaction. 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 demands a growing importance not only in business in general but also in academic research. As stated above, in our study we combine trust, one of e-commerce's main success drivers (Matthew and Lee, 2001), and the measures of the updated D&M model. The research model we propose tests the effect of individual performance based on technological characteristics and online consumer behaviour characteristics (trust). Figure 1 presents the proposed model of this study.
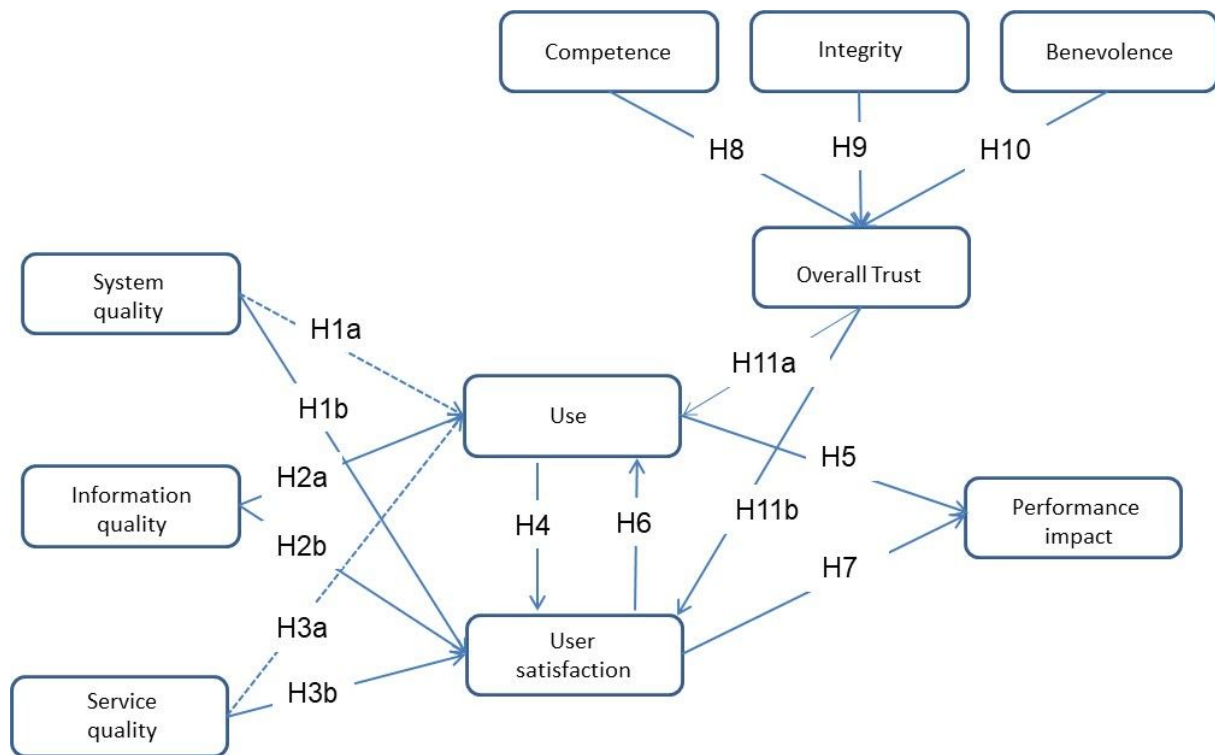
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Figure 1 - Research model

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 influences satisfaction (Lilien, Rangaswamy, Van Bruggen, and Starke, 2004) and is based on technical characteristics such as system features and quality features (Urbach and Müller, 2012). In the case of e-commerce, the system must provide simplicity during a transaction in order to ensure customer satisfaction (Guo and 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, and Xue, 2007) and thus, to user satisfaction. Poor system quality can frustrate users' experience as it increases their difficulty of using e-commerce and cannot lead to users' satisfaction. These premises are consistent with the DeLone and McLean (2003) model, 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 has a positive influence on the use of e-commerce.

H1b: System quality has a positive influence on 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 users' perceptions of satisfaction when using an e-commerce platform (Zhang, Xu, Zhao, and Yu, 2018). Indeed, Bennett (1983) suggested that the information provided by a system has an impact on user 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

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the website or gather more information about it (Skadberg and Kimmel, 2004), which translates into willingness to use. For e-commerce usage, the experience of using the service during the adoption or post-adoption phase could be affected by information quality, such as product and usage description. A good fit between information quality and use can increase feelings of enjoyment and satisfaction by the user (M. Koufaris, 2002; Wind and Rangaswamy, 2001). Therefore, we propose the following hypotheses:

H2a: Information quality has a positive influence on the use of e-commerce.

H2b: Information quality 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, and 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 has a positive influence on the use of e-commerce.

H3b: Service quality 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 and Todd, 1997), online user experience, control, self-efficacy (Koufaris, 2002), and user familiarity (Chen and Hung, 2010), which may have a positive influence on use. As for individual performance, earlier studies (Morris and Venkatesh, 2000; Igbaria and 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 and Alavi, 2008). 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 the literature. Hence, we hypothesize that:

H4. Use has a positive influence on user satisfaction of e-commerce.

H5. Use has a positive influence on individual performance.

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 and Torkzadeh, 1988). If the user is satisfied, the degree of confidence, effectiveness, and efficiency when completing a task in IS is also high (Katsanos, Tselios, and Avouris, 2010), and thus individual performance increases. In the updated version, (DeLone and McLean, 2003, p. 23) the model explained the construct as follows: "Use must precede 'user satisfaction' in a process sense, but positive experience

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with 'use' will lead to greater 'user satisfaction' in a causal sense". Increased user satisfaction will lead to a greater intention to use, which will subsequently affect individual performance. Hence, the following hypotheses are proposed:

H6. User satisfaction has a positive influence on the use of e-commerce.

H7: User satisfaction has a positive influence on 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. Accordingly, the following hypotheses were defined:

H8: Competence has a positive influence on overall trust.

H9: Integrity has a positive influence on overall trust.

H10: Benevolence has a positive influence on overall trust.

An extensive body of research has been developed to understand how trust influences consumer behaviour, such as that trust influences consumer attitude and intention to engage in behaviour (Alsajjan and Dennis, 2010), and trust as a key factor of success in the online context (Elbeltagi and Agag, 2016). The relationship between trust and satisfaction has been tested in previous studies (Fang, Chiu, and Wang, 2011; Shiau and Luo, 2012; Y. Wang and Lin, 2006). Trust is a strong predictor of satisfaction (Shiau and Luo, 2012) and also has an influence on use (Gefen, 2000). Taking this background into account, we propose to test the following hypotheses:

H11a. Overall trust in an e-commerce platform has a positive influence on the use of e-commerce.

H11b. Overall trust in an e-commerce platform has a positive influence on 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 construct 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,

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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 instead 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, additional incremental sales, reduced search costs, time savings, task performance, and task productivity. The items added (IP3 and IP5) 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 range 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 only complete the questionnaire 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 broad 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. To make the results generalisable, the participants of this study were university students from the European Union (EU). For Yang (2005), university students are likely to be the first customer segment to adopt e-commerce because of their high educational level and potential income. Based on that, we considered that highly educated students, who are e-commerce users, are appropriate for participating in research about e-commerce individual performance. A total of 730 e-mails were sent providing the hyperlink to the survey and inviting participation in it. 476 responses were received. 39 responses were removed due to incompleteness, leaving 437 of which were considered to be complete (60 per cent response rate) and therefore valid for statistical analysis. Common method bias was checked with the help of the marker variable technique to address potential threats to validity (Lindell and Whitney, 2001; Malhotra, Kim, and Patil, 2006). The observed variance of 2.31% in the data set shows no significant common method bias.

Table 1 presents 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 mentioning that only 24 individuals admitted that they had never bought products or services online, which represents a minor percentage (5.5%) of the total responses collected and illustrates the expansion of e-commerce use today. The mean age of the respondents was 30 years old, the youngest respondent being 18, and the oldest 75. Regarding the highest level of education completed, the majority of respondents had a master's (44%) or a bachelor's (39%) degree, followed by high school graduates (9%) and respondents with a doctoral degree (7%).

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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 falls within the minimum sample size for using partial least squares (Hair, 2014), the two models were estimated using the partial least squares (PLS) approach. Model 1 assumes that the influence is from use to user satisfaction (H4), whereas model 2 flows from user satisfaction to use (H6). 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 and 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, and Sinkovics, 2009; Reinartz, Haenlein, and Henseler, 2009), second due to its support for theory development (Hair, Ringle, and 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, and Newsted, 2003), marketing, and business research (Henseler et al., 2009). The method was applied with the help of SmartPLS 3 software (Ringle, Wende, and Becker, 2015).

5.1. Measurement model

The research instrument was tested for consistency and reliability to ensure a good fit. The traditional criterion for internal consistency is Cronbach's alpha, which provides an estimate of the reliability based on the intercorrelations of the observed indicator variables. Due to Cronbach alpha's limitations in the population, it is more appropriate to apply a different measure of internal consistency reliability, which is referred to as composite reliability (Hair, Hult, Ringle, and Sarstedt, 2016). 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, and 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	**0.95**									
IQ	0.72	**0.95**								
SVQ	0.60	0.55	**0.96**							
U	0.42	0.44	0.38	**0.89**						
US	0.51	0.50	0.46	0.60	**0.93**					
IP	0.40	0.40	0.31	0.44	0.49	**0.87**				
C	0.55	0.52	0.53	0.58	0.69	0.47	**0.93**			
I	0.53	0.54	0.58	0.45	0.56	0.42	0.62	**0.95**		
B	0.38	0.38	0.46	0.50	0.50	0.39	0.61	0.58	**0.95**	
OT	0.41	0.44	0.40	0.53	0.56	0.46	0.61	0.58	0.64	**0.91**
AVE	0.80	0.67	0.82	0.54	0.79	0.51	0.72	0.78	0.76	0.75
CR	0.94	0.92	0.95	0.85	0.92	0.84	0.91	0.94	0.93	0.90
CA	0.91	0.90	0.93	0.80	0.86	0.75	0.87	0.91	0.89	0.84
Mean	6.09	5.68	5.85	5.61	6.04	5.88	5.89	5.85	5.62	5.78
SD	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.
Note: Values in diagonal (bold) are the AVE square root.

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 and 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, and 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

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 hypothesised model and to estimate path coefficients. The results of the tests performed on the two structural models are depicted in Fig. 2. The upper path coefficients give the results of model 1 and the lower ones of model 2.
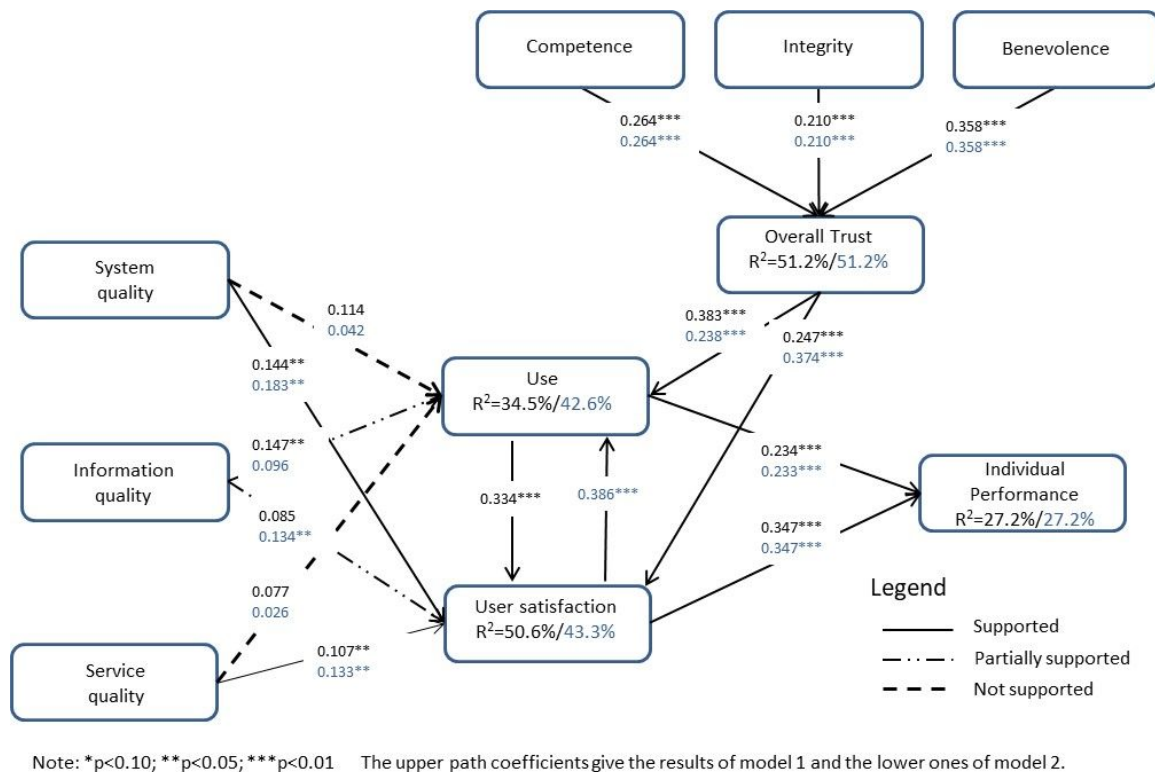

Figure 2 - Results summary

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 ($\hat{\beta}$ = 0.386, p < 0.01 in model 1) is statistically significant in explaining use, which endorses hypothesis H6. Information quality ($\hat{\beta}$ = 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 hypotheses H1a and H3a are not supported. Overall trust ($\hat{\beta}$ = 0.383, p < 0.01 in model 1 and $\hat{\beta}$ = 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 ($\hat{\beta}$ = 0.334, p < 0.01) is statistically significant in explaining user satisfaction, which supports hypothesis H4. System quality ($\hat{\beta}$ = 0.144, p < 0.05 in model 1; $\hat{\beta}$ = 0.183, p < 0.05 in model 2) and service quality ($\hat{\beta}$ = 0.107, p < 0.05 in model 1; $\hat{\beta}$ = 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 ($\hat{\beta}$ = 0.134, p < 0.05) is statistically significant in explaining user satisfaction in model 2, thus partially supporting hypothesis H2b. Overall trust ($\hat{\beta}$ = 0.247, p < 0.01 in model 1; $\hat{\beta}$ = 0.374, p < 0.01 in model 2) is statistically significant in explaining user satisfaction in both models, hence supporting hypothesis H11b.

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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 H5 and H7 are supported.

In conclusion, from 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 implications

To the best of our knowledge, this is the first empirical research that investigates the relationship combining the D&M model and overall trust in explaining individual performance in e-commerce. The vast majority of the hypotheses were supported, achieving an acceptance rate of 86.7% (hypotheses supported plus partially supported). Hypotheses tests' results are summarised in Table 4.

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%. The variation of user satisfaction 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, and Oliveira, 2016; Tam and Oliveira, 2016; Tam and Oliveira, 2017; 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 and Torkzadeh, 1988; DeLone and McLean, 1992). Of the three IS success metrics, information quality 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 the findings of earlier research (Aparicio et al., 2016; Tam and Oliveira, 2016; Tam and Oliveira, 2017; 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 and Straub, 2000). If use is perceived as research, maybe system and service quality are not important, whereas if use means to 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 in 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 overall trust is a determinant factor of e-commerce use and user satisfaction. Trust reduces risk and uncertainty and motivates customers to use e-commerce (Wu and Li, 2017). Theoretically, trusting customers sense higher levels of satisfaction and are more willing to engage with e-commerce (Cao, Yu, Liu, Gong, and Adeel, 2018). 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 and Cho, 2011; Palvia, 2009; Gefen, 2002).

The remaining hypotheses derived from the D&M model are supported. The model successfully predicts individual performance. This outcome 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 an area nearby, and saving 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^2
	Use			**34.5%/ 42.6%**
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	
H6: US -> U		0.386***	supported	
H11a: OT -> U		0.383***/ 0.238***	supported	
	User satisfaction			**50.6%/ 43.3%**
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	
	Overall trust			**51.2%/ 51.2%**
H8: C -> OT		0.264***/ 0.264***	supported	
H9: I -> OT		0.210***/ 0.210***	supported	
H10: B -> OT		0.358***/ 0.358***	supported	
	Individual performance			**27.2/ 27.2%**
H5: 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
Note: **$p<0.05$; ***$p<0.01$

Table 4 - Parameters estimates, hypotheses, and R^2

6.1.   Theoretical implications

Our main theoretical contribution is the proposed research model. The model presents an integration of the 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 solely depend 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 the 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

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primary 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 use and user satisfaction. The study provides more understanding of 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 emphasising 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) hypothesised. 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 and expectation to 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. For instance, information of all shipping costs should be communicated to the customer at the time of purchase and checkout, avoiding the communication of extra costs or hidden costs at a later time, preventing unhappy customers.

Although system quality and service quality were not found to be 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 summary, 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 and 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%. Not all e-commerce systems implementation is simple. E-commerce systems need to be an easy way for people to complete their purchase with multiple payment options and fewer steps.

Service quality must provide a high level of responsiveness and competence through customer support (Sun, Teh, and Chiu, 2012). Fostering contact between seller and customer is an emerging concern, as

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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 and Venkatesh, 2017). Given the nature of an online store, it becomes absolutely necessary to create excellent, reliable and effective customer service to help customers out in case of a problem or confusion. This aspect allows the business to add a personal touch to the online operation.

Means of increasing interaction between e-commerce and customers should be considered by managers; for example, investing in teams specialised 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 and Chervany, 2001). A trusting consumer is more likely to engage in a transaction, such as purchasing, cooperating or sharing information (Palvia, 2009: McKnight and Chervany, 2001), thus increasing use, user satisfaction, and individual performance.

In a nutshell, managers must assess the implications mentioned above, 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 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 a 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. Thus, user perceptions change over time as individuals gain experience, a time-lagged approach of data collection could offer valuable insights on individual performance at the post-adoption stage. Our research focuses on the individual performance of the customers. Although this limits the generalisability for an organisation level, our findings can be the basis for future studies. Despite earlier research suggesting that students represent typical consumers (Remus, 1986), they may not fully represent the population of all potential m-banking users, which might be a threat to our findings. To enhance generalisation and external validity, the sample for future research could include non-students.

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 (system quality, information quality, and service quality) 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 use and user satisfaction. Findings also explain the importance of system quality, information quality, service quality, and overall trust on e-commerce success. This research has theoretical and managerial implications, since the protagonism of e-commerce 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.

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Appendix A – Survey items

System quality (Urbach et al., 2010)
SQ1 - E-commerce is easy to navigate
SQ2 - E-commerce allows me to find the information I am looking for easily
SQ3 - E-commerce is well structured
SQ4 – E-commerce is easy to use

Information quality (Urbach et al., 2010)
IQ1 - The information provided by the e-commerce platform is useful
IQ2 - The information provided by the e-commerce platform is understandable
IQ3 - The information provided by the e-commerce platform is interesting
IQ4 - The information provided by the e-commerce platform is reliable
IQ5 - The information provided by the e-commerce platform is complete
IQ6 - The information provided by the e-commerce platform is updated

Service quality (Urbach et al., 2010)
SVQ1 - The customer service team is always highly willing to help whenever I need support with the e-commerce platform
SVQ2 - The customer service team provides special attention when I experience problems with the e-commerce platform
SVQ3 - The customer service team provides services related to the e-commerce platform at the promised time
SVQ4 - The customer service team has sufficient knowledge to answer my questions with respect to the e-commerce platform

Use (Palvia, 2009)
U1 - I would feel comfortable buying product/service information from this e-commerce platform
U2 - I would feel comfortable seeking product/service information from this e-commerce platform
U3 - I would feel comfortable receiving free product/service information from this e-commerce platform
U4 - I would feel comfortable providing information to this e-commerce platform in order to receive customised service
U5 - 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

Individual Performance (Urbach et al., 2010)
IP1 – E-commerce enables me to accomplish tasks more quickly
IP2 – E-commerce makes it easier to accomplish tasks
IP3 – E-commerce allows me to find products/services I would not find in my surroundings (new item)
IP4 – E-commerce increases my productivity
IP5 – E-commerce allows me to save money (new item)

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.

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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

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Appendix B – Factor loadings and Cross Loadings

	SQ	IQ	SVQ	U	US	IP	C	I	B	OT
SQ1	**0.87**	0.65	0.48	0.40	0.48	0.38	0.51	0.49	0.36	0.40
SQ2	**0.89**	0.65	0.53	0.35	0.43	0.33	0.46	0.46	0.32	0.35
SQ3	**0.89**	0.61	0.56	0.38	0.45	0.37	0.49	0.46	0.32	0.36
SQ4	**0.90**	0.64	0.54	0.37	0.45	0.36	0.52	0.46	0.35	0.36
IQ1	0.57	**0.84**	0.42	0.42	0.46	0.35	0.46	0.47	0.32	0.35
IQ2	0.61	**0.88**	0.45	0.41	0.44	0.35	0.44	0.46	0.31	0.35
IQ3	0.45	**0.65**	0.33	0.36	0.34	0.31	0.42	0.32	0.36	0.34
IQ4	0.61	**0.83**	0.49	0.31	0.39	0.32	0.41	0.46	0.31	0.40
IQ5	0.62	**0.84**	0.51	0.33	0.40	0.30	0.40	0.44	0.27	0.36
IQ6	0.65	**0.84**	0.49	0.30	0.41	0.33	0.41	0.45	0.28	0.33
SVQ1	0.51	0.47	**0.89**	0.33	0.41	0.28	0.47	0.52	0.40	0.38
SVQ2	0.54	0.46	**0.92**	0.35	0.41	0.25	0.50	0.49	0.45	0.39
SVQ3	0.55	0.52	**0.91**	0.33	0.44	0.27	0.47	0.53	0.39	0.33
SVQ4	0.55	0.53	**0.90**	0.36	0.42	0.33	0.49	0.54	0.40	0.34
U1	0.37	0.36	0.29	**0.82**	0.48	0.38	0.44	0.40	0.42	0.46
U2	0.51	0.48	0.43	**0.80**	0.61	0.42	0.55	0.53	0.43	0.53
U3	0.14	0.20	0.14	**0.63**	0.31	0.24	0.33	0.14	0.30	0.25
U4	0.13	0.17	0.17	**0.67**	0.30	0.19	0.34	0.14	0.32	0.25
U5	0.21	0.26	0.23	**0.73**	0.38	0.30	0.40	0.23	0.33	0.31
US1	0.40	0.43	0.35	0.54	**0.86**	0.44	0.59	0.47	0.45	0.50
US2	0.50	0.48	0.46	0.55	**0.93**	0.44	0.64	0.53	0.48	0.52
US3	0.46	0.42	0.43	0.51	**0.86**	0.41	0.60	0.47	0.41	0.48
IP1	0.33	0.30	0.23	0.29	0.40	**0.74**	0.35	0.27	0.25	0.31
IP2	0.39	0.38	0.32	0.37	0.43	**0.83**	0.41	0.40	0.36	0.38
IP3	0.27	0.27	0.21	0.27	0.33	**0.59**	0.32	0.31	0.24	0.33
IP4	0.19	0.21	0.17	0.32	0.26	**0.70**	0.30	0.23	0.27	0.32
IP5	0.22	0.24	0.16	0.33	0.27	**0.68**	0.27	0.27	0.24	0.32
C1	0.51	0.47	0.42	0.51	0.59	0.40	**0.82**	0.51	0.48	0.50
C2	0.44	0.42	0.43	0.52	0.58	0.38	**0.88**	0.47	0.50	0.51
C3	0.51	0.46	0.48	0.49	0.62	0.42	**0.85**	0.60	0.55	0.56
C4	0.41	0.42	0.47	0.45	0.55	0.39	**0.83**	0.53	0.52	0.50
I1	0.42	0.47	0.45	0.37	0.44	0.36	0.49	**0.81**	0.44	0.47
I2	0.46	0.47	0.52	0.39	0.50	0.37	0.54	**0.90**	0.52	0.50
I3	0.48	0.47	0.54	0.43	0.51	0.40	0.61	**0.92**	0.58	0.56
I4	0.50	0.50	0.53	0.40	0.51	0.36	0.56	**0.90**	0.52	0.52
B1	0.34	0.33	0.40	0.43	0.42	0.28	0.52	0.48	**0.85**	0.55
B2	0.38	0.35	0.44	0.40	0.50	0.35	0.53	0.58	**0.85**	0.53
B3	0.30	0.32	0.39	0.44	0.43	0.34	0.55	0.46	**0.90**	0.57
B4	0.31	0.32	0.35	0.47	0.40	0.37	0.52	0.51	**0.88**	0.58
OT1	0.26	0.24	0.25	0.44	0.40	0.35	0.44	0.37	0.54	**0.83**
OT2	0.43	0.49	0.41	0.46	0.54	0.43	0.55	0.60	0.53	**0.87**
OT3	0.36	0.39	0.37	0.47	0.51	0.42	0.59	0.53	0.59	**0.90**

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

Note: Values of cross-loadings in bold.