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REVIEW PAPER

The ever-changing business of e-commerce-net benefits while designing a new platform for small companies

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Abstract

Electronic commerce has allowed businesses to grow globally by breaking down barriers that many believed could not be overcome. Although large companies often outperform small and medium-sized businesses, e-commerce allows them to compete with them in some areas. Surprisingly, there is a lack of theoretical evidence regarding e-commerce net benefits for a small and medium-sized business that operates in the context of Business-to-Business. We expand the previous model of information system success by analyzing the role of game dynamics and user satisfaction in the intention to use e-commerce and its net benefits in the success of the new e-commerce platform. To help predict the success of a new e-commerce platform we collect 522 responses from a pool of clients of a small company that sells products to Hotels, Restaurants, and Cafes. Ease of use is the main variable that affects customer satisfaction and their intention to use e-commerce The company will only achieve e-commerce net benefits if these conditions are met. The results contribute to a better understanding of e-commerce net benefits while developing a new e-commerce platform and provide valuable practical contributions for small companies that have limited marketing and information systems.

Keywords E-commerce · Net benefits · Game dynamics · User satisfaction · Small and medium size enterprises · Business-to-business

JEL Classification O10

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1 Introduction

Electronic Commerce (EC) has allowed small companies to expand their business, overcoming barriers that in the past were thought to be impenetrable, making it possible to reach new markets, expand product portfolios, and grow their client bases (Peiris et al. 2015). Although small and medium size enterprises (SMEs) are often eclipsed by larger enterprises, EC brings the opportunity for SMEs to level the playing field with larger companies and to compete with them in some features (Minatogawa et al. 2020).

In Portugal EC has experienced rapid growth in recent years, driven not only by the COVID-19 pandemic but also by the ongoing technological revolution (Digital 2020). According to a report by Digital (2020) EC in Portugal reached 110 billion euros in 2020. This impressive figure underscores the increasing importance of EC in the Portuguese economy and highlights the need for firms to embrace digital technologies to remain competitive in the current business landscape (Tam et al. 2020).

Although only 10% of websites in Portugal are exclusively dedicated to Business-to-Business (B2B) sales, with the majority of Portuguese company websites serving only to present their products and services (76%), online B2B sales are projected to increase by 6 billion euros by 2025 (Digital 2020). Even though SMEs that sell through B2B have sought to implement strategies allowing them to boost their EC, these plans have had mixed results. On the one hand, there are high rates of EC implementation in SMEs, but on the other hand, B2B sales that require Service quality and customer satisfaction have not moved beyond the initial phase of implementation (Molla et al. 2006).

Today's market competition makes EC adoption inevitable for SMEs, forcing these companies to embrace cutting-edge and knowledgeable strategies to stay unique, successful, and profitable in both home and international markets (Bertoa et al. 2019). According to a report by Salesforce Research (2018), 63% of the 6700 B2B firms surveyed reported that their customers expect them to offer new and improved services with greater frequency than ever before. This highlights the urgent need for B2B firms to keep pace with technological advancements and meet the changing demands of their customers (Coppola 2021).

The rise of digital sales has become increasingly important for companies seeking to meet customer expectations and improve their overall performance (Suciu et al. 2019). As noted by Bongers et al., (2021), a practical approach to this issue involves the extension of digital sales capabilities using EC platforms. EC adoption is crucial for companies seeking to meet customer expectations and improve their performance, but a more nuanced approach is needed to understand the full impact of EC on company performance (Tobon et al. 2020).

The theoretical perspective on EC effectiveness requires a different procedure, as Jeyaraj (2020) highlights. The author points out the need for a new model capable of identifying the key elements of EC net benefits and empirically assessing these aspects in a real EC context. Such a model would provide a more comprehensive understanding of the impact of EC on company performance and help companies to optimize their use of digital sales channels (Yoon et al. 2021).

The DeLone and McLean (2003) model, introduced in 2003, offers a comprehensive methodology to assess IS (Information System) in general and EC in particular. Its dimensions outline EC success metrics, making it an increasingly important tool for enhancing overall EC success (Tam et al. 2020).

The DeLone and McLean (2003) model is one of the most widely used models for assessing EC adoption. However, previous studies conducted by Urbach et al., (2010) and Petter et al., (2008) have shown that the model lacks strong support in all relationships and has produced mixed results in many cases. Petter, DeLone, and McLean (2008) found that certain connections within the DeLone and McLean model (2003) did not receive strong support at the individual level, specifically, the connection between system quality and user satisfaction was found to be weak or inconsistent in some studies.

Additionally, Iivari, (2005) found that there was no significant link between system quality and actual use in the DeLone and McLean model and Mardiana et al., (2015) further concluded that a deeper understanding of Intention to use was required when using the DeLone & McLean model. Finally, Nyadzayo et al., (2020) recommended that future studies should explore the relationship between customers and service providers throughout the entire buying experience. Additionally, Bongers et al., (2021) suggested that future research should focus on the effects of introducing digital sales channels on interactions at different stages of a system, particularly within a business-to-business (B2B) context. Therefore, while the DeLone & McLean model remains an important tool for EC success, its limitations and potential areas of improvement warrant further research (Jeyaraj 2020).

Despite all the conclusions and recommendations made by several authors regarding the DeLone and McLean (2003) IS model, there is still a gap between the model and the implementation phase undertaken by SMEs that guide to EC net benefits in a real context. EC holds significant potential for SMEs, but to ensure its continued adoption and success, it is important to explore strategies to overcome potential barriers (Alzahrani 2019). To this end, this study proposes the integration of gamification theories into the DeLone and McLean (2003) IS Success Model for SMEs. By doing so, not only can SMEs leverage gamification to enhance EC adoption and success, but they can also differentiate themselves from other EC systems (Tobon et al. 2020). Given the critical role of EC in today's business landscape, it is important to identify innovative approaches to support SMEs and ensure their competitiveness in the digital sphere (Fonseca et al. 2020).

The need to understand the theoretical and practical foundation of B2B EC implementation by SMEs, and the role of gamification elements and mechanisms in this process, is of paramount importance in today's business landscape. However, previous research has reported a lack of clarity in this area (Garg and Choe, 2015; Hussein et al. 2020), highlighting the need for a dedicated study to address this gap. As such, this study aims to fill this methodological gap by investigating the following research question:

- How can SMEs enhance their EC net benefits?

The current study extends previous research not only in the domain of the IS model proposed by DeLone and McLean but also in the gamification theory. We aim to enhance SMEs' net benefits by proposing a new model, and defining two main objectives:

1. Investigate the relationships between the proposed model variables in the SMEs context that operate in the B2B.
2. Measure and compare the variables that are the most important for the model.

The adoption of gamification in EC platforms can be a powerful tool for SMEs to improve their competitiveness and enhance their online sales (Tobon et al. 2020). Therefore, the present study, which extends the De Lone & McLean model and develops a gamified EC platform for an SME in Portugal, offers a novel approach for SMEs to leverage their online presence and succeed in the B2B context. We expect that by implementing the proposed model, SMEs can gain a deeper understanding of EC and take advantage of gamification elements and mechanisms to improve customer engagement, loyalty, and satisfaction, ultimately leading to increased sales and revenue.

Small and medium-sized enterprises (SMEs) face a significant challenge in optimizing their IT utilization and reaping the maximum net benefits (Yoon et al. 2021). DeLone and McLean (2003) found that quantifying Intention to Use and actual use of EC platforms is challenging, and future research should focus on measuring net benefits instead of surrogate measures. To address this challenge, we propose a revised model that incorporates gamification as a key factor in strengthening Intention to Use EC, ultimately leading to increased net benefits for SMEs.

Our revised model builds on the existing Intention to Use EC framework and introduces Game dynamics as a critical contributor to its effectiveness. By integrating gamification we seek to increase engagement and user participation, leading to more significant benefits for SMEs. We recognize that measuring the impact of gamification on Intention to Use EC is challenging, but we believe that our approach provides a more holistic view of EC net benefits.

Our proposed model provides a roadmap for SMEs to optimize their EC platforms and reap the full benefits of IT utilization. We believe that our model can be a valuable tool for practitioners and researchers interested in enhancing EC platform effectiveness and improving the performance of SMEs in the digital economy.

Given the potential benefits of EC for SMEs, it is important to study this topic and explore the challenges and opportunities that SMEs face when adopting EC. Through our study we can identify best practices and strategies to help SMEs successfully leverage EC to enhance their competitiveness and achieve sustainable growth in today's digital marketplace. The present work provides a fresh opportunity for scholars and enterprises to analyze EC net benefit results as an outcome of the relationship between EC and Gamification.

2 Theoretical background

2.1 E-commerce net benefits for small and medium-size enterprises

EC has the potential to increase SMEs' efficiency and operation levels (Dirgantari et al. 2020). Due to the advantages of this type of business, many companies have migrated from the traditional way of doing business to the online business experience, principally due to its net benefits (Delone and Mclean 2014; Walker et al. 2016).

The concept of Net Benefits was first introduced by DeLone and McLean (2003), combining individual and organizational impact dimensions from their initial model published in 1992. For DeLone and McLean (2003) net benefits contribute not only to companies' success but also to individuals' realization, which has a positive impact on customers. For organizations, these benefits are operations cost reduction (fewer employees), revenue growth, greater competitivity in local and international markets, high customization, increase in companies' performance, and greater engagement with the customer (Dilworth and Kochhar 2013; Dirgantari et al. 2020; Fu et al. 2018; Senarathna et al. 2014; Yang et al. 2015).

On the other hand, several authors report some barriers to the adoption of EC by SMEs. Those problems are related to a lack of capabilities to adopt EC technologies, absence of financial resources to invest in the modernization of technological infrastructures, shortage of qualified human resources, high dependence on outsourcing companies, and lack of security and reliability (Awiagah et al. 2016; Elbeltagi et al. 2016; Poorangi et al. 2013; Suciu et al. 2019; Vajjhala and Thandekkattu 2017).

When implementing EC a key factor is having a well-structured IS model that can be implemented by SMEs (Abdu'a and Wasiyanti, 2019). As several authors report, many SMEs have difficulties in adopting new technologies due to the complexity of systems or lack of employees specialized in IT (Mazzarol 2015; Morais et al. 2012; Pham and Pham 2011).

The IS Success Model proposed by DeLone and McLean (2003) is designed to be a simple and uncomplicated model for companies to use (Hartono et al. 2010; Widiaty et al. 2020). Since its introduction, according to Research Gate, the DeLone and McLean (2003) IS Success Model has been cited more than 8,000 times and has contributed to several articles regarding IS (Gate 2022).

In 2005 (Iivari 2005) conducted research that tested the DeLone and McLean (2003) IS Success Model using a field study. He concluded that system quality and information quality are significant predictors of user satisfaction but not of system use, which in consequence affects the Intention to use EC. Additionally, Walker et al. (2016) found in their study that Ease of use is not significantly associated to EC use. For Buttle and Maklan (2019), the more satisfied the consumer, the greater the increase in the inclination to repurchase products. It is also found by Nyadzayo et al. (2020) that the relationship between customers and companies is considered critical to engage the consumer in the IS.

Furthermore, Jeyaraj (2020) emphasized the need to re-examine reciprocal relationships in success models in order to attain success in information systems. This

highlights the importance of conducting further research on a novel model that can improve EC Net benefits.

2.2 Small and medium-size enterprises in the context of B2B

SMEs are strategic companies for national GDP and economic growth due to their ability to find new business opportunities, expand networks into new markets, and develop new products (Vajjhala and Thandekkattu 2017; Wardati and Er 2019). Although SMEs face strong competition from larger companies and have fewer financial and human resources when compared to them, they can still be competitive, especially due to the adoption and use of IS technologies (Bocconcelli et al. 2017). These technologies give companies the possibility to develop their own EC platforms that allow them to conduct business transactions, maintain business relationships, and share business information (Holland and Gutiérrez-Leefmans 2018). As Wickramansinghe and Sharma (2005) stated, EC platforms can eliminate some of the competitive advantages of bigger enterprises and provide equal opportunities for all kinds of companies.

B2B is a way of directing business and settling relationships and interactions between the salespeople and the purchaser (Kumar and Pansari 2016). B2B companies are adjusting their way of conducting business by introducing EC into their sales strategy (Bongers et al. 2021). As Dotzel and Shankar (2019) state, B2B enterprises rely on new services or innovations to develop their business. As a consequence, from 2013 to 2019 the EC gross merchandise volume increased by 6.39 billion dollars in the United States (U.S.) alone (Mehta and Hamke., 2019). More recent data indicate that in 2023 U.S. B2B sales via EC will reach 1.8 trillion dollars, which represents a 4% increase compared to 2019 (Coppola 2021). B2B is fundamental for SMEs to consolidate and endorse new business, as this type of company usually has fewer resources to improve developments when compared with larger firms (Markovic et al. 2021). To accomplish this and to improve the chance of effective B2B, SMEs should make partnerships with research organizations, providers, wholesalers, and competitors (Bagherzadeh et al. 2020). Additionally, Markovic et al. (2021) conclude in their study that there are managerial factors that also influence the success of B2B, such as organizational innovation governance choice or internal firm readiness.

Nyadzayo et al. (2020) state that due to consumer uncertainty and competition from other companies, the B2B process should be more relational than transactional, which means having a highly engaged relationship between the SMEs and the client. In line with this argument, Bongers et al. (2021) clarify that developing inter-organizational relationships through personal interactions between companies and buyers has been essential in B2B contexts for decades, but that SMEs are now introducing digital sales channels to achieve this in the digital environment.

2.3 Model theoretical background

Before the DeLone and McLean (2003) model become one of the most cited IS models, several researchers studied and verified the first model, published in 1992. They conducted empirical tests on the DeLone and McLean (1992) model of IS to verify and validate its effectiveness. In doing so, the model has been tested with modified constructs and relationships and has also been respecified and extended with the inclusion of other constructs and relationships.

Garrity (1998) presented an ISS model that shared similarities with DeLone and McLean (1992) but also had two differences. The model excluded both quality dimensions in DM1992 while expanding the user satisfaction dimension to comprise task support satisfaction, decision support satisfaction, quality of work life satisfaction, and interface satisfaction Jeyaraj (2020). Larsen (2003) presented a wider viewpoint that incorporates IS implementation, user behavior, and performance, and highlighted the similarities and differences between ISS and DeLone and McLean (1992) or DeLone and McLean (2003). In line with the ongoing expansion of EC platforms, Lai (2014) replaced Service quality with e-service convenience in DeLone and McLean (2003) and subsequently assessed it with the e-SERVCON instrument. Later, Božič and Dimovski (2020) investigated the relationship between business intelligence and analytics (BI&A), absorptive capacity, and knowledge creation by applying the DeLone and McLean (2003) and the knowledge-based theory. The study found a significant positive relationship between BI&A use and absorptive capacity enhancement, which ultimately led to knowledge creation.

A recent study by Çelik and Ayaz (2022) evaluated the success of the Student Information System (SIS) using the DeLone and McLean (2003) and showed that system quality, information quality, and Service quality had a significant impact on use, but did not significantly affect user satisfaction. Interestingly, system use and user satisfaction were found to have no significant impact on the success of the SIS. Another study, by Millenia et al., (2022), applied DeLone and McLean (2003) to investigate the e-Filing system. The authors found that information quality had a significant positive impact on the use and satisfaction of taxpayers. Additionally, the quality constructs of system quality and Service quality were also positively and significantly related to taxpayers' satisfaction. Furthermore, the study revealed that system use and user satisfaction had a positive and significant effect on net benefits.

Although derived models have been proposed, DeLone and McLean (2003) has been widely used in previous research on the IS domain. These derived models have extended the original models by introducing new constructs such as Service quality and contributed to the understanding of IS Jeyaraj (2020). However, these models have limitations due to their specific research contexts and may not be limited to the IS dimensions.

Several prior studies on gamification have employed the DeLone and McLean (2003) IS dimensions. For example, Yin et al. (2022) investigated the relationship between gamification dimensions and user satisfaction, while Inan (2022) examined the impact of gamification on m-payment applications and measured the intention to use. Pasca et al. (2021) explored how app perception affects gamification, and how gamification enhances Service quality and user loyalty.

Additionally, Behl et al. (2021) conducted a study that uses game elements and information quality grounded in motivational affordance perspective (MAP) to study the intrinsic and extrinsic participation on a crowdsourcing platform. The study of how gamified systems' elements and mechanisms shape attitudes and behaviors has garnered significant interest in the literature as scholars from various disciplines including computer science, psychology, information systems, and social sciences, have conducted research on this topic (Tobon et al. 2020).

The DeLone and McLean (2003) IS success model has been adapted for EC and has been used to measure various information systems (Çelik and Ayaz 2022). However, there is a lack of research validating this model or its variations on SMEs that operate in the B2B. Our revisited model uses gamification to strengthen the Intention to Use EC, which will influence EC net benefits. As the Intention to Use EC and actual use are difficult to quantify with DeLone and McLean (2003), we propose in our model to apply Game dynamics as a key factor that leads to the Intention to Use EC, because as DeLone and McLean (2003) recommended in their report, future studies should contain net benefits measures and not be satisfied to gather only surrogate measures.

2.3.1 Website information

Information satisfaction is determined by users' evaluations of website subjects, hence IS contents will influence customers' satisfaction (Palvia 1996). When EC clients search for a product, they do it quickly, paying little attention to details, thereby obtaining information that is too general (Madu and Madu 2002). McKinney et al. (2002) concluded that the level of consumer satisfaction is influenced by information and the IS, confirming that one of the factors of EC user satisfaction is the IS.

Shi and Yuan (2019) conducted a study on the impact of EC and defined user satisfaction as a psychological mechanism of the consumer who is seeking to satisfy their desires. Anderson and Srinivasan (2003) defined satisfaction with EC as the satisfaction of the customer's buying experience compared to previous purchases. Chen (2012) mentions that user satisfaction is an aspect that influences customers, guiding them to repeat their online experience in buying products throughout the EC platforms.

Satisfaction evaluates if an IS user is pleased with the available resources, and how committed and engaged with the system the user is (Meng and Agarwal 2007), and how enjoyable the IS is to the user (Suh et al. 2018). Satisfaction has been recognized as the strongest link for continued use of IS by the users (Bhattacherjee 2001). Furthermore, user satisfaction is an essential criterion for a better understanding of consumer behavior by top managers (Santoso and Nelloh 2017).

User satisfaction enhances consumer loyalty in an online and offline environment (Shankar et al. 2003). The more satisfaction, the more predisposition a customer has to buy from the same enterprise, creating a cooperative relationship between both parts (Buttle and Maklan 2019). DeLone and McLean (2003) measured user satisfaction through information quality and system quality, while Goodhue and Thompson (1995) emphasized the importance of the user opinion about a specific IS on user satisfaction. User satisfaction increases the pleasure, thus leading to greater

enjoyment of a gamified IS (Suh et al. 2018). Mitrevski and Hristoski (2011) concluded that satisfaction is the overall feeling of customers who are doing online transactions.

User satisfaction has been studied with different theoretical approaches. When studied by psychological theories, which analyzed the relationships among experience, expectation, and user satisfaction, no influence of system use was found to affect user satisfaction (Brown et al. 2008). Seddon and Kiew (1996) conducted a study regarding information integration (which examined how cognitive elements affect user satisfaction) and found only weak influence of the perception of system attributes on user satisfaction. Sun et al. (2014) studied user satisfaction by using economics theories (adding a quadratic regression equation) and contributed to our understanding that aspects other than consumption could affect user satisfaction. Meanwhile, Seddon and Kiew (1996) state that the type of IS used will have an impact on user satisfaction and influence individual performance. Consequently, it is possible to realize that the greater the user satisfaction with an IS, the higher is the performance (Ratna et al. 2020).

In the business world companies must continuously search for improvement and make the best of their resources to comply with customers' wishes and needs (Bailey and Pearson 1983). As user satisfaction is a prominent factor for EC success, there must be mechanisms that evaluate the customers' satisfaction by relying on the attributes of the system and information (Muylle et al. 2004). User satisfaction can also be measured by the system success, which relies on the perceived system usage and information quality (Ives et al. 1983). As different users may have different product information wishes, a virtuous assessment of website user satisfaction is therefore crucial for the success of companies (Muylle et al. 2004).

Through satisfaction it is also possible to assess the loyalty and trust generated by customers toward the products or even the enterprise (Martínez-Navalón et al. 2021). Furthermore, other studies report that satisfaction affects other variables such as continuance intention and Service quality, showing the importance of this matter (Li et al. 2018; Shakib Hossain et al. 2019). Based on this, we propose the following hypothesis:

H1 The information provided by the EC platform has a positive effect on user satisfaction.

2.3.2 Service quality

Success can be determined by the enterprise's skill in providing services that engage the customers. Therefore, Service quality should be one of the first concerns of companies striving for an awareness of user satisfaction (Ratna et al. 2020). Service quality intensifies user satisfaction, encouraging customers to repurchase (Caruana 2002). For many companies, user satisfaction is a key factor due to the relevance it takes in business development (Bournaris et al. 2013). As Kenett and Salini (2011) stated, companies will achieve great performance levels only if they consider User Satisfaction as a key factor.

Even though quality can be the immediate quantification of a service or product provided to customers, Service quality is an opinion formed over a long period regarding the general assessment of a company's performance (Hoffman and Bateson 2016; Partap 2019). In the past, researchers have debated the relationship between Service quality and user satisfaction and concluded that from different perspectives Service quality has always had a positive effect on user satisfaction (Annamdevula and Bellamkonda 2016; Choshaly and Mirabolghasemi 2019). For our research it is important to verify if the relationship between these two subjects is in line with previous works. This led us to extend the literature review regarding these two dimensions.

Some studies conducted in previous years found that satisfaction and Service quality prevail in the services literature mainly in the realms of marketing and management (Caruana 2002; Nguyen 2009). A consensus exists regarding this theme that Service quality and satisfaction are key factors in companies' development and growth (Mosahab et al. 2010). For marketing researchers it is fundamental to quantify the Service quality, and models that measure this subject have been developed in recent years, including the five-factor SERVQUAL (Parasuraman et al. 1985), the three-dimension model (Gronroos 1990), and the hierarchical model (Brady and Cronin 2018). Nevertheless, there is still disagreement in terms of applicability through different areas (Annamdevula and Bellamkonda 2016).

An online system disrupts the face-to-face encounter between the customer and the company, which makes it a challenge to establish a continuous relationship based on trust (Moorman et al. 1992). Park et al. (2017) found that interactivity boosts the communication levels between the system and the user, and builds a bond of reliability and sympathy among users regarding information, leading to the enrichment of Service quality. Rousseau et al. (1998) state that reliability is a key factor in the use of IS to maintain the success of a system.

Consumption experience is a result of general service fulfillment whereby user satisfaction is dependent on the experience of use accumulated over a long period (Ballester and Alemán, 2001). The value that clients assign to their experiences turns into a bridge between Service quality and user satisfaction (Park et al. 2017). Additionally, Service quality is fundamental for IS development, by helping to maintain existing clients and attract new ones (Alam 2021). Quality has a positive impact on user satisfaction, which supports the theory that user satisfaction is a key factor in the success of IS (Tam et al. 2020). We therefore propose the following hypothesis:

H2 The Service quality delivered by the EC platform has a positive effect on user satisfaction.

2.3.3 Usability of the website (ease of use)

IS users will use a certain type of technology only if they consider that it is easy to be used (Ratna et al. 2020), and if technology being implemented on an IS is perceived as being complex for the user, it will be avoided (Ratna et al. 2020). For Davis (1989), Ease of use is the level to which the user believes that using a certain type of IS is easy regarding the physical, mental, and learning effort required. Ease

of use can be measured by how the operator recognizes and uses the technology and if it is easy to become skillful in its use, if it is flexible, understandable, clear, controllable, and easy to learn (Pham and Pham 2011). Ratna et al. (2020) stated that Ease of use can be measured by the performance of an operator in understanding, using, implementing, controlling, and maintaining a system.

To quantify the complete intellectual reaction that internet users have for websites, Eighmey (1997) introduced six key indexes: interaction, reliability, Ease of use, consultation value, entertainment value, and marketing cognition and concluded that Ease of use is central to user satisfaction. An EC IS with outstanding usability is generally user-oriented with articulated and informative content, fast and suitable navigation system, complete commodity classification, abundant information of personalized services, consistent security procedures that meet customers' requirements, and the ability to generate optimistic operation and high fulfillment (Shi and Yuan 2019).

Anjos and Gontijo (2017) conducted a qualitative-quantitative study to discover usability issues in EC websites and detect usability metrics. They proposed an instrument that integrates usability into the process of website development. One of the most commonly used usability assessment indicators today is the Microsoft Usability Guidelines (MUG), which measures usability centered on content, Ease of use, promotion, consistency with the medium, and emotion (Shi and Yuan 2019). Rawashdeh et al. (2021) conducted a study in which their findings contributed to understanding how Ease of use interacts with user satisfaction. As user satisfaction is a crucial managerial aspect that should be assessed by companies, Taherdoost and Madanchian (2021) stated that reaching high Ease of use performance levels is important to attain high Customer satisfaction.

An enterprise IS will be successful if the technology behind the system is applied in the right way by its users, which will boost the performance and strength of the relationship between the employer and the system (Goodhue and Thompson 1995). Furthermore, Davis (1989) states that the effectiveness of an IS relies on whether or not users have confidence that the system will lead to an enhancement of their performance or simplify their tasks. The persistence usage intention of a system will be shaped by system usage satisfaction, which is a key factor for the simplification of strategy, value-adding tasks, and plans (Rawashdeh et al. 2021). Based on this, we propose the following hypothesis:

H3 The EC platform's Ease of use has a positive effect on user satisfaction.

2.3.4 Game dynamics

Game dynamics is the term given to the characteristics of gamified structures that can predict or control a further situation in the system. Game dynamics comprise "constraints (certain limitations or forced withdrawal), emotions (curiosity, competitiveness, frustration, happiness), narrative (consistent, continuous and ongoing story), progression (consumer's, as player's, growth and development) and relationships (friendship created by social interaction, status, altruism)" (Werbach and Hunter 2012).

One of the Game dynamics goals is to capture customer "flow" (Bilgihan et al. 2015). This expression is used to designate a state of mind that is sometimes experienced by people who are involved in some activity with entire immersion, attention, and satisfaction, i.e., being completely absorbed in it (Pace 2004).

When using an IS, users search for an online experience that can provide benefits, such as visual appeal, good design, and enjoyment, but most importantly, a system that is easy and interactive to use (Bilgihan et al. 2015). Usability can be assessed during the development procedure, during the planning phase, strategy, replication, test sample, or final software and it is fundamental to determine whether the IS is user-friendly, efficient, and effective (Anjos and Gontijo 2017). Today it is not possible to develop an EC IS without engaging the issue of usability (Gabriel 2007). To help the development of EC, some authors have proposed the use of usability metrics, which are a series of indicators to use in evaluations (Bertoa and Vallecillo 2004; Gabriel 2007). These metrics consist of multiple usability guides, each one to evaluate the usability of a precise feature of the IS (Anjos and Gontijo 2017).

The combination of different elements from the virtual environment, such as website design, website communication elements, and website content, can be considered to be stimuli (Vaičiukynaitė and Gatautis 2013). According to Eroglu et al. (2003), stimuli in the virtual environment have an emotional and cognitive impact on consumers, and a more engaged consumer will be more interested in information related to the product (Gatautis et al. 2016). Engaging boosts Game dynamics and strengthens active and interactive engagement, which can be designed by providing more frequent feedback or rewards (Tu et al. 2015). Game dynamics are critical design strategies to stimulate, motivate, and promote learning objectives, and can include the interactions between the learner and the system that will be enhanced by its Ease of use (Prensky 2001).

Improvements in system Ease of use and utility enhance the navigation experience, raise a sense of trust, and have a positive impact on customers (Lowry et al. 2008). For Bridges and Florsheim (2008) the system and all valuable components that have an impact on usefulness, Ease of use, and enjoyment will shape the flow experience (Bilgihan et al. 2015). Based on this, we propose the following hypothesis:

H4 The EC platform's Ease of use has a positive effect on Game dynamics.

Werbach and Hunter (2012) called game components the resources used to engage the consumer and that in turn make the game more enjoyable, thereby motivating and attracting players who are more involved in the IS (Gatautis et al. 2016). The relationship of multiple game elements from different dimensions allows gamification to be applied in multiple situations (Gatautis et al. 2016). Also, IS hedonic aspects are important in promoting positive brand impartiality, strengthening the importance of website esthetics in forming and sustaining an optimistic attitude toward a product (Bilgihan et al. 2015). The combination of virtual elements has an emotional impact on consumers, which in turn prompts positive or negative consumer responses (Gatautis et al. 2016). Positive emotions enhance buying possibilities, while negative feelings may lead to a state of avoidance (Fiore and Jin 2003).

The system design quality positively affects the consumer's trust in the website, since is a critical element regarding online shopping (Ha and Stoel 2009). Furthermore, Utz, Kerkhof, and Van Den Bos (2012) state that consumers' trust increases when they believe that the technology is reliable and credible. Website developers are influenced to take inspiration from entertainment industries, such as video games and movies, to introduce more stimulating characteristics to website design. Even though incentives or rewards are a characteristic of gamification, such Game mechanics, rewards, and incentives unaccompanied do not characterize actual gamification design (Tu et al. 2015). In recent years gamification has become a popular topic among scholars and enterprises, resulting in several studies and applications with different game design types (Negruşa et al. 2015; Seaborn and Fels 2015). Although in the entrepreneurial context, gamification has been applied to boost the engagement level of clients in the B2B context, there is still a gap in the research undertaken by scholars (Nah et al. 2019; Robson et al. 2016; Silva et al. 2019).

The constructive emotions that result from the customer-system interaction intensify consumers' knowledge about the brand and strengthen their association with it. The Game design commonly uses diverse Game dynamics in the Game mechanics to continuously nurture engagement and enjoyment (Tu et al. 2015). The successful design has a high chance of initiating, simplifying, and maintaining desired learning objectives through effective step-by-step gamified prizes and/or a series of level-up rewards, such as leaderboards or scoreboards (Tu et al. 2015). Based on this, we propose the following hypothesis:

H5 The Game design supplied by the EC platform has a positive effect on EC platform Game dynamics.

Game mechanics are elements created by the game designers to enhance the player engagement in a gamified system (Gatautis et al. 2016). For Werbach and Hunter (2012), these mechanics can be challenges, elements of randomness, contests, shared goals, feedback, resources acquisition, rewards, transactions, extra turns, and win states. For Arnab et al. (2015), Game mechanics are the theoretical concepts of the game such as resources, goals, and dilemmas; and by the rules that are the guidelines of the game. Game mechanics control which stimuli should be attributed and outline when and how incentives should be obtained. Consequently, Game dynamics and Game mechanics are interconnected in such a way that they balance and boost each other (Tu et al. 2015). In addition, sensations such as enjoyment, awakening, fantasy, and happiness are some of the mechanics that enhance the shopping experiences (Xu et al. 2012). As Bilgihan et al. (2015) concluded, the online shopping experience is characterized by complete absorption in what one is doing, and an IS practical characteristics help consumers obtain a sense of self-control and an inherently fulfilling experience.

Game dynamics were defined by Gatautis et al. (2016) as a specific consumer state leading to additional engagement in gamified activities, which in the online world can lead to a consumer-specific state of stimulation. They are also considered to be among the most important subjects regarding gamification, as they can

encourage system users to explore new resources by giving them new and unexpected rewards (Tu et al. 2015).

Suh et al. (2018) concluded that Game dynamics satisfy users' essential psychological needs, which is paramount to boosting enjoyment, leading to customer engagement with a gamified IS.

The online shopping experience is associated with the flow experience because as O'Cass and Carlson (2010) state, it stimulates online shopping behaviors, impulse buying, purchase goals, and continuance intentions. Greater awareness of a system's interactivity over its mechanisms can amplify the user's experience and achievements (Bilgihan et al. 2015). Based on this, we propose the following hypothesis:

H6 Game mechanics on the EC platform have a positive effect on the platform's Game dynamics.

2.3.5 Intention to use EC

User satisfaction is a goal that all companies hope to achieve due to its advantages, such as customer loyalty, sustainable profitability, and positive reviews and comments from customers (Liu and Jang 2009). Customer satisfaction can be defined as the customer's perception of a service received compared to a service expected (Jani and Han 2011). In addition, Martínez-Navalón et al. (2021) state that if the user has predetermined quality expectations about a certain service and if the service is delivered in line with those expectations, satisfaction is generated.

If satisfaction is generated regarding a service or product, it positively affects the user's trust, which will encourage the user to continue buying the same products or using the same services (Martínez-Navalón et al. 2021). In the EC environment, user satisfaction is defined as the satisfaction of the consumer regarding her/his previous buying experiences with an EC company (Anderson and Srinivasan 2003). As Shakib Hossain et al. (2019) conclude, a robust relationship with users certainly affects brand loyalty in a positive way. Chen (2012) concluded that achieving user satisfaction is paramount for customer e-loyalty, not only because online Customer satisfaction can be attained through overall user satisfaction, user expectations, and the shopping experience, but also once customers become loyal they express their loyalty toward the e-retailer in different psychological and behavioral dimensions. For Chen (2012), customer loyalty is a significant objective for EC systems due to the advantageous customers' attitudes such as repeat purchase intentions and behaviors. In addition, a loyal regular user should be more likely to seek a product or service in the future than a first-time customer (Basalla et al. 2021).

User satisfaction is important for companies because a satisfied user repurchases, trusts the brand, and is loyal to the enterprise's services and products (Martínez-Navalón et al. 2021). Companies must focus on this matter for users to continue using their services and EC platforms. Based on this, we propose the following hypothesis:

H7 The user satisfaction provided by the EC platform has a positive effect on EC Intention to use.

IS performance is a key attribute in determining user satisfaction in EC and an aspect that affects the consumer's decision to purchase a product or not (Poggi et al. 2014). Website abandonment by EC visitors has a negative impact on companies' revenue and results (Marshak and Levy 2003). In their most recent study, Taherdoost and Madanchian (2021) stated that performance, trust, usability, user-friendliness, design, training, security, and quality are the most significant features of EC satisfaction and that these must be well planned in order to implement them correctly on an EC system.

For Chen (2012), customer loyalty is a significant objective for EC systems due to the advantageous customers' attitudes such as repeat purchase intentions and behaviors. In addition, a loyal regular user ought to be more likely to acquire a product or service in the future than a first-time customer (Basalla et al. 2021).

Gamification is a theoretical framework that merges game elements and techniques to improve results in a non-game context (Silva et al. 2019). In the business world gamification has the objective of improving Customer satisfaction and sales (Muangsrinoon and Boonbrahm 2019). Furthermore, game components characterize consumer understanding of website features as well as a different type of enthusiasm to become engaged in games Gatautis et al. (2016). Greipl et al. (2021) conducted a study that identified if participants were engaged in a game or non-game version of a spatial working memory task. The authors concluded that game elements enabled a more emotionally engaging experience. On the other hand, the non-game condition leads to a sense of boredom (Greipl et al. 2021). Game dynamics were defined by (Gatautis et al. 2016) as a specific consumer state leading to additional engagement in gamified activities, which in the online world can lead to a consumer-specific state of stimulation. They are also considered to be among the most important subjects regarding gamification as they can encourage system users to explore new resources by giving them new unexpected rewards (Tu et al. 2015). Suh et al. (2018) concluded that Game dynamics satisfy users' essential psychological needs, which is paramount to boosting enjoyment, leading to customer engagement with a gamified IS.

Based on this, we propose the following hypothesis:

H8 Game dynamics implemented on an EC platform have a positive effect on EC Intention to use.

2.3.6 E-commerce net benefits

Via the internet, IS, and applications, it is possible today to buy, sell, market, and commercialize products, services, and information (Ho et al. 2020). EC has become one of the most important approaches in businesses leading to an increase in efficiency in companies' operations (Abdu'a and Wasiyanti, 2019). At the same time, EC also establishes long-term relationships between consumers and enterprises, resulting in repurchase intentions (Agag and El-Masry 2016). Dirgantari et al. (2020) concluded in their recent study that companies must continue developing EC systems to increase usage level, information quality, information relevance, and client satisfaction. When compared to other companies, enterprises that use this

type of IS have the ability to become more resilient and improve their own ability to respond to competitors (Zhuang and Lederer 2003). Additionally, as mentioned above, Peiris et al. (2015) state that EC has the ability to retain customers, contributing to their intention to use these types of system.

Lederer et al. (2009) conducted a study to identify IT general benefits and concluded that in general there are 33 benefits categorized in six groups: information, cost savings, competitiveness, productivity, planning and control, and new applications. More specifically, there are several benefits when using EC IS, such as sales increase, cost reduction, and better customer relationship management (Bordonaba-Juste et al. 2012; Lyu et al. 2010). Additionally, Zhuang and Lederer (2003) identified other benefits for B2B EC, which are operational effectiveness and efficiency, better data control, better customer service, and access to new markets.

As Agag (2019) concluded in his study, relationship quality has a great influence on repurchase intention and loyalty, showing the importance of building a solid relationship between the online service provider and buyers. Furthermore, Carvalho and Mamede (2018) conducted a study in which companies' top managers pointed out the advantages of implementing and maintaining an EC system, mentioning greater knowledge of their target audience, contracts growth, transactions speed, wider geographic coverage, and turnover increase. EC has reshaped the commercial relationship between the customer and the seller because today it is possible to conduct business exchanges in real-time with no geographical boundaries (Luo et al. 2005).

EC is not only about successes, but also about failures that must be analyzed. "Net benefits" leaves a margin for error margin in the final results because "[no] outcome is wholly positive and without any negative consequences" (DeLone and McLean 2004). "Net benefits" measure the negative and positive impacts on companies, customers, suppliers, economies, and industries (DeLone and McLean 2004).

Based on this, we propose the following hypothesis:

H9 The Intention to use EC platform has a positive effect on EC net benefits.

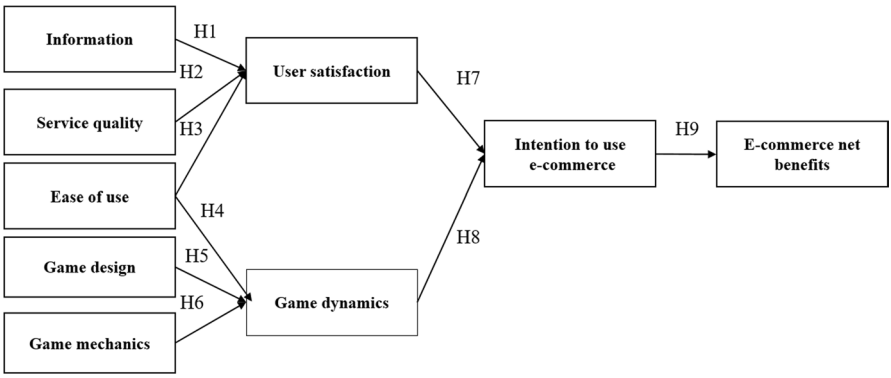

Fig. 1 New Proposal of IS Success Model. Source: authors

2.4 Conceptual model

The new proposed conceptual model (Fig. 1) summarizes the hypotheses for this research.

The suggested approach uses metrics of Game dynamics and User satisfaction to estimate the Intentions to use EC, which in turn evaluates the EC benefits. User satisfaction and its antecedents, namely Information, Service quality, and Ease of use have been considered as the overall Intention to use EC (Ilieva et al. 2022).

Game dynamics has been considered as the overall user game experience and is considered a fundamental part of the user's Intention to use EC (Yu and Huang 2022). Thus, three antecedents, Ease of use, Game design, and Game mechanics, were used to estimate Game dynamics. These variables and relationships in the proposed model are relevant for the study in the context of Small and Medium Size Enterprises (Schielzeth 2010).

3 Methodology

3.1 Context of the study

The sample for this study is a pool of clients of an SME that operates in the B2B context distributing products (e.g., coffee, chocolates, candies,) to Hotels, Restaurants, and Cafés. This small company seeks to increase online sales by creating a new website.

The survey was distributed among the company clients, i.e., the potential users of the new website. The survey was a fundamental resource to gather relevant information concerning the company, its clients, and their intention to use a new EC platform. It is important for this SME to participate in the project not only to understand and better comprehend the EC in B2B, but also to improve their online sales. As stated by Libai et al. (2010), an online atmosphere empowers corporations to be allied in dynamic new ways.

3.2 Data collection and questionnaire

Data were collected with a survey addressed to online clients of the case company between July 2021 and January 2022. The questionnaire was in Portuguese and available online via a link (https://iscteiul.co1.qualtrics.com/jfe/form/SV_8HaQK1KhPFUEOAC) that redirected the online consumers to the questionnaire (the questionnaire is included in the attachments). A total of 610 responses were received; 88 incomplete questionnaires were eliminated, and the final sample has 522 valid responses.

The questionnaire had ten sections, 9 for the model dimensions and the last for demographics. The first section comprised the Information EC and had 5 dimensions (Loiacono et al. 2014; Walker et al. 2016); the second section contained the Service quality EC and had 5 dimensions (Kuo et al. 2009),; the third section embraced the

Ease of use and had 5 dimensions (Chiew and Salim 2003); the fourth section was for Game design EC and had 12 dimensions (Thorne et al. 2009); the fifth section included the Game mechanics EC and had 5 dimensions (Bovermann and Bastiaens 2020), the sixth section comprised User Satisfaction and had 5 dimensions (Kuo et al. 2009), the seventh section contained the Game dynamics and had 5 dimensions (Bertoa et al. 2019), the eighth section contained Intentions to Use EC and had 4 dimensions (Belanche et al. 2012), and the nineth section included EC Net Benefits and had 5 dimensions (DeLone and McLean 2004; Zhuang and Lederer 2003); the last section comprised the Demographics.

Based on the literature, well-validated measurement items for study constructs were adopted and included in the questionnaire, which measured online consumers and ranked the importance of each attribute in their previous experience in online shopping. The responses used a 7-point Likert scale (1 = "Extremely unimportant"; 7 = "Extremely important").

3.2.1 Sampling

The respondents were company clients who had access to the shared link redirecting them to the questionnaire. Most of the respondents were male /54.2% of the sample), with the largest percentage between 18 and 25 years old 39.8%. Also important to remark is that the EC users 46–54 years old represent 23% of our sample. Time spent online by our users is essential for the results, since almost every respondent used the internet regularly (99%); and 200 respondents (38.3%,) reported making online transactions at least once per month, followed by 146 respondents making one online transaction quarterly (28% of the sample). It is also important to mention that 210 respondents had used EC for only 2–5 years, representing 40.2%, and 134 respondents had been making online transactions for more than 5 years (25.7% of the sample) (Tables 1 and 2).

3.3 Data analysis

Analyzing the outcome data of research is a complex task. Conventional statistical techniques for data analysis specify default models assuming that measurement occurs without error and are intransigent to some extent. On the other hand, structural equation modeling (SEM) is a multivariate technique incorporating measured variables and latent constructs, and clearly identifies measurement error (Suhr 2006).

To test the relationships hypothesized in the proposed conceptual model (Fig. 2), we used the SEM (IBM SPSS Amos 28 SEM), after performing an exploratory and confirmatory factor analysis with SPSS to estimate a series of interrelated dependence relationships simultaneously. The SEM approach has been used in many fields (social science, information technology, and others) to empirically analyze conceptual models, as it tests hypotheses regarding the model relationships; to represent, estimate, and test a model's relationships between variables; and to test hypothesized

Table 1 Demographics

Variable	Category	N	%
Gender	Male	283	54.2
	Female	239	45.8
Age group	18:25	208	39.9
	26:35	68	13
	36:45	83	15.9
	46:54	120	23
	> 55	43	8.2
Education	High school	157	30.1
	Four-year university	255	48.9
	Master's	90	17.2
	Doctorate	4	0.8
	MBA	5	0.9
	Other	11	2.1
Internet profile	Regular user	443	84.9
	Not regular user	79	15.1
Familiarity	Familiar with EC	443	84.9
	Not familiar with EC	79	15.1
Online transactions frequency	Weekly	68	13
	Monthly	200	38.3
	Trimestral	146	28
	Annually	96	18.4
	Never	12	2.3
EC years	< 1	178	34.1
	2:5	210	40.2
	> 5	134	25.7

patterns of directional and nondirectional relationships between measured and latent variables (Boomsma et al. 1995; MacCallum and Austin 2000; Rigdon 1998).

Exploratory factor analysis (EFA) and Confirmatory factor analysis (CFA) guarantee that the precision of this consideration complies with the current measures that are considered reasonable for conceptual model validation (Fig. 1). Using AMOS we performed an EFA in SPSS before conducting a CFA to identify the underlying constructs and to verify the factor structure for a set of measured variables according to participants responses (see Table S2 in attachment).

Inferential statistics regularly count on the supposition that data are regularly distributed. Values that are skewed or occur recurrently along one portion of the measurement scale will affect the variance–covariance among variables, and kurtosis in data will also impact statistics (Schumacker and Lomax 1996). Because of this, we tested the data for normality and the Skewness and Kurtosis measures were checked (see Table S3 in attachment).

There are several methods to determine the proper number of main components to characterize the data variance and the feature correlation in a principal analysis.

Table 2 KMO and Bartlett's Test

KMO and Bartlett's Test	
Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy	0.909
Bartlett's Test of Sphericity	
Approx. Chi-Square	13,764.473
gl	990
Sig	0.000

One of the most popular methods is the Kaiser–Meyer–Olkin (KMO) statistic test (Table 5), which measures the suitability of the data obtained for structure detection, and provides hints about the proportion of variance, given the analyzed variables (or items) that is caused by underlying factors, i.e., KMO indicates how well the items are suited to perform a factor analysis (Kaiser 1960). Low values of KMO suggests that the sum of partial correlations is greater than the sum of correlations, indicating that the use of factor analysis is unsuitable, while higher values of KMO suggests that the correlations' pattern is fairly compact and the use of factor analysis would give consistent results (Field 2013).

The reliability of scale is commonly measured by the Cronbach's alpha (Chan et al. 2018). It defines the mean correlation or the internal consistency between factors in the survey to assess the questionnaire's trustworthiness. The Cronbach's alpha coefficient takes a value between 0 and 1 and the closer to 1, the more consistent the measurement scale is (Reynaldo and Santos 1999).

The Square root of the AVE (Average Variance Extracted) and CR (Composite Reliability) were used to test whether the discriminant validity exceeded the correlation between the dimensions (Hair et al. 2006). The model has acceptable convergent validity, as shown by the results for CR and AVE (diagonal elements in bold) of all the dimensions (see Table 3), and the CR and AVE are above 0.7 and 0.5, respectively, as suggested by Nunnally and Bernstein (1994), indicating that the discriminant validity is adequate.

4 Results

Before analyzing the data from this investigation, the values of skewness and kurtois were examined. These values were gathered for data analysis and therefore SPSS and AMOS 28 were used. To better visualize the results, a descriptive statistics table (Table S1 in attachment), Skewness and Kurtosis measures table (Table S2 in attachment), KMO, Bartlett's Test table (Table 2), and a regression coefficient conceptual model (Fig. 3) were formulated.

Cronbach's alpha values for constructs were all above the minimum threshold of 0.70, demonstrating internal reliability in measurement items (Reynaldo and Santos 1999). For this research the variable with the greatest index is Intention to use (0.899), followed by EC Net benefits (0.898), the third variable is Customer satisfaction (0.845), the fourth is Information (0.833), the fifth is Ease of use (0.829), the

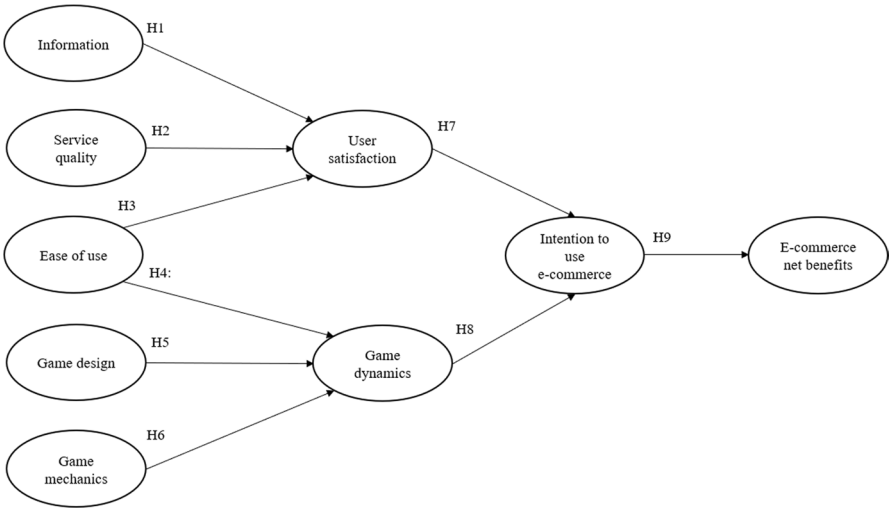

Fig. 2 Proposed Conceptual Model. Source: authors

sixth is Game mechanics (0.818), the seventh is Game design (0.803), the eighth is Service quality (0.783), and the variable with the lowest Cronbach's alpha is Game dynamics (0.760).

The current study found that skewness is between −1.062 and 0.3 (see Table S2 in attachments), indicating non-normal dissemination, but still within the presumptions of greatest probability (Field 2013). The most affected variables are Customer satisfaction 3 and Game mechanics 5.

Kurtosis ranged from −0.806 to 1.257, being recognized as a platykurtic distribution and demonstrating non-normal conveyances, but still inside the suspected range of greatest probability (Kallner 2018). The most affected variables are Game design 1 and Customer satisfaction 3.

The values for skewness and kurtosis −2 and +2 are considered tolerable and indicate normal univariate distribution (George and Mallery 2016). Thus, the variables Customer satisfaction 3 (kurtosis = 1.26) and Customer satisfaction 3 (Skewness = −1.062) may alert us to a problem and could be removed, as they suggest a large number of univariate outliers in the dataset. However, they have an acceptable commonality.

A variable is "good" for EFA if its commonality is moderate (above 0.5). When less than or equal to 0.5 it can be considered low, meaning that it shares less than half of its variability in common with the other variables (Velasquez and LaRose 2015). The commonality values show that all variables are good for an EFA (Table 4).

A KMO value greater than 0.7 indicates that factor analysis is appropriate for the dataset under consideration and if less than 0.50, is inadequate (Leech et al. 2005). The KMO value for this research is 0.909, which is a high value (close to 1) and is classified as "superb" on the Level of Acceptance, demonstrating that the data are adequate for a factor analysis (Table 2) (Field 2013). To test whether this value is statistically different from zero at $p = 0.05$, Bartlett's Test of Sphericity is required.

Table 3 Correlations between dimensions and AVE. (Source: Own elaboration)

	Correlations between dimensions and AVE									
	CR	EC Net benefits	Game dynamics	Game mechanics	Game design	Ease of use	Service quality	Information	Customer satisfaction	Intention to use
EC Net benefits	0.893	**0.817**								
Game dynamics	0.806	0.599	**0.728**							
Game mechanics	0.931	0.777	0.514	**0.881**						
Game design	0.945	0.509	0.775	0.845	**0.852**					
Ease of use	0.948	0.786	0.512	0.748	0.761	**0.794**				
Service quality	0.789	0.676	0.719	0.519	0.693	0.667	**0.822**			
Information	0.813	0.508	0.613	0.604	0.548	0.683	0.792	**0.839**		
Customer satisfaction	0.969	0.513	0.709	0.786	0.748	0.517	0.653	0.792	**0.803**	
Intention to use	0.965	0.583	0.712	0.713	0.716	0.619	0.757	0.758	0.752	**0.798**

The numbers of the diagonal (in bold) are the Square root of the AVE for each dimension

All correlations are significant at $p < 0.01$

The result χ^2 (522) = 13,764.473, $p < 0.000$, showing that correlations within items are good and significant (see Table 3). In conclusion, the present dataset is suitable to perform an EFA.

A SEM with maximum likelihood estimation procedure was run, with results showing a good model fit, as demonstrated in Table 5. The hypothesized relationships were tested. Figure 3 presents the empirical findings from the SEM. Hypotheses 1, 2, and 3 were tested, and their results indicated that User Satisfaction is positively affected by Information (β = 0.17), Service quality (β = 0.19), and Ease of use (β = 0.38), meaning that EC platform Ease of use has the greatest effect on user satisfaction.

When Hypotheses 4, 5, and 6 were tested, results showed that Ease of use (β = 0.20), Game design (β = 0.17), and Game mechanics (β = 0.49) exerted a substantial impact on Game dynamics, and thus Hypotheses 4, 5, and 6 are also supported. These results also show that Game mechanics brought by the EC platform has the most positive effect on EC platform Game dynamics.

Hypotheses 7 and 8 were then estimated. Intention to use EC is positively affected by User Satisfaction (β = 0.80) and Game dynamics (β = 0.16), indicating that Hypotheses 7 and 8 are also supported. The user satisfaction provided by the EC platform has the most positive effect on EC Intention to use. Finally, hypothesis 9 was assessed. EC net benefits are possibly affected by Intention to use EC (β = 0.70), meaning that the Intention to use EC platforms have a positive effect on EC Net benefits.

5 Discussion

Our study presents an original conceptual model to investigate the potential impact of a new EC website on the performance of a SME in the B2B context. Through an analysis of the company, its customers, and potential users of the new EC platform, we have identified a strong correlation between Customer Satisfaction and the Intention to Use. This relationship, in turn, has a direct and positive effect on the EC Net benefits as the dependent variable. This highlights the critical role of Customer Satisfaction and Intention to Use in driving the success of EC platforms for SMEs in the B2B context. Our results align with the research conducted by (Shahid Iqbal et al. 2018), who reported a significant positive correlation between self-service technology Service quality and behavioral intentions. Moreover, (Ma and Wang 2021) have demonstrated the importance of customer satisfaction in driving re-purchasing intention, especially in the context of service failure. These findings provide further support for the notion that enhancing customer satisfaction and Service quality can lead to improved Intention to Use EC.

Our study indicates that while all variables in the proposed model have some impact on the final results, certain factors may warrant more attention from companies seeking to enhance their net benefits. Our analysis has revealed that the Ease-of-Use variable exerts the greatest influence on Customer Satisfaction, while the Game Mechanics variable has the strongest impact on Game Dynamics. Additionally, we have found that Customer Satisfaction has a more significant positive effect on the

Table 4 Fit Model Values

Absolute Fit Indices	Value	Recommendations	Author
Chi-Square (X2)	1376.473	X2 five times or less than the df is acceptable	Hair et al. 2006
p-value (P)	0.000	<0.05	Hair et al. 2006
Degree of Freedom Ratio (df)	503		Hu and Bentler 1999 Schumacker and Lomax 1996
Chi-Square/degree of freedom ratio (X2/df)	3.645	X2 five times or less than the df is acceptable	Hu and Bentler 1999 Schumacker and Lomax 1996
Goodness-of-Fit (GFI)	0.821	>0.80	(Bollen 1989)
The Root Mean Square Error of Approximation (RMSEA)	0.071	Values closer to 0 represent a good fit. It should be $<.08$ or $<.05$	(Lewis 2017) (Cai et al. 2021)
Comparative Fit Index (CFI)	0.845	>0.85	(Byrne and Campbell 1999)
Incremental Fit Index (IFI)	0.830	>0.90	(Browne and Cudeck 1993)

Table 5 Regression results underling the hypothesis testing (SPSS AMOS output)

			Estimate	S.E	C.R	*P*	Label
Customer satisfaction	<—	Information	.171	.047	3.644	***	H1
Customer satisfaction	<—	Service quality	.199	.034	5.872	***	H2
Customer satisfaction	<—	Ease of use	.381	.047	8.082	***	H3
Game dynamics	<—	Ease of use	.201	.057	3.537	***	H4
Game dynamics	<—	Game design	.160	.105	1.517	.129	H5
Game dynamics	<—	Game mechanics	**.493**	.052	9.393	***	H6
Intention to use	<—	Customer satisfaction	**.804**	.080	10.040	***	H7
Intention to use	<—	Game dynamics	.165	.034	4.845	***	H8
EC Net benefits	<—	Intention to use	**.707**	.064	11.016	***	H9

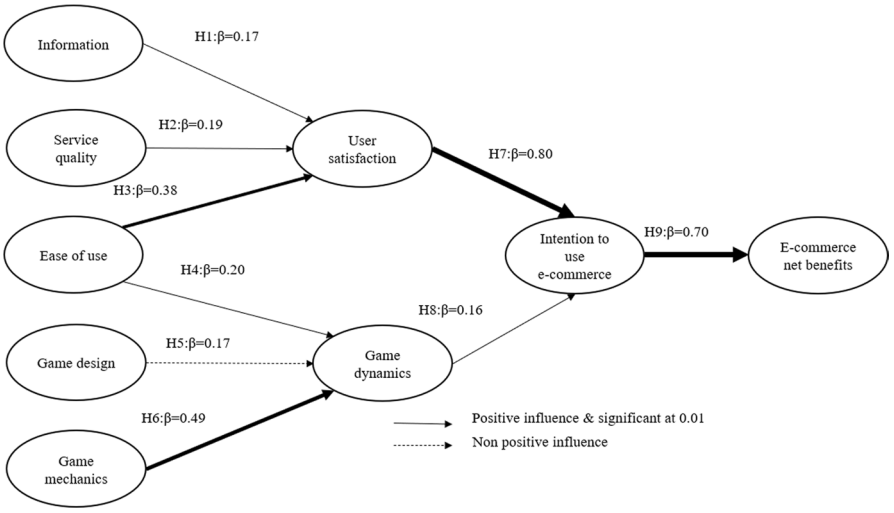

Fig. 3 Regression Coefficient Values

Intention to Use EC variable than on the Game Dynamics variable. Notably, the Intention to Use EC variable was identified as having a direct and positive impact on EC net benefits. These findings have important implications for companies seeking to improve their EC performance by prioritizing the most influential variables in the proposed model. Our study's findings are consistent with those of Agarwal and Dhingra (2023), Yadav and Goraya (2018), and Phaphoom et al., (2015), who have reported that Ease of use is the most crucial factor influencing cloud Service quality and, consequently, customer satisfaction.

For small B2B enterprises EC offers a variety of growth opportunities and advantages including cost savings, efficiency enhancements, better customer and supplier relationships, access to new markets, real-time marketing offers, higher profits, and gains in competitive advantage (Elbeltagi et al. 2016; Walker et al. 2016). Customers tend to use EC if the website delivers the proper service in the period agreed

to ensure that what the customer receives is what he or she believed they would get. Furthermore, customers are more likely to share information and conduct online transactions if they feel more secure (Agag 2019).

Although H1 and H2 had positive effects regarding the Customer satisfaction, H3 stands out more. Our results imply that at these levels of Ease of use customers will be more pleased and inclined to consume, thereby expressing consumer satisfaction. In a study conducted by Filieri et al. (2021) measuring if TripAdvisor is still relevant, the authors found that perceived Ease of use has a positive impact on Customer satisfaction, leading to the continuing relevance of the user generated platforms. On the other hand, the findings differed from those of (Shahid Iqbal et al. 2018), who found a strong relationship between self-service technology Service quality and customer satisfaction.

This study contributes to the very limited literature on SMEs that operate in the B2B context and the intent to use gamification as a mechanism to boost sales and increase the customer intention to use an EC website. Regarding the Game dynamics, the hypothesis found to be the most prevalent was H6. Hypotheses 4 and 5 did not have the same outcome values has H6, revealing that for Game dynamics success, developers should focus more on Game mechanics.

One of the earliest mechanics introduced was the frequent flyer program by American Airlines, which was followed by other airline companies. Subsequently car rentals and hotel chains started using mechanics of gathering points and exchanging them for other services and products as an instrument to grow the return rate of customers (Shpakova et al. 2017). Hamari et al. (2014) have reported that mechanics enable game dynamics to create a unique user experience. Moreover, Hofacker et al. (2016) have shown that game mechanics have the ability to shape users' perceptions of expected rewards.

While our study and others have highlighted the potential benefits of effective Game mechanics, Zhang and Huang (2010) have cautioned that the effectiveness of these mechanics may depend on consumer proximity to specific goals and the mechanics of goal achievement. These results suggest that careful attention must be paid regarding the tailoring of game mechanics to the specific needs and goals of users in order to maximize their impact on user behavior and outcomes.

The correlation between Ease of use and Customer satisfaction is slightly higher than the correlation with Game dynamics. Similar results were found in a Technology Acceptance Model (TAM): Ease of use, defined as the degree to which using a system is relatively free from effort; and usefulness, defined as the degree to which using the system enhances an individual's effectiveness (Davis 1989). Service quality and Information both have a small impact on Customer satisfaction with only Ease of use being relevant. Contrary to our research, Brown et al. (2008) found that the relationship between satisfaction and Ease of use and usefulness was not statistically significant. However, they found that the relationship between the interaction term and satisfaction for usefulness was statistically significant.

In the specific context of the study in which customers use the website for placing their orders, Game mechanics, which include scores, levels, and virtual goals, have a direct positive effect on Game dynamics (Bovermann and Bastiaens 2020). We found that customers tend to use gamification if it is related to financial benefits

or monetary gains, which is in line with the findings of (Rodrigues et al. 2016). For example, Game mechanics and Game dynamics might be a successful company strategy if they are related to quantity discounts or other monetary advantages. The non-positive effect of Game design and Game dynamics is that design is related to esthetics and when shopping online, customers may seek functional benefits and usefulness of the website rather than the design (Bridges and Florsheim 2008).

Another interesting finding is that Game dynamics (e.g., game characteristics such as trophies, rewards, contests, or avatars) have a weak effect on the intention to use the website for commercial transactions. On the other hand, when comparing H7 with H8, it is clear Customer satisfaction is more important than Game dynamics when the main objective is that clients intend to use the EC website. Tu and colleagues found that although gamified websites might include incentives and rewards, these Game mechanics do not constitute a successful gamification design on their own (Tu et al. 2015). For instance, Google's attempt to reward users for reading the news with badges was unsuccessful because they did not want to reveal the specific news they were interested in reading. This is an illustration of how poorly conceived mechanics may result in unfavorable dynamics. Gamification does not necessarily work or represent the best approach merely because it is popular at the present time (Robson et al. 2016).

In a study conducted by Khulood Alhammadi (2022) it was found that actual use mediates the relationship between satisfaction and net benefits. These findings are in line with our results whereby H7 is more important than H8, showing that Customer satisfaction will influence EC Net benefits but will be mediated by Intention to use EC. Our findings also indicate that EC Net benefits are highly dependent on Intention to use EC, resulting in the validation of H9. Similar results were also found by Jimmy (2014), who conducted a case study to measure the net benefits of the University of Surabaya's EC, finding that the net benefits dimension is the most critical one, and is responsible for cost savings, market expansion, additional sales, and time savings.

Our main results are in line with those of previous studies conducted in this area. Tobon et al. (2020)found that gamification enhanced customer engagement and consumer decision, Xi and Hamari (2019)discovered that gamification has a substantially positive effect on users' satisfaction, Rodrigues et al. (2016) state that gamification has a positive impact on customer intention to use a business software, and Blohm and Leimeister (2013) discussed in their study that gamification enhances loyalty and motivation toward a service, brand, or product.

Contrary to our findings, in which Game Mechanics were the gamification element with most impact on EC net benefits, Hofacker et al. (2016) report that Game Design is the gamification element which has the greatest positive impact on customers' decisions. Tobon et al. (2020) also points out the importance to study gamification using psychological theories, as individual desires and needs require understanding to develop new services and products.

6 Conclusion

Despite the phenomenal growth in EC, little is known about the way SMEs operating in B2B manage their EC IS. The main goal of this study, therefore, was to develop a theoretical model based on DeLone and McLean's (2003) model that elucidates how SMEs operating in B2B can attain EC Net benefits by considering gamification as a lever and a determining factor for EC success. Our study examined the associations among the proposed model variables to observe the influence of variables on each other and on the EC Net benefits and to measure and compare the importance of User Satisfaction and Game dynamics for the EC Net benefits.

Consistent with earlier research findings, the outcomes of this study substantiated the validity of our proposed model as a theory that can be applied not only to information system adoption, but also to the assessment of SMES EC. Our research has addressed a crucial gap between the model and implementation phases of EC in SMEs and has implications for achieving net benefits in a real-world context.

In general, with the aid of the proposed model, it has been verified that EC adoption plays a critical role in enabling organizations to satisfy customer demands. Therefore, the adoption of the proposed model may prove advantageous to businesses wishing to improve their competitiveness in the market. Our study has provided insights into the theoretical and practical aspects of B2B EC by SMEs as well as the potential of gamification elements and mechanisms in facilitating this process.

In particular, it can be concluded that a well-designed information system with good usability can significantly enhance customer satisfaction, leading to a positive buying experience. While the mechanics of the website also contribute to its overall performance, the impact of graphic design elements on the Intention to use EC is relatively lower compared to that of user satisfaction. Nevertheless, our analysis of the Intention to use EC reveals that greater customer satisfaction can result in greater net benefits for the company. Therefore, businesses should focus on improving the usability of their information systems to optimize customer satisfaction and enhance their overall performance.

The results also suggest that an information system with good usability can lead to increased customer satisfaction and a positive buying experience. While effective website mechanics contribute to improved dynamics, game dynamics have a relatively lower impact on the Intention to use EC compared to user satisfaction. Nonetheless, our analysis indicates that higher levels of Intention to use EC can result in greater net benefits for the company. Therefore, businesses should prioritize the development of user-friendly information systems to optimize customer satisfaction and improve their overall performance.

Additionally, our study successfully integrated gamification into a novel theoretical framework and extended the proposed model to encompass graphic design, game mechanics, and game dynamics, in line with DeLone and McLean's (2003) framework. While we do not claim that our theoretical model is extremely vigorous, it effectively demonstrated the positive impact of user engagement, game mechanics, user satisfaction, and Intention to use EC on the perceived net benefit. Therefore, our proposed model can serve as a useful tool for businesses seeking to enhance

customer satisfaction and improve their overall performance through the use of gamification. Undeniably, our proposed model involving these key factors has a strong explanatory power for outcome variables, whereby Ease of use (β = 0.20), Game mechanics (β = 0.49), User Satisfaction (β = 0.80), and Intention to use EC (β = 0.70) are revealed to be the most significant variables. The investigation brings to light operational relationships among research variables that will offer managers important material for building their own EC IS and attaining EC Net benefits.

A limitation of this study is the method used to collect the data. Although having a company that cooperated with our research was a positive issue, a drawback was that a portion of the sample were clients of this company. Future research could address more companies around the world focusing on more types of client.

In the future it would be valuable to examine the IS success model for EC in the Arab world, as proposed by Rouibah et al. (2015) in their study on B2C companies. Their model, which builds on Liu and Wang's (2008) model, highlights that has no bearing on user satisfaction in an Arab context. Our study's findings shed light on emerging trends and customers' satisfaction perceptions based on the online buying experience that affects EC Net benefits. As such, it would be interesting to explore how our study aligns with the Arab context and to apply our findings to this context, given that Ease of use is the variable that most strongly affects User Satisfaction.

The study by Wachidin Widjaja et al. (2017) investigates the determinants of a successful B2C EC website in Indonesia, Japan, and South Korea by using an updated DeLone and McLean Information System Success model. Their results reveal that all quality factors of B2C EC impact both user satisfaction and attitude toward the website across all research groups, regardless of the level. Their study concludes that improvements in user satisfaction and attitude toward the site can aid in the advancement of online business. The authors also mention that enhancement on user satisfaction will help in the development of an online business, and it is interesting to consider the outcomes of our study in this context, since our model is a tool for businesses seeking to enhance customer satisfaction and improve their overall performance through the use of gamification.

6.1 Theoretical contribution

The results allow us to conclude that all variables have a strong link, but Ease of use is the one that most affects the User Satisfaction; Game Mechanics is the variable that has the strongest link to Game Dynamics; User Satisfaction reveals having more influence than Game Dynamics; and it was possible to confirm that EC Net Benefits are positively influenced by Intention to Use EC.

In recent years, few academic researchers have conducted studies focused only on the SMEs that operate in the B2B market. Although many of these studies have launched EC models, not all have been tested in the field, as we do. Jeyaraj (2020) pointed out the need for more studies undertaken in specific areas in order to have specialized field studies.

By proposing a new model that extends that of DeLone and McLean (2003), scholars will be able to compare our results with previous studies conducted in this

area, especially with the most recent ones, identified in the articles conducted by Çelik and Ayaz (2022), Millenia et al. (2022), and Božič and Dimovski (2020). The present research adds new awareness by explaining the emerging trends and customers' satisfaction perceptions based on the online buying experience that affects EC Net benefits. It was noted by Dirgantari et al. (2020) that it was necessary develop EC systems for improving usage levels, information quality, and client satisfaction. Our study not only enhances the SME literature pertaining to the Intention to use EC, it also helps top managers to develop EC strategies to please their customers and increase net benefits. Agag (2019) reported that the establishment of a strong relationship between the online service provider and buyers is crucial, as it has a significant impact on both repurchase intention and loyalty, highlighting the importance of prioritizing relationship quality in the context of online services. This investigation also provides a fresh opportunity to judge and benchmark results with other research undertaken internationally.

6.2 Practical contribution

SMEs are the backbone of economies, which makes them very important for every country. However, these companies generally have limited resources, which denies top managers the opportunity to invest sufficiently in all departments, and they must choose wisely where to allocate their limited funds. Based on our model, enterprises should focus their investment on a system that provides good Ease of use to their customers in order to reach their satisfaction. By having a website that provides Customer satisfaction, firms will be able to impress their clients in a way that will encourage them to increase their Intention to use EC. The more a consumer intends to use EC systems, the more net benefits a company will obtain, which lets us conclude that EC Net benefits are directly and positively affected by Intention to use EC.

The recent years have shown an immense digital evolution in all ways, making EC a type of business that is indispensable for most companies that sell products, including those operating exclusively in the B2B markets. Those SMEs are now faced with the need to be online to attain EC Net benefits. If in the past there was no defined strategy to operate on the web through the EC, with the model we propose we guide companies to obtain EC Net benefits from the EC adoption. Based on our results companies will be able to focus their EC IS on the variables we identified as the most important. Nevertheless, managers should not forget to analyze their type of business and adapt our proposed model to their own specificities.

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Declarations

Conflict of interest The authors would like to thank Alfacreme – Alfredo Pereira da Costa for sponsoring the questionnaire distribution among its customers and being actively involved in this research project.

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