Gamification and online consumer decisions: Is the game over?

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Abstract

Consumption can be more than just a necessity; it can become a leisure activity. With the emergence of e-commerce and social media, products and services are just one click away; a trend that is further driven by gamified systems. This research aims to systematically analyze the most relevant academic literature on gamification, to establish if it influences online consumer decisions and, if so, which elements, mechanisms, and theories can explain it. After a thorough search from Web of Science and Scopus databases using SciMAT, 257 papers were analyzed. Twenty-nine (29) of the 36 papers found show empirical evidence that the inclusion of game elements in non-game activities has a significant influence on consumer engagement and online consumer decisions in digital contexts. Moreover, rewards and challenges were identified as the two most used mechanisms, with points, badges, and leaderboards being

the most tested gamification elements. The Self- Determination Theory (SDT) and the Technology Acceptance Model (TAM) are the two most common theoretical explanations for why gamification works. Lastly, possible future studies to include thematic, methodological and theoretical agendas were discussed.

Keywords: Gamification; online consumer decisions; elements; mechanisms; Self-Determination Theory; systematic review.

1. Introduction

Gamification is the incorporation of game mechanisms into non-game contexts to promote behavioral changes. To date, it has been applied primarily to education, to improve the autonomous e-learning process [1–3], and to promote healthy [4–10] or environmentally friendly behaviors [11,12]. For practitioners, designing digital platforms that are easier to use and more interactive has become a profitable way to engage consumers and to make boring and repetitive activities more fun [13,14].

According to Markets and Markets [15], the gamification industry will grow by 46.4% from 2015 to 2020, with total investment reaching $11.1 billion. As companies are investing in e-commerce platform designs, applications, and consumer loyalty programs [16], recent studies have analyzed the influence on online consumer decisions [17–19]. Today, gamification is more than a strategic decision. It seems to have become a basic tool for businesses that have to deal with digital consumers who spend almost two and half hours per day on the Internet or check their smartphone an average of 80 times per day [20,21].

Online stores have already used gamification. For example, the Starbucks rewards card is a prime example of the use of gamification to create consumer loyalty to the brand [22]. The launch of Amazon Prime in the United Kingdom featured a promotion for one free delivery in exchange for signing up for a free one-month trial of their streaming services, in an attempt to expand their services portfolio and retain their current customers [23]. Moreover, almost every bank in the world has an application (app) for customers to manage their money, and 55% of European online banking users confirm that they had also used mobile banking services [24].

The most common previous use of gamification applied to consumer contexts has been loyalty or rewards programs [25], where consumers obtain points that they can redeem for products. These programs thus focus exclusively on applying the gamification mechanism of the reward.

Loyalty programs have been widely used as marketing strategies to generate brand loyalty. Keh and Lee [26] found that the level of consumer satisfaction is a predictor of the effect of such programs on brand loyalty and Koo et al. [27] demonstrated that the perceived value of a loyalty program is crucial to its

effectiveness. Likewise, Temnyalov [28] showed that rewards programs are effective, also, as a strategy for establishing more efficient pricing for sellers.

However, loyalty programs that focus on rewards systems have neglected the implementation of Challenge, Social Influence, Meaningful or Interactivity mechanisms that, as shown by gamification theory, can influence the modeling of consumer decisions.

The literature that analyzes how elements and mechanisms of gamified systems interact to shape attitudes and behaviors has aroused great interest. Academics from different disciplines such as computer science, psychology, information systems, and social sciences have conducted studies considering that today people spend a great deal of their time, whether for work or leisure, connected through mobile devices or computers. Therefore, the explosion of mobile applications and interactive systems has revolutionized how human-information systems are related.

These gamified systems' influence on attitudes and behaviors have been analyzed systematically in many contexts. For example, Sardi et al. [7] have conducted a systematic review of the literature on gamification applied to e-health and found that gamification has focused on the rehabilitation of chronic diseases, physical activity, and mental health. Similarly, Johnson et al. [4] found 19 empirical papers that analyzed the influence of gamification applied to health and well-being, of which 11 reports positive influence and 8 mixed effects.

In contexts of application of gamified systems in education, Dichev and Dicheva [29] found that there is insufficient empirical evidence on the benefits of gamification in long-term motivation toward learning. Likewise, Faiella and Ricciardi [3] found that more empirical support is required regarding the efficacy of gamification applied to the learning process; although they found that agreement is high regarding the personalized use of gamification elements according to the profile of each student.

How gamified systems work in consumer decision-making processes and what elements and mechanisms are necessary for these systems to work are questions that have also been studied empirically, but this literature has yet to be analyzed systematically.

Recent systematic reviews on gamification literature have shown how an area of study of gamification applied to online consumption decisions has been consolidated. For example, Koivisto and Hamari [17] found 26 empirical documents that studied gamification in consumer decision contexts (domains such as business, marketing/consumer behavior, tourism, e-commerce/services). Furthermore, Kasurinen and Kanutas [30] found 50 papers that focused specifically on commercial activities.

The foregoing studies make it necessary to systematically analyze the empirical literature to i) give an account of the state of the art on the application of gamified systems in consumption decisions in digital contexts, ii) to establish the conditions and mechanisms that explain that gamification does indeed work and that it can provide much more than the simple, traditional brand loyalty programs that have been applied as a commercial strategy, and iii) to find new lines of research.

There is a resurgence of interest in analyzing how human interaction with information systems is shaping the way that consumers make decisions since people are online an average of 6:56 hours per day and use Social Networking Sites 2:20 hours per day [20]. For example, Xu et al. [31] analyzed the use of video to manage online customer reviews as well as the influence of online reviews in consumer decisions [32,33]. Chen et al. [34] analyzed how decision-making is supported by online systems that promote social and collaborative consumption. Finally, Sun et al. [35] demonstrated that user satisfaction depends on system attributes. Likewise, gamification systems have been studied concerning their influence on online consumer decisions, but it has not been specifically established if they work or what elements and mechanisms can explain it.

This research fills the gap in the systemization of the literature on gamification applied to online consumer decisions and shows the main theories, mechanisms, and elements that must be included in the design of gamified systems to engage users and make the decision-making process on digital platforms easy and fun for consumers. Moreover, this study proposes new avenues of research on gamified systems in e-commerce contexts.

2. Methodology

To meet the objectives, the PRISMA methodology was used to select which papers to include in the analysis [36]. The universe was all of the papers reported in Scopus or WoS, published from 2010 to 2018, and that included "gamif*" in the abstract, title, or keywords. After filtering out the literature that did not fit the criteria (Section 2.2), 257 papers remained. A bibliometric analysis using the SciMAT tool was subsequently performed to establish a conceptual map of the literature on gamified systems in the context of consumer decisions. Of these 257 papers, a manual review was performed to select only papers that included an empirical analysis of the influence of gamification on online consumer decision. A systematic literature review was conducted of the resulting 36 papers. The universe and the sample section are presented below.

2.1 Universe

Table 1 shows the gamification literature universe, sorted by subject, document type, author, and database.

Table 1. Gamification in numbers

Scopus		**Web of Science**
N= 4,302		N= 1,017
	By subject	
Computer Science: 41.1%		Education: 25.4%
Social Science: 1.5%		Computer Science: 25.3%
Engineering: 11.9%		Psychology: 13.3%
Math's: 8.9%		Medical and Health: 13.8%
Business, Management.: 4%		Business and Management: 8.1%
	Document type	
Conference Paper: 58.3%		Article: 84.5%
Article: 24.3%		Review: 6.3%
Conference Review: 6.3%		Editorial Material: 4%
Book Chapter: 5.7%		Proceedings Paper: 2.4%
	By Author	
Nacke, L.E.:31		Hamari, J.: 17
Hamari, J.:26		Su, CH.: 8
Nakajima, T.:23		Wiers, RV.: 8
Tondelo, G.F.:17		Marti-Parreno, J.: 7
Isotani, S.:16		Landers, R.N.: 6
Rapp, A.:16		Rapp, A.: 6
Johnson, D.:15		Armstrong, G.M.: 5
Korn, O.:15		Boendermaker WJ.: 5
Sakamoto, M.:15		De-Marcos, L.: 5
Landers, R.N.:1		Koivisto, J.: 5

The topic of gamification itself yielded 5,319 papers. 81% of them were found in the Scopus database and 19% in WoS. Education (25.4% of the WoS total) and Computer Science (41.1% of the Scopus total) were the most common subjects in which gamification was researched, but it has also been studied from a multidisciplinary approach [37]. Another relevant characteristic was the document type; in Scopus, 58.3% were conference papers, and in WoS 85.4% were articles. Nacke (31) and Hamari (30) are the authors with the largest bodies of work.

2.2 Sample

The sample selection was determined using the PRISMA methodology [36] with these steps:

1. The universe: The universe is all papers or conference papers published in peer-reviewed journals. They are also indexed and are a part of the Scopus and Web of Science Datasets (Table 1).
2. The results were segmented by searching Scopus and Web of Science (WoS) for papers published between 2010 and 2018 with a subject (TS) that included one of the following combinations: “TS= (GAMIF* AND MARKETING) OR TS= (GAMIF* AND "MOBILE MARKETING") OR TS= (GAMIF* AND "DIGITAL MARKETING") OR TS= (GAMIF* AND SMARTPHONE) OR TS= (GAMIF* AND TABLETS) OR TS= (GAMIF* AND ELECTRONIC DEVICES) OR TS= (GAMIF* AND E-COMMERCE) OR TS= ("GAME-BASED MARKETING") OR TS= (GAMIF* AND ONLINE) OR TS= (GAMIF* AND CONSUMER DECISIONS)". We selected the keyword “Marketing” because it summarizes all the studies in the field of consumer purchases and online consumer decisions while focusing on the literature that had empirically measured the impact of gamification techniques on consumer decisions [38].
3. This study focused on the literature on gamification and online consumer decisions (4% Scopus and 8.1% WoS). A total of 257 papers (articles and conference papers) were included in the bibliometric

analysis. After eliminating duplicate papers, the abstracts and the reference information on the papers were downloaded in .csv format and imported into the SciMAT tool for bibliometric analysis.

4. Exclusion criteria: This research excluded papers that were not about gamification, gamified systems, funware, or game-based marketing; were not studied in the context of consumer decisions; did not provide empirical research; were not peer-reviewed; were not written in the English language.
5. Inclusion criteria: This research included papers that had empirical research; focused on gamification in the context of online consumer decisions, marketing, digital marketing, mobile marketing, tourism, and services; examined the attributes, elements or mechanisms that influence the consumer's behavior or intention. Thirty-six empirical papers were included and summarized.

3. Results

In this section, the results of the systematic review are presented. First, a bibliometric analysis provides a snapshot of the literature on gamification as related to online consumption. Then the literature was systematically reviewed to address the question of whether or not gamification influences engagement and online consumer decisions. In the third part, future research streams are discussed and proposed.

3.1 Gamification and online consumer decision: A bibliometric analysis

Bibliometrics "is a set of methods used to study or measure texts and information, especially in big datasets." A bibliometric analysis illustrates on a Cartesian plane, the complete overview of the literature and the dominant themes in a given subject [39]. This map allows for the monitoring of a scientific field, the delimiting of research subjects, and the understanding of a subject's intellectual, social, conceptual and cognitive structure [40,41]. This tool has been widely used in several similar bibliometric analyses, for example [42,43].

Figure 1 lays out a strategic map of gamification in the context of consumer decisions on a Cartesian plane, where the X-axis represents the centrality, and the Y-axis represents the density of the related keywords in the analyzed literature. Centrality measures "the degree of interaction of a network with other

networks, and it can be understood as the external cohesion of the network." Density “measures the internal strength of the network, and it can be understood as the internal cohesion of the network” [36, p. 1617].

The diagram shows the conceptual map of the subject analyzed according to the centrality and density that each keyword has. For example, in the upper right quadrant (Figure 1), we find video games, which present high levels of density and centrality, because gamification theory takes elements from video-games for its implementation. The lower left quadrant represents the subjects with low levels of centrality and density, which makes it possible to highlight the issues that require further development and constitutes a future line of research.

In the upper-right quadrant, with high centrality and density, the motor themes identified were 'intelligent tutoring systems,' 'reviews,' and 'video games.' Intelligent tutoring systems adapt games in real-time depending on the player's performance. Reviews are a way for users to share information in gamified systems. Unsurprisingly, 'Video games' emerges as a major theme given that the majority of publications discuss gamification’s roots in video games.

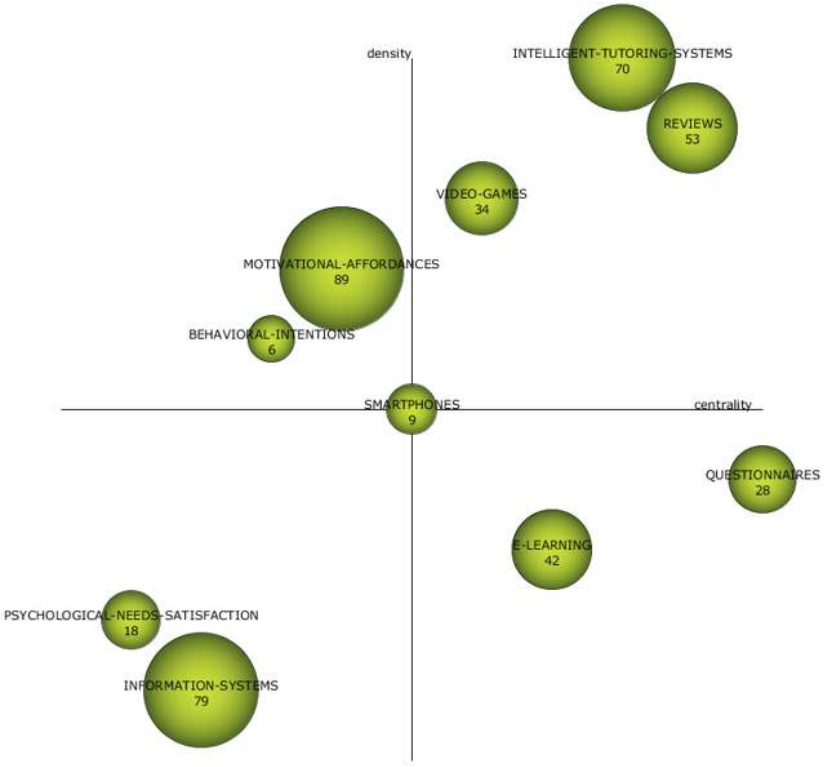

Figure 1. The strategic diagram of gamification and online consumer decisions (SciMAT output).

The upper-left quadrant, with high centrality but low density, features the highly developed but isolated themes 'Motivational affordances' and 'behavioral intentions,' indicating that these are well-developed themes that are marginally related. These themes discuss the psychological perspective of why people are motivated by game content and how intentions are shaped by gamification.

The lower-left quadrant with low centrality and density shows emerging themes. 'Information systems' and 'psychological need for satisfaction' are the themes that need more in-depth research. They have to do with understanding the needs of the users and designing interactive information systems that allow the user to engage with the platform. Information systems deal with how the gamification is organized, how the gamer's data is collected, the game's instructions, and the objectives that make up the context of the game, while 'psychological need for satisfaction' involves the psychology of the user. A gamified system is correctly designed when it satisfies at least one of the three main psychological needs: Competence, Relatedness, and Autonomy [44].

In the lower-right quadrant, with low centrality, but high density, the basic and transversal themes consist of 'E-learning' and 'questionnaires,' indicating that these are the least relevant and most studied themes. This is because gamification is frequently applied to e-learning and has already been extensively studied. In the case of questionnaires, this theme appears in this quadrant because it is the most widely used instrument for data collection, despite criticisms of its validity.

3.2 Gamification: definitions, mechanisms, and main theories

3.1.1 Definitions

Four definitions of gamification were identified as being the most frequently cited (Table 2). These definitions can be divided into two categories; those that emphasize the stimuli (or gamification elements) and those that emphasize the type of response that is elicited. Both Deterding et al.'s [45] and Zichermann & Linder's [25] definitions focus on the game elements and mechanisms respectively, so they can both be categorized as stimuli emphasis, whereas, Hamari et al. [46] and Huotari et al. [47,48]'s definitions focus

more on the experience of the subject than on the process of gamification itself. In this case, systems are not gamified, but rather people engage with something that evokes game-like experiences. In conclusion, gamification can be defined as the process of applying elements of game design to a non-game context, where the interaction between the game mechanisms and personal disposition result in a fun and enjoyable experience.

Table 2. Main gamification definitions, elements and citations.

Definition	Document Type	Elements/Mechanisms	Reference	Cited by[1]
"The use of game design elements in a non-game context" (p. 2)	Proceedings of the 15th International Academic MindTrek, 2011	• Self-representation with avatars. • Three-dimensional environments. • Narrative context. • Feedback. • Reputation, rank, and levels. • Marketplace and economies. • Competition under rules that are explicit and enforced. • Teams. • Parallel communication systems. • Time pressure.	[45]	1,893
"Gamification is a form of service packaging where a core service is enhanced by a rules-based service system that provides feedback and interaction mechanisms to the user to facilitate and support the users' overall value creation" (p. 19)	*Electronic Markets* Proceeding MindTek, 2012. Workshop Gamification, 2011	Systemic conditions: rules, conflicting goals, variable and uncertain outcomes. Experiential conditions: the voluntary involvement of player/users. The responses included hedonic pleasure, suspense, and gamefulness.	[47,48]	435
"A process of enhancing services with (motivational) affordance in order to invoke gameful experiences and further behavioral outcomes" (p. 3026).	47th Hawaii International Conference on System Science	Affordance: points and leaderboards, achievements/badges, levels, story/theme, a clear goal, feedback, rewards, progress, challenge.	[46]	973
"The process of game-thinking and game mechanics in order to engage the user and solve problems" (p. xiv) Funware: "the application of game mechanics to everyday situations" (p. 14).	Book	Points, and levels, leaderboards, badges, onboarding, challenges and quests, social engagement loops, customization, gaming the system, agile and gamification design, empty bar problem, and dashboards.	[25]	236

[1] According to Scopus, May 21, 2019

3.1.2 Elements and Mechanisms

The literature reviewed uses the concepts of elements, mechanisms, and mechanics [38,49] indistinctly. As Table 2 shows, the inclusion of game elements and mechanisms are essential to the definition of gamification. However, many definitions use the terms mechanics and elements interchangeably when in reality they are two different concepts.

In an attempt to clarify this distinction, Liu, Santhanam, and Webster [50] proposed a new taxonomy defining *gamification objects* as "the basic building block of a gamified system, which typically include items, characters, scripts, visual assets, and so on" and *gamification mechanics* as the game rules. This taxonomy is useful to the design of gamified systems but fails to provide a theoretical explanation of how the interactions between elements, themes, mechanics and gamer experience constitute a successfully gamified system.

In this paper, mechanisms are considered the systems that explain why and how the combination of elements (*objects*), rules (*mechanics*), and gamer characteristics can result in a gameful experience [51]. For example, Li [52] studied whether gamification would result in increased adoption of the new Starbucks application. Points and badges (game elements/objects) were given to users who switched from their traditional CRM card to the new Starbucks app. The results showed that the use of these gamification elements caused an increase in app adoption. In this case, the gamification elements (*objects)* are points and badges, and the gamification *mechanism* that accounts for the behavioral change is the *reward*.

Reiners and Wood [53] argued that there are two kinds of gamification; reward-based and meaningful. Reward-based gamification is a system designed to condition a behavior by "adding Badges, Levels/Leaderboards, Achievements, and Points to a real-world setting" (p. 2). This kind of gamification is considered extrinsic motivation, and while it has a short-term effect on user behavior when rewards stop, the behavior also stops [54]. On the other hand, meaningful gamification is considered intrinsic motivation and is associated with "transformative learning, where learners connect experience to previously held beliefs, which can allow the transformation of those beliefs and long-term change" [50, p. 4].

Nicholson [55] affirmed that gamified systems can become a source of intrinsic motivation if they include six elements: play, exposition, choice, information, engagement, and reflection. These elements can satisfy the three psychological needs established in the Self- Determination Theory (SDT) [53].

According to the literature revised here, gamification processes must have one or more of the following elements: points, levels, leaderboards, achievements/badges, story/themes, and avatars. Points are rewards that are either symbolic or can be redeemed for money or products. Levels are increasingly difficult contexts that, depending on the gamer's performance, can be reached or unlocked. Leaderboards contain information about the performance of other participants, which permits social comparison [38]. Badges are symbolic distinctions for participants when they reach levels [56]. The story/theme is the background of the game that permits the participant to perceive the context and, avatars are the self-representation of the participants [55].

In order to increase the effectiveness of the implementation of gamified systems, the literature reports the use of mechanisms such as feedback, competition, rewards, challenges, social engagement and rules [45,46], as necessary conditions; there also need to be certain conditions inherent to the system such as voluntary participation and challenging objectives [46].

3.1.3 Gamification Theories

Twenty-three (23) out of the 36 papers that were analyzed did not include any theoretical perspectives. The other 15 papers (Table 3) attributed the effects of gamification to one or more of the following theories: SDT, Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), Social Influence, and Flow Theory.

Table 3. Main gamification theories.

Theory	Description	Subject	Papers
Self-Determination Theory (SDT)	A motivational theory that is based on the assumption that "people have an inherent growth tendency and innate psychological need that is the basis of their self-motivation and personality integration." According to this theory, there are three kinds of psychological need: competence (to make changes to the environmental and to attain valued outcomes), relatedness ("sense of belongingness and connectedness to the persons, group, or culture disseminating a goal"), and autonomy ("internal perceived locus of causality") [55, p. 64]. Only when these needs are satisfied can a person experience well-being and mental health. This theory establishes that are two types of motivation: extrinsic and intrinsic.	Psychology	[18,19,58–60]

Technology Acceptance Model (TAM)	This theory establishes, as the determinants of computer acceptance, "perceived usefulness" (U) and "perceived ease of use" (EU). U is "the prospective user's subjective probability that using a specific application system will increase his or her job performance." EU "refers to the degree to which the prospective user expects the target system to be free of effort." [59, p. 985].	Computer Science	[55,62–64]
Theory of Planned Behavior (TPB)	This theory states that the "intention to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior, subjective norms, and perceived behavioral control" [63, p. 179].	Psychology	[49,63]
Flow Theory (FT)	This theory holds that an optimal experience with something is "when a person perceives that the environment contains high enough opportunities for action (or challenges), which are matched with the person's own capacity to act (or skills). When both challenges and skills are high, the person is not only enjoying the moment, but they are also stretching his or her capabilities with the likelihood of learning new skills and increasing their self-esteem and personal complexity" [64, p. 816].	Psychology	[64,67]
Social Influence (SI)	Three main theories on social influence were identified: • The Theory of Social Comparison Process (TSCP) "social influence processes and some kinds of competitive behavior are both manifestations of the same socio-psychological process and can be viewed identically on a conceptual level. Both stem directly from the drive for self-evaluation and the necessity for such evaluation being based on comparison with other persons" [66, p. 136]. • SDT, described above, while not explicitly a social influence theory, does address social influence, primarily because of the *relatedness* need. People need to be part of a community) [44]. • TPB, *subjective norms,* "refers to the perceived social pressure to perform or not to perform the behavior." [63, p.188].	Psychology	[49]

The *Self-Determination Theory* is frequently used in the literature of gamification to try to explain why gamification is effective in engaging the consumer. According to SDT, people have three basic psychological needs: competence, autonomy, and relatedness. When these needs are satisfied, people experience satisfaction and well-being [69]. Deci and Ryan [44,70] pointed out that these three needs are associated with intrinsic motivation.

Intrinsic motivation "describes the natural inclination toward assimilation, mastery, spontaneous interest, and exploration which are so essential to cognitive and social development. It represents a principal source of enjoyment and vitality throughout life" [55, p. 70]. Extrinsic motivation "refers to the performance of an activity in order to attain some separable outcome" [55, p. 71].

According to this theory, people are influenced by both intrinsic and extrinsic motivations. The more intrinsically motivated a consumer is, the greater the control they have over their behavior and the more self-determination they will feel.

From the point-of-view of Self-Determination Theory, gamification could be considered extrinsic motivation, where obtaining points, badges, or other rewards explains why people engage in gamifying activities [19,53,71]. Nonetheless, some authors argued that these kinds of rewards can become a form of intrinsic motivation [58,72]. For example, Kim et al. [58] proved that using feedback as an implicit reward more effectively increases the implicit motivation to engage in a loyalty program than explicit rewards such as points. Olsson et al. [59] demonstrated that the use of gamified systems increases the engagement with an application; this behavioral change was attributed to the effect of intrinsic motivation.

According to the *Technology Acceptance Model (TAM)*, people will engage with the application, product or service website as long as it is useful and easy to use. Learning a new way to do something is always difficult because people tend to resist change; however, if companies make their electronic commerce platforms simple and user-friendly, then the consumer would try to use the new applications or websites. For example, Ayding [62] found that people have the intention to use a page like Empire Avenue as long as they can learn something about it first and they perceive it as enjoyable. Yang et al. [55] showed evidence that consumers engage with the Oreo cookie game when they find it useful and easy to use.

The *Theory of Planned Behavior (TPB)* is a decision-making theory that defines the factors that predict behavior. According to this theory, all behavior is preceded by an intention, and the intention is determined by the attitudes toward the behavior, subjective norms, and perceived behavioral control. Attitude can be "a favorable or unfavorable evaluation of the behavior." Subjective norms have been defined as the "perceived social pressure to perform, or not, the behavior in question." Perceived behavioral control is the perceived level of difficulty when it comes to performing the behavior [63, p. 188].

This theory has been used in the gamification of consumer contexts to explain the intention of consumers to use gamified products or services. Bittner and Schipper [63] found that TPB can predict the intention to purchase non-gamified products, whereas TAM predicts the intention to purchase gamified products. Additionally, Hamari [49] found that TPB explains how badges can be an effective way to engage the

consumer with a gamified product because they can compare their performance to other players. Subjective norms then push everyone to a better level of performance.

Flow Theory (FT) predicts that activity becomes a better experience if it presents a certain level of challenge without completely surpassing a user's skill level [66]. This explains why a consumer would find interacting with an effectively gamified brand enjoyable and engaging [73]. Berger et al. [67] found that the consumer can become self-brand connected with a brand if its gamification includes high interactivity and optimal challenges.

Finally, *Social Influence* theories analyze "how one person or group affects another's opinions, attitudes, emotions, or behaviors" [72, p. 3]. Hamari [49] found that performance comparison between users of Sharetribe was a mediating factor in the effect that badges had on the frequency of use of this website.

3.2 Does gamification matters in online consumer decisions?

We looked for studies that empirically analyzed the effect of gamification on online consumer decisions. In this section, a summary of the influence of gamification on consumer brand engagement is presented.

Table 4 synthesizes the findings of the literature regarding the influence of gamification on consumer behavior. Thirty-six papers were found to have empirical evidence regarding which game elements and in what contexts gamification influences consumer behavior in terms of engagement, loyalty, or purchase intention. Twenty-nine (82.8%) of these papers present evidence that gamification has a significant, positive influence on consumer behavior while four papers found that gamification's influence is relative, meaning that the influence was mediated by other variables. The last two papers did not conclude that gamification had any influence.

The primary mechanisms that can be credited with gamification's influence on consumer decisions are rewards, challenge, meaningfulness, social influence, assessment, and interactivity.

The literature reports two types of rewards that the consumer can obtain in a gamification context as a result of performing the "correct" behavior: symbolic and social. Symbolic rewards may be points that are redeemable for money or products. Badges and leaderboards are the most common form of social

recognition or social influence, and they can be obtained by reaching a certain level of performance [19,52,58,75–80].

When it comes to e-learning, challenging and meaningful mechanisms increase engagement to the same extent that the system allows them to acquire or perfect a skill [81]. However, gamification in consumer contexts defines the concept of "challenging" as "activities or actions which provide opposition to be overcome by the player" [80, p. 287], and "meaningful" as activities that are useful or gratifying in their own right. Therefore, in the online consumer decision context, being challenging is associated with game elements such as competition, levels, goals, and tasks [59,83–85], and being meaningful is associated with interactivity, aesthetics, functionality, control, and platform [82]. Both mechanisms are considered reward-based gamification.

Social influence mechanisms that enable consumers to compare their performance with other players, such as leaderboards or ratings, can account for increased consumer engagement [49]. Similarly, assessment and interactivity mechanisms also elicit increased engagement, the former, because the consumer feels that they are being evaluated and the latter because interaction with the system and with other participants gives them the feeling that they have control over their performance [86,87].

Two papers reported that gamification lacks a significant direct influence on consumer decisions. In both cases (Table 4), an experimental online design was used. Högberg, Shams, & Wästlund [71] performed an experiment in which consumers used a mobile application while shopping in a brick and mortar store in order to assess the influence of mechanisms such as rewards and challenges (quizzes, time limits, feedback, hunting for offers) on the engagement with the store brand in general, and especially on their purchasing decisions regarding the promoted products. They found that gamification only influenced consumer decisions when the user truly became engaged with the application. Hamari [49] conducted an experiment designed to evaluate the influence of badges on the frequency of use of the Sharetribe platform. He did not find that a significant direct influence resulted from the use of this particular reward mechanism. However, he proved that allowing each of the participants to compare their performance with others had a significant influence on the use of the website's services.

Although these conclusions have only been drawn from two papers, it suggests that gamification may not be effective in every context and that more research on the effects of gamification as applied to consumer decisions is needed, using a variety of products, game elements-mechanisms, and methodologies.

Table 4. Empirical evidence of gamification's influence on online consumer decisions.

Authors	Mechanisms	Gamification elements	Methodology	Context	Response	Results	Gamif. Matter[2]
Xi and Hamari [18]	Immersion, Achievement, Social Influence	Avatars, badges, points, virtual currency, progress bar, levels, leaderboards, task, social network	Quantitative: survey	Xiaomi and Huawei online communities	Intrinsic needs satisfaction (autonomy, competence, and relatedness)	Achievement and social influence are the two strongest mechanisms that meet the three psychological needs defined by SDT. Immersion does not predict satisfaction of the autonomy need.	Yes
Jang, Kitchen, and Kim [19]	Rewards	Points, badges, leaderboards and social interactions throughout its usage	Quantitative: Longitudinal data	Exercise "Tranggle" App: exercise and purchase behavior	Engagement and purchase	Epistemic, social and personal integrative benefits are positively associated with engagement and the purchase of the app. The relationship is moderated by age and experience.	Yes
Liu and Tanaka [88]	Rewards, Challenge	Points, rewards and competition	Experiment	Game-like shopping experience	Increase in the consumption of eco-friendly goods	Including points and levels elements in a game-based system increases the consumption of environmental products.	Yes
Mulcahy, Russell-Bennett, Zainuddin, and Kuhn [83]	Challenge	Hedonic design elements: challenge, character, feedback. Transformative design elements: behavior monitoring, virtual training	Mixed method: focus group and survey (497)	Apps promoting healthy and environmental consciousness	Satisfaction, knowledge and, behavioral intentions	Significant influence from the game design elements on satisfaction, knowledge and behavioral intentions. The influence was differential according to the type of game.	Yes
Högberg, Shams, and Wästlund [71]	Rewards, Challenge	Quiz, rewards, hunt for an offer, feedback, time limit, visual feedback, haptic feedback, other's responses, 50/50	Experiment on a real store	Apps in smartphones. Shopping in a real store.	Engagement, fixation on the target product, choice.	The hypothesis that gamification influences the choice of a target product was not supported. Gamification only had an influence when users became genuinely engaged with the application.	No
Berger, Schlager, Sprott, and Herrmann [67]	Interactivity, Challenge	Launch, interactivity and the challenge of a gamified interaction.	Experiment	67 games. Automobile and financial services.	Emotional and cognitive brand engagement; self-brand connection (daily likes of a brand network profile)	Games that are highly interactive and optimally challenging lead to increased emotional and cognitive engagement and strong connections to the brand. Conditions under which the consumer did not become engaged with the brand were: restricting control and time pressure.	Yes
Li [52]	Rewards	App	Quantitative: Survey 329	Starbucks membership card and app	Switching from membership card to the app	Gamification motivated the consumer to switch from the membership card to the Starbucks app.	Yes

[2] The research shows that gamification has a positive influence (matters) or a negative influence (does not matter) in the study.

Table 4. (Continued).

Authors	Mechanisms	Gamification elements	Methodology	Context	Response	Results	Gamif. Matter
Dietrich, Mulcahy, and Knox [82]	Rewards, Challenge, and Meaningful	Achievements, badges, feedback leaderboards, points, progress rewards; competition, goal, level, task; interactivity, aesthetics, functionality, control, equipment.	Experiment, Survey	Games: Dumb Driver; Perfect Pour; Alcohol Trivia	Level of preference	Meaningful game characteristics were preferred over reward game characteristics.	Yes
Nour, Rouf, and Allman-Farinelli [76]	Rewards	Ranking, feedback, and badges.	Mixed method	Vegetable consumption in young adults	Increased motivation to consume vegetables. Increased use of the application	An app that tracks users' vegetable consumption and rewards them with personalized reports on the benefits they reap for having eaten well is useful for increasing vegetable intake.	Yes
Hsu and Chen [80]	Rewards	Badge	Quantitative: Survey	E-book retailing	Hedonic value, utilitarian value, satisfaction, brand love	Desirable consumer behaviors like brand love and satisfaction are explained by gamification activities in marketing, emphasizing hedonic and utilitarian value.	Yes
Ayding [62]	Meaningful	N/A	Quantitative: Survey	Empireavenue.com	Intention to use gamified systems	Age and gender moderate the relationship between usefulness, ease of use, perceived enjoyment and the intention to use the gamified system.	Yes
Meder et al. [89]	Rewards	Tangible vs. intangible rewards	Experiment	Mobile e-commerce application	Application user activity.	Rewards have a significant influence on user activity. Tangible rewards increase activity more than intangible ones.	Yes
García-Jurado et al. [64]	Rewards	Points, badges, and leaderboards	Quantitative: Survey	Amazon.es	Intention to use e-commerce platform (Amazon); flow.	Gamification elements (points, badges, and leaderboards) do not have a significant, direct influence on consumers' intention to use the e-commerce platform; this relationship was mediated by flow in Millennials.	Relative No
Poncin, et al. [84]	Challenge	Challenge, fantasy	Experiment	Collaborative design of new laptop bag in an online smart store.	Control, challenge, arousal, consumer experience	Gamifying the consumer experience with challenges and fantasy is a necessary condition, but it is not enough to enhance the quality of design of the laptop bag.	Relative Yes

Table 4. (Continued).

Authors	Mechanisms	Gamification elements	Methodology	Context	Response	Results	Gamif. Matter
Leclercq, Poncin, and Hammedi [90]	Meaningful, Challenge	Cooperation and competition	Mixed methodologies	Real online platform for the design of new products or services.	Ideas/design submission; writing reviews, name submissions, voting.	Four profiles of participants were identified according to the level of engagement and their participation in the co-creation activities: competitors, cooperators, coopetitors, and invisible users.	Relative Yes
Liang et al. [77]	Rewards	Badges and price	Quantitative: Econometrics Model	Airbnb "Superhost" badge	Accommodation's review volume and ratings	Hosts with a "Superhost" badge are more likely to receive reviews, while more expensive accommodations had a lower volume of reviews. Additionally, the badge has a positive effect on the guests spending more on accommodation.	Yes
Kim and Ahn [58]	Rewards	Explicit or implicit rewards, visual feedback.	Quantitative: Survey	A loyalty program for Starbucks	Intrinsic or extrinsic motivation to engage with a loyalty program	Groups with salient rewards were less motivated to engage in loyalty promotion than groups without salient rewards. In the context of gamification where feedback was given via a progress bar, intrinsic motivation was high.	Yes
Rodrigues, Costa, and Oliveira [91]	Meaningful, Interactivity	Design, easy-to-use, information, webpage characteristics	Quantitative: Survey		Intention to use e-banking	Gamification and ease of use have a significant, positive influence on the intention to use e-banking websites.	Yes
Nobre and Ferreira [92]	Meaningful	N/A	Qualitative: Semi-structured interviews and a focus group	Gaming	Consumers' motivation to engage in gamified experiences	Gamification can be a marketing tool for brand value co-creation where the consumer may engage with a brand. Moreover, practitioners can access reliable consumer data on the consumer profile, preferences, trends, and new product opportunities.	Yes
Yang, Asaad, and Dwivedi [55]	Meaningful, Rewards	Perceived usefulness, ease of use, social influence, enjoyment	Mixed methodologies, Questionnaire	"Oreo: Twist, Lick, Dunk" game	Consumers' intention to engage in the gamification process; brand attitude	Perceived usefulness and enjoyment have a significant influence on the intention to engage and brand attitude.	Yes

Table 4. (Continued).

Authors	Mechanisms	Gamification elements	Methodology	Context	Response	Results	Gamif. Matter
Hsu, Chen, Yang, and Lin [87]	Interactivity, Meaningful	Website features (utilitarian, hedonic)	Quantitative: Web-based Survey	Recycling	User attitude and behavioral intentions	Web features have a significant influence on consumer attitude and the behavioral intention of recycling. This influence is mediating by user experience and attitude.	Yes
Mitchell, Schuster, and Drennan [93]	Challenge, Interactivity	Variable difficulty levels, player choice and, dynamic feedback.	Between-subject experiment	App designed to encourage walking	Walking behavior over time	Gamification can facilitate the initial behavior change and the maintenance of this behavior change. However, it does not have a real influence on intrinsic motivation to perform the walking behavior.	Yes
Baptista and Oliveira [79]	Rewards	Points, reward, prices	Quantitative: Survey	Mobile banking services	Behavioral intention; use behavior.	Gamification has a significant influence on behavioral intentions to use mobile banking services.	Yes
Olsson et al. [59]	Challenge	Challenge, progress, radar	Quantitative: Experiment	App designed and used to find images in a retail store	Intrinsic motivation, satisfaction and, intention to use	Gamification and consumer experience have a positive influence on intrinsic motivation, satisfaction, and intention to use.	Yes
Gatautis et al. [56]	Rewards, Assessment	levels, points, feedback/rewards, achievement/badges, leaderboards	Quantitative: Survey	Lithuanian consumers	Consumer brand engagement: cognitive, emotional, and behavioral.	A weak correlation between game elements and consumer brand engagement. They found cognitive engagement.	Relative Yes
Xu et al. [94]	Challenge, Assessment	N/A	Qualitative: Focus Group.	Gamification in tourist destinations	People give reasons for people using games at tourist destinations.	Curiosity, explore the destination, socialize, fun and fantasy experiences, challenges and achievement.	Yes
Sigala [78]	Rewards	Points, badges, leaderboard and social interaction throughout its usage	Quantitative: Survey	TripAdvisor	Experiential value, trip planning, trip experience	The website task and Facebook social graph were the gamified elements that produced the most engagement from TripAdvisor users.	Yes
Harwood and Garry [95]	Challenge, Rewards	Challenge, task, rewards, badges, leaderboards, win conditions	Mixed methodology	Samsung Nation Website	Consumer engagement: behavioral and emotional	Gamification mechanisms that can influence consumer engagement are intrinsic/extrinsic rewards, relationship, loyalty, subversion (repeat interaction).	Yes

Table 4. (Continued).

Authors	Mechanisms	Gamification elements	Methodology	Context	Response	Results	Gamif. Matter
Bailey, Pritchard, and Kernohan [86]	Assessment	Framework, rule, layout. Soft and hard gamification survey	Quantitative: Online Survey	Consumer shopping habits	Consumer engagement and data validity	Gamification increases participant engagement in both scenarios, but for open questions, the soft gamification scenery was more reliable.	Yes
Insley and Nunan [85]	Challenge	Competition between: - Retailers and other consumers in the price of clothing. -Against other shoppers. -Against the retailers' policies -pricing games	Qualitative: Observation, Semi-structured in-depth interviews.	Fashion clothing	Entertainment experiences from partaking in online shopping	Shopping is itself an entertainment activity that reports emotional benefits such as excitement when the product is delivered, and the hedonic rewards are a distraction, self-justification, and self-gift.	Yes
Ziesemer, Müller, and Silveira [60]	Meaningful, Rewards	Tangible-Intangible rewards: points or reputation	Quantitative: Survey	Online shopping	Reasons for rating purchased products (recommendation)	People rate products when it does not meet their expectations (positive or negative). People do it for tangible rewards.	Relative Yes
Bittner and Shipper [63]	Meaningful, Interactivity	Flow, enjoyment and perceived usefulness	Quantitative: Online Survey	Digital games	Purchase intentions, intrinsic and extrinsic motivation	TPB theory (attitudes, subjective norm, and perceived control) explains the purchase intention of everyday goods. Enjoyment and flow were the mediators between motivation incentives and purchase intentions.	Yes
Wen et al. [75]	Rewards	Rewards, leaderboards	Quasi-experimental	Marketing campaign app	Engagement and purchase	The gamification mechanisms influenced engagement with the app and purchase behavior.	Yes
Xu et al. [94]	Challenge and assessment	N/A	Qualitative: focus group.	Gamification in tourist destinations	Why do people use games at tourist destinations?	Curiosity, explore the destination, socialize, fun and fantasy experiences, challenges and achievement.	Yes
Conaway and Garay [96]	Reward, Interactivity	Progress paths, feedback, and rewards, social connection, the attractiveness of the website	Quantitative: Survey	Business websites	Consumer engagement with the website	They found that the mechanisms of competition and fun were related to the visual design of the website, and challenges and competitions with progress bars.	Yes
Hamari [49]	Rewards, Social Influence	Badges	Quantitative: Online experiment	Sharetribe in a university.	Service use: trade proposals posted, number of transactions, and page views.	The use of badges as a gamification mechanism did not cause increased use of the website's services.	Relative No

4 Limitations, discussion, and conclusions

The overall objective of this study was to analyze the literature on gamification as applied to online consumer decisions. The research was limited to the literature on gamification available in the databases Scopus and Web of Science. Other related literature published in newspapers or other databases such as Google Scholar was omitted to avoid the inclusion of papers that had not been peer-reviewed. Furthermore, a search of the Google Scholar database did not reveal any unique records. The research did not include gamification in other subjects like education, health, and environment. However, comparing the gamified elements that work in different subjects could prove to be an exciting research project.

The main conclusions were the following.

1. *Does gamification matter*: Twenty- nine (29) out of thirty-six (36) papers presented evidence that gamification has a significant and positive influence on online consumer decisions (Table 4). Four (4) papers showed a relative influence or that the influence is mediated by other variables such as user profile [90], consumer experience [84], user implication [56], or user expectation [60]. Three (3) papers did not demonstrate a positive influence of gamification on online consumer decisions [49,64,71].

   The literature analyzed presents evidence of the influence of gamification on the online decision-making process. Engagement with apps, attitudes toward products or brands, and purchase or use intentions are among the consumer decisions that were studied. The most common gamified systems used to study this phenomenon were mobile apps, e-commerce, downloaded games and online communities centered on technological brands.

   Gamification's influence on online consumer decisions is explained, primarily, by the reward mechanism. In other words, consumers are willing to participate in the game if, and only if, they earn a reward in return, whether it is symbolic or real, meaning they can cash it in for money or products [97]. However, the use of other types of symbolic recognition, such as badges or leaderboards are elements of gamification that could explain why consumers are willing to engage with brand

communities. These elements allow them to compare their performance with others, imitate their behavior, or gain social recognition. In this case, social influence is the gamification mechanism that explains this behavior. This use of other types of gamification mechanisms can allow companies to overcome the limitations of the traditional point systems in loyalty programs [27].

The review: 36 of 257 documents were retrieved from the consulted databases that present empirical evidence on the influence of gamified systems on consumer decisions. The remaining 221 documents, although they included the term "gamification" and are within a consumption context, did not study how they interact and affect consumption decisions. The above poses the challenge of studying in greater depth the combination of elements and mechanisms of gamified systems that explain their influence on the decision making of online consumption.

2. *Theoretical foundations*: The theories most frequently cited to explain gamification's influences were the Self-Determination Theory and the Theory of Planned Behavior; both of them are psychological theories. However, only 15 out of 36 papers adopted a theoretical perspective in their research. Four main definitions of gamification were found in the literature review. Two of them emphasize stimulus and its influence on consumer behavior and attitude [25,45]. Meanwhile, the other two emphasize consumer experience [46–48]. Finally, the most frequent mechanisms were rewards (points, badges, and feedback), challenges, interactivity, and meaningfulness.

   In addition to more empirical studies, the subject requires more theoretical development to explain its nature and how it operates. Using psychological theories about human motivations may allow this existing theoretical void to be filled. The consumer is an individual with needs, desires, and frustrations that requires understanding to design products and services according to their nature. Gamified systems allow us not only to study consumer needs in greater depth but also to satisfy them in a differentiated way. Explaining why the reward is the main driving force behind gamification influencing consumer decisions is a challenge to overcome for researchers and practitioners of consumer behavior.

3. According to Deci and Ryan [44], people have three fundamental psychological needs: autonomy, competence, and relationship. How is the reward-related to these three needs?

In conclusion, gamification influences the way we make consumption decisions. This influence is explained, mainly, by the mechanism of reward, challenge, meaningful, and interactivity. Likewise, in theoretical terms, SDT and TPB are the theoretical developments most frequently used to explain this relationship. These are both psychological theories that study human motivations and they suggest that gamification in consumption scenarios often deals with more than just basic needs. What other needs does gamification supply? These are relevant questions that must be answered.

5. The future of gamification and online consumer decisions

The analysis of the literature on gamification in this paper has focused on answering the following research questions: 'Do gamified systems influence online consumer decisions and, if so, which elements, mechanisms, and theories explain its influence? Furthermore, our results suggest four future lines of study that require more empirical research on gamification as applied to online consumer decisions.

Following, the future research agenda on gamification applied to online consumer decisions are presented. The agenda was organized into Thematic, Methodological and Theoretical agendas [17].

5.1 Thematic agenda

The results of the literature review showed that the Reward is the most studied gamification mechanism. This is explained by the widespread use of rewards programs in the traditional customer loyalty strategies implemented by entrepreneurs. However, although this strategy has proven to be effective in stimulating demand in the short term, it has generated many doubts about its effectiveness in the long term [27]. Therefore, future research should include other mechanisms of gamification and empirically contrast their effectiveness in establishing relationships with the client over time.

The above should help us establish the motivators that can explain why a consumer engages with a product or brand. According to the Self-Determination Theory, people have three fundamental

psychological needs: Autonomy, Competence, and Relatedness. Therefore, it is clear that in a commercial exchange they seek more than direct or symbolic rewards.

Theme 1: **Future research should incorporate other mechanisms, apart from Rewards and Challenges, such as Social Influence, Meaningful, and Interactivity to establish its impact on consumer decisions.**

The current consumer has greater access to information and therefore greater tools for making consumption decisions. The consumer seeks to satisfy higher needs such as belonging to significant social groups and other social needs. It is thus necessary to analyze social order mechanisms to understand how the virtual communities that social networks have shaped are impacting social consumption behavior.

Theme 2: **What role do the psychological characteristics of users play in the effectiveness of implementing gamified systems in consumer contexts?**

The theoretical foundation of gamified systems in e-commerce needs to be improved and empirically tested. For example, are the three psychological needs described in the SDT approach satisfied by gamified systems? Is each type of user motivated by the same need?

There is literature that demonstrates the importance of personal characteristics in consumer decision-making [98]. How do these psychological profiles interact with the group to shape buying behaviors [99]?

In the game literature, five-player profiles have been identified. Each of them is determined by the player's primary motivation for playing, and all of them correspond to psychological profiles; *achievers* play to win, to gain a reward, or to reach high-performance levels, *socializers* want to make new friends and *explorers* want to discover different aspects of the game (dynamic, objectives and context). *Killers* want to perform better than anyone else and *naïve* people do not have a specific objective or motivation [100].

These personal characteristics can determine or moderate the gamer's performance and encourage them to engage in gamification in the context of consumer decisions [5]. For example, participants with achiever or killer characteristics could be much more likely to invest time and resources in the gamification context because they are seeking material gains or symbolic rewards. Conversely, explorers

or socializers could be more apt to become frustrated with gamification because they are just looking for fun or to make new friends.

The question is, do gamified systems work differently depending on the psychological profile of the user?

5.2. Methodological agenda

The results of the literature review of studies on gamified systems in consumer contexts have allowed us to show that there is a body of empirical literature that has analyzed the influence of gamification elements in consumption decisions. The methodologies used include experiments, surveys, qualitative research, mixed methods, and only one longitudinal study.

Considering that new technologies allow us to not only collect but to analyze large volumes of data with analytical tools, the development of research with broader time horizons should be explored in the field of gamification in e-commerce.

Theme 3: **Future research should include the time variable in their studies to establish how consumer behaviors and decisions change in extended gamification applications over time**.

Gamification, as applied to online consumer decisions, is designed to engage with the consumer in a specific context and within a limited period. However, the investment made in gamification is part of a business strategy to build long-term customer loyalty. Therefore, further analysis is needed to see if, and how long-term, gamification campaigns for products or services can be effective. Will the consumer, who is a part of the gamification campaign, continue to be loyal to the product when the reward or game is over?

When explaining the extrinsic and intrinsic motivation, the SDT warns that extrinsic motivation (when people do something to obtain a reward) is not effective in the long term because without a reward the behavior ceases [70]. Despite this risk, only one research study that used a longitudinal methodology was found. Jang et al. [19] spent two years analyzing the behavior of an online brand community and found that the intention to continue to be part of the community was explained by gamification elements, such as points, leaderboards, and badges. The best predictors of this behavior, however, were the social benefits,

the feeling of belonging and connectedness. Therefore, more research needs to be done to study precisely which gamification mechanisms are effective in eliciting the desired behavior in the long run.

Theme 4: **Can gamified systems be vehicles for implementing online experiments in social science and for product testing before launch?**

The majority of Social Science research uses a quantitative methodology and questionnaires to collect the data [43]. The result of the systematic revision has shown that 16 of 36 empirical paper (See Table 4) implemented quantitative methodologies with surveys to test the hypotheses; 9 experiments, 5 mixed methodologies, 3 qualitative methodologies, 1 longitudinal study, 1 econometric model, and 1 quasi-experiment.

By using gamification, it is possible to implement online experiments to analyze how much one or more variables influence consumer behavior. Using gamified systems, consumer behaviors such as product choice and stickiness (the time spent on the platform and the number of repeated visits per user, etc.) can be measured directly [101], and the Likert scale and questionnaire instrument, which has many limitations and validity problems, can thus be phased out [102].

This tool can allow practitioners to perform trials of new designs or services inexpensively before launching a new product, thus reducing overall cost. Furthermore, the data that can be collected through gamification and stored in servers online can also serve as a rich source of information for practitioners to analyze and take management decisions [103].

5.3 Theoretical agenda

What explains why a user engages with gamified systems when making their consumption decisions? The results of the gamification literature review do not provide an answer to that question.

We found that 15 of the 36 papers analyzed focused on theoretical issues. The rest are limited to empirical studies of gamification elements and their influence on the modeling of consumption behaviors, without delving into the psychological or sociological determinants of those behaviors.

Theme 5: **Future research should analyze which psychological or social determinants explain that people find a gamified system attractive and engaging when making online consumer decisions**.

The results of the review showed that Self-Determination Theory was the theoretical explanation most often used to answer this question. This theory postulates that people experience well-being if they manage to fulfill three basic psychological needs (Autonomy, Competence, and Relatedness). The question is, can gamification meet some or all of those needs?

Moreover, what other explanations, from a more sociological perspective, could explain its effectiveness, especially in virtual social communities?

Theme 6: **Which elements of gamification, incorporated in gamified systems, have the greatest impact on the information systems that consumers consult to make their online consumption decisions?**

Research on gamification applied to online consumer decisions necessitates a multidisciplinary approach [37,88]. It must incorporate psychological theories on human motivators to determine which elements and mechanisms work best in a game context to program those elements and design an information system that is interactive, enjoyable, and useful. It is not enough to determine which elements work in gaming contexts, but rather the entire gamified ecosystem must be understood in order to design systems that respond to users' psychological needs, fulfill technological requirements, and meet organizational objectives. E-commerce demands that "instrumental outcomes" be transformed into "experiential outcomes" [50], and that customers are provided with a tangible experience.

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