



Game on! A state-of-the-art overview of doing business with gamification

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ABSTRACT

Gamification is the act of applying game-design elements to transform activities, products, services, and systems in a way that provides the kind of experiences similar to those offered by games. These elements include badges, points, and leaderboards to motivate and reward problem solving activities and processes. Both businesses and business researchers are increasingly interested in the application of gamification. In this regard, this review aims to offer a state-of-the-art overview of gamification in business, revealing its current trends and future directions. Using business research on gamification published in the last decade (2012–2022) found on Scopus and Web of Science, we conduct a performance analysis to illuminate the field's performance (publication productivity and impact) alongside its key contributors (journals, authors, and countries) as well as a science mapping using a co-citation analysis to locate knowledge foundations, and bibliographic coupling and keyword co-occurrence analysis to reveal major themes in business gamification. Our exploration has unearthed gamification's pervasive influence across business domains, from enhancing *learning* and fostering *innovation* to empowering *marketing* strategies and catalyzing *transformation*. Gamification has also made significant inroads into *management* practices, driving *engagement*, influencing *behavioral outcomes*, and ushering *sustainability*. Peering into the future, our density-centrality quadrant analysis casts light on emerging frontiers. Noteworthy, we expect the next wave of gamification to be shaped by the allure of *video games* and the *metaverse*, bespoke *industry-specific designs*, confluence with *e-commerce* trends, emphasis on *sustainable development*, expanded *social responsibilities*, innovations in *virtual reality*, intersections with *human urbanism*, and the rise of *smart cities*. As gamification continues to integrate and reshape myriad facets of the business world, it holds the promise of not only enriching current practices but also charting the course for the future of innovative, sustainable, and transformative business strategies.

1. Introduction

In today's crowded and highly competitive marketplaces, companies continually experiment with new ways to enhance their effectiveness and expand their business (Bhaskaran, 2013; Tse and Soufani, 2003). As customers adopt and embrace technology, abundant opportunities arise for businesses to engage with them, one of which is “gamification”.

Gamification is defined as “the intentional use of game elements for a gameful experience in non-game tasks and contexts” (Seaborn and Fels, 2015). Such game mechanics include clear goals, levels, points,

achievements/badges, leaderboards, stories/themes, and rewards, among others. It enhances the overall user experience by fostering intrinsic motivation for the development of specific actions that might otherwise be considered uninteresting or boring (Hamari et al., 2014; Trinidad et al., 2021).

The growth and proliferation of digital platforms, social media, and mobile technologies have led to the rapid spread of the gaming phenomenon (Deterding et al., 2011). Gamification is applied in various non-gaming contexts to connect with users and influence and improve employee and customer behavior (Deterding et al., 2011; Robson et al.,

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2015). These mechanisms produce psychological and behavioral consequences (Koivisto and Hamari, 2019; Sigala, 2015a, 2015b; Su and Cheng, 2015), with essential motivation, connectivity, engagement, and competence (Hamari et al., 2014; Sailer et al., 2017). Since its proliferation in late 2010, gamification has become central to many organizations' efforts to influence engagement, experience, satisfaction, and loyalty. E-commerce platforms like Amazon and Flipkart, along with banks like SBI in India, use gamification as a marketing and engagement tool to attract more customers to use their platforms regularly. According to a report by Markets and Markets (2020), the gamification market size is projected to grow to USD 30.7 billion by 2025. Consequently, many firms are adopting gamification to future-proof their businesses.

As noted by Dymek and Zackariasson (2016), the most cited definition of gamification—applying gaming elements in non-gaming contexts—will continue as a guiding principle in the business world and within industries. While understanding the progression of gamification becomes increasingly relevant and the popularity of gamification is growing, it remains a relatively young area in business research, with few studies investigating the relationship between gamification and business-related variables. This situation calls for a comprehensive study covering the entirety of gamification in business research rather than focusing on fragmented studies. While recent studies have attempted to review the gamification field, they have faced various limitations. For example, Trinidad et al. (2021) review has made use of only a single database while Behl et al.'s (2022) and Swacha's (2021) reviews on gamification focus on learning and education rather than business.

To the best of our knowledge, no review of gamification research has been published in the new normal using more than one database while shedding light on the concept of gamification within a business context. This significant gap limits our understanding of gamification applications in business and thus calls for a new review that would bridge this gap. Bibliometric analysis can potentially address this issue as it is a powerful method for quantitatively and objectively investigating scientific activities based on the content of large corpora of scientific literature (Broadus, 1987; Donthu et al., 2021; Kraus et al., 2022; Lim et al., 2022a; Mukherjee et al., 2022). Therefore, a new review in this direction can contribute towards a state-of-the-art overview of business insights on gamification, revealing its current trends and future directions.

With the above background, the research objectives (ROs) of this study are threefold: the first is to trace the development of gamification in business research (RO1), providing a comprehensive timeline of its journey; the second is to map the intellectual structure of gamification in business research (RO2), unearthing the foundational knowledge and major themes that have shaped the field; and the third is to chart the way forward to advance the scope of gamification in future business research (RO3), identifying novel areas of exploration and practical implications for businesses. Guided by these ROs, we address the following research questions (RQs):

RQ1. *How has the publication (productivity) and citation (impact) of gamification in business research evolved?* This will provide an objective, quantifiable view of the field's growth alongside its influence in the scientific community.

RQ2. *Who are the most productive and impactful contributors to gamification in business research?* By identifying these contributors, we endeavor to spotlight the pioneers and thought leaders, offering a guidepost for influential experts and works on business gamification.

RQ3. *What are the major knowledge foundations used to generate insights on gamification in business?* This question delves into the foundational perspectives and underpinnings that have driven gamification research in business, setting the stage for understanding its thematic development.

RQ4. *What are the current insights on the major themes of gamification in business research?* Following from RQ3, this will provide a detailed exploration of the major themes on gamification that have been explored by business researchers, showing how foundational knowledge has evolved into diverse research topics.

RQ5. *What are the future directions for advancing the scope of gamification in business?* Through this endeavor, we hope to delineate uncharted territories and emerging trends, bridging the gap between academic research and real-world business application.

By addressing these questions, we aim to not only offer a comprehensive overview but also highlight the novel contributions of our review on business gamification, bridging theoretical exploration with actionable insights for both researchers and practitioners. The scope of this review, as espoused through RO1–RO3 and RQ1–RQ5 are in line with the convention of systematic literature reviews relying on bibliometric analysis (Donthu et al., 2021) and the theoretical and practical contributions expected from such reviews (Mukherjee et al., 2022).

The rest of the article is structured as follows: First, we disclose the methodology underpinning our review on gamification in business research, followed by the findings from a performance analysis, which illuminate the field's performance (publication productivity and impact) alongside its key contributors (journals, authors, and countries). Following that, we report the results from our science mapping, which uses a co-citation analysis to locate knowledge foundations, bibliographic coupling and keyword co-occurrence analysis to reveal major themes, and a density-centrality four quadrant analysis to establish future directions. Finally, we conclude with key takeaways and implications from our review for the advancement of the theory and practice of gamification in business.

2. Methodology

2.1. Corpus curation

This study uses bibliographic data from Scopus and Web of Science to explore the application of gamification in business. Scopus and Web of Science are scientific databases that offer the most comprehensive and high-quality collections of science and social science research (Donthu et al., 2021; Paul et al., 2021; Zyoud and Fuchs-Hanusch, 2017). These databases have a thorough coverage of years going back to the 1900s (Goodman, 2007), as well as a more extensive and diverse range of bibliometric information such as authors, countries, institutions, abstracts, citations, keywords, and references of publications (Donthu et al., 2021) for English-language journals (Archambault et al., 2006) for various disciplines in comparison to alternative databases (e.g., Google Scholar) (Donthu et al., 2021). Keeping in mind that gamification is largely a business-driven research area, data is extracted from subject categories “Business, management and accounting” in Scopus and “Business and management” in Web of Science. In order to acquire an exhaustive corpus of bibliographic data on gamification in business, a string of various filters was used. The document search and selection procedure is in line with the PRISMA protocol (Moher et al., 2009) and illustrated in Fig. 1. The search results returned with 647 documents after filtering for duplicates, document type (i.e., article), source type (i.e., journal) and language (i.e., English).

2.1.1. Identification

A total of 11,990 (Scopus) and 8880 (Web of science) documents published between 2012 and 2022 were found in the search using the term “gamification\$”. Specifically, “gamification” is multifaceted, and thus, in order to get the complete collection of documents, a dollar sign to the syntax of the keyword (“gamification\$”) was added to account for homologous terms. This strategy made it possible to cover the topic's complexity in respect to other related keywords.

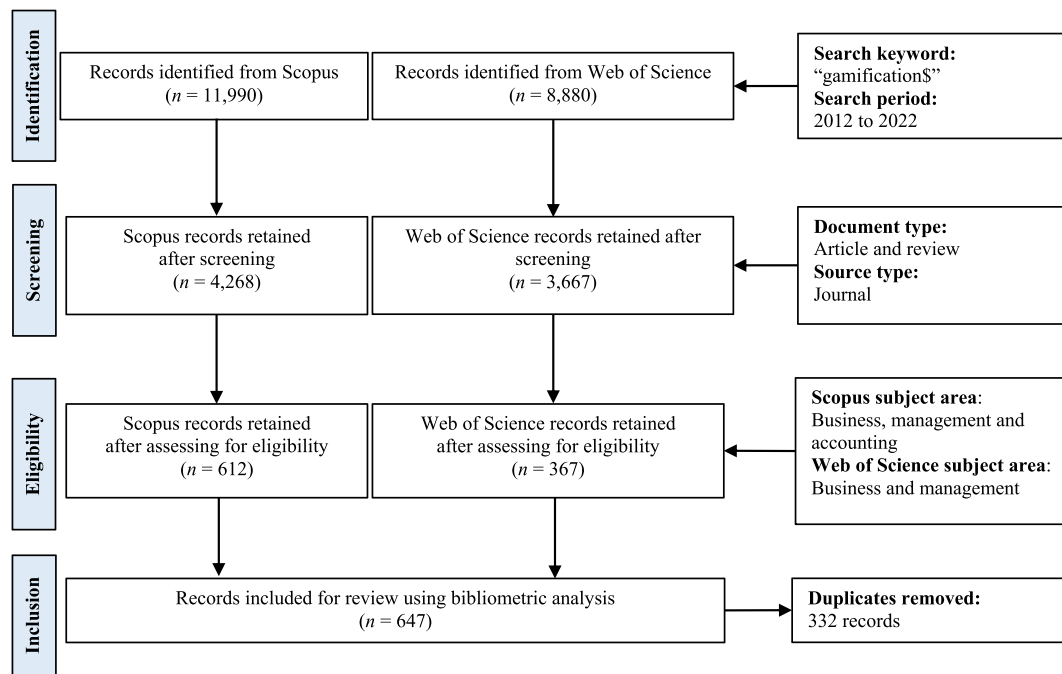


Fig. 1. Review procedure.

2.1.2. Screening

A total of 4268 (Scopus) and 3667 (Web of Science) documents were retained following scholarly filtration. This filtration accounted for document type (i.e., article, review) and source type (i.e., journal). Articles often encompass conceptual and empirical research that shed new insights while reviews tend to provide insights that can only be revealed when a bird's eye synthesis is undertaken and thus they were both included in this study, whereas others such as editorials and notes were excluded as they may not have been peer reviewed (Kraus et al., 2022). Likewise, only journals were included, as other source types such as books tend to be more explanatory rather than exploratory while conference proceedings are typically a work in progress that tend to appear in journals when fully fledged out at a later stage (Archambault et al., 2006; Paul et al., 2021).

2.1.3. Eligibility

A total of 612 (Scopus) and 367 (Web of Science) documents were retained following subject area filtration. Specifically, the documents were restricted to "Business, management and accounting" for Scopus and "Business and management" for Web of Science, which was a necessary step to ensure that the documents retained were relevant to the scope of the study (i.e., gamification in business).

2.1.4. Inclusion

A total of 647 documents were included following the consolidation of documents from Scopus and Web of Science. Therefore, this exercise led to the removal of 332 documents, which were duplicates across the two databases, thereby enabling the study to accurately analyze unique documents on gamification in business research. The bibliographic data of 647 documents were saved in Excel and used in bibliometric software such as Bibliometrix in R (Aria and Cuccurullo, 2017) and VOSviewer (Van Eck and Waltman, 2010).

2.2. Corpus analysis

A bibliometric analysis was carried out in this study (Donthu et al., 2021). In particular, a performance analysis was conducted to illuminate the performance (publication productivity and impact) and key

contributors (journals, authors, and countries) of gamification in business research. In addition, a science mapping of gamification in business research was performed in three ways: first, we employed a co-citation analysis in VOSviewer to locate knowledge foundations; second, we executed bibliographic coupling and keyword co-occurrence analysis in VOSviewer to reveal major themes, enabling us to triangulate these themes; and third, we utilize a density-centrality four quadrant analysis in Bibliometrix in R to establish future directions, thereby presenting ways forward in a data-driven manner (Kraus et al., 2022; Mukherjee et al., 2022). The ensuing results were interpreted using a sensemaking approach that involved scanning of trends, sensing for insights, and substantiating with rationales (Lim and Kumar, 2023).

3. Performance analysis of gamification in business research (RQ1–RQ2)

3.1. Publication trend of gamification in business research (RQ1)

This study retrieved a corpus of 647 documents on gamification in business from 287 journals through Scopus and Web of Science over the 2012 to 2022 timeframe. These publications were written by academics from all around the world. Only 37 reviews were found in the collection, and 94.4 % of the collection consisted of articles. Out of the 647 publications, only 75 (11.5 %) were single-authored, and 69 single authors (10.6 %) were observed. Each author had an average of 0.38 documents, and there were an average of three authors per document. At the time of this study, there were 13,587 citations from the 647 documents in the collection, which equates to an average of 20.54 citations per publication.

Fig. 2 displays the annual growth of publications related to gamification in business research. It is evident that the number of publications has increased significantly over the years. In 2012, only four documents were published, while in 2016, 26 documents were published, 47 documents in 2018, 99 documents in 2019, and 140 documents in 2022. The year 2021 had the highest number of publications (n : 148) published in a single year while 75 % of the collection was published within the last four years (2019–2022). These trends indicate that the productivity of gamification in business research is growing on a positive

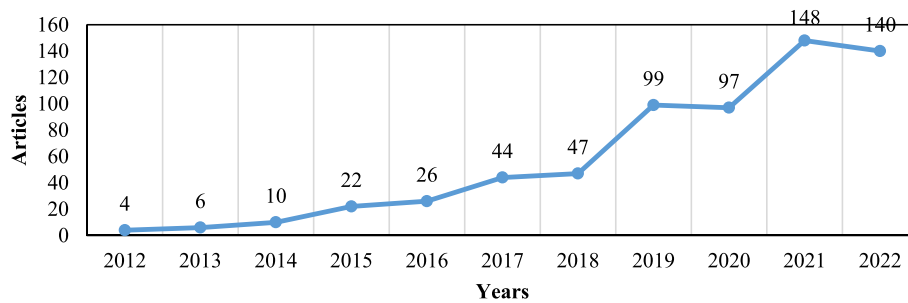


Fig. 2. Publication trend of gamification in business research.

trajectory, signaling the immense potential of research in this field.

The upward trajectory in the number of publications on gamification in business research could be attributed to several factors. Firstly, as businesses globally face increased competition and rapidly changing market dynamics, there is a continuous search for innovative strategies to engage customers (Lim and Rasul, 2022; Lim et al., 2022b) and improve organizational performance (Donthu et al., 2023; Lim, 2023b). Gamification, with its roots in game-design elements, offers an interactive and engaging approach that many businesses find useful in enhancing customer loyalty and workforce productivity (Wunderlich et al., 2020). Secondly, the digital transformation wave (Ciasullo and Lim, 2022), characterized by the rise of digital platforms, social media, and mobile technologies (Kraus et al., 2023), provides a conducive environment for the application and study of gamification strategies. Moreover, the younger generation, accustomed to gaming experiences (Milanesi et al., 2023), is entering the workforce and market (Lim, 2023a; Lim et al., 2023), creating a demographic shift that favors gamified approaches in business. Lastly, the interdisciplinary nature of gamification—combining insights from business, design, psychology, and technology—makes it a rich and fertile ground for research exploration (Sam-Epelle et al., 2022). The confluence of these factors contributes to the burgeoning interest and exponential growth in publications related to gamification in business research.

3.2. Citation trend of gamification in business research (RQ1)

Table 1 shows that gamification in business research is fairly impactful. Noteworthy, seminal publications in the field are highly cited or referred to, as seen by the higher average citations received by such publications. It is also important to note that unlike citations, which tend to favor older publications, average citations were used to account for this potential bias. Therefore, the observation herein reaffirms the impact and influence of seminal publications in the field.

3.2.1. Global citations

Global citations are a measure of the number of citations received from publications that have not been filtered and thus can be used to

Table 1
Citation trend of gamification in business research.

Year	Total publication	Average citation per publication	Average citation per year	Citable years
2012	4	31.75	2.89	11
2013	6	102.17	10.22	10
2014	10	97	10.78	9
2015	22	60.05	7.51	8
2016	26	38.12	5.45	7
2017	44	65.7	10.95	6
2018	47	26.55	5.31	5
2019	99	27.86	6.96	4
2020	97	13.11	4.37	3
2021	148	5.93	2.96	2
2022	140	1.57	1.57	1

assess the impact and influence of a publication across fields (Baker et al., 2020; Donthu et al., 2021). In this study, we found that the publication with the most global citations is “The rise of motivational information systems: A review of gamification research” by Koivisto and Hamari (2019) with 534 global citations, followed by “Psychological Capital: An Evidence-Based Positive Approach” by Luthans and Youssef-Morgan (2017) with 385 citation, further followed by “Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service” by Hamari (2013) with 343 global citations (Table 2 Panel A). It is noteworthy that gamification plays an increasingly prominent role in most of the citing publications, indicating the significance of gamification as a research topic and its potential impact on various domains and industries.

3.2.2. Local citations

Local citations are a measure of the number of citations received from publications within the review corpus and thus can be used to assess the impact and influence of a publication within the field (Baker et al., 2020; Donthu et al., 2021). In this study, local citations were determined based on the citations from 647 publications on gamification in business between 2012 and 2022 obtained from Scopus and Web of Science, which were filtered for document type, source type, period, and subject area. The publication that received the most local citations is “A definition for gamification: Anchoring gamification in the service marketing literature” by Huotari and Hamari (2017) with 71 local citations, followed by “Gamification and mobile marketing effectiveness” by Hofacker et al. (2016) with 59 local citations (Table 2 Panel B). It is noteworthy that gamification plays a prominent role in most of the citing publications, particularly in terms of its conceptualization and effectiveness, though its magnitude of influence in the field appears to much less than across fields, which is nonetheless not uncommon.

3.3. Journals publishing on gamification in business research (RQ2)

An analysis of publications by journals reveals that the *Journal of Business Research* is the most frequent publisher of gamification in business research (n : 31) (Table 3 Panel A), followed by *Simulation and Gaming* (n : 25), *International Journal of Information Management* (n : 20), *TEM Journal* (n : 17), and *International Journal of Management Education* (n : 14). This demonstrates that gamification in business research is well-received, including among premier journals, as evidenced by the journals in this list that have a high impact factor and a rank of “A*” or “A” in the Australian Business Deans Council Journal Quality List.

Upon detailed scrutiny of the impact of gamification in business research, the *Journal of Business Research* and *Simulation and Gaming* have once again come up tops from having the highest h -index of “16”, followed by the *International Journal of Information Management* with an h -index of “7” and the *Journal of Interactive Marketing* with an h -index of “6” (Table 3 Panel B). It is also noteworthy that the *International Journal of Information Management* has the highest citations at 1661, followed by *Simulation and Gaming* with 1082 citations and the *Journal of Business Research* with 816 citations. These findings indicate the significant

Table 2
Most impactful publications on gamification in business (global and local citations).

Panel A. Global citations					
Rank	Title	Author(s) and year	Global citations	Global citations per year	Normalized global citations
1	The rise of motivational information systems: A review of gamification research	Koivisto and Hamari (2019)	534	106.8	19.17
2	Psychological capital: An evidence-based positive approach	Luthans and Youssef-Morgan (2017)	385	55.00	5.86
3	Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service	Hamari (2013)	343	31.18	3.36
4	Developing a theory of gamified learning: Linking serious games and gamification of learning	Landers (2014)	340	34	3.51
5	Why do people use gamification services?	Hamari and Koivisto (2015)	317	35.22	5.28
6	Is it all a game? Understanding the principles of gamification	Robson et al. (2015)	303	33.67	5.05
7	What is eSports and why do people watch it?	Hamari and Sjöblom (2017)	294	42	4.47
8	A definition for gamification: Anchoring gamification in the service marketing literature	Huotari and Hamari (2017)	293	41.86	4.46
9	Toward meaningful engagement: A framework for design and research of gamified information systems	Liu et al. (2017)	262	37.43	3.99
10	Customer experience challenges: Bringing together digital, physical and social realms	Bolton et al. (2018)	212	35.33	7.98
Panel B. Local citations					
Rank	Title	Author(s) and year	Local citations	Local citations/global citations ratio (%)	Normalized local citations
1	A definition for gamification: anchoring gamification in the service marketing literature	Huotari and Hamari (2017)	71	24.23	10.63
2	Gamification and mobile marketing effectiveness	Hofacker et al. (2016)	59	33.15	12.47
3	Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service	Hamari (2013)	54	15.74	4
4	Is it all a game? Understanding the principles of gamification	Robson et al. (2015)	53	17.49	6.59
5	An investigation into gamification as a customer engagement experience environment	Harwood and Garry (2015)	40	30.3	4.97
6	Game on: Engaging customers and employees through gamification	Robson et al. (2016)	29	24.58	6.13
7	Gamification in the workplace: The central role of the aesthetic experience	Suh et al. (2017)	29	25.89	4.34
8	Serious games and the gamification of tourism	Xu et al. (2017)	28	17.28	4.19
9	The gamification of advertising: Analysis and research directions of in-game advertising, advergames, and advertising in social network games	Terlutter and Capella (2013)	27	14.75	2
10	A theory of work gamification: Something old, something new, something borrowed, something cool?	Cardador et al. (2017)	23	35.38	3.44

impact of gamification in business research and its positive reception in high-quality journals, emphasizing the relevance and importance of continued research in this field.

3.4. Authors publishing on gamification in business research (RQ2)

The dispersion of publications by authors reveals that Juho Hamari of Tampere University has published the most on gamification in business (n : 19) (Table 4 Panel A). Among the 19 publications authored by Juho Hamari, several are highly cited within the field and across fields (Table 2). His seminal publication, “A definition for gamification: Anchoring gamification in the service marketing literature”, is among his most widely cited gamification in business research that was co-authored with Kai Huotari. His other noteworthy contributions include how gamification is transforming freight transport (Tomé Klock et al., 2021) and used for prolonged experience (Jankowski et al., 2019), logistics (Warmelink et al., 2020), and marketing (Hamari, 2013), among others. It is noteworthy that Juho Hamari's contributions have also made Tampere University one of the most recognized in the field where gamification and business intersect.

Following Juho Hamari, Richard N. Landers (n : 11) and Abhishek Behl (n : 10) have authored the second- and third-highest number of

gamification-related publications in business. Together with Juho Hamari, Richard N. Landers and Abhishek Behl also occupy the top three positions in terms of h -index (15, 8, and 6, respectively) and citations (2566, 815, and 104, respectively) (Table 4 Panel B). Richard N. Landers, with a single-authored publication titled “Gamification misunderstood: How badly executed and rhetorical gamification obscures its transformative potential”, has received a total of 36 citations. His works focus on assessment gamification (Landers and Collmus, 2022) and management gamification (Landers, 2014). Abhishek Behl, the third most impactful author with an h -index of six, has published on gamification and e-learning in young consumers (nine citations) (Behl et al., 2020) as well as gamification for disaster relief (39 citations) (Behl and Dutta, 2020).

3.5. Countries publishing on gamification in business research (RQ2)

Table 5 presents the distribution of publications on gamification in business among countries. The United States (n : 193) leads the list of the top 20 countries that contribute the most publications to gamification in business research, followed by China (n : 92), India (n : 86), the United Kingdom (n : 83), Germany (n : 71), Spain (n : 65), Australia (n : 55), Finland (n : 53), and others. The United States is the most productive and

Table 3
Top journals for gamification in business research.

Panel A. Most productive journals				
Rank	Sources	Publications	ABDC journal rank	Web of Science impact factor
1	<i>Journal of Business Research</i>	31	A	7.5
2	<i>Simulation and Gaming</i>	25	–	1.77
3	<i>International Journal of Information Management</i>	20	C	14.09
4	<i>TEM Journal</i>	17	–	1.17
5	<i>International Journal of Management Education</i>	14	C	11.3
6	<i>International Journal of Innovation and Learning</i>	11	C	4.5
7	<i>Technological Forecasting and Social Change</i>	10	A	0.93
7	<i>Young Consumers</i>	10	C	4.1
9	<i>International Journal of Selection and Assessment</i>	9	A	2.13
10	<i>Information and Management</i>	8	A	1.8
10	<i>International Journal of Market Research</i>	8	B	7.5

Panel B. Most impactful journals				
Rank	Element	h-index	Total citations	Total publications
1	<i>Journal of Business Research</i>	16	816	31
1	<i>Simulation and Gaming</i>	16	1082	25
3	<i>International Journal of Information Management</i>	14	1661	20
4	<i>Journal of Interactive Marketing</i>	7	398	7
5	<i>International Journal of Management Education</i>	6	183	14
5	<i>Journal of Management Inquiry</i>	6	137	6
7	<i>Creativity and Innovation Management</i>	5	175	8
7	<i>Internet Research</i>	5	430	7
7	<i>Journal of Retailing and Consumer Services</i>	5	132	5
7	<i>Technological Forecasting and Social Change</i>	5	125	10
7	<i>Tourism Management</i>	5	391	7

impactful contributor to gamification in business research in terms of both the number of publications (n : 193) and citations (n : 1894). This suggests that the United States is a major player in the business of gamification and has made significant contributions to the development of research in this field. Among the developing countries on the list, China, India, and Brazil have a relatively lower number of articles, but better citations, suggesting the potential for quality research and the need for further exploration of gamification in business across these countries. These findings can help guide policymakers and practitioners in terms of investing in gamification in business research and development, potentially leading to innovations and advancements in gamification applications across industries.

4. Science mapping of gamification in business research (RQ3)

4.1. Knowledge foundations for gamification in business research using co-citation analysis (i.e., clustering by cited articles) (RQ3)

Co-citation analysis identifies documents (or references) frequently cited by the publications in the review corpus to establish clusters representing knowledge foundation (Donthu et al., 2021). Specifically, co-citation analysis reveals the knowledge that authors have adopted and relied upon to develop the field. We employed VOSviewer co-citation

Table 4
Top authors for gamification in business research.

Panel A. Most productive authors				
Rank	Author	Affiliation	Total publications	
1	Juho Hamari	Tampere University	19	
2	Richard N. Landers	University of Minnesota	11	
3	Abhishek Behl	Fortune Institute of International Business	10	
4	Rory Francis Mulcahy	University of the Sunshine Coast	9	
5	Sara Catalán	University of Zaragoza	8	
6	Isabel Buil	University of Zaragoza	7	
6	Wafa Hammedi	University of Namur	7	
6	Rebekah Russell-Bennett	Queensland University of Technology	7	
9	Thomas Leclercq	IÉSEG School of Management	6	
9	Ingrid Poncin	Université Catholique de Louvain	6	

Panel B. Most impactful authors					
No	Author	h-Index	g-Index	m-Index	Total citations
1	Juho Hamari	15	19	1.364	2566
2	Richard N. Landers	8	11	0.8	815
3	Abhishek Behl	6	10	1.5	104
3	Sara Catalán	6	8	1.2	134
3	Wafa Hammedi	6	7	0.857	275
3	Thomas Leclercq	6	6	0.857	263
3	Rory Francis Mulcahy	6	9	1	160
3	Ingrid Poncin	6	6	0.857	263
3	Rebekah Russell-Bennett	6	7	1	148

analysis using publication references to unpack the clusters of knowledge foundations, keeping to a threshold of seven. In total, the co-citation analysis revealed six clusters, which alongside the top five most cited publications for each cluster, are presented in Table 6 and illustrated in Fig. 3.

4.1.1. Cluster 1 (red): gamification impacts

Cluster 1, the largest cluster, encompasses publications that address the themes of gamification and its varied impacts. This cluster recognizes gamification and its perceived benefits when implemented in business models. It improves user experience when integrated with

Table 5
Top countries for gamification in business research.

Rank	Country	Total publications	Total citations
1	United States	193	1894
2	China	92	974
3	India	86	219
4	United Kingdom	83	936
5	Germany	71	802
6	Spain	65	344
7	Australia	55	590
8	Finland	53	2575
9	Brazil	40	109
10	France	36	267
11	Portugal	34	496
12	Italy	23	105
13	Canada	22	608
14	Iran	21	49
15	Switzerland	19	101
16	Sweden	18	94
17	Belgium	16	184
18	Greece	16	143
19	Turkey	16	31
20	Austria	13	251

Table 6

Knowledge foundations for gamification in business.

Cluster	No	Publication	Citations	Total link strength
Cluster 1: Gamification impacts (35 publications)	1	Gamification in theory and action: A survey	52	444
	2	Demographic differences in perceived benefits from gamification	33	389
	3	How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction	28	287
	4	Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance	21	176
	5	Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being	21	184
Cluster 2: Gamification and marketing (34 publications)	1	Gamification and mobile marketing effectiveness	26	313
	2	Gamified information presentation and consumer adoption of product innovations	23	279
	3	The gamification of advertising: Analysis and research directions of in-game advertising, advergames, and advertising in social network games	22	194
	4	The boundaries of gamification for engaging customers: Effects of losing a contest in online co-creation communities	20	269
	5	Gamification and the online retail experience	10	102
Cluster 3: Gamification and management (21 publications)	1	An empirical study comparing gamification and social networking on e-learning	14	107
	2	A theory of work gamification: Something old, something new, something borrowed, something cool?	12	105
	3	Gamification: Making work fun, or making fun of work?	12	102
	4	Gamification of task performance with leaderboards: A goal setting experiment	11	151
	5	Gamification in the workplace: The central role of the aesthetic experience	10	156
Cluster 4: Gamification experiences (16 publications)	1	Measuring flow in gamification: Dispositional flow scale-2	15	165
	2	The motivational pull of video games: A self-determination theory approach	14	172
	3	Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage	9	80
	4	The fit game: Preliminary evaluation of a gamification approach to increasing fruit and vegetable consumption in school	8	125
	5	Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service	7	11
Cluster 5: Gamification, sustainability, and tourism (16 publications)	1	Serious games and the gamification of tourism	22	206
	2	The application and impact of gamification funware on trip planning and experiences: The case of Tripadvisor's funware.	10	111
	3	Gamification and serious games within the domain of domestic energy consumption: A systematic review	10	100
	4	Tourists as mobile gamers: Gamification for tourism marketing	9	81
	5	Exploring gamification techniques and applications for sustainable tourism	9	87
Cluster 6: Gamification revolution (11 publications)	1	Why do people use gamification services?	42	490
	2	Do badges increase user activity? A field experiment on the effects of gamification	23	265
	3	Why so serious? Gamification impact in the acceptance of mobile banking services	14	125
	4	How gamification marketing activities motivate desirable consumer behaviors: Focusing on the role of brand love	10	145
	5	A definition for gamification: Anchoring gamification in the service marketing literature	7	10

interactive designs and explores the ease of use of gamification in relation to user demographics (Koivisto and Hamari, 2014). Additionally, the studies in this cluster suggest that gamification mechanics should be applied mindfully, as they significantly impact performance and empowerment (Li et al., 2021; Sailer et al., 2017). Prominent publications in this cluster, such as Ryan and Deci (2000), highlight that gamification aims to fulfill users' innate psychological needs, resulting in enhanced self-motivation and mental health.

The implications of the findings from this cluster are profound for both researchers and practitioners. Recognizing the varied and multifaceted impacts of gamification not only helps businesses leverage its benefits but also cautions them about its nuanced application. Given that the effectiveness of gamification varies with user demographics and interactive designs, businesses can tailor their gamification strategies to meet the specific needs and preferences of their target audience. This customization ensures a better user experience, potentially leading to enhanced brand affinity and customer loyalty. Furthermore, the mindful application of gamification mechanics, as underscored by the referenced studies, is vital to ensure that performance and empowerment are optimized. At a deeper level, by addressing users' psychological needs through gamification, businesses can not only foster greater engagement and motivation but also contribute positively to users' overall well-being and mental health. This holistic approach goes beyond mere transactional benefits, positioning gamification as a strategic tool for cultivating long-term, meaningful relationships with users.

4.1.2. Cluster 2 (green): gamification and marketing

Cluster 2 focuses on the significance of gamification for market effectiveness, building a relationship between gamification as an information disseminator for introducing innovative products to the market (Müller-Stewens et al., 2017). The studies highlight the perception of advertising in gamification and addresses issues regarding its regulation (Terlutter and Capella, 2013). The studies also investigate the context of co-creation communities in relation to competition and cooperation, as induced by effective gamification mechanics in marketplaces (Leclercq et al., 2018). Moreover, the studies support the importance of gamification in retail experiences, highly recommending online businesses to gamify their models effectively to reduce undesirable customer behavior (Hsu and Chen, 2018; Insley and Nunan, 2014). Overall, this cluster focuses on various studies where gamification is used as an efficient marketing tool to scale up businesses.

The revelations from this cluster carry significant strategic weight for businesses, especially those operating in the digital realm. The clear emphasis on gamification as a potent tool for effective marketing strategies underscores its potential to revolutionize traditional advertising and marketing campaigns. By integrating gamification into advertising and marketing, businesses can enhance the reception of their products, creating a more engaging and memorable user experience. This not only improves product visibility but also amplifies the overall brand image. The highlighted concern about advertising regulation in gamification suggests a need for businesses to ensure ethical and transparent gamified

marketing practices. This attention to ethical considerations can help companies avoid potential pitfalls and negative public relations incidents. Furthermore, the exploration of co-creation communities implies that gamification can foster both competition and collaboration. By gamifying these spaces, businesses can capitalize on the natural human instinct for competition while also facilitating cooperation, thus enhancing user engagement and ensuring sustained participation. With the rising importance of e-commerce and online shopping, the application of gamification in online retail experiences is more relevant than ever. Businesses that successfully integrate gamification can mitigate undesired customer behavior, such as cart abandonment, and bolster their online sales. In essence, the insights from this cluster suggest that when gamification is adeptly integrated into marketing strategies, it can serve as a transformative catalyst, propelling businesses to new heights of market presence and customer engagement.

4.1.3. Cluster 3 (dark blue): gamification and management

Cluster 3 encapsulates gamification implementation at work scenarios for social networking (De-Marcos et al., 2014), goal setting, and task performance (Landers et al., 2017). The studies articulate that gamification is an effective tool for workplace management systems, promoting intended work performance enhancements compared to traditional systems (Cardador et al., 2017). Studies project gamification as a business transformation that can produce better workforces (Dale, 2014). The studies also focus on the detailed mechanisms of leaderboards, a common gamification tool that enhances employee behavior, and how gamified information systems in workplace scenarios can encourage users to sustain aesthetic experiences and increase work efficiency (Landers et al., 2017; Suh et al., 2017).

The implications of this cluster hold considerable promise for organizational development and workforce engagement. Businesses looking to elevate their management systems can harness the power of gamification, not merely as a trendy addition, but as a strategic instrument for enhancing employee performance. By integrating gamified elements like social networking, goal setting, and leaderboards into work scenarios, organizations can foster a more engaged and motivated workforce. These gamified mechanisms, when effectively employed, can transform traditional workplace environments into more dynamic and interactive spaces, leading to heightened efficiency and productivity. Furthermore, the evolution of gamified information systems accentuates this transformation, promising not only enhanced task performance but also more enriching and aesthetically pleasing user experiences for employees. Given the results from the studies, it is evident that gamification does not just change the way tasks are approached, but can fundamentally reshape an organization's culture, propelling it towards a more collaborative, innovative, and performance-oriented direction.

4.1.4. Cluster 4 (yellow): gamification experiences

Cluster 4 emphasizes the core aspects of gamification and the experiences that can be curated, such as heightened enjoyment, focused immersion, curiosity, and control (Agarwal and Karahanna, 2000). Studies also establish relationships between autonomy and competence satisfaction in solitary gameplay (Ryan et al., 2006). The psychometric properties of scales are investigated in the context of gamification, and various outcomes, such as autotelic experience and skill balance, are observed among users (Hamari and Koivisto, 2014). Furthermore, incentive-based gamification designs promote healthy eating habits among users (Jones et al., 2014). Overall, this cluster highlights various empirical studies where active monitoring of badges increases enhanced user activity.

The revelations from this cluster offer substantial insights into how businesses can optimize their gamification strategies for maximum impact. The experiential facets, including heightened enjoyment, immersion, curiosity, and control, underscore the power of gamification to transcend traditional engagement mechanisms and create a more enriching user interaction. Businesses can harness these elements to

curate bespoke experiences that align with their brand ethos and resonate deeply with their audience. The relationship between autonomy, competence satisfaction, and solitary gameplay demonstrates the importance of offering individualized challenges and experiences in gamification models, enabling businesses to cater to diverse user preferences. Moreover, understanding the psychometric properties of scales in gamification can allow businesses to refine their strategies, ensuring a balanced blend of autotelic experiences and skill enhancement. The potential of incentive-based gamification designs, such as promoting healthy behaviors, exemplifies the broader societal impact gamification can achieve. This goes beyond business objectives and positions gamification as a tool for societal betterment. Lastly, the active monitoring of badges and its correlation with enhanced user activity underscores the importance of real-time analytics in gamification, enabling businesses to continuously iterate and adapt their strategies for optimal user engagement and satisfaction.

4.1.5. Cluster 5 (light blue): gamification, sustainability, and tourism

Cluster 5 covers studies on the application of gamification for sustainability and tourism. These studies highlight various extrinsic and intrinsic motivational gaming elements that result in meaningful gamification through the use of travel and sustainability case studies (Sigala, 2015a, 2015b). Gamification elements have been applied in specific tourism fields, benefiting tourism marketing practices (Xu et al., 2017). Gamification in tourism leads to productive interactions and increased satisfaction, enhancing brand awareness and destination loyalty (Negruşa et al., 2015; Xu et al., 2017). Furthermore, the studies emphasize that gamification promotes the integration of sustainable practices, such as energy conservation (Johnson et al., 2017).

The findings within this cluster present several critical implications for stakeholders, particularly in the tourism sector, and sustainability initiatives. The application of gamification in tourism, particularly using motivational gaming elements, not only redefines the traveler's journey but also reimagines the ways destinations market themselves. By introducing gamified elements, destinations can drive more meaningful interactions, leading to heightened satisfaction levels among travelers. This, in turn, has the potential to significantly elevate brand awareness and instill a deeper sense of loyalty towards a particular destination. Such gamified experiences can serve as differentiators in a competitive tourism market. Beyond the immediate benefits in tourism marketing, there is an even broader implication. Gamification's role in promoting sustainable practices indicates a paradigm shift in how sustainability goals can be achieved. By gamifying sustainable actions, such as energy conservation, there is an opportunity to appeal to a broader audience, making sustainability not just a necessary practice but an engaging and rewarding one. This confluence of gamification with sustainability and tourism suggests that businesses can craft strategies that are not only profitable but also responsible and impactful in the longer run.

4.1.6. Cluster 6 (purple): gamification revolution

Cluster 6 represents how gamification is driving significant business revolutions. The studies present empirical evidence on the mediated relationship established by gamification between hedonic and utilitarian benefits and attitudes towards the use of gamification (Hamari and Koivisto, 2015). This relationship enables the continued use of gamification services in businesses among users. Studies also suggest that gamification has propagated the use of mobile banking services and motivated users to exhibit desired behaviors (Baptista and Oliveira, 2017). Businesses are achieving high customer acceptance, brand loyalty, and value by introducing the right game mechanics in their models (Baptista and Oliveira, 2017; Hsu and Chen, 2018).

The insights from this cluster have far-reaching implications for how businesses strategize and position themselves in an increasingly competitive landscape. Understanding the intricate interplay between hedonic (pleasure-driven) and utilitarian (function-driven) benefits underscores the importance of delivering a balanced gamification

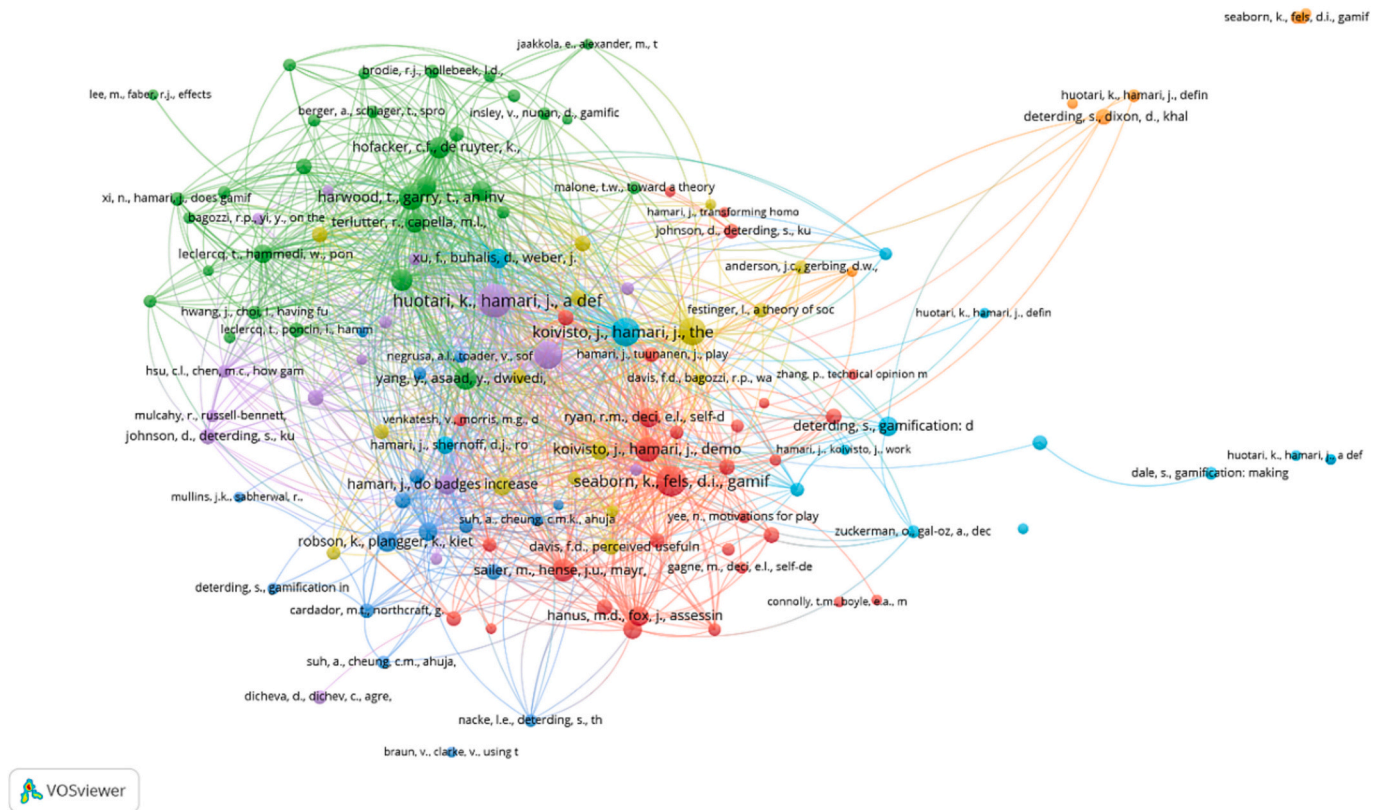


Fig. 3. Network of knowledge foundations for gamification in business.

Notes: Cluster 1 (red): Gamification impacts. Cluster 2 (green): Gamification and marketing. Cluster 3 (dark blue): Gamification and management. Cluster 4 (yellow): Gamification experiences. Cluster 5 (light blue): Gamification, sustainability, and tourism. Cluster 6 (purple): Gamification revolution.

experience to users. A gamification strategy that prioritizes both these facets can lead to sustained user engagement, making the difference between a fleeting interest and long-term adoption. Furthermore, the emergence of gamification in sectors as traditional as banking indicates a broader acceptance and trust in gamified services. This suggests that even in areas where security and reliability are paramount, gamification, when executed correctly, can enhance user experience without compromising on core functionalities. The resultant benefits—ranging from increased acceptance of services like mobile banking to heightened brand loyalty—reiterate the transformative power of gamification. For businesses, this means not just adding gamified elements but also understanding and tailoring them to resonate with their target audience's motivations and needs. As gamification continues to revolutionize various sectors, businesses that strategically harness its potential stand to gain a competitive edge, ensuring relevance and resonance in a rapidly evolving market landscape.

4.2. Knowledge clusters (major themes) of gamification in business research using bibliographic coupling of references and keyword co-occurrence analysis (i.e., clustering by citing articles) (RQ4)

Using VOSviewer, we conducted a keyword co-occurrence analysis to identify the knowledge clusters (major themes) of gamification in business research. Ten major clusters of keywords with a minimum of five occurrences were revealed, in which the network among these clusters are illustrated in Fig. 4 and summarized in Table 7. This approach is based on the assumption that the keywords that authors list for their publications serve as reliable proxies that reflect the content of their publications and that their co-occurrences, which form a unique knowledge cluster reflecting a major theme, provide insights into a domain's intellectual structure (Ding et al., 2001; Donthu et al., 2021). Similarly, we also performed bibliometric coupling using VOSviewer,

which is an alternative that uses that uses references in publications as a means to identify the major themes as compared to author keywords in the keyword co-occurrence analysis (Donthu et al., 2021). The bibliographic coupling of publications sharing similar references led to eight major themes, with the most cited publications in each theme presented in Table 8, which, in turn, triangulate the insights revealed from the keyword co-occurrence analysis (Mukherjee et al., 2022).

4.2.1. Cluster 1: gamification and learning

Cluster 1 concentrates on the moderating processes linking gamification to learning outcomes. Most publications in this cluster recognize gamification as a crucial element for enhancing learning in business. The article “An empirical test of the theory of gamified learning: The effect of leaderboards on time-on-task and academic performance” receives the highest citations of 177 in this cluster. It emphasizes that gamification can be a powerful method for altering psychological characteristics, affecting outcomes of interest, and creating experiences that improve task performance (Landers and Landers, 2014). When applied in learning settings, gamification elements enhance learning, foster engagement, improve learning dynamics, and elevate the overall learning experience (Licorish et al., 2018). The success of e-business and MOOCs is largely due to gamification, which positively impacts utilization, individual outcomes, organizational outcomes, and the relationship between individual and organizational outcomes (Aparicio et al., 2019). Additionally, a study in this cluster evaluates the effect of gamified training in a business environment, identifying gamification elements that make the training process more conducive while highlighting its potential detrimental effects (Armstrong and Landers, 2017).

The insights gleaned from this cluster hold significant implications for businesses, corporate trainers, educators, and instructional designers. Acknowledging gamification as a pivotal tool in enhancing learning outcomes necessitates a shift in how traditional learning

modules are designed and delivered. The efficacy of gamification in shaping psychological attributes and bolstering task performance implies that educators and trainers can harness these mechanics to create immersive learning environments. These environments not only facilitate the retention and application of knowledge but also foster a culture of continuous learning and engagement. The remarkable success witnessed in e-business and MOOCs, attributable to gamification, provides a compelling argument for its widespread adoption across diverse learning platforms. Moreover, the discernible positive impacts on both individual and organizational outcomes advocate for a more integrated approach where gamification becomes an intrinsic part of learning strategies. However, while the benefits are undeniable, it is equally important to be cognizant of potential pitfalls. Striking the right balance in the application of gamification elements is crucial to ensure that the learning process remains effective and that any potential negative repercussions are mitigated. This holistic understanding underscores the transformative potential of gamification in shaping the future of business learning and training methodologies, revolutionizing the educational landscape and making learning not just effective but also enjoyable.

4.2.2. Cluster 2: gamification and management

Cluster 2 focuses on examining the impact of integrating gamification techniques in workplace settings. Gamification-based, glory-driven incentives motivate users to participate more effectively before goals are reached, and also study the detrimental effects after goal achievements (Goes et al., 2016). It has been found that the use of gamification mechanics increases employee and user engagement in participative healthcare services. Two case studies highlight the experiential impact

of gamification mechanics, individual factors influencing users' gamified experiences, and multiple cognitive, emotional, and engagement outcomes (Hammedi et al., 2017). Organizational goals can be achieved if task completion is made synonymous with playing a game, as employees can be intrinsically motivated by the activity challenge and put in sustained effort in their work (Perryer et al., 2016). Web-based training can be gamified and adopted to train employees. A study demonstrates how gamification can be used for training in a scientifically supported way, and is most impactful when used in conjunction with instructional design principles (Armstrong and Landers, 2018). Additionally, the application of gamification into traditional assessment methods can better assess candidates' soft skills and improve employee selection procedures (Georgiou et al., 2019).

The implications drawn from this cluster offer invaluable insights into optimizing managerial practices and enhancing organizational outcomes. At its core, gamification serves as a bridge, connecting employees' intrinsic motivations with organizational objectives. Incentivizing through gamification, as highlighted by the findings, does not only propel employees towards goal attainment but also fosters sustained effort, thereby enhancing overall productivity and organizational performance. Furthermore, the experiential facets of gamification pave the way for more immersive and meaningful work experiences, factoring in individual preferences and varied emotional and cognitive outcomes. This underscores the importance of a tailored approach, ensuring gamified interventions resonate with individual employees, thereby optimizing their impact. The transformative potential of gamification also extends to training and recruitment. By gamifying web-based training modules, organizations can elevate the learning experience, ensuring effective knowledge transfer and skill acquisition. Combining

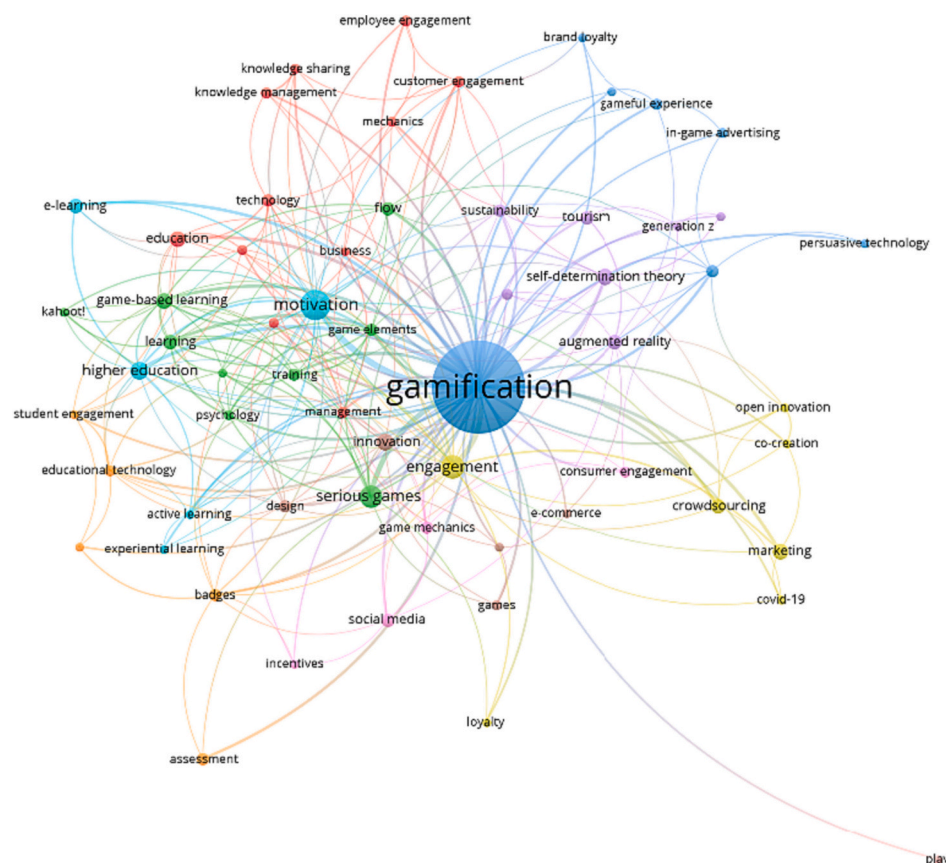


Fig. 4. Keyword co-occurrence network of major themes of gamification in business research.

Notes: Cluster 1 (light blue): Gamification and learning. Cluster 2 (green): Gamification and management. Cluster 3 (red): Gamification and engagement. Cluster 4 (brown): Gamification and innovation. Cluster 5 (purple): Gamification and sustainability. Cluster 6 (dark blue): Gamification and behavioral outcomes. Cluster 7 (pink): Gamification and marketing. Cluster 8 (light green) Gamification and transformation.

Table 7

Keyword co-occurrences and major themes of gamification in business research.

Keyword co-occurrence cluster	No	Keyword	Occurrences	Total link strength
<i>Major theme</i>				
Cluster 1 (light blue): Gamification and learning	1	E-learning	11	18
	2	Higher education	17	37
	3	Virtual reality	6	12
	4	Motivation	47	97
	5	Active learning	5	12
	6	Experiential learning	5	8
Cluster 2 (green): Gamification and management	1	Training	8	27
	2	Learning	12	38
	3	Learning outcomes	5	19
	4	Game-based learning	13	29
	5	Psychology	6	27
	6	Serious games	26	49
	7	Game elements	9	30
	8	Flow	10	18
Cluster 3 (red): Gamification and engagement	1	Customer engagement	7	17
	2	Employee engagement	7	9
	3	Knowledge sharing	6	14
	4	Knowledge management	7	12
	5	Mechanics	6	12
	6	Technology	8	13
	7	Game design	6	12
	8	Business	5	16
	9	Management	7	17
Cluster 4 (brown): Gamification and innovation	1	Innovation	5	10
	2	Design	8	19
	3	Games	6	9
	4	E-commerce	5	5
	5	Literature review	5	8
Cluster 5 (purple): Gamification and sustainability	1	Sustainability	9	16
	2	Tourism	10	13
	3	Social marketing	7	15
	4	Augmented reality	11	18
	5	Generation z	5	8
	6	Self-determination theory	16	26
Cluster 6 (dark blue): Gamification and behavioral outcomes	1	Brand loyalty	5	6
	2	Customer experience	5	7
	3	Gameful experience	7	11
	4	Intrinsic motivation	9	18
	5	Persuasive technology	5	6
	6	In-game advertising	6	4
	7	Gamification	442	457
Cluster 7 (pink): Gamification and marketing	1	Social media	10	16
	2	Incentives	5	7
	4	Game mechanics	9	16
	5	Consumer engagement	7	11
Cluster 8 (light green): Gamification and transformation	1	Crowdsourcing	12	19
	2	Engagement	29	66
	3	Loyalty	5	7
	4	Marketing	13	17
	5	Covid-19	5	7
	6	Open innovation	5	9
	7	Co creation	8	19

gamification with scientifically backed instructional design principles augments its effectiveness, creating a robust framework for continuous employee development. Moreover, the innovative integration of gamification in assessment procedures marks a paradigm shift in recruitment, allowing for a more holistic evaluation of candidates, particularly in the realm of soft skills. The role of gamification is therefore clearly multifaceted: elevating managerial practices, fostering employee engagement, and ensuring a more holistic and effective approach to human resource management.

4.2.3. Cluster 3: gamification and engagement

This cluster emphasizes how gamification can increase engagement for businesses. Gamification is used as an additional tool to convince clients to make purchases or participate in campaigns, establishing a relationship between gamification and engagement behaviors and sales. Gamification benefits businesses by fostering repeat purchases and increasing word of mouth, thus engaging users with brands (Eisingerich et al., 2019). Gamification also contributes to customers' value creation, and value creation benefits brand engagement. It induces reward satisfaction among users, which further inbuilt continued engagement intention (Högberg et al., 2019). Gamified loyalty programs help monitor non-purchase activities by customers that benefit businesses, through incentivized referrals and feedback suggestions. These programs also motivate users to earn points by resharing content, watching videos, or broadcasting their achievements on social networking sites, thereby deepening customer-brand relationships (Hollebeek et al., 2021). Brands should employ game mechanics in non-game contexts to influence behavior through entertaining and engaging experiences (Hsu and Chen, 2018). Empirically demonstrated, gamification may boost brand equity and favorably influence brand engagement, even appearing to be a successful brand management strategy (Xi and Hamari, 2020).

The implications derived from this cluster offer significant insights for businesses striving to fortify their customer relationships. The inextricable link between gamification and enhanced engagement showcases the potential of gamification as more than just a fleeting trend; it represents a strategic avenue for sustained customer engagement. By employing gamification, businesses can navigate the complexities of the modern customer journey, tapping into the inherent human desire for reward and recognition. This not only fosters immediate actions, such as repeat purchases and active participation in campaigns, but also cultivates deeper, emotional connections between brands and their customers. Gamified loyalty programs, which capture a broader spectrum of customer activities beyond mere purchases, allow businesses to harness valuable insights, from customer feedback to referral patterns. Such a holistic engagement strategy amplifies brand visibility, with customers themselves becoming brand ambassadors as they share their achievements and experiences. Moreover, integrating game mechanics within non-game contexts can transform mundane interactions into memorable, enjoyable experiences, further solidifying customer loyalty. As brands grapple with the challenges of an increasingly competitive marketplace, the evidence from this cluster underscores the power of gamification, not just as a tactical tool, but as a comprehensive strategy to elevate brand equity and forge enduring customer relationships.

4.2.4. Cluster 4: gamification and innovation

This cluster highlights that gamification is a modern tool that enables businesses to actively participate in processes that involve them and positively impact innovation. Game-based business models present new business opportunities, providing a fun and intuitive reference frame to existing ratio-focused business model frameworks (Roth et al., 2015). Gamification approaches can support the early stage of innovation and address innovation challenges simultaneously (Patrício et al., 2018).

Table 8

Top publications and major themes of gamification in business research.

Bibliographic coupling cluster/ major theme	Article	Author(s) and year	Citations	Total link strength
Cluster 1: Gamification and learning	An empirical test of the theory of gamified learning: The effect of leaderboards on time-on-task and academic performance	Landers and Landers (2014)	177	69
	Students' perception of Kahoot!'s influence on teaching and learning	Licorish et al. (2018)	136	51
	Gamification: A key determinant of massive open online course (MOOC) success	Aparicio et al. (2019)	128	125
	Kahoot! it: Gamification in higher education	Tan et al. (2018)	70	37
	An evaluation of gamified training: Using narrative to improve reactions and learning	Armstrong and Landers (2017)	67	156
Cluster 2: Gamification and management	Enhancing workplace motivation through gamification: Transferrable lessons from pedagogy	Perryer et al. (2016)	49	241
	The use of gamification mechanics to increase employee and user engagement in participative healthcare services: A study of two cases	Hammedi et al. (2017)	66	414
	Gamification of employee training and development	Armstrong and Landers (2018)	48	193
	Gamification in employee selection: The development of a gamified assessment	Georgiou et al. (2019)	46	78
	Do incentive hierarchies induce user effort? Evidence from an online knowledge exchange	Goes et al. (2016)	97	42
Cluster 3: Gamification and engagement	Hook vs. hope: How to enhance customer engagement through gamification	Eisingerich et al. (2019)	73	171
	Gamification, the finer art: Fostering creativity and employee engagement	Kumar and Raghavendran (2015)	24	51
	Does gamification affect brand engagement and equity? A study in online brand communities	Xi and Hamari (2020)	96	499
	Game on! How gamified loyalty programs boost customer engagement value	Hollebeek et al. (2021)	24	415
	Incentive design and gamification for knowledge management	Friedrich et al. (2020)	70	281
Cluster 4: Gamification and innovation	The ludic drive as innovation driver: Introduction to the gamification of innovation	Roth et al. (2015)	67	142
	Gamification of creativity: Exploring the usefulness of serious games for ideation	Agogu� et al. (2015)	48	56
	Identify innovative business models: Can innovative business models enable players to react to ongoing or unpredictable trends?	Pisano et al. (2015)	46	10
	Smart technologies and shopping experience: Are gamification interfaces effective? The case of the Smartstore	Poncin et al. (2017)	58	343
	Co-creation of new solutions through gamification: A collaborative innovation practice	Patricio et al. (2020)	20	130
Cluster 5: Gamification and sustainability	GREENIFY: A real-world action game for climate change education	Lee et al. (2013)	77	4
	Designing gamified apps for sustainable consumption: A field study	Mulcahy et al. (2020)	48	203
	Developing a gamified mobile application to encourage sustainable energy use in the office	Oppong-Tawiah et al. (2020)	38	193
	'Go with the flow' for gamification and sustainability marketing	Whittaker et al. (2021)	34	341
	Serious games and the gamification of tourism	Xu et al. (2017)	204	229
Cluster 6: Gamification and behavioral outcomes	How does attachment style influence the brand attachment – Brand trust and brand loyalty chain in adolescents?	Bidmon (2017)	36	41
	Gamification and online impulse buying: The moderating effect of gender and age	Zhang et al. (2021)	40	466
	Can gamification improve financial behavior? The moderating role of app expertise	Bayuk and Altobello (2019)	27	171
	Gamification as a mean of driving online consumer behaviour: SOR model perspective	Gatautis et al. (2016)	42	201
	Motivational effects and age differences of gamification in product advertising	Bittner and Shipper (2014)	118	121
Cluster 7: Gamification and marketing	Understanding how gamification influences behaviour in social marketing	Mitchell et al. (2017)	45	166
	The gamification of advertising: Analysis and research directions of in-game advertising, advergames, and advertising in social network games	Terlutter and Capella (2013)	222	84
	Experiences that matter? The motivational experiences and business outcomes of gamified services	Wolf et al. (2020)	50	563
	Gamification in market research: Increasing enjoyment, participant engagement and richness of data, but what of data validity?	Bailey et al. (2015)	29	29
	Having fun while receiving rewards?: Exploration of gamification in loyalty programs for consumer loyalty	Hwang and Choi (2020)	81	398
Cluster 8: Gamification and transformation	Designing gamified transformative and social marketing services: An investigation of serious m-games	Mulcahy et al. (2018)	30	266
	Crowdsourcing innovation and product development: Gamification as a motivational driver	Kavaliova et al. (2016)	38	189
	Gamification and entrepreneurial intentions	Ruiz-Alba et al. (2019)	25	340
	Creating student interaction profiles for adaptive collaboration gamification design	Knutas et al. (2016)	23	84
	Gamification as a platform for brand co-creation experiences	Nobre and Ferreira (2017)	50	183

Research indicates that game-based workshops develop a relevant environment for gamification at the forefront of corporate strategy, entrepreneurship, and innovation management ([Patricio et al., 2020](#)). Games are effective instruments for fostering cooperation and sharing prior information among players by creating an innovative environment, though they may not sufficiently stimulate the acquisition of external knowledge necessary to achieve high levels of originality ([Agogu  et al., 2015](#)). Moreover, it is noteworthy that gamification

revolves around the epicenter of value proposition when applied through specific applications in business models ([Pisano et al., 2015](#)).

The implications drawn from this cluster offer valuable insights for businesses looking to remain agile and competitive in an ever-evolving market. With gamification emerging as a potent instrument for catalyzing innovation, businesses stand to gain a competitive edge by embedding game mechanics in their innovation processes. By leveraging gamification for crowdsourcing and open innovation, organizations can

tap into a vast reservoir of diverse ideas and perspectives, leading to more robust and customer-centric solutions. Game-based business models not only present new monetization avenues but also transform traditionally rigid business processes into fluid, user-centric experiences. These models challenge businesses to transcend conventional ratio-focused frameworks, ushering in an era of intuitive, user-driven business strategies. Moreover, the strategic integration of gamification in the early stages of innovation ensures that potential challenges are addressed preemptively, paving the way for smoother product development and market integration. By creating environments conducive to collaboration and information-sharing through game-based workshops, businesses can harness the collective intelligence of stakeholders. However, businesses must be aware of the limitations of gamified approaches, particularly in ensuring a balance between internal ideation and external knowledge acquisition to achieve genuine originality. Ultimately, when executed thoughtfully, gamification transforms the very core of a business's value proposition, positioning it as an indispensable tool in modern business strategy and innovation management.

4.2.5. Cluster 5: gamification and sustainability

This cluster notes that firms in developing countries appear to be more interested in addressing sustainability concerns according to global surveys (Enkvist et al., 2008). It is essential to explore cutting-edge techniques that can contribute to building a sustainable civilization. This cluster focuses on sustainable consumption, sustainable energy usage, climate change, and low carbon strategies (Oppong-Tawiah et al., 2020), among others. This cluster demonstrates that gamification can raise awareness about climate change and motivate informed action by providing a fun and engaging experience (Lee et al., 2013). Gamification is employed as an effective tool for sustainability marketing, fostering positive perceptions of sustainable behavior among users (Whittaker et al., 2021). This cluster also presents studies investigating the application of gamification for promoting sustainable consumption, sustainable nutrition behavior, and sustained health maintenance (Berger and Schrader, 2016; Lee et al., 2017; Mulcahy et al., 2020), including in organizational settings to promote sustainability (Prakash and Manchanda, 2021).

The revelations from this cluster hold significant implications for businesses, policy-makers, and environmental advocates. The heightened interest of firms in developing countries in sustainability, as evidenced by global surveys, underscores the global momentum behind sustainable practices and the potential of gamification as an accelerator. By utilizing gamification to raise awareness about pressing issues such as climate change, businesses have a potent tool to drive both understanding and behavior change in a manner that traditional communications may not achieve. This is particularly critical given the urgency of environmental challenges we face. Moreover, the role of gamification in sustainability marketing not only aids in reshaping customer perceptions but also presents an opportunity to align business objectives with environmental conservation. This alignment is vital, ensuring that the pursuit of profit does not undermine our planet's well-being. Additionally, gamification's application in promoting sustainable consumption and health behaviors can redefine public health and wellness campaigns, making them more interactive and influential. For organizational settings, embedding gamification can lead to the cultivation of a sustainability-centric culture, where both employees and stakeholders are aligned in their pursuit of greener and more responsible practices. As businesses increasingly recognize the value of sustainable operations, gamification can serve as a catalyst, making the transition not just necessary but engaging and rewarding.

4.2.6. Cluster 6: gamification and behavioral outcomes

This cluster reveals that organizations increasingly use gamification to engage with and influence customers' attitudes and behaviors. Empirical findings suggest that gamification mechanisms related to economics and accomplishment (e.g., awarding incentives and

upgrading badges) are effective in enhancing customers' perceptions of enjoyment and social engagement, which may significantly increase impulsive buying (Zhang et al., 2021). Gamification also benefits financial services marketing, as financial applications with gamification features can motivate customers and improve their financial well-being (Bayuk and Altobello, 2019). Gamification has been shown to increase attitudinal loyalty towards core service providers (Bidmon, 2017). Studies also demonstrate that gamified mobile payment apps can capture customer loyalty by offering rewards (Behl and Pereira, 2021). Gamification can also influence online customer behavior (Gatautis et al., 2016), activate repurchase intention (Aparicio et al., 2021), and elicit positive emotions like electronic word-of-mouth sharing (Al-Zyoud, 2021).

The findings from this cluster have far-reaching implications for how businesses engage with customers in today's digitally-driven landscape. The increasing reliance of organizations on gamification to influence customer attitudes underscores its potency as a behavioral nudge. For brands looking to cement customer loyalty, the knowledge that gamified loyalty programs can bolster such attachment offers a clear path to differentiate themselves in crowded marketplaces. Beyond mere transactional interactions, gamification seems to enhance the experiential dimension of customer engagement, tapping into feelings of enjoyment and social connectedness, which can further catalyze impulsive buying behaviors. This ability to evoke deep-seated emotional responses transforms gamification from a mere tactical tool to a strategic asset, particularly in sectors like financial services, where gamified apps not only drive usage but also promote financial health. By increasing attitudinal loyalty, activating repurchase intentions, and sparking organic customer advocacy through positive e-word-of-mouth sharing, gamification stands out as a powerful lever for businesses to drive both short-term sales and long-term brand equity. As the digital realm continues to evolve, businesses equipped with insights from this cluster are well-poised to create immersive, rewarding, and behaviorally impactful customer journeys.

4.2.7. Cluster 7: gamification and marketing

This cluster highlights that advertising plays a pivotal role in businesses' marketing activities. Digital game advertising has become a widespread phenomenon and a crucial channel for connecting with users. Advergimes are explicitly developed and built using gamification techniques to promote a brand, product, service, or idea, ultimately increasing website traffic for the brand (Redondo, 2012). This cluster presents literature where gamification techniques applied as advergimes appear to be more effective as promotional tools used to encourage new product trial behavior among users (Terlutter and Capella, 2013). Sports marketing incorporating game aspects may benefit public health efforts by encouraging people to adopt healthier lifestyles and engage in more physical activity (Bittner and Shipper, 2014). Gamification can help social marketing campaigns maintain socially significant behavioral changes (Mitchell et al., 2017). Digital service providers are increasingly "gamifying" their services to enhance user value in terms of specific user experiences, with the most significant impact on business outcomes stemming from self-development (Wolf et al., 2020).

The implications drawn from this cluster underscore the transformative role of gamification in reshaping contemporary marketing strategies. As businesses strive to capture and retain the attention of increasingly discerning audiences, integrating gamification techniques—such as advergimes—emerges as an innovative solution. Not only does it enhance brand visibility and engagement, but it also translates to actionable customer behaviors, such as trying out new products. Moreover, the application of gamification in sports marketing showcases its potential to transcend conventional marketing outcomes, influencing societal health and wellness. This alignment of marketing goals with larger societal benefits amplifies the reach and impact of campaigns. Additionally, gamification's incorporation in social marketing

campaigns provides a sustainable mechanism to instigate and maintain significant behavioral shifts, further solidifying its role as a potent tool for effecting change. On the technology front, the advent of serious mobile games in marketing activities offers a dual advantage: they provide both entertainment and knowledge enhancement, ensuring that users remain engaged and informed. Lastly, as digital service providers look to differentiate themselves in a saturated market, gamifying their offerings presents a unique opportunity. By catering to users' innate desires for self-development and enriching experiences, businesses can not only foster customer loyalty but also achieve tangible improvements in business outcomes.

4.2.8. Cluster 8: gamification and transformation

This cluster highlights how gamification is applied as a popular technique that fosters entrepreneurial intentions among users and encourages business transformation. Businesses are adopting economical badge design strategies as a modern approach to business transformation in order to incentivize user engagement on social media platforms (Easley and Ghosh, 2016). Gamification technology is also transforming educational settings by creating adaptive gamification approaches for online learning and collaborative learning environments (Knutas et al., 2016). Additionally, gamification is employed as a smart technology in retail settings, providing users with personalized shopping experiences and customized products, ultimately changing trends in the shopping industry (Poncin et al., 2017). In tourism, gamification is being adopted in the form of geocaching to engage tourists, enhance destination experiences, and ensure sustainability (Skinner et al., 2018).

The insights from this cluster carry significant implications for businesses across diverse sectors, pointing to the transformative power of gamification when applied strategically. As businesses today face an increasingly dynamic environment, they must be agile, and gamification appears to be a potent tool in this quest for adaptability and innovation. Its role in fostering entrepreneurial intentions suggests that gamification can be a catalyst for not just incremental but also radical shifts in business models and strategies. The adoption of gamified techniques, such as economical badge design for social media engagement, demonstrates how even seemingly simple gamified incentives can have profound impacts on digital marketing outcomes. Furthermore, in educational contexts, the transformation brought about by gamification has the potential to redefine how learning is delivered and consumed, making it more interactive, engaging, and student-centric. In the retail and tourism sectors, the emphasis on personalized experiences, whether it is in shopping or destination exploration, indicates a larger trend of businesses shifting towards a more user-centric model. Gamification is driving this trend by enabling businesses to leverage data-driven insights and technology to offer bespoke experiences, thereby enhancing user satisfaction and loyalty. For businesses, understanding and harnessing the transformative potential of gamification can be the key to staying competitive and relevant in a rapidly evolving marketplace.

5. Future directions for gamification in business research using the density-centrality four quadrant analysis (RQ5)

This study identifies potential future research directions using a density-centrality four quadrant analysis conducted in R. The strategic diagram, based on author keywords (Fig. 5), presents four quadrants along with variables of centrality and density (Callon et al., 1991), wherein the higher the centrality and density, the more relevant and developed the theme is (López-Robles et al., 2021; Sharma et al., 2021). The development of a selected theme is assessed by its density, while its importance is determined by its centrality. The map is divided into four sections:

1. The bottom-left corner contains declining or developing themes.
2. The bottom-right corner represents basic themes that have been widely researched.

3. The upper-left portion displays specialized themes that are developed but isolated.
4. The upper-right corner features well-developed themes.

We set the minimum threshold to 250 keywords and a minimum frequency of five for the analysis. This examination revealed nine clusters distributed across the four quadrants in the strategic diagram. Upon in-depth analysis of these clusters, we propose eight future research extensions to advance and enrich the past and present knowledge structure of gamification in business research:

1. Extension of gamification in business research with virtual reality.
2. Extension of gamification in business research with human and urbanism.
3. Extension of gamification in business research with e-commerce.
4. Extension of gamification in business research with sustainable development.
5. Extension of gamification in business research with smart cities.
6. Extension of gamification in business research with social responsibilities.
7. Extension of gamification in business research with video games and the metaverse.
8. Extension of gamification in business research with industry-specific design.

These future research extensions aim to build upon existing knowledge while exploring new areas where gamification can be applied or studied further. By investigating these proposed extensions, researchers can contribute to the advancement of gamification in business research and potentially uncover novel applications or insights that can benefit various industries and domains.

5.1. Extension of gamification in business research with virtual reality

The digital era has stimulated businesses to adopt virtual reality as a cutting-edge tool to build connections with users. The collaborative use of gamification and virtual reality is projecting promising growth (Loureiro et al., 2020). As depicted in the quadrant, virtual reality emerges as an emerging theme. Scholars may view virtual reality applications used for knowledge exchange and communication as an opportunity to explore the impact of virtual reality and gamification in more practical settings, providing possibilities for users and participants to learn through doing, using, or visiting (Villagrasa et al., 2014). Virtual reality technologies that employ gaming strategies can be used to learn and bring gamified experiences to users (Pinto et al., 2021). Further exploration is needed to observe the desirable changes that can be brought about among users through the collaboration of virtual reality and gamification. Questions that can be addressed include how 5G technology can contribute to enhancing the learning and engagement process using VR and gamification, and how to implement an integrated learning and engagement process using gamification and VR (Loureiro et al., 2020), bringing on board the full cooperation of stakeholders (e.g., employees, customers) in line with stakeholder theory (Mahajan et al., 2023). This, in turn, could extend to other forms of reality, including augmented reality and mixed reality (Soon et al., 2023).

5.2. Extension of gamification in business research with human and urbanism

The cluster in the upper-left quadrant of the figure, encompassing economics, human, and methodology, underscores the evolving nature of human experiences—how they navigate, engage, and inhabit spaces—and their gravitation towards a more playful ethos. Simultaneously, essential activities are being reformed or adapted to keep up with this cultural shift. Ludicization underlies many gamification and/or playification initiatives, which purposefully seek to transform settings

conducive to play, and in some cases, where the environment itself can be played (Thibault, 2019). This opens avenues for novel research, given the limited literature on the subject. When gamification principles are integrated into human living, which is increasingly urbanized, they have shown potential to combat burnout, increase motivation and engagement, and encourage participation in skills-intensive tasks (Raoufrahimi et al., 2022; Redondo et al., 2020).

Recognizing that the idea of work-life balance is progressively transitioning into work-life harmony (or integration) in urban settings (Mello and Tomei, 2021), it is important to expand the scope of human living to also encapsulate the future of work. Noteworthy, there is an intriguing prospect of gamifying career trajectories within organizations. Drawing parallels with the academic sector can be illuminating. In academia, an individual might begin as a lecturer, ascend to the status of a professor over the years, and meanwhile, undertake administrative roles such as a department head or director. Even if they later relinquish these administrative responsibilities, they still retain their academic stature, such as that of a professor. Analogously, in the corporate world, rather than just vertical ascents, professionals can “level up” through acquiring diverse roles and experiences, gaining “experience points” along the way. They could rise to senior positions based on merit, and simultaneously take on varying functional roles. Once these roles culminate, they can retain their seniority, augmented with the experiences and recognitions garnered. This multidimensional progression model can not only enhance employee motivation but also create a rich tapestry of skills and experiences within an organization. To bolster this, businesses could employ badges, tokens, or other gamified elements to acknowledge the multifaceted growth of their personnel. Such an innovative approach resonates with the evolving dynamics of the modern workplace, where employees yearn for diverse experiences and growth avenues.

5.3. Extension of gamification in business research with e-commerce

The emerging cluster on e-commerce represents a growing niche area. E-commerce websites employ gamification strategies to capitalize on the immediate benefits of frequently visited customers through recommendation engines and increase customer retention (Behl et al., 2020). Notable examples include Google Pay, which encourages cashless transactions and rewards users with e-scratch cards or coupons during account transfers. As a result, gamification has significantly transformed user engagement and promoted positive website usage. This approach motivates customers to revisit e-commerce websites, ultimately boosting their financial growth (Behl et al., 2020). The introduction of new gamification elements ensures more direct and personalized user engagement, which will enhance online sales (García-Jurado et al., 2021). Additionally, artificial intelligence-based live chat (also known as chatbots) can help dispel uncertainties, attracting more attention and improving the user experience (García-Jurado et al., 2021). In this regard, venturing into the realms of artificial intelligence (Thakur and Kushwaha, 2023), marketing analytics (Basu et al., 2023), personalization (Chandra et al., 2022), and storytelling (Júnior et al., 2023) should be potentially fruitful to enhance the gamification experience in e-commerce.

5.4. Extension of gamification in business research with sustainable development

In the quadrant of emerging themes, sustainable development and customer behavior are prominently featured, indicating that the intersection of gamification and sustainable development will likely gain importance in the future. Our previous discussion on cluster identification revealed that gamification has been effectively employed for sustainability marketing and has fostered positive perceptions of

sustainable behavior among users. This includes promoting sustainable consumption, sustainable nutrition behavior, and sustained health maintenance (Berger and Schrader, 2016; Lee et al., 2017; Mulcahy et al., 2020). Though some research has been conducted on gamification and sustainability, the studies are scattered and the area remains largely unexplored. Encouraging research in this direction is essential, as it presents a promising avenue for examining the long-term impact of gamified processes on sustainable development. Furthermore, it enables the design of gamified environments that offer possibilities for follow-up and measurement (Mandujano et al., 2021). Additionally, while studies have presented an integrative view of gamification for sustainable tourism, there is a need to develop and implement effective and expressive outcomes in the area of ecogamification to encourage sustainable behavior aligned with sustainable development goals (Negruța et al., 2015; Souza et al., 2020).

5.5. Extension of gamification in business research with smart cities

Advancements in information technology and augmented reality have significantly contributed to the rise of smart cities. Gamification serves as a tool to motivate citizens to participate in smart city development (Zica et al., 2017). Studies highlight the value of gamified surveys as a tool for academic research on smart cities, and experimental findings demonstrate the effectiveness of gamification in promoting sustainable urban mobility, an essential aspect of smart cities (Kazhamiakin et al., 2015). Gamification techniques have also been used to encourage garbage recycling, contributing to the betterment of smart cities (Briones et al., 2018). The methodology of gamification, multi-agent systems, and properly processed and enriched data can help popularize carpooling among smart city residents. Consequently, researchers should explore more dimensions of smart cities where gamification approaches can be applied to make the smart city concept more achievable (Olszewski et al., 2018).

5.6. Extension of gamification in business research with social responsibilities

As customers become more sensitive to social responsibilities, brands are continuously adopting strategies to incorporate socially responsible practices into their businesses to maintain a strong bond between the brand and its customers. Gamification has proven to be an effective, innovative method for implementing corporate social responsibility initiatives in firms (Ghahroudi, 2020). Although studies have explored how gamification is applied for communicating with stakeholders (Maltseva et al., 2019) and employees for corporate social responsibility, additional research is needed to investigate how brands can augment corporate social responsibility itself through gamification. Studies highlight that the design components of gamification significantly interact with users' psychological benefits and provide intentional motivation for them to participate in social value co-creation (Jun et al., 2020). In this regard, other variables influencing user psychology can be explored by applying different socioenvironmental settings (Jun et al., 2020).

5.7. Extension of gamification in business research with video games and the metaverse

The central cluster, which is slightly moving towards the emerging themes quadrant, holds significant importance. Interestingly, gamification is also seen to be manifesting in a gradual rise in emerging technologies like the ‘metaverse’ due to the emergence of augmented reality games and virtual reality technologies that enable more seamless integration of games into our real world (Jovanović and Milosavljević, 2022). The primary users of video games and the metaverse are

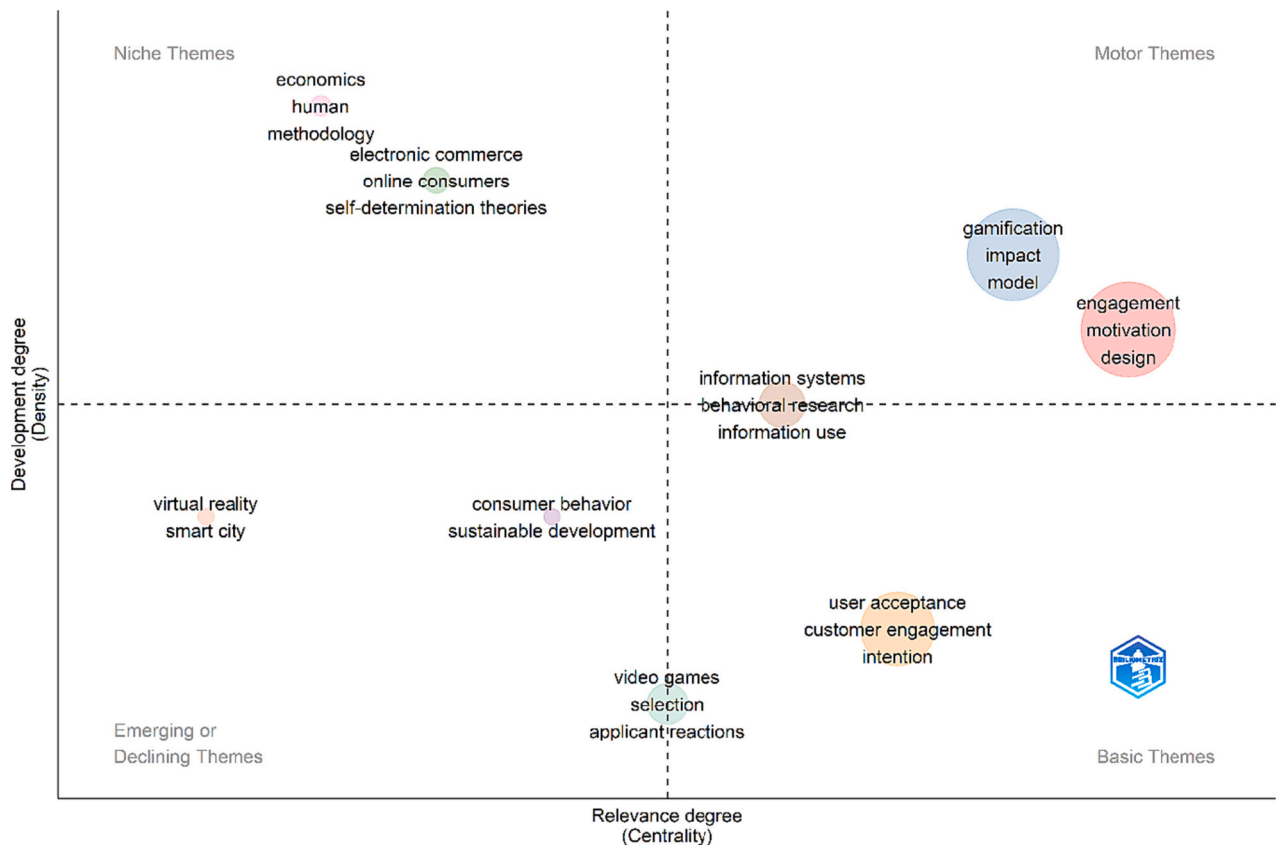


Fig. 5. Strategic diagram of future directions for gamification in business research.

Generation Z members, which is why this area is expected to boom in the coming years. However, there is insufficient literature on gamification in metaverse environments representing gamified relevant details frequently used in the metaverse (Kraus et al., 2023; Tayal et al., 2022). According to an experimental study conducted in the metaverse, the application of game-like experiences to a user's activity area and the game-like experience-based universe are anticipated to increase a user's drive to acquire (Park and Kim, 2021). Yet, there is a need to investigate and analyze the existing gamification development methodology or design framework and procedures necessary for metaverse world design that can promote long-term impact on users (Park and Kim, 2021).

5.8. Extension of gamification in business research with industry-specific design

The motor cluster in the upper-right quadrant of the figure highlights themes related to design, impact, model, and engagement, which demonstrate a close relationship with one another. Gamification is employed by businesses using various game method combinations to enhance their business designs and models to engage more users and customers. For example, Korn et al. (2017) suggest an application that introduces three concepts for gamifying manufacturing design settings in the automotive sector, illustrating an instance from the automotive industry. Donatiello et al. (2018) showcase the application of gamification in a virtual changing room called "Fashion Island" for the fashion sector. Gamification also offers opportunities to engage employees in the Fourth Industrial Revolution (Industry 4.0). It aims to attract individuals to explore the concepts of sustainable manufacturing and promote sustainably produced goods. Since Industry 4.0 strives to develop more sustainable processes, there is interest in disseminating the idea of sustainability through gamification in Industry 4.0 (Paravizo et al., 2018). The potential of gamification in industrial settings should be further

investigated in a practical manner, examining the use of game methods with the objective of better adaptation, increased engagement, supporting the growth of engineers, skill development, and enhancing stakeholder engagement and training (Reis et al., 2020).

6. Conclusion

6.1. Key takeaways

This comprehensive review of 647 documents significantly expands the existing literature on gamification. The technology-enabled systematic literature review of gamification utilized big data from online scientific databases (Scopus and Web of Science) and was analyzed using a combination of fit-for-purpose bibliometric software (i.e., Bibliometrix and VOSviewer). The study has met its overarching goals and answered its specific research questions about the performance and intellectual structure of the field. Notably, this study has provided several major takeaways.

First, this study has clarified the current state of gamification in business research, revealing that publications in the field are growing exponentially, with most research being published in recent years (RQ1). Besides that, this study has found that the publications by Koivisto and Hamari (2019) and Huotari and Hamari (2017) had the highest global and local citations, respectively.

Second, this study has found that Juho Hamari from Tampere University and the United States are the top contributors of gamification in business research while the *Journal of Business Research* has published the most on gamification in business research, followed by *Simulation and Gaming*, the *International Journal of Information Management*, the *TEM Journal*, and the *International Journal of Management Education* (RQ2).

Third, this study has uncovered the knowledge foundations

underpinning gamification in business research, encompassing the key understanding of Gamification impacts (Cluster 1), Gamification and marketing (Cluster 2), Gamification and management (Cluster 3), Gamification experiences (Cluster 4), Gamification, sustainability, and tourism (Cluster 5), and Gamification revolution (Cluster 6) (RQ3).

Fourth, this study has revealed the major themes contributed by gamification in business research, spanning across the domains of Learning (Cluster 1), Management (Cluster 2), Engagement (Cluster 3), Innovation (Cluster 4), Sustainability (Cluster 5), Behavioral outcomes (Cluster 6), Marketing (Cluster 7), and Transformation (Cluster 8) (RQ4).

Finally, this study has presented the directions for future research to advance the theory and practice of gamification in business through the lenses of Virtual reality (Avenue 1), Human and urbanism (Avenue 2), E-commerce (Avenue 3), Sustainable development (Avenue 4), Smart cities (Avenue 5), Social responsibilities (Avenue 6), Video games and the metaverse (Avenue 7), and Industry-specific design (Avenue 8).

6.2. Theoretical implications

Theoretically, this study discusses the major contributors and contributions of gamification in business research, uncovers the significant themes that have been explored, and examines the strengths and limitations of existing work. Gamification scholars can find valuable information on publication outlets, impactful publications, and potential collaborators from leading countries in the domain. This study's unique contribution lies in identifying the knowledge foundation in the form of clusters through co-citation analysis, providing an overview of the current foundational structure of gamification research, as well as the major themes contributed by research in the field, which were triangulated using bibliographic coupling and keyword co-occurrence analysis.

Gamification research in the business context is founded on knowledge spread across six clusters: Gamification impacts (Cluster 1), Gamification and marketing (Cluster 2), Gamification and management (Cluster 3), Gamification experiences (Cluster 4), Gamification, sustainability, and tourism (Cluster 5), and Gamification revolution (Cluster 6). Drawing from these foundational clusters, authors in the field have embarked on knowledge creation, presenting a myriad of topics spread across 10 major thematic clusters, wherein Gamification is examined in tandem with Learning (Cluster 1), Management (Cluster 2), Engagement (Cluster 3), Innovation (Cluster 4), Sustainability (Cluster 5), Behavioral outcomes (Cluster 6), Marketing (Cluster 7), and Transformation (Cluster 8).

The extensive breadth of gamification research in the business context, structured across six foundational clusters, signifies the transformative impact and adaptability of gamification principles across a range of business facets, from marketing to transformative practices. Furthermore, a deeper exploration into the eight thematic clusters reflects gamification's multi-faceted nature, intertwined with critical business functions such as learning, engagement, and innovation. This intricate structure points to the significant evolutionary themes of gamification in business, hinting at the potential future trajectories the field might take.

As gamification continues to reshape the business landscape, it becomes imperative to consolidate diverse studies and findings to provide a holistic view of its influence on user engagement, market effectiveness, sustainable behavior, and more. Our study has amalgamated this vast body of knowledge using a bibliometric analysis, unveiling foundational structures that offer clearer insights into prominent research streams. This comprehensive categorization not only provides a basis for past and present insights but also forecasts emerging themes, directing future research endeavors. Such a collective understanding is paramount for both academia and industry, as it allows for the design of informed strategies, fostering innovation and sustainable practices while driving transformative change in the gamified business domain.

6.3. Managerial implications

The future research extension section presents numerous prospects in this field, with e-commerce expected to be a particularly exciting area for business as more customers increasingly use these platforms for purchases. This trend offers ample opportunities for managers to identify, acquire, and retain valuable customers using cutting-edge technologies involving gamification. Based on this study, we propose further directions that can create research opportunities, exploring the integration of gamification techniques with social responsibility, virtual reality, urbanism, e-commerce, sustainable development, the metaverse, smart cities, and Industry Specific Design.

In today's world, managers and organizations aiming to rapidly adopt new management techniques and technologies that effectively utilize human resources are gaining prominence. Gamification of business processes and employee activities is an innovative approach for unlocking employee creativity and maximizing human resource potential. Creativity, autonomy, and a supportive work environment are essential prerequisites for successfully implementing gaming concepts in a business context. The gamification approach allows for multivariance in selecting the most logical course of action and executing it. Additionally, the audience perceives the reward for winning a game as an added achievement, supplementing moral fulfillment, creative self-expression, and realization of justice. Consequently, the best solutions to business challenges emerge during the gameful experience.

This study emphasizes that gamification is anticipated to enable and transform business efforts across organizations. A paradigm shift in thinking about how gamification and social activities can help increase employee engagement and generate better business outcomes is underway. Furthermore, the current study supports the idea that whether applied in educational, health, or business settings, gamification consistently focuses on customer behavior and experience. There is a wide range of business applications for gamification, from fostering communities and collaboration to enhancing customer service and support.

Managers should evaluate the clusters and future extensions provided by this study to understand what has been done and what can be planned further, ensuring that gamification becomes a future-proof method for guiding businesses towards more advantageous situations that promote sustainable development. The themes represented by various clusters offer valuable insights for managers and policymakers. Managers should conduct surveys to determine whether advances in gamification technology are promoting positive or negative behavior. Additionally, they should consider the future scope of each cluster for investigation.

6.4. Limitations and other future directions

The primary objective of this study was to understand the evolution of gamification in business research by highlighting its intellectual structure in the business context and suggesting possible areas of future explorations. We addressed each RQ through performance analysis and science mapping, which resulted in a unique and in-depth intellectual organization presented in the form of clusters. However, as with any research output, there are limitations to consider.

The co-citation analysis and bibliographic coupling were performed with a threshold of seven and five, respectively. As the field grows even larger, future research could alter the threshold and expand the data to gain deeper insights into gamification research. Future researchers can also explore the use of alternative tools instead of Bibliometric in R and VOSviewer to obtain additional clusters and expand the analysis. Options include CiteSpace, Gephi, HistCite, NodeXL, Pajek, or SciMAT, each of which offers distinct capabilities and might reveal additional clusters or offer expanded insights (e.g., hot and cold topics, temporal evolution).

While we provided several future research extensions, future studies

could investigate practical challenges in executing operations and propose models to fit gamification techniques in different business settings. Furthermore, exploring the key risks involved in applying gamification elements in different managerial settings and addressing privacy and security-related concerns could be a fruitful avenue for future research.

In conclusion, this study contributes to the understanding of gamification research in the business context by providing insights into its intellectual structure and suggesting potential areas for future exploration. However, further research is needed to address the limitations and expand our understanding of this rapidly evolving field.

CRediT authorship contribution statement

Wamika Sharma (Conceptualization, Investigation, Methodology, Data curation, Formal analysis, Visualization, Writing – Original draft); **Weng Marc Lim** (Conceptualization, Investigation, Methodology, Supervision, Validation, Writing – Original draft, editing, and writing); **Satish Kumar** (Conceptualization, Investigation, Methodology, Supervision, Writing – Editing and writing); **Aastha Verma** (Conceptualization, Investigation, Supervision, Writing – Editing and writing); **Rajeev Kumra** (Conceptualization, Investigation, Supervision, Writing – Editing and writing).

Declaration of competing interest

The authors declare no conflict of interest.

Data availability

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