



Recognized by: Higher Education Commission (HEC), Government of Pakistan

Unveiling Research Frontiers in In-Game Purchases: A Bibliometric Approach

Ms. Shehla Naureen *

Capital University of Science and Technology, Islamabad, Pakistan

shehlanaureen@gmail.com

<https://orcid.org/0009-0000-4844-0476>

Dr. Shazia Faiz

Capital University of Science and Technology, Islamabad, Pakistan

shazia.Faiz@cust.edu.pk

<https://orcid.org/0000-0001-7005-0505>

* Corresponding Author

ABSTRACT

The rapid advancement of digital technologies has significantly transformed the gaming industry, particularly through the integration of in-game purchases, which has impacted revenue strategies and player engagement. This study conducts a comprehensive bibliometric analysis of the in-game purchase literature using data exclusively from the Dimensions database. Relevant publications were collected, categorized, and analyzed using search terms such as "in-game purchases," "microtransactions," and "virtual goods." The analysis addresses research questions designed to elucidate temporal trends, influential authors, key journals, and major contributing countries in the field. Bibliometric tools, notably VOS viewer, were employed to map co-authorship networks, citation patterns, and keyword co-occurrence clusters to facilitate the identification of thematic concentrations within the field. The results illustrate the evolution of in-game purchase research over time, highlighting prominent authors, collaborative networks and primary publication venues. The study also revealed significant international variations in publication volume and citation impact. Thematic mapping uncovered clusters focused on psychological and behavioral effects, economic and design models, and regulatory and ethical considerations. By systematically presenting these trends, this study offers a comprehensive overview of the intellectual landscape surrounding in-game purchases, contributing to a deeper understanding of the intersection between technological, psychological, and economic perspectives in shaping academic discourse and industry practice. These findings provide valuable

insights for developers and policymakers and future research directions in the rapidly evolving fields of digital gaming and in-game monetization.

Keywords: In-game purchases, Microtransactions, Virtual goods, Bibliometric analysis, Player behavior

INTRODUCTION

Researchers have highlighted that the rapid advancement of emerging technologies has profoundly impacted the gaming industry, particularly in shaping player engagement and monetization practices (Makki et al., 2025). Among these advancements, in-game purchases have become a pivotal element of game design, transforming traditional revenue models and redefining the relationship between players and digital platforms. For over a decade, microtransactions and virtual economies have offered developers new avenues for generating sustainable income while simultaneously providing players with personalized experiences that extend beyond the initial game purchase. The industry has shifted from relying on one-time purchases to a dynamic ecosystem driven by continuous digital transactions. In-game purchasing, often facilitated through advanced algorithms and behavioral data, reflects not only economic strategies but also psychological mechanisms that influence player motivation, satisfaction, and decision making. Rahman emphasized, incorporating user feedback and behavioral insights is crucial for refining monetization models that align with players' preferences and foster meaningful engagement. The interplay between technology and psychology underscores the evolving complexity of player behavior, where choices are shaped by personalization, accessibility, and the immersive nature of digital environments. The integration of in-game purchases has also redefined market dynamics, offering valuable insights for developers, marketers and policymakers. Sustainable models that prioritize long-term player enjoyment and loyalty are increasingly considered essential, as they strengthen community trust and mitigate the risks associated with exploitative monetization strategies (Lim et al., 2025). Furthermore, as emerging technologies such as artificial intelligence, data analytics, and immersive platforms continue to advance, patterns of in-game purchasing are expected to evolve in more sophisticated ways, presenting both opportunities and ethical considerations. In this evolving paradigm, understanding the connection between player psychology, technological design, and economic strategies is critical. By highlighting current challenges and anticipating future shifts, this study provides a comprehensive perspective on in-game purchases, guiding the development of more engaging, responsible, and sustainable gaming ecosystems.(Lim et al., 2025).

As in-game purchasing becomes increasingly prevalent in the gaming industry, particularly with the advent of microtransactions, loot boxes, and subscription-based models, several concerns arise. Gui et al. (2025) note that although developers increasingly use behavioral data to refine monetization strategies, the complexity of player psychology makes it difficult to align commercial interests with user satisfaction. Effective monetization often requires advanced

analytics and targeted personalization, which may raise concerns about privacy and the potential exploitation of user data. Critics argue that aggressive in-game purchasing models can diminish the intrinsic enjoyment of gaming, distracting players from core gameplay and creating frustration and disengagement (Lim et al., 2025). Han et al. (2023) highlight further issues such as lack of transparency in pricing, cultural variations in payment acceptance, accessibility challenges, regulatory gaps, and overreliance on financial incentives for engagement (Sikka & Bhayana, 2024). Other scholars have noted that despite rapid advancements, many developers and players remain unaware of the long-term implications of these monetization models. For instance, (Lee & Seo, 2024) emphasizes that while AI-driven personalization in purchases may enhance short-term satisfaction, it risks reinforcing compulsive behaviors, particularly among younger audiences (Bojić et al., 2025). He points out the possibility that future monetization strategies may simulate highly adaptive user interfaces capable of understanding not only purchasing patterns but also emotional triggers, thereby amplifying both opportunities and risks in player engagement. As (Lee & Seo, 2024) argues, “gaming is not only about consumption, but also about creativity, expression, and community monetization practices must always consider these interpersonal and cultural dimensions.” (Woods, 2025) summarize the issue by stating that “no economic model is sufficient to capture the open-ended nature of play, highlighting the limitations of monetization as a framework for understanding gaming experiences. Since the early 2000s, research on digital monetization systems within gaming and economics literature has steadily increased, particularly with the expansion of online and mobile platforms. Initial studies primarily concentrated on the economic and design aspects of virtual goods and microtransactions. In contrast, more recent research delves into psychological, ethical, and regulatory dimensions (Hamari & Keronen, 2017). Despite extensive publications in digital economics, online consumption, and behavioral analytics, studies specifically addressing the intersection of player psychology and in-game purchasing have only recently gained momentum. This emerging trend serves as the primary motivation for this study.

Research Questions

1. What is the distribution of publications on in-game purchases across years, and how has the field evolved over time?
2. Who are the most influential authors in this domain, and what collaborative networks exist among them?
3. Which journals and publication outlets most frequently disseminate research on in-game purchasing?
4. What are the leading contributing countries, and how does their impact differ in terms of publication volume versus citation influence?
5. What thematic clusters emerge in the literature (e.g., psychological/behavioral impacts, economic models, regulation and ethics), and how are these distributed across different research communities?

METHODOLOGY

In this study, a bibliometric analysis was conducted using the document review method, a qualitative research technique that enables the systematic gathering and examination of data through the analysis of written documents and records that illuminate real-world phenomena (Nobanee et al., 2024). According to Block and Fisch (2020), a bibliographic review is an observational, retrospective, and systematic approach designed to select, analyze, interpret, and discuss theoretical perspectives, findings, and conclusions from scientific articles published in recent years, with the aim of generating insights to address a specific research issue. The primary data source for this research was the Dimensions database, with additional academic sources used as required. The search terms included “in-game purchases,” “microtransactions,” and “virtual goods.” The publications were filtered and organized based on relevance, citation count, and publication year. To identify broader patterns, bibliometric tools were used to examine the publication trends, citation structures, co-authorship networks, and thematic clusters. Additionally, this study involved a comparative analysis of various gaming genres to uncover unique patterns and strategies related to in-game purchases on different platforms. This comparative approach provides insights into how player demographics, cultural differences, and social contexts affect purchasing behaviors and preferences in digital environments. Such an analysis uncovers the diverse motivations behind in-game purchases, emphasizing how community dynamics, cultural backgrounds, and individual needs influence the spending behavior. According to Duguleană et al. (2024) classification of bibliographies, this work can be categorized as a “completed” bibliography (as it was compiled from materials published within specific dates), a “special” bibliography (as it focuses solely on in-game purchases and related monetization strategies), and a chronologically arranged bibliography (organized by the publication years of the selected works). As Fendt (2025) notes, whether research is cumulative or disruptive, building on previous findings is essential for advancing knowledge.

Data Selection

Research data were exclusively obtained from the Dimensions database, which is renowned for its comprehensive coverage of scholarly works across multiple fields. To ensure the reliability and academic rigor of the study, specific inclusion and exclusion criteria were applied to select the studies. Initially, only studies published from 2013 to 2023 were included, capturing a decade marked by growing scholarly interest in the subject. Additionally, the search was limited to English-language publications to ensure analytical consistency. The search terms “in-game purchases,” “microtransactions,” and “virtual goods” were used to locate pertinent literature in the titles, abstracts, and keywords. Publications that broadly discussed gaming without directly focusing on the in-game purchasing mechanisms were excluded. Only studies with full texts or accessible abstracts were considered. Non-peer-reviewed sources such as blogs, opinion pieces, and media articles were excluded to maintain academic integrity. Finally, the selected dataset was analyzed

using VOS viewer, a bibliometric tool that facilitates the visualization and mapping of research trends. This analysis helped identify influential authors, highly cited journals, leading countries, and thematic clusters, offering a structured and comprehensive understanding of this field.

DATA ANALYSIS

In this study, the gathered data were systematically categorized and arranged according to the criteria specified in the research questions. Quantitative data obtained from the publications were directly displayed using frequency (f) and percentage (%) tables to clearly depict the publication trends. For the analysis of data related to the 3rd and 4th research questions concerning keyword distribution and subject area classification the content analysis method was applied. The extracted data were sorted into specific themes and visualized through graphic tables to highlight the significant patterns and thematic clusters. The term “Null” was used to indicate cases where information was unavailable in the database. VOSviewer bibliometric software was used to analyze and visualize co-authorship networks, keyword co-occurrence maps, and citation structures. This approach facilitated the identification of publication trends, influential authors, and thematic concentrations in the research field. The combination of statistical and bibliometric visualization techniques ensured a comprehensive interpretation of the data by integrating both descriptive and structural insights.

FINDINGS

Table I. Distribution of Publications by Most Prolific Authors

Rank	Author	Documents	Citations	Total Link Strength
1	Zendle, David	12	711	387
2	King, Daniel L.	16	532	267
3	Delfabbro, Paul	10	427	63
4	Hing, Nerilee	13	335	287
5	Chen, Hong	9	313	12
6	Drummond, Aaron	9	298	253
7	Long, Ruyin	7	298	12
8	Close, James	7	192	299
9	Lloyd, Helen	7	192	299
10	Lloyd, Joanne	7	192	299

Table 1 shows the distribution of Publications by Top cited authors. The analysis identified several influential scholars in the realm of in-game purchases. Among the most frequently cited authors, David Zendle (711 citations), Daniel L. King (532), and Paul Delfabbro (427) stood out as particularly impactful. Other significant contributors included Nerilee Hing (335) and Aaron Drummond (298). Notably, a group of scholars, including James Close, Helen Lloyd, Joanne Lloyd, Laura Louise Nicklin, and Stuart Gordon Spicer, exhibited identical citation and link strength values, indicating strong collaboration within the same research domain.

These findings underscore the prominence of a select group of leading researchers whose work significantly shapes the ongoing discourse on in-game purchasing behavior. Figure A also highlight these in their Density visualization view.

Figure A. Top Authors (Density Visualization)

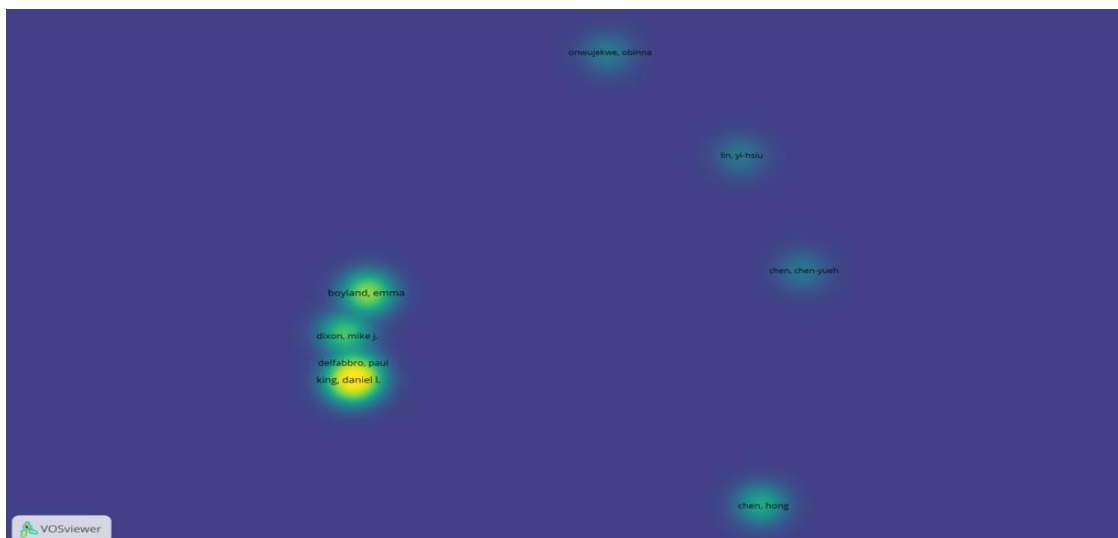


Table II. Distribution of Publications by Most Prolific Journals

Rank	Journal Name	Documents	Citations	Total Link Strength
1	Psychological Science	10	3125	8
2	Journal of Personality and Social Psychology	8	2601	5
3	Proceedings of the National Academy of Sciences of the USA (PNAS)	11	1805	3
4	Frontiers in Psychology	110	1301	83
5	International Journal of Environmental Research and Public Health	81	1399	100
6	Journal of Gambling Studies	77	1428	182
7	PLOS One	204	1740	161
8	Scientific Reports	97	1137	82
9	Addictive Behaviors	21	1057	253
10	Journal of Environmental Management	57	1224	33

Table II shows, research on in-game purchases spans a range of multidisciplinary outlets. Among the most cited journals are Psychological Science (3,125 citations), Journal of Personality and Social Psychology (2,601 citations), and Proceedings of the National Academy of Sciences (PNAS) (1,805 citations). Domain-specific journals, such as the Journal of Gambling Studies (1,428), Frontiers in Psychology (1,301), and Addictive Behaviors (1,057), also feature prominently, highlighting the intersection of psychological, behavioral, and health perspectives in this field. General science platforms, such as PLOS One (1,740) and Scientific Reports (1,137), further enhance visibility. The presence of both specialized and broad-scope journals indicates that the study of in-game purchases appeals to niche research communities and broader interdisciplinary audiences.

Figure B. Top Journals (Density Visualization)

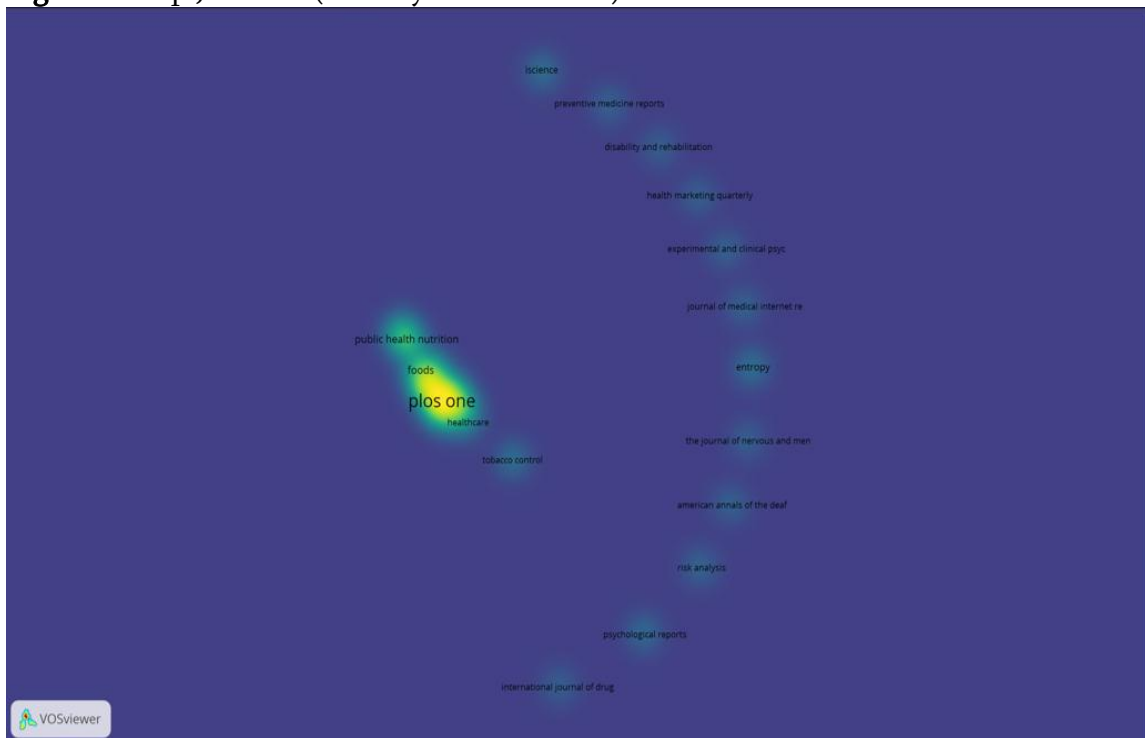


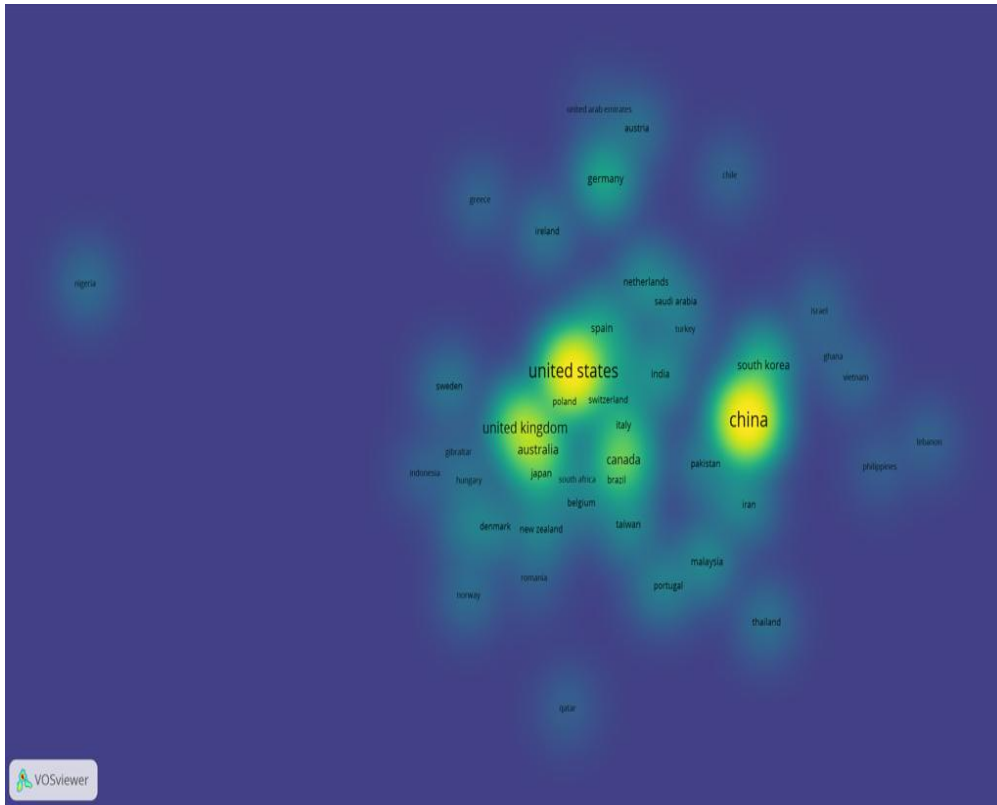
Table III. Distribution of Publications by Most Prolific countries

Rank	Country	Documents	Citations	Total Link Strength
1	United States	644	21,624	681
2	United Kingdom	274	7,372	957
3	China	749	6,730	283
4	Canada	177	5,516	486

Rank	Country	Documents	Citations	Total Link Strength
5	Australia	172	3,527	818
6	Germany	82	1,576	106
7	Netherlands	41	1,477	82
8	Japan	46	795	140
9	Spain	63	1,026	150
10	Denmark	24	1,011	211

At the national level, the United States led with the highest number of citations (21,624), followed by the United Kingdom (7,372) and China (6,730). While China produced the largest volume of documents (749), the United Kingdom and Australia demonstrated a comparatively higher citation impact relative to their output, underscoring their significant roles in shaping global discourse. Canada (5,516 citations) and Australia (3,527 citations) ranked among the top contributors. European countries, such as Germany, the Netherlands, Spain, and Denmark, featured within the top ten, reflecting strong engagement from Western research communities. Denmark's relatively small publication volume but high citation count (1,011 from 24 documents) indicates a substantial impact of each article. Table III states all Top Countries, and Figure C is also demonstrating the Density visual.

Figure C. Top Countries



Furthermore, Figure D and E are showing the key words and documents view analysis vis Vos viewer to be searched in Density and Overlay Visualization

Figure D. Overlay Visualization

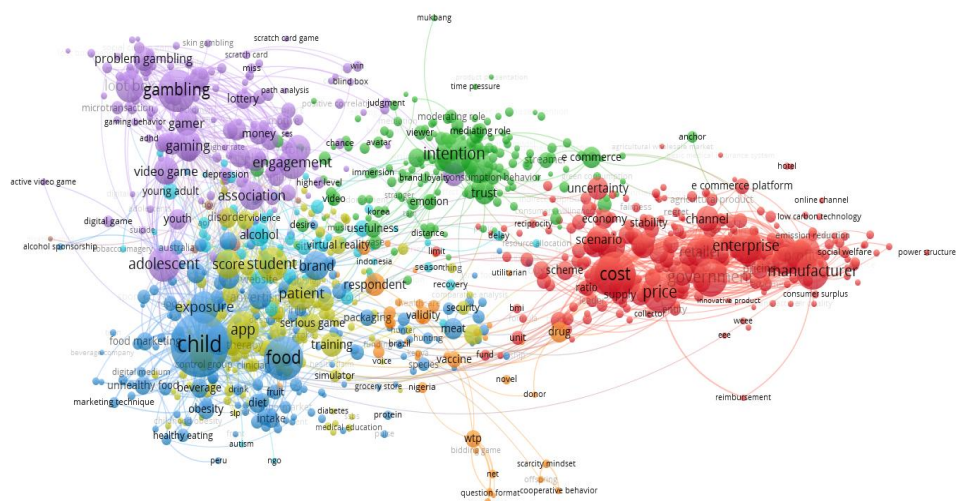
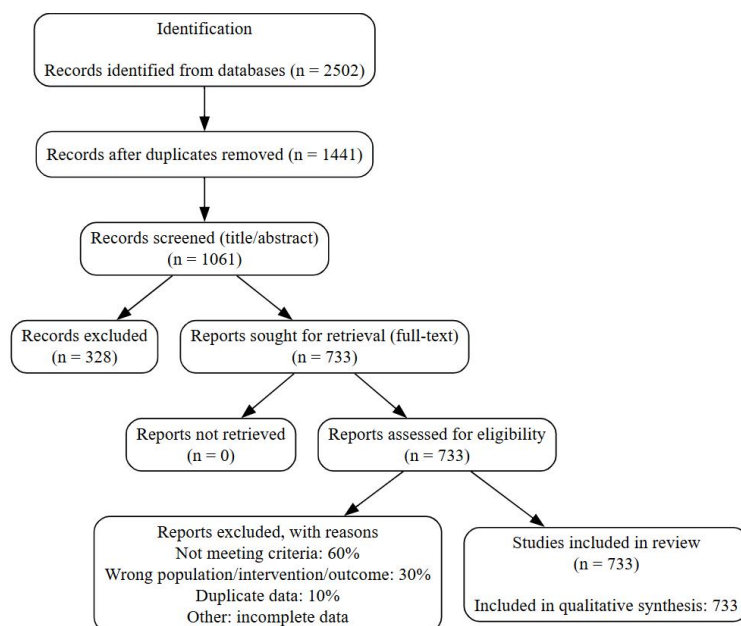


Figure E. Density Visualization

purchases, especially loot boxes and micro transactions, on player motivation, risk-taking, and behaviors akin to gambling (Çetiner & Çalışkan, 2025); Gibson et al. (2022). This cluster is strongly associated with prominent authors like Zendle et al. (2020); Zendle et al. (2021) and is frequently published in journals such as *Addictive Behaviors* and the *Journal of Gambling Studies*. Economic Models and Industry Practices. Another key cluster examines the monetization strategies employed by gaming companies, including the design of reward systems, pricing models, and the broader economic consequences of digital micro transactions. Research in this area often appears in multidisciplinary journals like *PLOS One*, *Scientific Reports*, and *Frontiers in Psychology*, indicating its broad appeal. Regulation, Ethics, and Policy. The third cluster focuses on the ethical issues and regulatory challenges related to in-game purchases, particularly the blurred boundary between gaming and gambling. Studies in this field address consumer protection, age restrictions, and responsible gaming policies, often featuring contributions from European and Australian research communities, where regulatory discussions are particularly active. Collectively, these clusters demonstrate that the study of in-game purchases is not confined to a single disciplinary perspective but rather represents a multidisciplinary research domain. It integrates insights from psychology, marketing, information systems, law, and behavioral economics to understand player motivation, design ethics, and policy implications. This convergence underscores the evolving nature of digital consumption behavior and highlights the need for cross-sector collaboration to ensure a balanced approach between commercial innovation and ethical responsibility in the gaming industry.

PRISMA



The PRISMA flow diagram shows the methodical procedure used to find and hone the body of research that was part of this bibliometric analysis. After a thorough screening and eligibility check, only 733 studies were kept for analysis out of the original 2,502 entries. This methodical technique improves the review's reproducibility and transparency. The comparatively large percentage of exclusions owing to noncompliance with inclusion criteria (60%) indicates that a significant fraction of the published literature was unrelated to the research topic, highlighting the necessity for additional focused investigations in this area. The completed dataset offers a strong and representative basis for mapping the field's thematic evolutions, collaboration patterns, and research trends.

DISCUSSION

The bibliometric analysis shows the expansion of research on in-game purchases, reflecting the growing influence of digital gaming and micro transaction models on consumer behavior. Academic output has increased, aligning with trends in online gaming, virtual goods and the metaverse. Authors David Zendle, Daniel L. King, and Paul Delfabbro shape the discourse on in-game purchases, researching psychological and behavioral impacts of micro transactions. Their work with Nerilee Hing and Aaron Drummond explores gaming-gambling intersections and problematic purchasing behaviors. Collaborative clusters, including James Close, Helen Lloyd, Joanne Lloyd, Laura Louise Nicklin, and Stuart Gordon Spicer, reveal emerging research networks. Publication outlets reflect the field's multidisciplinary nature, with generalist journals such as *Psychological Science* and specific outlets such as the *Journal of Gambling Studies* publishing research on psychological and policy dimensions. The United States leads in terms of publications and citations, while the UK and Australia show a high impact relative to volume. China has a high number of publications but a low citation impact, indicating its potential for global

integration. Denmark demonstrates a strong influence despite its smaller output, highlighting the dominance of Western countries while suggesting opportunities for broader engagement. Research clusters on psychological impacts, economic models, and regulatory concerns show the multifaceted nature of in-game purchase studies. Research highlights micro transactions' role in user engagement and revenue, while raising concerns over gambling-like mechanisms and problematic spending. As gaming expands into the metaverse, these debates will likely intensify. Several gaps remain: long-term effects on player satisfaction and retention are underexplored, cross-cultural comparisons are limited, and ethical discussions remain reactive rather than proactive in nature. Future research requires longitudinal studies, comparative analyses, and interdisciplinary collaborations linking psychology, economics, law, and digital policy. This diversity underscores the complex role of in-game purchases in the digital economy.

Future Research Directions

Future investigations should move beyond existing issues to fill several significant gaps in the current literature. Firstly, the ethical considerations surrounding in-game purchases, particularly their effects on vulnerable populations such as children and teenagers, need more thorough examination. Research should assess not only the potential for financial exploitation and gambling-like features but also the success of consumer protection measures and regulatory actions. Secondly, longitudinal research is essential to gain a deeper understanding of the long-term impacts of in-game purchasing on player well-being, gaming satisfaction, and retention. This type of study could determine whether micro transactions contribute to or detract from ongoing engagement with digital games over time. Thirdly, cross-cultural and comparative research should explore how cultural, regulatory, and economic factors shape purchasing behaviors and their outcomes. This would help distinguish between universal and context-specific trends in gaming-related consumption. Lastly, with the rise of immersive environments and the metaverse, future studies should investigate how new technologies (e.g., VR, AR, blockchain-based economies) are changing the nature of in-game purchases. This includes analyzing new forms of digital ownership, virtual economies, and their psychological and social impacts.

CONCLUSION

This bibliometric analysis highlights the growing academic interest in in-game purchases, underscoring their crucial role in shaping the contemporary gaming industry. The findings indicate that research in this domain spans diverse fields, including psychology, behavioral sciences, health studies and economics, reflecting its multifaceted nature. Influential authors, leading journals, and key contributing countries have collectively advanced the discourse, particularly in areas such as the psychological impact of microtransactions, economic significance of virtual goods, and ethical and regulatory challenges associated with loot boxes and similar mechanisms. As the metaverse and other immersive digital environments continue

to expand, in-game purchases are anticipated to become even more integral to both user experience and business strategies. However, gaps remain in understanding the long-term effects of these purchasing practices, especially among younger and more vulnerable populations. Addressing these challenges requires interdisciplinary collaboration, cross-cultural insights, and innovative strategies. Ongoing research in this field is essential to ensure that in-game purchasing systems evolve in ways that are both economically viable and socially responsible.

REFERENCES

- Block, J. H., & Fisch, C. (2020). Eight tips and questions for your bibliographic study in business and management research. *Management Review Quarterly*, 70(3), 307-312.
- Bojić, L., Matthes, J., Samala, A. D., & Čabarkapa, M. (2025). The dual impact of virtual reality: examining the addictive potential and therapeutic applications of immersive media in the metaverse. *Information, Communication & Society*, 1-33.
- Çetiner, B., & Çalışkan, A. (2025). Motivators Affecting Pokemon Go Players' In-Game Purchase Intentions Using Microtransactions. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 25(1), 295-314.
- Duguleană, A. R., Tănăsescu, C. R., & Duguleană, M. (2024). Emerging trends in play-to-earn (P2E) games. *Journal of Theoretical and Applied Electronic Commerce Research*, 19(1), 486-506.
- Fendt, J. (2025). Embracing emergence in qualitative meta-analysis: A guide to higher-order synthesis. *Methodological Innovations*, 20597991251352414.
- Gibson, E., Griffiths, M. D., Calado, F., & Harris, A. (2022). The relationship between videogame micro-transactions and problem gaming and gambling: A systematic review. *Computers in Human Behavior*, 131, 107219.
- Gui, Y., Zhao, S., & Hoyt, G. (2025). How Effectively Can We Encourage Players to Pay to Win? International Conference on Human-Computer Interaction,
- Hamari, J., & Keronen, L. (2017). Why do people play games? A meta-analysis. *International Journal of Information Management*, 37(3), 125-141.
- Lee, C. S., & Seo, H. (2024). Being social for whom? Issues of monetization, exploitation, and alienation in mobile social games. *Journal of Consumer Culture*, 24(1), 82-99.
- Lim, W. M., Das, M., Sharma, W., Verma, A., & Kumra, R. (2025). Gamification for sustainable consumption: a state-of-the-art overview and future agenda. *Business Strategy and the Environment*, 34(1), 1510-1549.
- Makki, M., Jafari, M., & Parsanejad, M. (2025). Marketing strategies and dynamics in online mobile gaming: a diffusion model. *Internet Research*.
- Nobanee, H., El Maknouzi, M. E. H., Sadok, H., & Alodat, A. Y. (2024). Analysis of insurance entrepreneurship as a hedge in times of crisis: a literature review. *Sustainable Technology and Entrepreneurship*, 3(2), 100065.
- Sikka, V., & Bhayana, P. (2024). Barriers to comprehensive financial inclusion across

- the globe: From sociocultural norms to systemic challenges. In *E-Financial strategies for advancing sustainable development: Fostering financial inclusion and alleviating poverty* (pp. 89-126). Springer.
- Woods, O. (2025). The experiential value of gambling in f2p gamespaces. *Convergence*, 13548565251320477.
- Zendle, D., Meyer, R., Cairns, P., Waters, S., & Ballou, N. (2020). The prevalence of loot boxes in mobile and desktop games. *Addiction*, 115(9), 1768-1772.
- Zendle, D., Walasek, L., Cairns, P., Meyer, R., & Drummond, A. (2021). Links between problem gambling and spending on booster packs in collectible card games: A conceptual replication of research on loot boxes. *Plos one*, 16(4), e0247855.