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Game Startup Business Sustainability Through Strategy, Innovation, and SDGs Orientation: A Bibliometric Analysis

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Abstract

Background: The digital creative industry requires game startups to achieve business sustainability while responding to technological change, market uncertainty, platform dependence, and sustainability demands. However, literature remains fragmented across strategic management, innovation, entrepreneurship, competitive advantage, and Sustainable Development Goals (SDGs), leaving the integrated structure of game startup sustainability insufficiently mapped.

Objective: This study aims to map the development, conceptual structure, thematic evolution, and collaborative landscape of game startup business sustainability research through strategy, innovation, competitive advantage, and SDGs orientation.

Methods: A descriptive quantitative design using bibliometric analysis was employed. The dataset comprised 1,269 scientific publications retrieved from the Dimensions database for 2017–2026. Bibliographic metadata were analyzed using VOSviewer through annual publication trends, keyword co-occurrence, density visualization, temporal overlay analysis, and collaboration networks involving countries, authors, and organizations.

Results: Publication output increased from 25 articles in 2017 to 275 in 2025, indicating growing scholarly attention. Keyword mapping identified interconnected themes involving business models, capabilities, performance, entrepreneurship, policy, investment, innovation, and sustainable development. Temporal analysis revealed emerging attention to artificial intelligence, transformation, governance, policymaking, investment, resilience, and infrastructure. International collaboration was broad, although contributions remained concentrated among established research systems, while Indonesia occupied a comparatively less central position.

Conclusion: Game startup business sustainability constitutes a multidisciplinary research domain integrating strategic management, innovation, digital entrepreneurship, institutional ecosystems, and sustainable development. The findings provide a conceptual foundation for future empirical research on sustainable adaptive strategy, sustainable business model innovation, competitive advantage, and sustainability outcomes, particularly in emerging economies and policy development in Indonesia.

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INTRODUCTION

Game startups are no longer merely providers of entertainment; they have become important drivers of innovation and value creation within the digital creative economy. However, survival in this highly volatile industry requires more than the development of engaging products. These firms operate under continuous pressure from shifting consumer preferences, dependence on digital platforms, unstable funding cycles, and short product life cycles. Studies on small businesses and startups in the digital era show that resilience is closely related to digital transformation, marketing capabilities, adaptability, and the capacity to respond to disruptive environments (Hokmabadi et al., 2024). Research on entrepreneurial startups also emphasizes that long-term viability is shaped by internal strategic resources and external ecosystem conditions, including technology dynamics, institutional support, and competitive pressure (Manolopoulos et al., 2025). In this context, the timing of strategic pivots becomes critical, as early and well-informed adjustments may determine whether a studio survives or fails.

Sustainability in the gaming industry cannot be understood solely as economic survival. It also requires the creation of enduring economic, social, and environmental value. Sustainable business model innovation is widely discussed as a mechanism for creating shared business and social value, improving sustainable corporate performance, and supporting long-term sustainability outcomes (Zhou et al., 2023). This dual demand is particularly evident in both global and emerging markets. In developing digital economies such as Indonesia, game startups face additional challenges, including limited funding access, fragmented ecosystem support, and infrastructure constraints, while also competing with established international firms. Therefore, their survival depends on the interaction between internal capabilities, such as sustainable value marketing, technological agility, and customer understanding, and the external conditions of the entrepreneurial ecosystem (Hokmabadi et al., 2024; Manolopoulos et al., 2025).

Game startups operate at the intersection of strategic management, digital entrepreneurship, and the Sustainable Development Goals (SDGs). Lean methods, rapid experimentation, and structured learning help studios respond to market shocks and adjust their business models. Nevertheless, these internal mechanisms do not function in isolation. The broader entrepreneurial ecosystem, including incubators, government policies, funding networks, human capital, strategic capital, and partnerships, can either support or constrain sustainable growth (Manolopoulos et al., 2025). Studies on digital transformation and startup resilience further show that digital capabilities, organizational adaptability, and marketing capabilities help small businesses and startups withstand disruption and seize new opportunities (Hokmabadi et al., 2024). For this reason, the sustainability of game startups must be examined through both firm-level strategies and institutional conditions.

From a strategic management perspective, game startup sustainability can be understood through the firm's ability to read environmental change, mobilize resources, and transform capabilities into lasting competitive advantage. Strategic management literature explains that competitive advantage depends on resources, capabilities, innovation, business models, platforms, and the ability to adapt strategy under changing conditions (Rothaermel, 2017; Whittington et al., 2020). This perspective is especially relevant to game development because the industry depends on iterative design, continuous player engagement, and frequent product updates. As a result, business model innovation becomes a central requirement. Business model innovation research emphasizes that firms must continuously redesign how they create, deliver, and capture value, particularly when technology, customer expectations, and competitive conditions change (Amit & Zott, 2020). Studios must therefore continually reconsider how they create and capture value through

monetization strategies, network effects, platform relationships, and ecosystem collaboration.

Integrating an SDG orientation adds an important layer of accountability to game startup sustainability. A sustainable game startup should not only pursue market growth, but also contribute to responsible production, decent work, accessible digital communities, and user well-being. Studies on sustainable business model innovation show that sustainability must be embedded into value proposition, value creation, value delivery, and value capture rather than treated as a separate activity (Zhou et al., 2023). However, the use of digital technology alone does not guarantee sustainable outcomes. Research on digital transformation and startup resilience indicates that technology must be supported by capabilities, strategic alignment, and organizational learning to produce durable results (Hokmabadi et al., 2024). Without clear governance mechanisms and impact assessment, sustainability claims in the technology sector may become symbolic rather than substantive.

Despite the growing relevance of game startup sustainability, previous bibliometric studies have not specifically examined how strategic adaptation, business model innovation, organizational capabilities, institutional ecosystem support, and sustainable development goals interconnect as an integrated framework for understanding game startup business sustainability. While empirical research exists on entrepreneurial startups, digital transformation, and sustainability separately, the bibliometric literature has yet to map the conceptual and thematic structure of game startup sustainability as a multidisciplinary field. This represents a critical gap in understanding what scholarly attention reveals about how these interconnected dimensions are theorized and researched.

To address this gap, this study maps the literature on game startup business sustainability through the interconnected lenses of adaptive strategy, competitive advantage, and the SDGs. Using bibliometric analysis, the study identifies the field's foundational structure, dominant themes, emerging trends, and research gaps. This approach is appropriate because the existing literature on startups, digital transformation, business model innovation, strategic ecosystems, and sustainability is broad but fragmented across different theoretical and empirical traditions (Hokmabadi et al., 2024; Manolopoulos et al., 2025; Zhou et al., 2023). This mapping positions game startup sustainability within broader debates on responsible value creation and provides a conceptual foundation for future empirical research and policy development.

This bibliometric study addresses four research questions by examining the key publication trends in game startup business sustainability research, exploring how core research themes such as strategy, innovation, competitive advantage, and sustainability are structured and interconnected, analyzing the temporal evolution of research priorities, and investigating how countries, authors, and institutions collaborate in this emerging field.

METHOD

This study employed a descriptive quantitative research design using a bibliometric approach to map the development of scholarly literature on game startup business sustainability through the lenses of strategy, innovation, and Sustainable Development Goals (SDGs) orientation. Bibliometric analysis was considered appropriate because the study does not seek to test causal relationships empirically, but rather to identify the intellectual structure, publication patterns, collaboration networks, and thematic trajectories that have shaped research on game startup business sustainability, strategic management, innovation, and SDG-oriented value creation. This methodological choice is consistent with prior bibliometric studies that position bibliometric analysis as a systematic technique for mapping the evolution, conceptual structure, influential contributors, and future directions of a research field (Correggi et al., 2024; Kitsios et al., 2020; Piwowar-Sulej et al., 2021). This bibliometric approach maps the evolution of scholarly literature and conceptual structures in game startup business sustainability research. It does not directly measure startup

performance, sustainability outcomes, or the effectiveness of specific strategies. Rather, it analyzes how researchers conceptualize and interconnect game startup sustainability with strategic, organizational, institutional, and sustainability-oriented frameworks.

The unit of analysis consisted of scientific documents retrieved from the Dimensions database using a keyword combination that reflected the research focus, including game, startup, business, sustainability, strategy, management and organizational behavior, industry, innovation and infrastructure, responsible consumption and production, climate action, sustainable cities and communities, decent work and economic growth, and good health and well-being. This search process yielded 1,269 documents, which were subsequently used as the bibliometric dataset. The research instruments comprised the literature search protocol, document inclusion criteria, bibliographic metadata extracted from Dimensions, and VOSviewer as the software for bibliometric mapping and visualization. The data collection procedure involved entering the predetermined keywords into Dimensions, limiting the results to scientific documents relevant to the research scope, and exporting bibliographic metadata in a format compatible with VOSviewer. The exported metadata included titles, abstracts, keywords, author names, organizational affiliations, countries, publication sources, publication years, and citation information. The dataset was then checked to ensure metadata readability, topical relevance, and the completeness of bibliographic elements required for consistent analysis. Data analysis was conducted using VOSviewer to generate network, overlay, and density visualizations based on keyword co-occurrence, authorship, organizational affiliation, country collaboration, and document relationships. Network analysis was used to examine conceptual and actor relationships within the literature, overlay analysis was applied to identify temporal thematic development, and density analysis was used to locate highly concentrated research areas as well as themes with further development potential. In addition, annual publication trends were analyzed to understand the growth dynamics of the field and to relate these trends to prior studies emphasizing adaptive strategy, business model innovation, ecosystem support, sustainable dynamic capabilities, and SDG-aligned value creation in digital and entrepreneurial contexts (Argaw & Liu, 2024; Balzano et al., 2025; Correggi et al., 2024; Gouveia et al., 2024; Mick et al., 2024). Through this procedure, the study offers a replicable bibliometric protocol based on a clearly defined data source, search strategy, unit of analysis, metadata structure, and visual mapping technique.

Given the broad search terms, a two-stage screening procedure was implemented, beginning with an evaluation of titles and abstracts to exclude publications focusing on commercial gaming without a startup context, startups without a specific focus on the game industry, sustainability disconnected from business strategy, or studies lacking integration of the game, startup, and sustainability dimensions. In the second stage, a full-text review was conducted to confirm that the retained documents addressed at least two core dimensions, namely strategic adaptation, organizational capabilities, or ecosystem support. This screening process ensured that the 1,269 included publications substantively addressed game startup business sustainability.

RESULTS AND DISCUSSION

Result

Publication Trends

The Dimensions search retrieved 1,269 publications based on the terms *game*, *startup*, *business*, and *sustainability*, combined with the Strategy, Management and Organizational Behavior category and selected SDG categories for the 2017–2026 period.

As shown in table 1, annual publication output generally increased from 25 publications in 2017 to 275 in 2025, although there was a small decline in 2022. The 129 publications recorded for 2026 should be interpreted cautiously because the data were exported on 27 June 2026 and therefore represent an incomplete year.

Table 1
Annual Publication Output

Year	Number of Publications
2017	25
2018	28
2019	38
2020	83
2021	119
2022	113
2023	167
2024	223
2025	275
2026*	129

Note: The 2026 data were incomplete at the time of export.

Overall, the annual pattern indicates modest research activity between 2017 and 2019, followed by stronger growth from 2020 onwards. After the minor decline in 2022, publication output increased again in 2023 and reached its highest point in 2025. Because the 2026 data cover only part of the year, It could not be compared directly with complete annual totals.

Keyword Co-occurrence Network

The keyword co-occurrence visualization presents a broad and connected structure centered on business model, business model innovation, capability, performance, entrepreneurship, policy, investment, startup, and sustainable development. These keywords show that the literature brings together strategic, organizational, entrepreneurial, institutional, technological, and sustainability-related concerns.

As shown in figure 1, on the left side of the network, the dominant terms relate to *business-model development, organizational transformation, circular economy, sustainable innovation, adoption, integration, operations, supply chains, and blockchain*. Together, these terms point to a theme concerned with *value-creation innovation and sustainability-oriented business practices*.

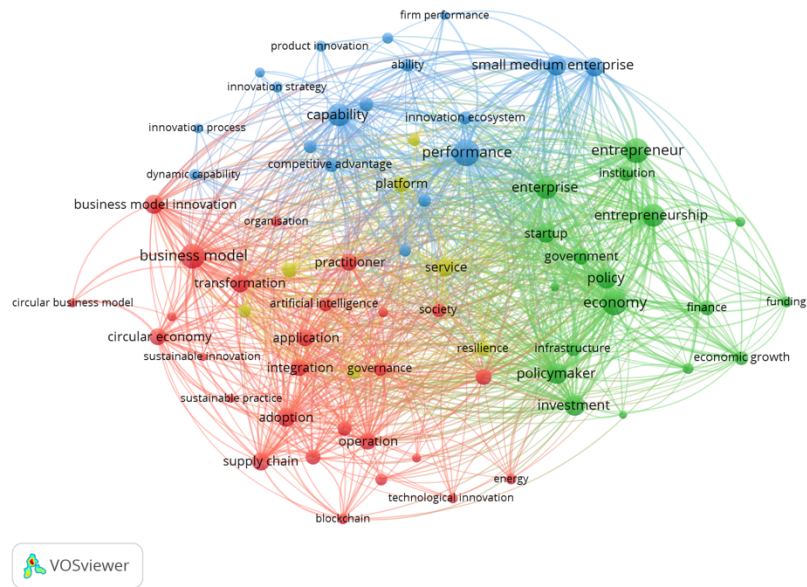
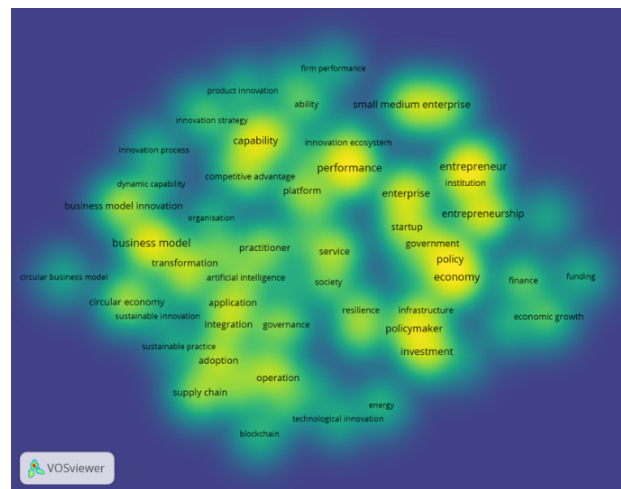


Figure 1. Network Visualization of the keywords

The central and lower areas connect *startup, society, resilience, governance, service, energy, and technological innovation*. These links show how organizational and entrepreneurial themes intersect with societal, governance, technological, and sustainability issues. The color clusters reinforce this structure. The red cluster relates to business models and transformation; the blue cluster to capabilities, performance, innovation strategy, and small and medium enterprises; the green cluster to entrepreneurship, policy, institutions, and investment; and the yellow cluster to society, service, governance, and practice. The connections among these clusters suggest an interdependent knowledge structure.

The density visualizations identify the strongest concentrations around *business model*, *capability*, *performance*, *entrepreneur*, *entrepreneurship*, *policy*, *economy*, *investment*, *application*, *integration*, *operation*, and *supply chain*. As shown in figure 2, *Business model* appears in a high-density area close to *business model innovation*, *circular economy*, *transformation*, *artificial intelligence*, *application*, and *integration*. This indicates strong connections among business-model issues, organizational change, and technological transformation.



Resilience is concentrated near *society, service, governance, infrastructure*, and *technological innovation*, while *circular economy* appears close to *sustainable innovation, sustainable practice, circular business model*, and *supply chain*. Yellow represents the highest density, green an intermediate level, and blue a lower level.

Temporal Development of Research Themes

The overlay visualization presents the average temporal distribution of keywords from approximately 2022 to 2024. In this map, blue represents earlier terms, green indicates intermediate terms, and yellow marks more recent terms.

As shown in figure 3, earlier terms include *business model innovation*, *business model*, *capability*, *performance*, *small and medium enterprise*, *entrepreneur*, *entrepreneurship*, *policy*, *economy*, *finance*, and *supply chain*. These terms form the established foundation of the literature.

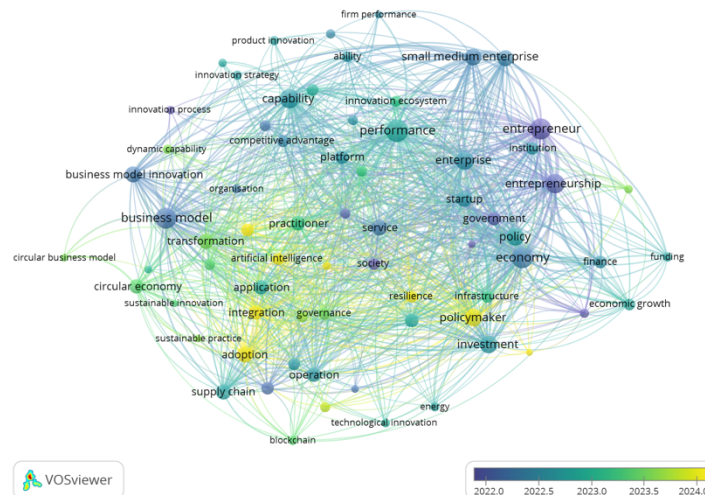


Figure 3. Overlay Visualization of the Keywords

Intermediate terms include *circular economy*, *sustainable innovation*, *product innovation*, *innovation strategy*, *platform*, *startup*, *service*, *society*, *resilience*, *infrastructure*, and *technological innovation*. Their presence shows the field's movement towards sustainability, platforms, resilience, and technology. Recent terms include *transformation*, *artificial intelligence*, *application*, *governance*, *policymaker*, and *investment*. These terms relate to *integration*, *practitioner*, *economy*, *infrastructure*, *resilience*, *energy*, *government*, *institution*, *entrepreneurship*, and *finance*.

Overall, the map indicates a shift from established themes around business models, capabilities, entrepreneurship, finance, and policy towards newer attention to artificial intelligence, transformation, governance, investment, resilience, and infrastructure. Even so, earlier themes remain central and continue to provide the basis for newer developments.

Country, Author, and Organizational Collaboration Network

The country collaboration network indicates broad international collaboration, with prominent nodes including the United Kingdom, China, the United States, Italy, Germany, Australia, France, India, Brazil, the Netherlands, Spain, and Indonesia. The United Kingdom appears as the most central and visible node, while China, the United States, Italy, and Germany also show wide connections across the network. Their links with European, Asian, and American partners indicate strong cross-regional collaboration. Indonesia is in the lower-left part of the network and is connected with countries such as Malaysia, Vietnam, Thailand, Bangladesh, Taiwan, South Korea, Pakistan, Saudi Arabia, and Australia. This position shows Indonesia's involvement in both regional and wider international research relationships. Other visible countries include Greece, the United Arab Emirates, Cyprus, Iran, Russia, Turkey, Japan, Chile, Canada, Norway, Poland, Austria, Nigeria, Portugal, South Africa, Finland, Switzerland, Sweden, and Denmark. The colors represent collaboration clusters, while the lines show relationships among countries in the dataset.

The author visualizations present a small and concentrated collaboration network involving Laura Broccardo, Reeti Agarwal, Sushant Kumar Vishnoi, Varun Chotia, Rsha

Alghafes, Naveen Virmani, Arvind Upadhyay, and Sunil Luthra. The network forms three main clusters: a left green cluster linking Laura Broccardo with Reeti Agarwal, a central red cluster connecting Sushant Kumar Vishnoi, Varun Chotia, Rsha Alghafes, and Naveen Virmani, and a right blue cluster involving Arvind Upadhyay and Sunil Luthra. Varun Chotia appears to act as an important connector, while the network lines indicate collaborative or bibliographic relationships among the authors.

The organizational network includes universities and research institutions from several regions, such as the University of Turin, University of Nicosia, Indian Institute of Technology, Universidade de São Paulo, Technical University of Berlin, Maastricht University, Polytechnic di Milano, Delft University of Technology, Copenhagen Business School, University of Science and Technology, and Hong Kong Polytechnic University. The University of Turin and University of Nicosia appear in the left green cluster, while Universidade de São Paulo and Technical University of Berlin are positioned in the lower-left area. Maastricht University is visible in the upper-central area, and Polytechnic di Milano occupies a central position linked with institutions such as the University of Lisbon, Paris School of Business, Queensland University of Technology, and NEOMA Business School. Lund University, Delft University of Technology, University of St. Gallen, Vrije Universiteit Amsterdam, Copenhagen Business School, University of Science and Technology, and Hong Kong Polytechnic University are positioned mainly on the right side. The colors indicate organizational clusters, while the lines represent relationships among institutional affiliations

Discussion

Growth and Consolidation of the Research Field

Annual publication patterns show that research on startups, business sustainability, strategy, innovation, and the SDGs has grown from a limited area into a rapidly expanding multidisciplinary field. The rise from 25 publications in 2017 to 275 in 2025, especially after 2020, indicates the consolidation of startup sustainability as a strategic management and entrepreneurship issue.

This growth reflects the uncertainty faced by digital ventures, which must respond to market volatility, resource constraints, rapid technological change, and pressure to adapt their value propositions and operating models. Hadizadeh et al. (2024) highlight the role of digital platforms in supporting sustainable entrepreneurship, innovation, collaboration, and market access in emerging economies. The trend shows that these issues are increasingly linked to business-model resilience, sustainable value creation, innovation ecosystems, competitive advantage, and development goals.

The slight decline in 2022 does not change the overall growth trend, as output increased again in later years. The incomplete 2026 figure, recorded only up to June 2026, should not be read as evidence of declining research activity.

This growth signals the field's academic maturation. While earlier startup studies often focused on venture creation, financing, entrepreneurial intention, or survival, the current literature increasingly examines how ventures remain viable while creating sustainable economic, social, and environmental value. This supports positioning game startup sustainability within debates on strategic adaptation, innovation management, and sustainable entrepreneurship.

Thematic Structure of Game Startup Sustainability Research

The keyword network shows four connected domains: business-model innovation and transformation; organizational capability, innovation, and performance; entrepreneurship, finance, and institutional ecosystems; and sustainability, governance, and resilience. Their importance lies not only in individual keywords, but also in how these themes connect.

The prominence of *business model* and *business model innovation* suggests that startup sustainability is often examined through how ventures create, deliver, and capture

value. Their links with *circular economy*, *sustainable innovation*, *transformation*, *artificial intelligence*, *application*, and *integration* show that business-model change is tied to technological and sustainability transformation.

This interpretation is supported by Hernández-Chea et al. (2021), who show that business models can facilitate sustainability transitions through value proposition, creation, delivery, and capture, and by Böttcher et al. (2024), who show how digital technologies can integrate ecological and economic sustainability into business models. The bibliometric structure extends these arguments by linking business-model innovation with circularity, sustainable practices, and technological transformation.

The second domain centers on *capability*, *performance*, *competitive advantage*, *innovation strategy*, *product innovation*, and *dynamic capability*. Their proximity suggests that organizational capability connects strategic action with innovation and performance, indicating the need for adaptive capabilities under technological, market, and sustainability pressures.

For game startups, this means creative ideas must be supported by technical development, user analytics, design, community engagement, platform management, intellectual-property protection, and monetization decisions. These capabilities become valuable when they support innovation, performance, competitive advantage, and long-term sustainability.

The third domain links *entrepreneurship*, *policy*, *economy*, *government*, *institution*, *finance*, *funding*, *investment*, and *infrastructure*. This shows that startup sustainability is shaped not only by firm-level decisions but also by ecosystem conditions. Hadizadeh et al. (2024) support this view by showing that digital platforms, policy actions, and stakeholder coordination can strengthen sustainable entrepreneurship in developing economies.

The network therefore challenges explanations that attribute venture sustainability only to entrepreneurial skill or internal resources. Policy, finance, institutions, and infrastructure indicate a multilevel process in which internal capabilities interact with external conditions that may support or constrain growth.

The fourth domain includes *sustainable development*, *resilience*, *governance*, *energy*, *society*, *service*, and *technological innovation*. These terms connect internal business issues with wider questions of social value, accountability, technology, and long-term resilience, suggesting that sustainability is an integrative outcome rather than a narrow environmental category.

This finding is supported by George et al. (2021), who define digital sustainability as technology-enabled activity that advances sustainable development through socioecological value creation, and by Hernández-Chea et al. (2021) who explain that business models support sustainability transitions through coordinated firm activities and stakeholder collaboration.

Conceptual Relationship between Strategy, Innovation, Competitive Advantage, and Sustainability

The network suggests a linked strategic process: environmental and technological change shape capabilities; capabilities support business-model and product innovation; innovation connects with performance and competitive advantage; and these outcomes remain embedded in institutional, financial, governance, and sustainability contexts. This reading is consistent with studies showing that digital transformation and dynamic capabilities require ongoing strategic renewal of business models, collaboration, and organizational practices (Warner & Wäger, 2019; Zhang & Ravishankar, 2024).

Although the network does not prove causality, it shows that *capability*, *innovation strategy*, *business model innovation*, *competitive advantage*, *performance*, *resilience*, and *sustainable development* are repeatedly studied together. This supports examining sustainable adaptive strategy, sustainable business model innovation, sustainable competitive advantage, and business sustainability as related but distinct constructs, rather than as a confirmed causal sequence.

Startup and digital-platform literature helps explain this process. Startups refine strategy through learning, experimentation, customer feedback, platform interaction, and iterative adjustment. Zhuge et al. (2023) show that lean startup strategy supports sustainable development through organizational iterative learning, while Hadizadeh et al. (2024) show that digital platforms can support startup sustainability through innovation, collaboration, market access, value creation, and policy support. Thus, adaptive strategy can be seen as a structured response to uncertainty.

Business model innovation translates adaptive strategy into changes in value proposition, value creation, delivery, and capture. Amit & Zott (2020) explain that business models describe how firms create and capture value, while Hernández-Chea et al. (2021) show that business models can support sustainability transitions through value proposition, creation, delivery, and capture. In game startups, this may involve platform choice, genre, target market, monetization, publishing, community management, or intellectual property strategy.

The capability competitive advantage link shows that strategy and business-model change need organizational capacities to produce outcomes. Zhang & Ravishankar (2024) identify adaptation, networking, reengineering, and refinement as capabilities that help digital startups develop and deliver digital services. In game startups, comparable capabilities may include rapid development, analytics, digital distribution, live-service management, community engagement, creative integration, and ecosystem collaboration.

The network also shows that competitive advantage depends on external conditions. Links among entrepreneurship, policy, finance, investment, government, and infrastructure suggest that ecosystem support can enable or limit how internal capabilities produce sustainable outcomes. Bergmann & Utikal (2021) show that accelerators can support sustainability-oriented startups by providing knowledge, coaching, funding, and ecosystem access for sustainable business model development.

Temporal Evolution and Emerging Research Priorities

The overlay visualization shows a shift from established themes such as business models, entrepreneurship, capabilities, performance, finance, and policy towards newer concerns with artificial intelligence, transformation, governance, investment, resilience, and infrastructure.

Earlier themes remain central, but the field now gives greater attention to how digital transformation is governed, financed, and aligned with sustainability goals. This is consistent with studies showing that digital transformation can reshape business strategy, competitiveness, innovation, and sustainability outcomes (Asif et al., 2024; Yaqub & Alsabban, 2023).

Artificial intelligence is relevant to game startups because it can affect design, content generation, analytics, testing, support, moderation, and monetization. Its proximity to governance and application terms suggests that these uses also raise issues of accountability, intellectual property, data use, creative labor, fairness, and responsible monetization.

Governance and policymaker-related terms show a move from firm-centered explanations towards ecosystem coordination. Hadizadeh et al. (2024) support this view by emphasizing digital platforms, policy actions, stakeholder roles, global market access, competitiveness, value creation, and platform governance in sustainable entrepreneurship.

Investment also appears as a recent theme linked with policymakers, infrastructure, resilience, energy, and the economy. For game startups, financing can shape survival, autonomy, monetization choices, infrastructure access, and the ability to adopt sustainable operations. This aligns with startup sustainability literature showing that funding, resources, and sustainable practices influence startup performance and resilience (Duve & Marx, 2025).

Overall, the temporal findings suggest that the research frontier is moving towards the governance of technological transformation, especially how digital innovation, artificial

intelligence, investment, and platform dependence can support sustainable and responsible outcomes.

International Collaboration and the Position of Indonesia

The country network shows an internationally distributed field, but visibility remains concentrated in countries such as the United Kingdom, China, the United States, Italy, Germany, Australia, and several European countries. This suggests that the knowledge base is shaped mainly by established innovation, entrepreneurship, and sustainability research systems.

Indonesia appears in the network through links with Southeast Asia, East Asia, South Asia, the Middle East, and Australia. Its presence shows the relevance of startup sustainability to emerging economies, but its less central position indicates that Indonesia's indexed contribution remains comparatively limited.

This creates an opportunity for contextual research from emerging economies. Such settings often face uneven infrastructure, limited resources, policy uncertainty, and institutional constraints, while digital platforms can still support market access, innovation, collaboration, and sustainable entrepreneurship (Egala et al., 2024; Hadizadeh et al., 2024).

The Indonesian game industry is therefore a useful context because local studios compete in global digital markets while operating within domestic regulatory, financial, and labor conditions. Evidence from this setting can extend global theory by showing how adaptive strategies and business-model innovation work under local constraints and platform dependence.

The author and organizational networks also show collaboration concentrated in limited groups. Wider cross-country and cross-institutional collaboration could improve comparative analysis, methodological diversity, and the generalizability of future findings. Entrepreneurial ecosystem research similarly emphasizes the role of interactions among institutions, governments, universities, suppliers, customers, and entrepreneurs in supporting sustainable entrepreneurship (Chaudhary et al., 2023).

Academic Novelty and Contribution

The novelty of this study lies in integrating research streams that are often treated separately, including startup survival, business-model innovation, dynamic capabilities, entrepreneurial ecosystems, governance, and SDG alignment. By mapping these streams within one bibliometric structure, this study positions game startup sustainability as a multidisciplinary issue involving strategy, innovation, capability, ecosystem support, and sustainable value creation.

The findings show that business-model innovation, capability, entrepreneurship, institutional support, governance, resilience, and sustainable development form an interconnected landscape. This extends sustainability transitions and startup research by linking business model change with stakeholder collaboration, sustainable value creation, ecosystem conditions, and performance-oriented capabilities (Ghezzi & Cavallo, 2020; Hernández-Chea et al., 2021; Manolopoulos et al., 2025).

A second contribution is the conceptual positioning of sustainable adaptive strategy, sustainable business model innovation, sustainable competitive advantage, and game startup business sustainability. Although these exact constructs are not equally established keyword clusters, the links among *transformation*, *innovation strategy*, *capability*, *business model innovation*, *competitive advantage*, *performance*, *resilience*, and *sustainable development* provide a basis for future empirical modelling.

This contribution is not a causal claim. The bibliometric network shows conceptual proximity and research attention, not causal direction. It therefore offers a theoretically meaningful structure for hypothesis development and later empirical testing.

Methodologically, the study shows how Dimensions and VOSviewer can be used to examine publication growth, conceptual structure, thematic density, temporal change, and collaboration networks. This provides a broad map of a fragmented literature and indicates

where systematic review, content analysis, and empirical validation are needed.

Theoretical Implications

The findings suggest that game startup business sustainability should be studied through an integrated strategic management framework. The network links internal capabilities, adaptive strategy, business model innovation, competitive outcomes, governance, funding, and sustainable development, showing that sustainability cannot be explained by a single construct.

Dynamic capability theory helps explain this relationship. The prominence of capability terms suggests that sensing, seizing, and transforming processes support responses to technological and market change. These capabilities become strategically valuable when they reshape how firms create, deliver, and capture value through business-model innovation (Bocken & Geradts, 2020; Teece, 2007).

The findings also support viewing adaptive strategy as a continuing process. Lean experimentation, learning, user feedback, platform interaction, and pivoting help explain how game studios adjust products, content updates, community engagement, technology use, and monetization over time (Zhuge et al., 2023).

Sustainability should also be treated as a strategic orientation, not only as a performance dimension. The links among sustainable development, governance, resilience, society, technology, and business models show that sustainability can shape strategic priorities, value propositions, operations, and impact measurement. This is consistent with studies on sustainable business-model innovation, platform-enabled entrepreneurship, and sustainability transitions (Bocken & Geradts, 2020; Hadizadeh et al., 2024; Hernández-Chea et al., 2021).

Finally, institutional theory complements capability-based explanations by showing how policy, norms, investor expectations, platform rules, and ecosystem practices shape strategic decisions. This is especially relevant in emerging markets, where institutional support and constraints can influence whether internal capabilities produce sustainable outcomes (Balzano et al., 2025; Lee et al., 2024).

Practical and Policy Implications

For game startup leaders, sustainability requires coordinated management of strategy, innovation, capabilities, and ecosystem relationships. Founders should regularly evaluate value propositions, monetization, customer relationships, distribution, platform dependence, and costs as part of ongoing strategic learning, not only during crises. This aligns with business-model innovation guidance that treats value creation, capture, and adaptation as central managerial tasks (Amit & Zott, 2020).

Game studios should also build creative, technical, managerial, and digital capabilities together. Commercially sustainable games require design quality, software engineering, analytics, community management, financial planning, and strategic leadership. Startup research similarly shows that performance depends on a mix of internal capabilities, strategy, human resources, and external conditions (Argaw & Liu, 2024; Manolopoulos et al., 2025).

Policy and ecosystem actors also shape game startup sustainability. Governments, associations, incubators, accelerators, investors, and universities should move beyond short-term funding and generic training by supporting international market access, specialized talent, publishing networks, intellectual-property expertise, responsible technology use, and long-term investment. This is consistent with evidence that startup success depends on internal and environmental factors, while sustainable ecosystems require coordinated stakeholder support (Argaw & Liu, 2024; Villegas-Mateos, 2022).

For emerging economy policymakers, international partnerships with established innovation systems can support knowledge transfer, co-development, comparative research, and global market access. These partnerships should strengthen domestic capabilities rather than create dependence, especially for Indonesian studios and

researchers.

Sustainability-oriented support should include measurable criteria such as fair work, inclusive design, responsible monetization, energy efficient digital operations, mental-health awareness, and transparent data practices. Without clear indicators, sustainability may remain symbolic rather than operational.

Limitations and Future Research

This study has several limitations: (1) First, the dataset came only from Dimensions, so the results depend on its coverage, metadata quality, indexing, classification, and citation records. Studies indexed only in Scopus, Web of Science, or specialized game and computing databases may have been excluded. (2) Second, the keyword and filter choices shaped the dataset. Relevant studies using different terms may have been missed, while broad terms such as *enterprise*, *small and medium enterprise*, *entrepreneurship*, *economy*, and *policy* may have included research beyond game startups. (3) Third, co-occurrence and network analysis identify metadata patterns, not the quality or validity of individual studies. Large or central keywords do not necessarily represent mature constructs, and network proximity does not establish causality. This limitation is consistent with bibliometric studies that combine mapping with content analysis to interpret research fields more carefully (Kraus et al., 2022; Piwowar-Sulej et al., 2021). (4) Fourth, the study did not independently verify whether all SDG-classified publications measured sustainability outcomes. The results should therefore be read as a map of scholarly attention, not as evidence of substantive SDG performance. (5) Fifth, the 2026 total was incomplete because the data were exported on June 2026. Sixth, some author labels were only partly visible in the visualization, limiting the precision of the author-network description. (6) Finally, this study did not test causal relationships among sustainable adaptive strategy, sustainable business model innovation, sustainable competitive advantage, and game start-up business sustainability. These relationships should be treated as bibliometrically informed propositions for empirical testing.

Future research should conduct systematic reviews or qualitative content analysis of key publications to clarify how sustainability, adaptive strategy, business-model innovation, competitive advantage, and resilience are defined and measured. This would also distinguish studies on game developers and studios from broader work on digital startups, small firms, and entrepreneurial ecosystems.

Future bibliometric studies could combine Dimensions with Scopus or Web of Science and apply bibliographic coupling, co-citation analysis, thematic evolution, and source-impact analysis. Comparative studies could also examine differences between advanced and emerging economies.

Empirical research should test the relationships among environmental pressures, digital capabilities, sustainable adaptive strategy, sustainable business model innovation, sustainable competitive advantage, and game startup business sustainability through firm-level studies involving chief executive officers or senior leaders.

Research in Indonesia should examine how game studios respond to global platform dominance, funding constraints, changing user behavior, talent competition, and public policy. Comparative studies with other emerging game markets could show how institutional differences shape strategic adaptation and sustainability.

CONCLUSION

This study demonstrates that research on game startup business sustainability has evolved into a multidisciplinary field integrating strategic management, digital entrepreneurship, innovation, and sustainability perspectives. The main contribution lies in integrating previously dispersed literature into a coherent knowledge structure that connects sustainable adaptive strategy, business model innovation, organizational capabilities, institutional ecosystems, and SDG-aligned value creation.

Practically, the findings guide game startup leaders in managing strategy,

capabilities, and ecosystem relationships simultaneously, while informing policymakers on ecosystem support. Future research should extend this bibliometric mapping through systematic reviews, qualitative content analyses, and empirical studies that test relationships among strategic adaptation, business model innovation, competitive advantage, and sustainability outcomes in emerging economy contexts, particularly in Indonesia.

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AUTHOR CONTRIBUTION STATEMENT

Nur Azizah contributed to the conceptualization, methodology, data collection, bibliometric analysis, visualization, and preparation of the original manuscript. Vanessa Gaffar contributed to the conceptual framework, supervision, validation, and critical review of the manuscript. Lili Adi Wibowo contributed to the theoretical development, interpretation of the findings, supervision, and review and editing of the manuscript. Tutik Inayati contributed to the interpretation of the results, validation, and review and editing of the manuscript. All authors reviewed and approved the final version of the manuscript and agreed to be accountable for the integrity of the work.

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