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O R I G I N A L   A R T I C L E

A Bibliometric Analysis of Electronic Sports: Identifying the Knowledge Structure, Key Trends, and Future Research Horizons

Mehrzad Hamidi[1], Abdullah Rasaee Rad[2]*, Gity Haez[3], Jahan Jamal Sirat[4]

1. Professor, Department of Sport Management, University of Tehran, Tehran, Iran.
2. Ph.D, Department of Sport Management, Shahid Chamran University of Ahvaz, Ahvaz, Iran
3. Ph.DStudent Department of Sport Management, University of Tehran, Tehran, Iran.
4. Assistant Professor, Department of Physical Education and Sport Sciences, Yasuj Branch, Islamic Azad University, Yasuj, Iran.

*Correspondence
Abdullah Rasaee Rad
Email:Abdolah.r1371@gmail.com

EXTENDED A B S T R A C T

Introduction
 In the past decade, electronic sports (esports) have transcended their origins as a leisure activity to become a global phenomenon and a burgeoning industry with significant economic, social, and cultural implications. Defined as organized, competitive video gaming facilitated by electronic systems, esports has developed a sophisticated ecosystem mirroring traditional sports, characterized by professional teams, structured tournaments, massive spectatorship, and substantial sponsorship. With global revenues projected to reach multi-billion-dollar figures and audiences surpassing hundreds of millions, the field has attracted not only commercial investment but also rapidly increasing academic interest. However, the rapid expansion of esports literature has led to a fragmented body of knowledge. Research often exists in silos, focusing disparately on specific niches such as player performance, gambling behaviors, or marketing strategies, without a cohesive understanding of how these domains intersect. Consequently, policymakers, investors, and scholars face challenges in grasping the holistic trajectory of the field. To address this gap, this study employs a systematic scientometric approach to map the intellectual structure of esports research. The primary objective is to identify dominant research trends, key actors (influential researchers, publications, and institutions), active research hubs, and emerging thematic clusters within the current body of knowledge, thereby providing a data-driven roadmap for future inquiry. **Methodology**
 This study utilizes a bibliometric analysis framework to quantitatively evaluate scientific production in the field of esports. Data were harvested from the Scopus citation database, selected for its extensive coverage of high-quality, peer-reviewed journals and rich metadata. The search strategy employed the query string TITLE-ABS-KEY (esport*), limited to journal articles published in English. Following a rigorous screening process to remove irrelevant documents, a final dataset of 901 articles published between 2012 and 2025 was compiled. The analysis was conducted using Biblioshiny, a web interface for the R-package "bibliometrix". This tool facilitated a multi-dimensional analysis, including descriptive statistics

(citation counts, h-indices), conceptual structure mapping (co-word analysis, thematic evolution), and social structure analysis (co-authorship networks and institutional collaboration). The study specifically examined the annual growth rate, document average age, keyword evolution, and international collaboration networks to discern the developmental phases of the field.

Findings
Publication Trends and Growth The analysis reveals a remarkable trajectory of growth, with the field expanding at an annual rate of 25.42%. The data suggests three distinct phases of development: Incubation (2012–2016): A period of low output where the field struggled for academic definition. •Explosion (2017–2023): A significant surge in publications, driven by the global legitimization of esports. Maturation (2024–2025): High but stabilizing volume, indicating a shift toward specialized, depth-oriented research. The average age of documents is merely 2.94 years, yet the average citation per document stands at 15.03, underscoring the high immediacy and relevance of current research. Influential Sources and Authors The study identified core journals driving the discourse, including Computers in Human Behavior, Frontiers in Psychology, and International Journal of Sports Marketing and Sponsorship. In terms of authorship, Hamari J. emerged as a preeminent figure with an h-index of 10 and over 2,100 citations, reflecting deep scientific influence. Other key contributors include Byon K.K. and Trotter M.G. The analysis of highly cited papers highlights the work of Hilvert-Bruce et al. (2018) on Twitch user motivations as the most influential document (591 citations), indicating a strong academic focus on the social and consumption aspects of esports, specifically live-streaming behavior. Conceptual Structure and Thematic Map A co-word analysis of over 4,900 keywords provided a "cartography" of esports knowledge, categorized into four quadrants:

• Motor Themes (Well-developed & Central): This cluster is dominated by "Gambling and Virtual Economy" (loot boxes, skin gambling) and "Ecosystem & Governance." These represent the most mature and impactful areas of study, linking behavioral psychology with economic models.

• Basic Themes (Central but Less Developed): This includes "Cognitive/Physiological Performance" and "Mental Health." These themes act as the foundational bridge connecting esports to traditional sports science and medicine, focusing on stress, heart rate variability, and cognitive load. •

Niche Themes: Topics such as "Simulation Sports" (e.g., FIFA games) appear as isolated specialties with limited integration into the broader discourse.

• Emerging Themes: "Consumer Behavior" and "Media Innovation" appear in the periphery, suggesting they are the new frontiers for research, particularly regarding the adoption of technology and marketing theories. Keyword Evolution The temporal analysis of keywords reveals a semantic shift. In the early years, general terms like "Video Games" prevailed. Post-2018, specific terms like "Esports," "Performance," and game-specific titles like "League of Legends" surged. This transition signifies the field's move from general gaming studies to a distinct discipline focused on competitive performance and professional structures. Global Collaboration Networks The geopolitical landscape of esports research is defined by a bipolar axis between the USA and China, representing the strongest collaboration link (20 instances). This reflects the intersection of China's massive market/infrastructure with the US's academic capital. Additionally, Australia plays a critical role as a strategic "broker" in the network, particularly through institutions like Southern Cross University, which exhibits high "betweenness centrality," effectively bridging European and Asian research clusters. Discussion and Implications The findings characterize esports science as a young, hyper-dynamic, and increasingly interdisciplinary field.

The dominance of the "Gambling" and "Governance" themes suggests that academia has been reactive to the regulatory and ethical controversies surrounding the industry. However, the strong emergence of "Performance" and "Health" themes indicates a proactive shift toward "athleticizing" esports players, treating them with the same physiological rigor as traditional athletes. The study also highlights a "Geopolitics of Science" where Western and Asian powers drive the agenda, leaving a gap in perspectives from developing regions (Latin America, Middle East, Africa), despite their growing market consumption. The disconnect between the "Social/Leisure" aspects and the "Performance/Business" aspects in the thematic map suggests a need for more integrative research that connects the spectator experience with the athlete's reality.

Conclusion and Future Directions

This bibliometric analysis confirms that esports research has successfully transitioned from a fringe topic to a legitimate, high-impact academic domain. The field is currently in a state of rapid specialization, moving away from definitional debates toward complex inquiries into health, economy, and technology. For future research, this study recommends:

• Interdisciplinary Integration: Bridging the gap between the "business" of esports and the "health" of players.
• Methodological Diversity: Moving beyond cross-sectional surveys toward longitudinal and experimental designs, particularly in performance studies.
• Global Inclusivity: Expanding collaboration networks to include underrepresented regions to capture the true global nature of the phenomenon. While limited by its exclusive reliance on Scopus and English-language publications, this study provides a comprehensive baseline. It offers scholars, investors, and policymakers a clear data-driven vantage point to navigate the complex, rapidly evolving ecosystem of electronic sports.

KEYWORDS
Esports, Scientometrics, Trend analysis, Research dynamics, International Collaboration.