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Digital Knowledge Networks and Global Research Trends on Generation Z: A Bibliometric Perspective (2006–2024)

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Abstract. Using bibliometric informatics and network analysis, this study maps the evolution of global research on Generation Z (2006–2024) , identifying major collaboration patterns and thematic clusters across 1,643 publications from the Scopus database. By employing VOSviewer and Excel, the analysis identified eight thematic clusters derived from keyword co-occurrence networks, including consumer behavior, sustainable tourism, education and career, and educational technology. A co-authorship analysis constructs a data-driven knowledge map of Generation Z research, revealing global collaboration structures and interdisciplinary convergence, with the United States central to these networks. This study provides a data-driven framework for tracing the intellectual evolution of Generation Z research, identifying key topics, research gaps, and future interdisciplinary opportunities. The findings offer a map to address further research questions regarding Gen Z as a transformative influence and hold implications for digital innovation and knowledge systems.

Keywords: Generation Z, Bibliometric Analysis, Scopus, Vosviewer.

1. Introduction

Generation Z, born between 1997 and 2012 (Dimock, 2019), is the first cohort fully immersed in digital technologies from birth (Gentina & Parry, 2020). This "digital native" status (Pérez-Escoda et al., 2016) , shaped by ubiquitous internet access and smartphones, fundamentally distinguishes their information consumption, communication styles, and learning approaches from previous generations (Shatto & Erwin, 2016; Berkup, 2014). Their technological proficiency extends beyond passive consumption to active content creation (Styvén & Foster, 2018) and a preference for online, visually-rich information sources like YouTube and TikTok over traditional media (Duffett, 2020; Hoang & Khoa, 2022).

A defining characteristic of Generation Z is their technological proficiency. While earlier generations adapted to computers, mobile phones, and the internet at various stages of their lives (Chan & Lee, 2023), Generation Z has been surrounded by these technologies as an integral part of daily existence (Pérez-Escoda et al., 2016). Frequently characterized as “digital natives,” this generation exhibits an inherent and fluid engagement with digital instruments (Al-Htaybat et al., 2018). Their involvement transcends passive consumption, extending to active content generation on social platforms and contributions to digital advancements, such as app and online tool development (Styvén & Foster, 2018).

A key divergence in Generation Z's information acquisition lies in their inclination towards online platforms. Shifting from the historical reliance on television and print for news and entertainment, this generation predominantly sources information via platforms like YouTube (Duffett, 2020), TikTok (Cervi, 2021), and Instagram (Choi et al., 2024). They show a preference for succinct, visually rich content, including short-form videos, social media updates, and real-time news, marking a notable contrast with the media consumption behaviors of preceding generations (Reinikainen et al., 2020).

These advancements have not merely altered teaching methodologies but have also democratized educational opportunities worldwide (Negm, 2023). 1 In the professional realm, Generation Z readily embraces flexible work modalities, including remote work and virtual collaboration, thereby promoting global interconnectedness from the outset of their careers (Ross & Rouse, 2022). In addition to their information consumption habits, Generation Z displays distinctive consumer behaviors and values. A notable preference for tailored products and services (Martínez-González & Álvarez-Albelo, 2021) among this generation aligns with the expansion of e-commerce and digital marketplaces (Duffett, 2017). Moreover, they place a high value on corporate transparency and social responsibility, showing a preference for brands that champion environmental sustainability, diversity, and equality (Williams & Hodges, 2022; Yeo et al., 2025). This trend indicates a larger evolution in consumer thinking, where ethical considerations increasingly guide purchasing decisions (Nguyen et al., 2019). This digital immersion also defines their consumer, professional, and educational behaviors. Gen Z exhibits a preference for personalized products (Martínez-González & Álvarez-Albelo, 2021) , values corporate transparency and sustainability (Williams & Hodges, 2022) , has benefited from online learning (Szymkowiak et al., 2021) , and embraces flexible, remote work modalities (Ross & Rouse, 2022). However, despite an expanding body of literature, much of the existing research remains segmented, often focusing on isolated aspects such as consumer behavior, marketing strategies, or technological impacts, without a comprehensive synthesis of overarching trends.

Given these distinctive attributes, research on Generation Z is imperative and expanding (Gazzola et al., 2020; Črešnar & Nedelko, 2020). However, this growing body of literature remains segmented, with studies often isolated within specific disciplines. This fragmentation creates a research gap: there is a lack of a comprehensive, informatics-based mapping of Gen Z scholarship that visualizes its intellectual structure, collaboration networks, and thematic evolution across disciplines and regions. A notable study by Dąbrowski and Środa-Murawska, titled Generation Z on the Rise: A Scientometric Analysis Using CiteSpace, analyzed scholarly publications related to Generation Z using CiteSpace software to identify major research themes. However, the study was constrained by its reliance on the singular keyword “Generation Z,” thereby overlooking alternative terminologies such as Gen Z, Z

Generation, Gene Z, Z Gen, and Gen-Z. Additionally, the study utilized the Web of Science (WoS) database, covering 746 documents from 2008 to 2021. In contrast, the present study leverages the Scopus database, encompassing 1,643 documents from 2006 to 2024, thus providing a broader temporal scope and a more comprehensive perspective on research developments concerning Generation Z over nearly two decades.

The objective of this paper is to offer a systematic analysis of Generation Z-related research based on Scopus data (2006–2024). Employing bibliometric methodologies, this study addresses the following research questions: What are the publication and citation trends in Generation Z research from 2006 to 2024? Which authors, documents, and regions lead global collaboration in this field? What are the dominant research themes and how have these topics evolved? By answering these questions, this study presents an integrated overview of the knowledge field, identifies existing gaps, and proposes avenues for future scholarly inquiry.

2. Methodology and Data

This study employed bibliometric analysis to investigate the evolution of Generation Z research within the social sciences and its relevance to online shopping behavior. Bibliometric methods are effective for identifying publication trends, mapping journal development, and clarifying relationships among authors, institutions, and publishers (Morris & Van der Veer Martens, 2008). They also facilitate the visualization of scientific collaboration networks, which helps illustrate the structure and growth of research communities and related academic domains (Lawani, 1981).

The Scopus database was selected as the primary data source. Scopus was chosen over other databases (such as Web of Science) for its extensive coverage of peer-reviewed journals, including broader interdisciplinary and social science coverage, reliable citation metrics, and robust analytical capabilities, enabling a more comprehensive bibliometric visualization. A comprehensive search was conducted using the query: TITLE-ABS-KEY (“Gen Z”) OR TITLE-ABS-KEY (“Generation Z”) OR TITLE-ABS-KEY (“Z generation”) OR TITLE-ABS-KEY (“gene Z”) AND PUBYEAR > 2005 AND PUBYEAR < 2025 AND LIMIT-TO (SUBJAREA,” SOCI”) AND LIMIT-TO(LANGUAGE,”English”). This search captured various expressions of “Generation Z,” a term lacking standardized definition, and was restricted to English-language publications in the social sciences. This subject area limitation was applied to maintain focus on the human, social, and behavioral dimensions of Gen Z, rather than purely technical or medical studies. Conducted on May 26, 2025, the search covered studies from January 1, 2006—the first identified Gen Z publication—to December 31, 2024, initially retrieving 1,729 documents exported in CSV format.

To ensure data quality and reliability, a data cleaning process was implemented. The 1,729 records were exported in CSV format and screened for duplicates (e.g., using DOI matching) and ineligible document types (e.g., editorials, book reviews, errata). This process, combined with a manual screening of titles and abstracts to remove records irrelevant to the study's focus, resulted in the removal of 86 documents. The final, reliable dataset comprised 1,643 relevant publications. Metadata including authors, affiliations, journals, countries, keywords, years, and citation counts were extracted for analysis. VOSviewer 1.6.19 was used to generate network, overlay, and density visualizations, revealing co-authorship patterns and thematic evolution, while Excel was applied to produce descriptive statistics, keyword timelines, and trend charts. This approach provided a concise and systematic mapping of the structural and thematic development of Generation Z research. This data processing pipeline—from search and export to cleaning, analysis, and visualization—embodies an information-system perspective for mapping the structure of a global knowledge domain.

3. Results

The final dataset for analysis included 1,643 publications from the Scopus database (2006-2024). This

corpus involved 4,812 authors, was published across 951 sources, and had accumulated a total of 13,564 citations. The following sections detail the publication trends, leading authors and countries, and thematic clusters.

3.1. Trends of publications and citations

This study examines the distribution of Gen Z research from 2006 to 2024 within the Scopus database, with the results presented in Figure 1.

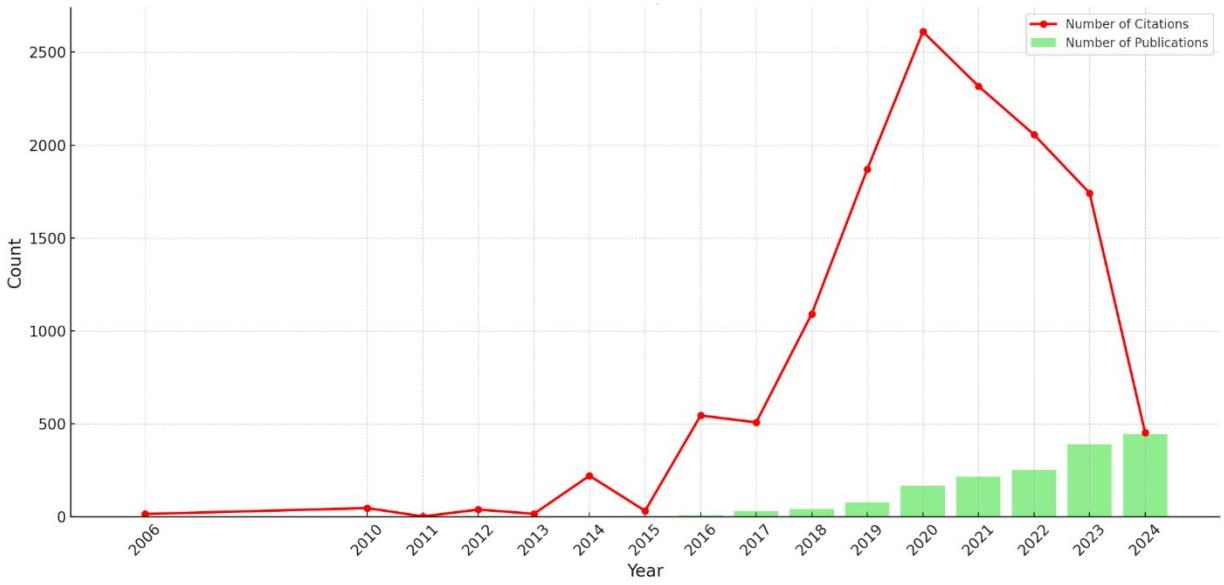

Fig. 1: Distribution of Publications and citations by Years

Figure 2 reveals a clear upward trend in Gen Z research. After a nascent period (2006-2014) with minimal output, a noticeable uptick began around 2015. Publication output grew steadily, peaking in 2021 (approx. 145 publications), reflecting Gen Z's transition into adulthood and the intensification of research. Citations surged concurrently, reaching a high of 2,500 in 2021. While a slight decline in annual citations is seen post-2021 (a common artifact as newer papers accrue citations), the sustained high volume of publications (approx. 130-150 in 2023-2024) highlights the topic's ongoing relevance in contemporary scholarship.

3.2. Most Authors

Table 1 presents detailed information on the top 5 most-cited articles. Statistical analysis indicates that these articles collectively received 2,034 citations, accounting for 15.01% of the total 13,564 citations across the dataset collected by the research. All articles were published in high-impact scientific journals, underscoring the scientific quality and impact of the research published therein. These publications not only highlight the visibility of their respective authors but also reflect key thematic trajectories in Gen Z research.

Table 1: The most cited authors in the field of Generation Z

Title	Author	Year	Total cited
Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people	Szymkowiak A.; Melović B.; Dabić M.; Jeganathan K.; Kundi G.S.	2021	313
Trends in the fashion industry. The perception of sustainability and circular economy: A gender/generation quantitative approach	Gazzola P.; Pavione E.; Pezzetti R.; Grechi D.	2020	234
Generation z's teachers and their digital skills	Fernández-Cruz F.-J.; Fernández-Díaz M.-J.	2016	227
Online shopping motives during the COVID-19 pandemic—lessons from the crisis	Koch J.; Frommeyer B.; Schewe G.	2020	219
Influence of social media marketing communications on young consumers' attitudes	Berkup S.B.	2017	197

The most frequently cited document is “Information Technology and Gen Z: The Role of Teachers, the Internet, and Technology in the Education of Young People” (n = 313) by Szymkowiak A. et al. In second place is Gazzola P. et al., with 234 citations, followed closely by Fernández-Cruz F.-J. et al, ranking third with 227 citations. Top-cited authors often collaborate across fields like education, marketing, and digital media. These interdisciplinary efforts have contributed to new subfields such as digital pedagogy and algorithmic youth culture. While the most-cited studies center on education and consumption, gaps remain in areas such as Gen Z’s mental health, political engagement, and global comparisons. Future bibliometric trends may reveal emerging foci that diverge from current dominant themes.

3.3. Country co-authorship analysis Keyword co-occurrence analysis

This article assesses the geographic distribution of publications in the field of Gen Z research. Figure 2 presents a world map illustrating the number of publications published in each country, providing insight into the regional distribution of research. Meanwhile, Figure 3 offers a visual representation of the simultaneous presence of countries in scientific publications, highlighting the level of collaboration and intersection between countries in this research field.

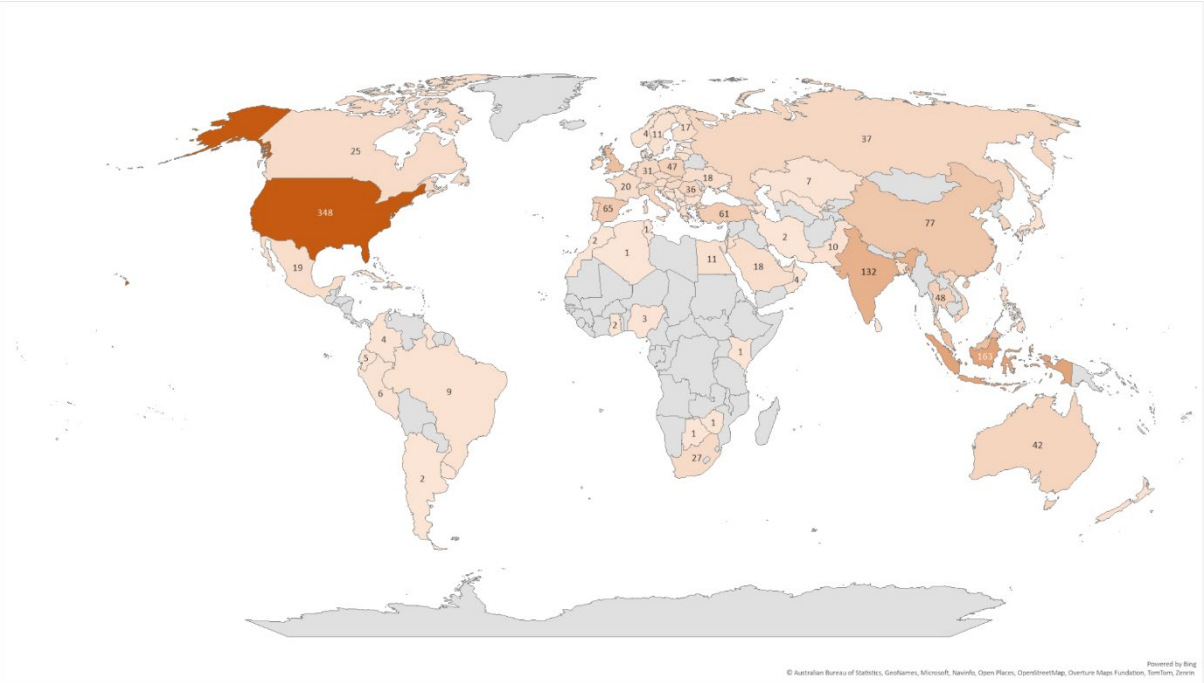

Fig. 2: Global map of documents published in different countries.

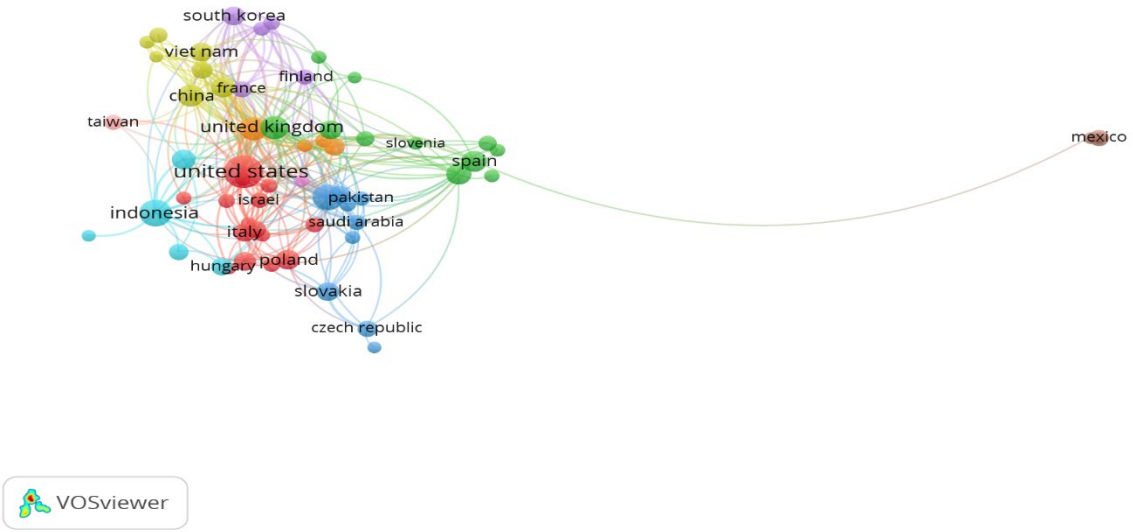

Fig. 3: Network of Collaboration Among Countries.

The keyword map generated by VOSviewer offers valuable insights into the global distribution of research on Generation Z, visually representing countries with similar academic interests through color-coded clusters. A detailed analysis of these clusters reveals the key contributors to the field and their research focus. The country distribution map highlights the widespread engagement of various nations in Gen Z studies, with the United States leading in publication volume (348 studies), followed by Indonesia (163), India (132), and European nations such as Germany (65) and the United Kingdom (61). These countries primarily explore Generation Z's behaviors, psychological characteristics, and cultural dynamics within the context of globalization and digital transformation.

The United States plays a pivotal role in the international research network, exhibiting the highest international connectivity (Total Link Strength = 154). It maintains extensive collaborations with countries such as the United Kingdom (Link Strength = 32), France (Link Strength = 18), South Korea (Link Strength = 15), and Indonesia (Link Strength = 12). This strong connectivity underscores the global nature of Gen Z research. The U.S. (Link Strength = 154) and the U.K. (Link Strength = 68) function as central knowledge hubs, fostering international research partnerships that contribute to a well-integrated academic landscape. Notably, Mexico, despite a comparatively lower number of publications, has developed an independent research network, likely focusing on distinct cultural and societal factors that offer a unique regional perspective on Generation Z. Such diversity enriches the global discourse, ensuring a more comprehensive understanding of this generation from multiple perspectives. In conclusion, Generation Z research is expanding rapidly and adopting a multidimensional approach across various countries. While some nations primarily address domestic concerns, international collaborations continue to strengthen, reflecting a shared global commitment to understanding the future trajectory of this generation and its impact on society and the workforce.

3.4. Country co-authorship analysis Keyword co-occurrence analysis

A keyword map was generated using VOSviewer to visualize research topics related to online consumer behavior through primary keywords. With a minimum occurrence criterion of 5 times, 08 main research clusters were formed, the circle size corresponds to the frequency of each keyword, highlighting focal points within the current research landscape.

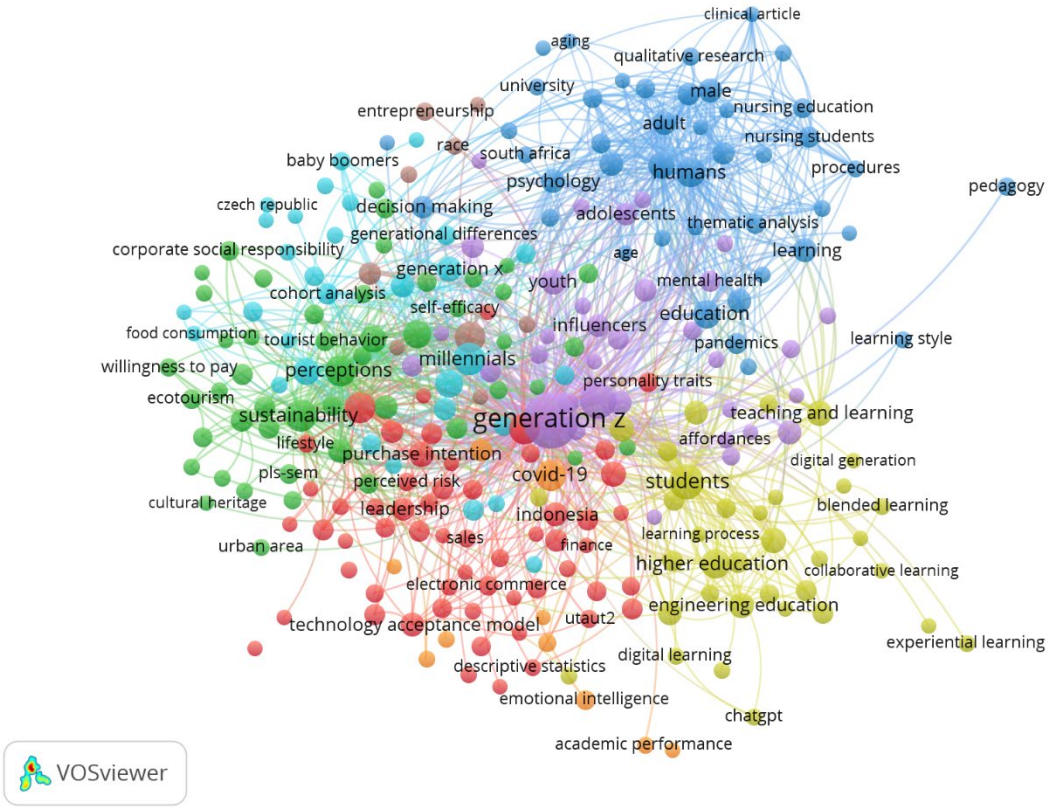

Fig.4: Network of Co-occurrence Among Keywords

Table 2 below provides a concise summary of the thematic name and core keywords for each cluster, serving as a detailed legend for the visual network map (Figure 4).

Table 2. Summary of Thematic Clusters from Keyword Co-occurrence

Cluster	Cluster Theme	Key Keywords
Cluster 1 (Red)	Business, Technology, and Consumer Behavior of Generation Z	generation z, purchase intention, e-commerce, leadership, utaut2, technology acceptance model, perceived risk
Cluster 2 (Green)	Sustainable Tourism and Social Responsibility among Generation Z	sustainability, millennials, tourist behavior, ecotourism, willingness to pay, food consumption, perceptions, lifestyle
Cluster 3 (Blue)	Education and Career Development of Generation Z	humans, adolescents, nursing education, nursing students, psychology, mental health, qualitative research
Cluster 4 (Yellow)	Educational Technology and Learning	students, higher education, blended learning, experiential learning, teaching and learning, chatgpt, engineering education
Cluster 5	Digital Media and Marketing	influencers, education, pandemics, personality traits,

(Purple)		social media
Cluster 6 (Cyan)	Generational Analysis and Sustainable Development	generation x, baby boomers, generational differences, cohort analysis, corporate social responsibility, decision making, youth
Cluster 7 (Orange)	Academic Competence and Psychology of Generation Z in Learning and Work	academic performance, emotional intelligence, digital learning, covid-19, finance, indonesia
Cluster 8 (Pink)	Social Identity and Risk Perception	self-efficacy, risk perception, cultural diversity, gender identity, social identity

Cluster 1: Business, Technology, and Consumer Behavior focuses on Gen Z's e-commerce adoption (Do et al., 2023) and general technology use (Samila et al., 2022). Consumer behavior is shaped by perceived risk and value. Studies utilize the UTAUT2 model (Samila, 2022) to analyze purchasing intention and the integration of emerging technologies like the metaverse and AR/VR (Jorge et al., 2023).

Cluster 2: Sustainable Tourism and Social Responsibility highlights increasing environmental awareness (Haddouche & Salomone, 2018). Research shows a strong inclination toward eco-tourism and green consumption (Schönherr & Pikkemaat, 2023). Studies also explore social media's role in spreading this consciousness (Choi et al., 2024).

Cluster 3: Education and Career Development centers on career choices (Popaitoon, 2022) and skill development, notably in nursing education (Shatto & Erwin, 2016). Psychology research (Sanchez-Chaparro et al., 2024) emphasizes mental health amid academic and professional pressures (Al-Htaybat et al., 2018).

Cluster 4: Educational Technology and Learning explores technology's transformative impact, emphasizing blended learning (Sękala et al., 2023) and experiential learning (Negm, 2023). Gen Z's adaptation to digital environments (Meet et al., 2022) fosters critical skills (Al-Htaybat et al., 2023). Emerging tools include Artificial Intelligence (AI) (Chan & Lee, 2023) and Virtual Reality (VR) (Hernandez-Pozas & Carreon-Flores, 2019).

Cluster 5: Digital Media and Marketing investigates Gen Z's interaction with digital marketing campaigns (Duffett, 2017). Attuned to identity (Styvén & Foster, 2018), the cohort prefers personalized experiences (Martínez-González & Álvarez-Albelo, 2021). Platforms like YouTube (Duffett, 2020) and TikTok (Cervi, 2021) leverage influencer-driven promotions.

Cluster 6: Generational Analysis and Sustainable Development focuses on generational differences (Levickaite, 2010) compared to Millennials and Baby Boomers. Research highlights Gen Z's role in promoting the circular economy (Gazzola et al., 2020) and sustainable consumption (Schönherr & Pikkemaat, 2023).

Cluster 7: Academic Competence and Psychology in Learning and Work examines academic performance and emotional intelligence (Negm, 2023). Studies explore their adaptability to post-COVID-19 work (Črešnar & Nedelko, 2020) and the demands of Industry 4.0

Cluster 8: Social Identity and Risk Perception delves into social identity and risk perceptions (Seabra et al., 2021). Topics include cultural diversity (Lifintsev & Wellbrock, 2019) and gender identity. Research emphasizes Gen Z's awareness of social justice (Ross & Rouse, 2022) and climate change (Block et al., 2024).

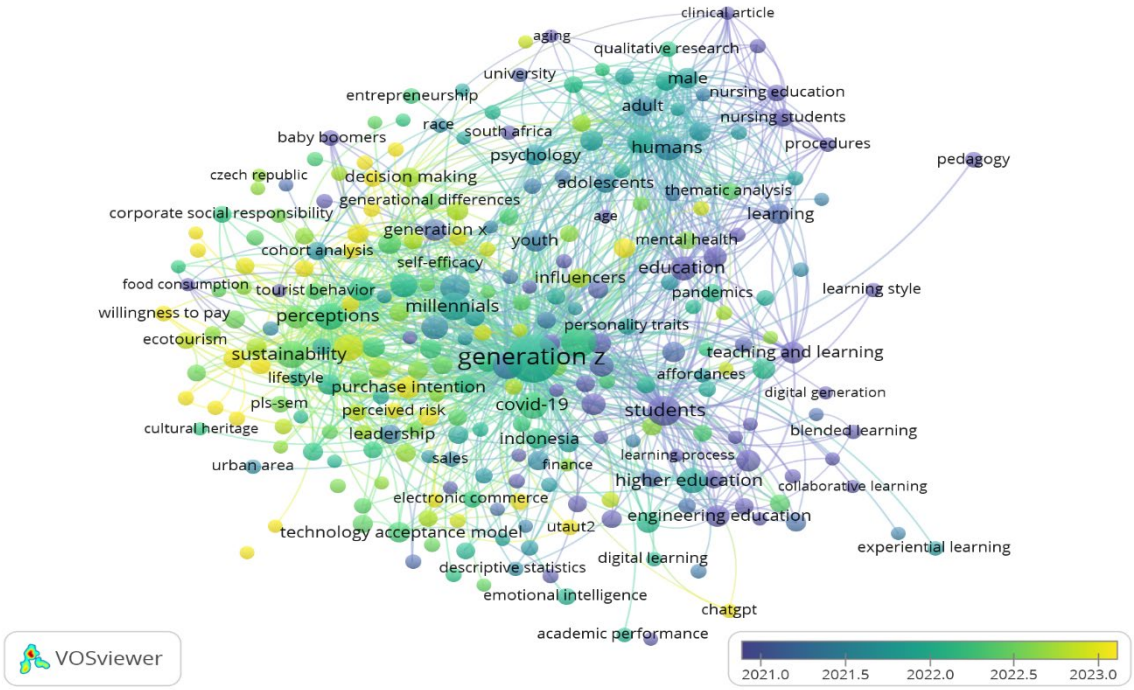

Fig.5: Keyword Co-occurrence – Overlay Visualization

The evolution of research on Generation Z (Gen Z) is intricately linked to their life stages, offering deeper insights into their societal impact. During their childhood (1997–2009), Gen Z was profoundly shaped by the rapid advancement of digital technology. Research from 2005 to 2016 primarily examined their interaction with digital tools in education (Evain et al., 2012), focusing on the development of "digital skills" (Thomas & Srinivasan, 2016) and "learning outcomes" (Igel & Urquhart, 2012). These studies underscored their foundational identity as digital natives (Pérez-Escoda et al., 2016). Comparative analyses further explored generational differences, particularly between Gen Z, Generation X, and Generation Y, across various dimensions (Levickaite, 2010; Berkup, 2014).

During their adolescence (2010–2020), Generation Z increasingly engaged with social media and digital platforms, shaping their social identity (Reinikainen et al., 2020). Research conducted between 2017 and 2020 highlighted their growing influence as digital consumers (Duffett, 2017; Gentina & Parry, 2020), alongside their heightened awareness of environmental (Nguyen et al., 2019) and ethical issues (Song et al., 2020). The study of Generation Z's consumer behavior has continued to evolve, extending into subsequent life stages (Martínez-González & Álvarez-Albelo, 2021).

As they transitioned into early adulthood (2021–2024), Gen Z emerged as key drivers of sustainability and technological innovation (Williams & Hodges, 2022) Recent studies emphasize their leadership in adapting to artificial intelligence (Chan & Lee, 2023; Gupta et al., 2024) and immersive technologies, particularly in the context of promoting sustainable development and integrating advanced digital tools (Jabar et al., 2024). The progression of research across these life stages highlights Gen Z's transformation from learners to digital pioneers (Huang et al., 2023) and global influencers (Mukhopadhyay & Chakrabarti, 2023). This trajectory underscores their pivotal role in driving social transformation, particularly through their commitment to sustainability (Sanchez-Chaparro et al., 2024).

4. Discussion

This bibliometric analysis provides a comprehensive mapping of global research trends on Generation Z from 2006 to 2024. The findings highlight the significant growth in scholarly attention and identify key research clusters, gaps, and emerging opportunities. The results confirm Gen Z's status as a central

focus across multiple disciplines. The dominant thematic clusters, such as sustainable tourism, digital marketing, and educational technology (Table 2), reflect how this cohort interacts with digital technologies, shapes its social identity, and demonstrates a growing commitment to sustainability.

A key finding of this study is the global and networked nature of Gen Z research. The co-authorship analysis (Figure 4) reveals a "core-periphery" structure typical of global knowledge diffusion in emerging, interdisciplinary fields. The United States (Total Link Strength = 154) and the United Kingdom (Total Link Strength = 68) function as central knowledge hubs. This dominance reflects a hierarchical diffusion model where high-capacity research systems drive foundational conceptualization and disseminate knowledge to periphery regions. This well-integrated academic landscape suggests that the theoretical understanding of Gen Z, particularly concerning their digital behaviors, is largely structured and propagated by highly collaborative international teams.

4.1. Implications for Informatics and Service Science

Beyond mapping a demographic trend, the findings hold direct, critical implications for the informatics and service-science disciplines central to the Journal of Logistics, Informatics and Service Science (JLISS):

- Knowledge System Visualization: The utilization of VOSviewer to map keyword co-occurrence and collaboration networks provides a methodological framework aligned with JLISS's focus on data-driven mapping of global knowledge systems. This approach visualizes the intellectual structure and highlights the disciplinary convergence (e.g., between Psychology, Marketing, and Education) essential for understanding complex phenomena like generational behavior.
- Digital Service Design and AI Strategy: The identified research clusters (Cluster 1: Consumer Behavior and Cluster 5: Digital Marketing) offer a roadmap for service science innovation. Gen Z's demand for personalization, trust, and advanced e-commerce adoption (Do et al., 2023) requires a focus on designing effective digital services, intuitive User Interfaces (UI/UX), and implementing ethical AI-driven marketing strategies (Li & Shen, 2022).
- E-Learning System Development: Cluster 4 (Educational Technology) highlights the irreversible shift toward blended learning, AI integration (Chan & Lee, 2023), and immersive learning experiences. For informatics, this signals a compelling need to develop robust, flexible, and engaging e-learning systems and digital pedagogies that directly cater to the digital-native learning styles of Gen Z students.

4.2. Future Research Directions

Despite the progress made in Gen Z research, several gaps persist. One of the most pressing issues is the inconsistency in defining and conceptualizing Generation Z across studies. While this study employed a broad range of keywords to capture the diversity of the literature, the absence of a standardized definition of Gen Z poses challenges for synthesizing research findings across disciplines. This lack of uniformity risks overlooking critical insights and may hinder cross-study comparisons. Future research should prioritize the establishment of a more precise and widely accepted definition of Gen Z, thereby facilitating greater coherence in scholarly discourse.

Based on an analysis of prominent keywords in recent studies (2022–2024), several future research directions can be identified. First, interdisciplinary studies should continue to examine the intersection of technology, social identity, and sustainability, as these themes are central to Gen Z's societal impact. The role of emerging technologies, including artificial intelligence, augmented reality, and the metaverse, in shaping Gen Z's behaviors, values, and interactions presents a particularly rich area for further exploration. Second, given the generational focus of this study, future research should investigate interactions between Gen Z and other generational cohorts, particularly Millennials and Generation X. Comparative analyses can offer valuable insights into both the unique and shared characteristics of these groups, enabling businesses, educators, and policymakers to develop more effective engagement strategies. Lastly, there is a critical need for longitudinal studies that track the

evolution of Gen Z over time. Given the rapid pace of technological advancement and societal change, longitudinal data can provide a more dynamic understanding of how Gen Z adapts to new challenges and opportunities as they progress through different life stages. Despite the progress, the thematic evolution (Figure 5) suggests a research gap in truly longitudinal studies that track Gen Z's post-COVID-19 professional development over time. Furthermore, future research must continue to examine the ethical implications of emerging technologies (AI, metaverse) on Gen Z's social identity and decision-making processes. This will be essential for anticipating shifts in workforce trends, consumer behavior, and societal values.

5. Conclusion

This bibliometric analysis presented a comprehensive overview of global research trends on Generation Z from 2006 to 2024, drawing on 1,643 publications. The study makes several contributions. Methodologically, it provides a large-scale, two-decade data-driven knowledge map of Gen Z research using network visualization. Theoretically, it identifies eight key research dimensions and charts the field's interdisciplinary convergence around themes of digital technology, sustainability, and education. Practically, the findings offer a framework for understanding global knowledge flows that can guide data-informed policymaking, e-learning system development, and digital service design for this generation.

However, several gaps remain in the existing literature, particularly concerning the definition and conceptualization of Generation Z. Future research should work toward standardizing definitions, addressing the psychological and emotional dimensions of Gen Z's development, and further examining their contributions to sustainability, digital innovation, and social identity formation. Additionally, as Generation Z continues to mature, longitudinal studies will be indispensable for tracking the evolution of their behaviors, values, and societal influence over time.

A key limitation of this study is its reliance on the Scopus database. While Scopus provides a comprehensive dataset, it may not capture all relevant research on Generation Z, as studies indexed in other databases, such as Web of Science or Google Scholar, could offer additional insights. Furthermore, this study is restricted to English-language publications, which may exclude valuable perspectives from non-English-speaking regions. Although these limitations do not diminish the significance of the study, they suggest that future research could adopt a broader methodological approach, incorporating multiple databases and languages to develop a more holistic understanding of Generation Z. For instance, future work could integrate AI-enhanced bibliometrics, such as topic modeling (e.g., LDA) or natural language processing (NLP), to deepen the analysis of thematic evolution beyond keyword co-occurrence.

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