Information Management and Business Review (ISSN 2220-3796)
Vol. 16, No. 3, pp. 53-64, Sep 2024

Bibliometrics Analysis of Event Management in the Digital Era: Challenges and Opportunities for Event Planners

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Abstract: To remain competitive, event planners must stay current with the latest trends and technologies, such as virtual and augmented reality, artificial intelligence and the Internet. This paper presents a comprehensive bibliometric analysis using VOSviewer software to provide insight into the intellectual structure of knowledge using citation and co-citation networks, as well as key concepts using a keyword co-occurrence network, on the topic of opportunities and challenges faced by event planners when managing events in the digital era. The investigation begins by examining the Scopus database for articles published with keywords relevant to the topic. VOSviewer software was used for science mapping and network analysis of extracted data. This systematic field mapping helps graphically illustrate the publication evolution between 2015 and 2024 and identify the current research interests and potential directions for future research. A total of 125 articles were included comprising 44 conference papers, 39 original articles, 9 book chapters, 5 books, and 2 reviews. The United States, United Kingdom and Germany were the principal countries of origin of publications. The most frequently appearing keywords were "information management" with 116 occurrences and "network security" with 68 occurrences. The top five keywords with the greatest total link strength were information management, network security, security information and event management, cybersecurity, and intrusion detection. It is imperative that stakeholders, including funding agencies, event management organizations, researchers, and event managers, collaborate to ensure that the volume of quality research in this area keeps pace with the rapid advancements transforming the industry.

Keywords: *Event management, Digital event management, Challenges, Opportunities, Event planner, Literature Review, Network Analysis, Bibliometrics, VOSviewer*

1. Introduction and Background

The digital age has had a huge influence on the event management sector, creating challenges and opportunities (Bladen et al., 2022). This study aims to apply bibliometrics to summarize the knowledge structure and to provide insights into the evolution, impact, and gaps of adopting digital technology in handling events. The advent of the digital technology era has brought about a paradigm shift in the field of event management, presenting both challenges and opportunities. The rationale for this study lies in the rapid digital transformation that reshaping the event management industry. The integration of digital technologies has revolutionized the way events are planned, executed and evaluated, thereby imposing a thorough understanding of the emerging trends, challenges and opportunities (Hassan & Quader, 2022). This paper seeks to identify the most influential articles, authors and research themes in the domain of event management in the digital era. Furthermore, it is also important to uncover the challenges faced by event planners in leveraging digital technologies and highlight the opportunities that digital technologies present for enhancing event experiences and outcomes.

A holistic view of the current research landscape should be provided to guide future research directions in the field of event management (Miles & Shipway, 2020). Furthermore, the insights derived from this bibliometric analysis can assist event planners in navigating digital transformation, thereby contributing to the advancement of the event management industry in the digital era (Kaurav et al., 2020). The analysis is based on a careful review of articles that serve as a reference for this study. These articles, which have been meticulously selected for their relevance and contribution to the field, provide the foundation for this bibliometric analysis. Through this study, it is hoped to shed on the involved dynamics of event management in the digital era and pave the way for future research and practice.

Thus, the research questions have been created to identify the emerging trends in event management research in the digital age by determining the most popular countries and what are the seminal works in the field of digital event management and discovering the citation analysis related to the impact and relevance of research on digital event management. With the rise of remote work and virtual events, people may now attend events from anywhere in the globe (Chodor, 2020). However, event planners must guarantee that distanced attendees are engaged and included in the event experience. Adopting digital technology in daily life may boost participant engagement, offer more interesting and dynamic experiences, and aid in data-driven decision-making (Qi et al., 2024). Gamification, social media integration, and live polling are all ways that digital tools and platforms may encourage involvement and cooperation (Apostolopoulos & Potsiou, 2022). The internet has enabled event planners to access a worldwide audience, allowing them to attract a wide spectrum of guests. The digital era has both obstacles and opportunities for event planners. By accepting these changes and remaining adaptive, companies may survive in the digital world while continuing to provide excellent events for their attendees. The findings of this study will serve as a guideline for event planners to identify the factors that contribute to the transformation of traditional event management practices by adopting digital technology. Thus, helps the event planners to gain knowledge on the innovative strategies for enhancing attendee engagement in digital and hybrid events. Moreover, event planners can extract the best practices for adaptability and contingency planning in digital event management.

The digital age has brought about a paradigm shift in the way we live, work and interact with one another. This transition has also significantly impacted the event management industry. Navigating through the era of technological advancements, event planners are faced with new challenges and opportunities. The rapid pace of technological advancements has disrupted the traditional event management landscape. Event planners must now stay abreast of the latest trends and tools to remain competitive. This includes understanding and leveraging technologies such as virtual and augmented reality, artificial intelligence, and the Internet of Things (IoT) (Khanal, 2024). Moreover, with the increasing reliance on digital platforms and tools, event planners must ensure the security of their attendees' personal and financial information (Disimulacion, 2020). This requires implementing robust cyber security measures and staying vigilant against potential threats specifically the crackers who will try to eavesdrop on any information transmitted over the network. In the digital age, people are constantly bombarded with information and stimuli (Şahin & Demirbilek, 2022). This has led to a phenomenon known as the "attention economy" where individuals have limited attention spans and are selective about what they choose to engage with (Jung, 2021). Event planners must find innovative ways to capture and maintain the attention of their attendees, both online and offline. Furthermore, the rise of remote work and virtual events has made it easier for people to attend events from anywhere in the world. However, the challenge faced by event planners is to ensure that remote participants feel engaged and included in the event experience.

Despite the challenges faced by event planners, they will also gain benefits from adopting the technology in their daily lives in handling the events such as digital technology can enhance participants' engagement. Digital tools and platforms offer event planners the opportunity to create more engaging and interactive experiences for their participants (Buhalis et al., 2023). This can include using gamification, social media integration, and live polling to foster participation and collaboration. Another payback that event planners will also get from adopting digital technology in completing their daily event tasks or transactions is the data-driven decision-making process (Sarker & Datta, 2022). The digital age has made it easier for event planners to collect and analyze data about their events and attendees. This data can be used to make more informed decisions about event design, marketing and attendee engagement strategies. The application of a network is one of the main requirements to connect people with other elements of event management systems that are responsible for the distribution of data as input and information as output to all related users in the events conducted (Laghari et al., 2021). The Internet has made it possible for event planners to reach a global audience, regardless of geographic location (Parncutt et al., 2021). This global reach presents a unique opportunity to expand the reach of events and connect with a diverse range of attendees from around the world. Besides, digital tools and platforms allow event planners to personalize the event experience for each attendee (Estanyol, 2022). This personalization includes tailoring content, recommendations, and networking opportunities based on individual preferences and interests.

The digital age has brought about a new set of challenges and opportunities for event planners. While the rapid

pace of technological change can be daunting, it also presents exciting possibilities for creating more engaging, interactive and personalized event experiences. By embracing these changes and staying adaptable, event planners can thrive in the digital age and continue to deliver exceptional events for their attendees.

2. Literature Review

The advent of the digital age has profoundly transformed the event management industry, presenting both challenges and opportunities for event planners. This paper explores the key challenges and opportunities that event managers face in the digital landscape. The event management industry is undergoing a significant transformation due to the rapid advancement in digital technologies. Bibliometric analysis is a quantitative method used to analyze the body of scientific literature related to a particular topic (Linnenluecke et al., 2020). By examining the number of publications, citations, and other metrics, bibliometric analysis can provide valuable insights into the evolution of a field, the key players, and the most influential research directions (Janik et al., 2021).

Event planners face several challenges in the digital era, in which digital technologies have made it possible for new entrants to the market to compete (Cozzolino et al., 2021). Another challenge faced by event planners in the digital era is changing consumer behavior. Attendees are increasingly using digital channels to research and book events, which requires event planners to adapt their marketing and sales strategies (Nalbant & Aydın, 2023). Not only that, the abundance of data available through digital technologies can be overwhelming, making it difficult for event planners to identify and utilize the most relevant information.

However, despite the challenges, digital technologies also present significant opportunities for event planners. The digital platforms enable event planners to reach a wider audience and promote events more effectively. Besides, digital technologies allow event planners to collect and analyze data about attendees, enabling them to create personalized experiences and build stronger relationships (Rocha et al., 2021). Digital tools can streamline event planning processes, reduce costs, and improve efficiency.

Conducting a bibliometric analysis related to event management challenges and opportunities in the digital technology era is essential to identify the research gaps. By analyzing the existing literature, bibliometric analysis can identify areas where further research is needed to address the challenges and opportunities facing event planners (Celuch, 2021). In addition, bibliometric analysis can track the emergence of new technologies and research directions, helping event planners stay informed about the latest trends. Event planners can compare their research output with other institutions or researchers and do benchmarks to identify areas for improvement that also contribute to their performance. Furthermore, bibliometric analysis can provide evidence-based insights that can inform event planning decisions and strategies (Sharifi, 2021).

Digitalization has significantly impacted the event industry, changing how events are planned, executed, and evaluated. A bibliometric analysis revealed that digital technologies have made it easier for event planners to handle issues such as crowd management and tracking human mobility during mass events (Furno, 2021). Technologies such as the Internet of Things and special-purpose mobile applications have been instrumental in this regard.

The digital age has presented several challenges in event management, including issues of digitalization and implementing digital technologies. However, it has also opened up opportunities for innovation and efficiency. For instance, the use of digital technologies has enhanced customer experience and facilitated the creation of event-based social networks (Manikandan et al., 2024). Despite the growing number of literature on this topic, there are still gaps that need to be addressed. For instance, more research is needed on the dependency of digital technologies on the event type (Benbya et al., 2020). Furthermore, future research directions include technological aspects of online event-based social networks, issues of crowd management and security of mass events and issues of attendees' acceptance of novel digital technologies.

This research is significant as it contributes to the understanding of the impact of digitalization on event management. It provides insight into the challenges and opportunities presented by the digital age, thereby informing strategies for effective event management. Moreover, by identifying gaps in the literature, this

research paves the way for future studies in this field.

3. Research Methodology

This research employs a bibliometric analysis approach to examine the challenges and opportunities in event management in the digital age. This quantitative method allows for the exploration of patterns, trends and gaps in the existing literature (Chawla & Goyal, 2022). The search strategy involved the use of specific keywords and phrases related to event management challenges and opportunities in the digital age. These included "event management", "digital", "challenges", "opportunities" and "bibliometric analysis". Boolean operators (AND, OR) were used to combine these keywords to refine the search.

The Scopus database was used to retrieve relevant literature. The Scopus database was chosen due to its extensive coverage of literature in the field of event management and digital technologies (Pirola et al., 2020). The initial search yielded a large number of articles when using the "event management" keyword itself without filtering. The inclusion criteria included articles that were peer-reviewed, written in English and published between the years of 2015 and 2024, and types of documents filtered to original articles, conference papers, book chapters, books and reviews. The exclusion criteria included articles that were not directly related to the research topic, such as focusing solely on event management without any reference to the digital age.

The selected articles were then subjected to bibliometric analysis. This involved the use of the VOSviewer software tool to analyze the data and generate bibliometric indicators such as citation counts based on country, co-citation analysis and keyword analysis. These indicators provided insights into the most influential works in the field, the relationship between different works, and the most frequently discussed topics. By employing a bibliometric analysis, this research aims to provide a quantitative assessment of the literature on event management in the digital age, highlighting the challenges and opportunities that have been identified and discussed in the field.

4. Results and Discussion

Bibliometric analysis of publication output: Extracted publications from the Scopus database were examined for performance analysis which descriptively examined and described the performance of published articles. All the published articles selected for this study must be in English. Of a total of 125 articles published in Scopus, 99 were considered based on selected filtering as shown in the following Search String:

Search String:

TITLE-ABS-KEY ("event management" AND opportunity* OR challenge* AND digital* OR technology*) AND PUBYEAR >2015 and PUBYEAR <2024 AND (LIMIT-TO (DOCTYPE, "ar")) OR LIMIT-TO (DOCTYPE, "re") OR LIMIT-TO (DOCTYPE, "cp") OR LIMIT-TO

(DOCTYPE, "bc") OR LIMIT-TO (DOCTYPE, "b")) AND (LIMIT-TO (LANGUAGE, "English")).

As stated in the Search String, the filtering of documents was based on English language only, the year published ranges from 2015 until 2024 and document types selected include article, review, conference paper, book chapter and book contributing to 99 documents extracted for the analysis. This volume of articles indicates a substantial body of literature related to this study, suggesting that it is an area of active research and interest. Two articles were excluded that refer to the "note" document type. The volume of articles published is depicted in Table 1. This ensures that the analysis is focused on recent and relevant literature selected for this study. The exclusion of the "note" document type helps maintain the focus on more substantial and comprehensive works.

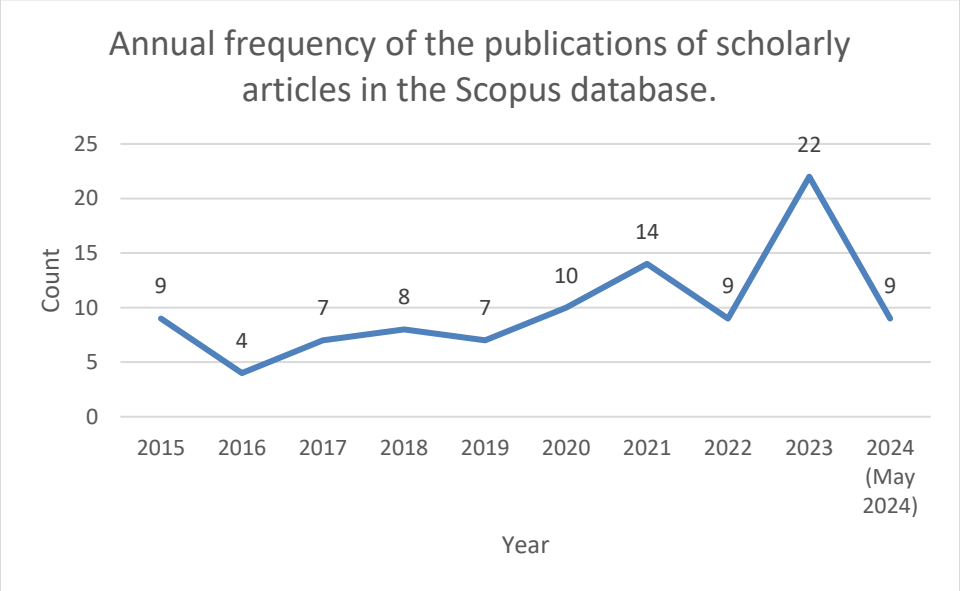
Table 1: Articles included in Scopus from 2015 until 2024

Before filtering				After filtering			
Articles included		**Articles Excluded**		**Articles included**		**Articles Excluded**	
Article	50	Note	2	Article	39	Note	2
Review	3			Review	2		
Conference	53			Conference paper	44		
paper	11			Book chapter	9		
Book chapter	6			Book	5		
Book							
Total	**123**	**Total**	**2**	**Total**	**99**	**Total**	**2**

Table 2: Annual frequency of the publication of scholarly articles in the Scopus database

Year	Count
2015	9
2016	4
2017	7
2018	8
2019	7
2020	10
2021	14
2022	9
2023	22
2024 (May 2024)	9
Total	**99**

Figure 1: Annual frequency of the publications of scholarly articles in the Scopus database



Based on Table 2 and Figure 1, the annual frequency of citations of articles in the Scopus database was maximum in the year 2023 with 22 articles published. This suggests that interest and research activity in the field have been increasing over time, reaching a peak in 2023. It could also indicate that the research published in 2023 was particularly influential, as evidenced by the high number of citations in which the research has been conducted during the COVID-19 pandemic which impacts the event industry. The results of this analysis provide valuable insights into the evolution of the field over time. The increasing frequency of citations suggests that the field is growing and that recent research is having a significant impact. This information can be useful for researchers to understand the current state of the field and identify trends and gaps in the literature.

Bibliometric analysis of the citations based on countries: Citation by countries with a maximum number of countries per document is 25; minimum number of documents of a country is 5 and minimum number of citations of a country is 1. The result generated shows that out of the 43 countries, 7 meet the thresholds as shown in Figure 2 until Figure 5. The top countries contributing to this bibliometric analysis were dominated by the United States with 290 citations, followed by the United Kingdom with 162 citations and Germany with 133 citations.

Figure 2: Top 7 countries contributing to the publications in this study

Create Map

Verify selected countries

Selected	Country	Documents	Citations	Total link strength
☑	france	6	38	1
☑	germany	6	133	1
☑	malaysia	7	11	1
☑	united kingdom	16	162	1
☑	india	11	41	0
☑	italy	9	41	0
☑	united states	14	290	0

Figure 3: Pie chart of the top 7 countries contributing to the publications in this study

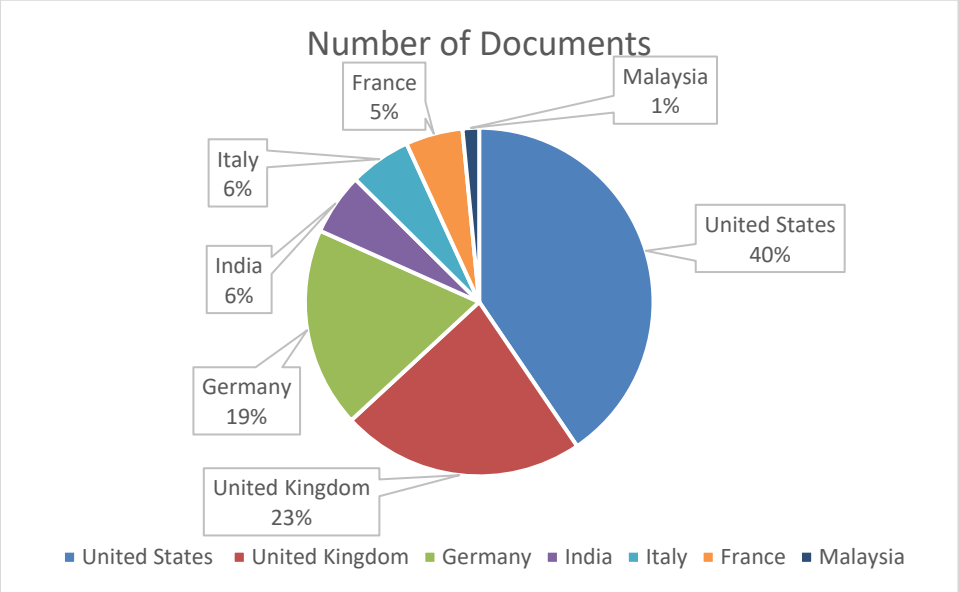


Figure 4: World map of the top 7 countries contributing to the publications in this study

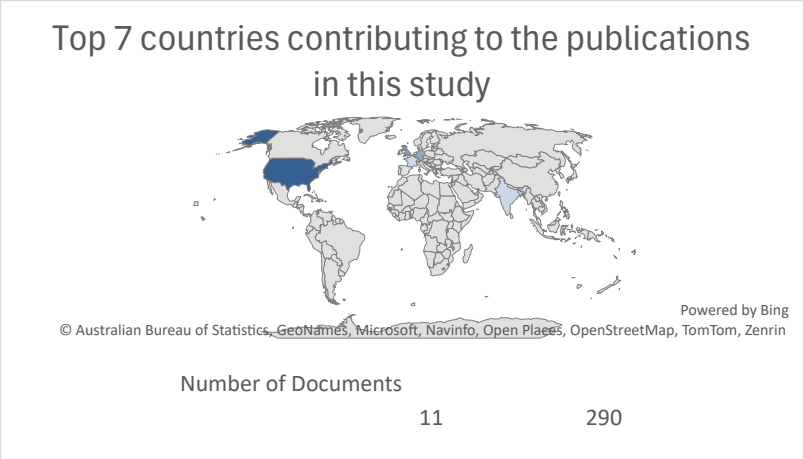


Figure 5: VOSviewer output showing the top 7 countries contributing to the publications in this study



This pattern shows the number of citations received by the publications from listed countries. The United States leading the list with 290 citations indicates that research conducted in the United States had a significant impact on this field. It shows that researchers in the United States have been producing high-quality work that others in the field find valuable and cite in their research. Ranked second in the United Kingdom with 162 citations, indicating that it is also a major contributor to this field. Another key player is Germany with 133 citations signifies that German research also contributed valuable insights.

The citation counts for these countries reflect the impact and influence of their research in the field of event management in the digital era. It is important to note that while citation count is a useful metric, it is not the only measure of research quality or significance. Other factors, such as the relevance of research to real-world applications and its contribution to advancing knowledge and understanding in the field, are also important.

Bibliometric analysis of co-citation based on authors: The minimum number of citations of an author is 8, Out of the 8559 authors, 33 meet the threshold. For each of the 24 authors, the total strength of the co-citation links with other authors was calculated in this analysis. The authors with the greatest total link strength were selected as shown in Figure 6 and Table 3 respectively.

Table 3: Co-citation based on authors list

Author	Number of citations
Getz D.	42
Mair J.	18
Bouramdane A.A.	16
Ziakas V.	16
Rahman M.K.	13
Ostfeld A.	11
Radoglou-Grammatikis P.	10
Sarigiannidis P.	10
Wang L.	10
Antchak V.	9
Azarderakhsh R.	9
Buhalis D.	9
Finkel R.	9
Hart W.E.	9
Li Y.	9
Robertson M.	9
Silvers J.R.	9
Thiesse F.	9
Chen T.	8
Hu C.	8
Liu Y.	8
Wang Y.	8
Grand Total	**259**

In a co-citation analysis, two works are considered to be co-cited if they are both cited by a third work. The strength of the co-citation link between two works is determined by the number of times they are co-cited. Based on the result shown in Table 3 and Figure 6, the top author works that have a high number of citations are Donald Getz who contributes 42 citations and is most frequently cited by others. For each of the 24 authors who met the threshold, the result shows the total strength of the author's co-citation links with other authors. This indicates how often Getz. D's work is cited alongside other works, which suggest relationships between different research topics and areas that were discussed in the next section. The author with the greatest total link strength is Donald Getz, who published a book entitled “Event Studies: Theory and Management of Planned Events” with 42 citations that show his work is not only frequently cited but also often cited in conjunction with other influential works. This indicates that his work is considered foundational in the event management area and also has been influential in shaping the direction of subsequent research.

It is important to note that while co-citation analysis can provide valuable insights into the structure and evolution of a scientific field, it is only one of many possible bibliometric measures. Other factors, such as the relevance of research to real-world applications and its contribution to advancing knowledge and understanding in the field are also important.

Bibliometric analysis of co-occurrence based on all keywords: In a co-occurrence analysis, two keywords are considered to co-occur if they appear in the same article or the number of co-occurrences of two keywords is the number of publications in which both keywords occur together in the title, abstract or keyword list. The strength of the co-occurrence link between two keywords is determined by the number of times they appear together.

The type of analysis using co-occurrence with the unit of analysis selected is "All keywords" and the counting method uses "Full counting" with a minimum number of occurrences of a keyword set to 5. The result shows that out of the 1032 keywords extracted from the published articles, 10 keywords meet the threshold. For each of the 10 keywords, the total strength of the co-occurrence links with other keywords was calculated. The keywords with the greatest total link strength were selected. Based on Figure 7 and Figure 8, results show that the top four keywords with the greatest total link strength were information management with 29 occurrences, security information and event management (siem) (22), network security (17), cybersecurity (14) and intrusion detection (9).

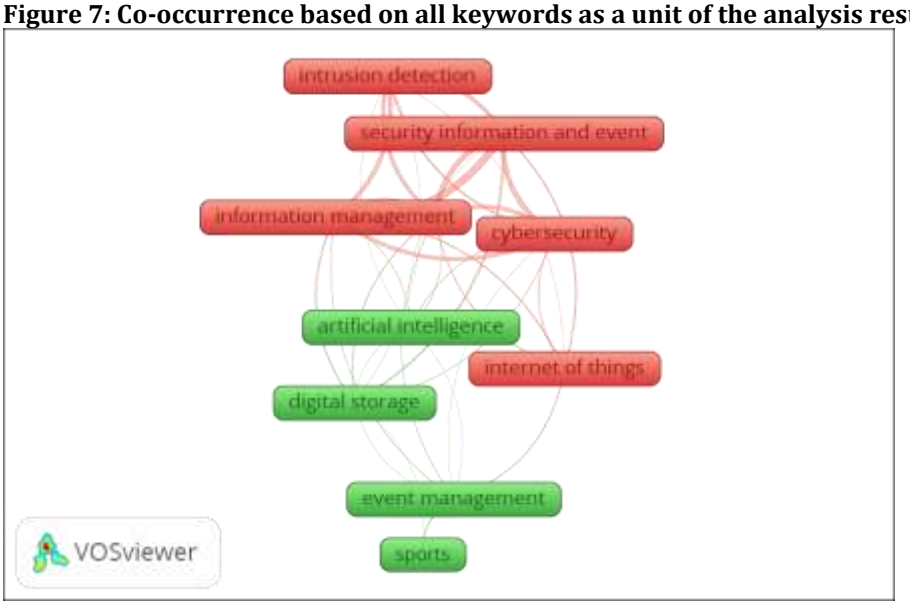
Figure 6: Co-occurrence based on all keywords as a unit of the analysis result list

Create Map

Verify selected keywords

Selected	Keyword	Occurrences	Total link strength
☑	information management	29	58
☑	security information and event management (siem)	22	54
☑	network security	17	51
☑	cybersecurity	14	39
☑	intrusion detection	9	33
☑	digital storage	7	18
☑	internet of things	9	18
☑	event management	18	14
☑	artificial intelligence	6	10
☑	sports	5	5

Figure 7: Co-occurrence based on all keywords as a unit of the analysis result



For each of the 10 keywords, the total strength of their co-occurrence links with other keywords was calculated and indicates how often these topics are discussed in conjunction with other topics and shows the relationship between different research areas. Based on Figure 6 and Figure 7, the top keyword with the greatest total link strength is information management with 58 total link strength. This suggests that information management is a key topic in the field of event management in the digital era. It indicates that managing information

effectively is a significant challenge and opportunity in the event management field.

Second in the row is security information and event management (siem) with 54 total link strength suggesting that security information and event management is a crucial aspect of event management and indicates that managing security information and events is a significant challenge. Network security with a total link strength equal to 51 also indicates that securing networks is a significant challenge and the same goes for cybersecurity ranked number four in the list suggesting that it is important to detect and prevent cybercrime or cyber intrusions. They must also protect participants' personal and financial information by employing strong cyber security measures and remaining attentive to any attacks. The "attention economy" necessitates novel approaches to capturing and maintaining participants' attention, both online and offline.

5. Conclusion

In the rapidly evolving digital and technology era, event planners must embrace bibliometric analysis to stay informed about the latest challenges and opportunities. By analyzing the scientific literature, event planners can identify research gaps, monitor emerging trends, benchmark their performance, and make informed decisions that will drive success in the competitive industry (Ogutu et al., 2023).

Bibliometric analysis offers detailed insights using VOSviewer software, highlighting citation and co-citation networks, and keyword co-occurrence networks. This paper maps the publication evolution from 2015 to 2024, identifying current research interests and potential future directions. This paper emphasizes the importance of information management and network security as the most frequently appearing keywords. Effective information management in the digital era is crucial and event planners need to be adapted to collecting, analyzing and utilizing data to make informed decisions (Yitmen et al., 2021). This could involve using digital tools to track attendee behavior, measure event success, and personalize the event experience. Security has become a paramount concern with the increasing digitalization of events (Farayola et al., 2024). Event planners need to be aware of potential security threats and implement robust security measures using security information and event management tools to monitor network activity and detect potential security incidents.

As an event becomes more connected, the security of the network infrastructure becomes critical, and the networks must be secure to protect sensitive data and ensure the smooth running of the event when conducting events (Toledano, 2024). Event managers need to be aware of potential cyber threats and implement measures to protect against them. This could involve training staff on cybersecurity best practices and implementing secure systems and processes. Event managers need to use intrusion detection systems to monitor the networks and systems' malicious activity (Radoglou-Grammatikis et al., 2021).

This topic highlights the need for event planners to stay up to date with the latest digital trends and challenges. By understanding and addressing these issues, event planners can leverage the opportunities of the digital age to create more successful and engaging events. It is important to note that while these are currently the most frequently discussed topics, the field is rapidly evolving, and new trends and challenges are likely to emerge in the future. Therefore, continuous learning and adaptation are key to success in event management in the digital era.

For future research, further investigation into the integration of digital technologies in event management and the development of strategies to enhance event practices and industry innovation. Directions for future research include exploring the dependence of digital technologies on event types, online event-based social networks, crowd management, and attendees’ acceptance of new digital technologies.

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