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Science Mapping of ITIL-Based IT Service Management Research: Advancing Sustainable Development Goals on Industry, Innovation, and Infrastructure

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Abstract

This bibliometric study examines the role of ITIL-based IT Service Management (ITSM) in advancing Sustainable Development Goal 9 (SDG 9), which focuses on building resilient infrastructure, promoting sustainable industrialization, and fostering innovation. Using Scopus-indexed literature from 2003 to 2024, the research applies VOSviewer for co-citation, co-authorship, and keyword co-occurrence analyses to uncover the intellectual structure and thematic evolution of ITSM research. The analysis reveals four major clusters: (1) strategic ITSM processes and foundations, (2) regional ITIL adoption and decision-support systems, (3) cultural readiness and organizational performance, and (4) integration of automation and emerging technologies such as AI and Industry 5.0. These themes underscore ITIL's role in enhancing digital infrastructure, optimizing service delivery, and promoting innovation—key elements of SDG 9. Emerging technologies like AI, machine learning, and cloud computing are increasingly embedded in ITSM frameworks, enabling smarter and more sustainable service operations. Despite its benefits, ITSM adoption faces barriers such as high costs and organizational resistance. The study provides a knowledge base for future research and policy-making, advocating for scalable innovation, inclusive governance, and digital transformation aligned with global sustainability goals.

1. Introduction

In the evolving landscape of sustainable development, innovation and information technology have emerged as central enablers of long-term industrial growth and infrastructure modernization. Recent research emphasizes the strategic alignment of innovation practices and IT management with the United Nations Sustainable Development Goals (SDGs), particularly SDG 9, which focuses on building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation. Bibliometric studies have mapped domains such as green supply chain management to SDGs, revealing strong linkages with SDG 9 and SDG 12 (Responsible Consumption and Production), highlighting the transformative potential of integrated systems thinking in achieving sustainability targets (Raman et al., 2023).

Within the IT domain, the implementation of the Information Technology Infrastructure Library (ITIL) framework has gained traction for its systematic approach to managing IT services, improving efficiency, and enabling continuous improvement (Duarte de Barros et al., 2015). ITIL-based IT Service Management (ITSM) practices are increasingly

being viewed as drivers of innovation in organizations through process automation, service standardization, and improved governance. Parallel to this, research into innovation indicators such as ICT infrastructure and R&D investments further supports their critical role in achieving SDG 9 outcomes (Mavuri et al., 2019). This study aims to map the scientific landscape of ITIL-based ITSM research through science mapping techniques, identifying key trends, thematic clusters, and future research directions. By examining its intersection with SDG 9, the study contributes to a deeper understanding of how ITSM practices support sustainable, inclusive, and innovation-driven industrial development.

2. Literature Review

The convergence of automation, incident management, and service operations within IT Service Management (ITSM) frameworks is driving innovation in IT service delivery. Organizations are increasingly adopting AI-based solutions to optimize processes, reduce manual interventions, and improve response times in incident management (Aluwala, 2023). The integration of modern technologies like cloud computing and machine learning with ITIL processes is reshaping ITSM practices (Eghbal Ghazizadeh et al., 2019). Automation is seen as a key solution for meeting the demands of digital businesses, with many IT organizations systematically automating repeatable processes (Krishnan & Ravindran, 2017). These advancements align with the goals of Industry 5.0 and SDG 9, promoting sustainable, resilient, and inclusive industrial development through human-centric approaches and cutting-edge technologies like AI and ML (Costa, 2024). However, challenges such as implementation costs and the need for workforce adaptation remain, necessitating strategic considerations for successful integration of these technologies in ITSM.

The papers highlight the growing importance of IT service management (ITSM) and sustainable manufacturing (SM) in the modern business landscape. ITIL, a framework for ITSM, has been widely adopted to define, deliver, and govern IT services (Krishnan & Ravindran, 2017). Automation is identified as a key solution for meeting digital business demands, with organizations increasingly automating repeatable processes (Krishnan & Ravindran, 2017). In the manufacturing sector, SM has emerged as a critical research topic, driven by government policies, social awareness, and technological advancements (Jamwal et al., 2021). The adoption of Industry 4.0 technologies is transforming manufacturing sustainability, with recent years seeing an increase in publications related to sustainability and Industry 4.0 (Jamwal et al., 2021). Both ITSM and SM research trends emphasize the importance of continuous improvement, best practices, and the integration of new technologies to meet evolving business needs and sustainability goals (Krishnan & Ravindran, 2017; Jamwal et al., 2021).

Recent research highlights the growing importance of artificial intelligence (AI) in achieving the UN Sustainable Development Goals (SDGs). Studies show an increasing trend in AI applications across various SDGs, with SDG 3 (health) and SDG 7 (energy) receiving the most attention (Singh et al., 2023). AI has the potential to revolutionize public service delivery by enhancing efficiency, effectiveness, and accessibility (Anshari et al., 2024). However, current AI development focuses primarily on economic growth (SDG 9), potentially

neglecting societal and environmental issues (Nasir et al., 2023). In the business and management fields, SDG research clusters around technology and innovation, education and human resource management, CSR and firm performance, supply chains and governance, and business strategies (Lee & Zhou, 2022). These findings suggest that while AI holds promise for advancing the SDGs, a more balanced approach is needed to address all 17 goals comprehensively.

Recent bibliometric analyses of Sustainable Development Goals (SDGs) research reveal emerging trends and clusters in business and management disciplines. Studies have identified key focus areas including sustainable supply chains, technology and innovation, corporate sustainability, and circular economy (Wichaisri & Sopadang, 2018; Lee & Zhou, 2022; Gyimah et al., 2024). The importance of balancing economic, environmental, and social dimensions for long-term development is emphasized (Wichaisri & Sopadang, 2018). Research clusters highlight the role of artificial intelligence, business collaboration, and entrepreneurship in advancing SDGs (Gyimah et al., 2024). The United States and United Kingdom lead in publications and citations, with the World Health Organization and universities being prominent contributors (Yeh et al., 2022). Future directions point towards integrating sustainability into business strategies, stakeholder engagement, and leveraging science and technology for sustainable development (Wichaisri & Sopadang, 2018; Yeh et al., 2022).

3. Methodology

3.1 Bibliometric Approach

This study adopts a bibliometric approach to systematically explore the intellectual structure and emerging trends of ITIL-based IT Service Management (ITSM) research in the context of Sustainable Development Goal 9 (Industry, Innovation, and Infrastructure). Bibliometric analysis is a robust quantitative method for evaluating scientific literature, identifying patterns, thematic evolution, influential authors, and intellectual networks within a research domain (Passas, 2024). The methodology follows a structured process comprising research design, data collection, search refinement, data cleaning, bibliometric and qualitative content analysis, and interpretation of results (Moresi et al., 2021).

Data was sourced from a leading academic Scopus ensuring coverage of peer-reviewed articles and conference proceedings relevant to ITIL, ITSM, and SDG 9. The data was exported in CSV formats, then processed and analyzed using VOSviewer bibliometric tools for network visualization, co-citation, and co-occurrence mapping. These tools allowed the identification of clusters, key themes, and temporal trends. Integration of qualitative content analysis was employed to contextualize and deepen the interpretation of the quantitative findings (Moresi et al., 2021; Öztürk et al., 2024). To visualize the conceptual and social structure of the research domain, co-citation analysis**,** co-authorship analysis, and keyword co-occurrence analysis were performed using VOSviewer. Co-citation analysis helped identify clusters of publications frequently cited together, revealing thematic groupings and intellectual foundations of ITIL-based ITSM research. Co-authorship analysis examined collaboration patterns among researchers and institutions, highlighting key contributors and research networks. Keyword co-occurrence analysis mapped the relationships between core concepts and emerging topics,

enabling the identification of research hotspots and future trends, especially those related to automation, innovation, and sustainable infrastructure. This methodological approach enables a comprehensive understanding of how ITIL-based ITSM research contributes to industrial innovation and sustainability. The findings aim to guide scholars, practitioners, and policymakers in aligning IT practices with global development goals.

3.2 Search String

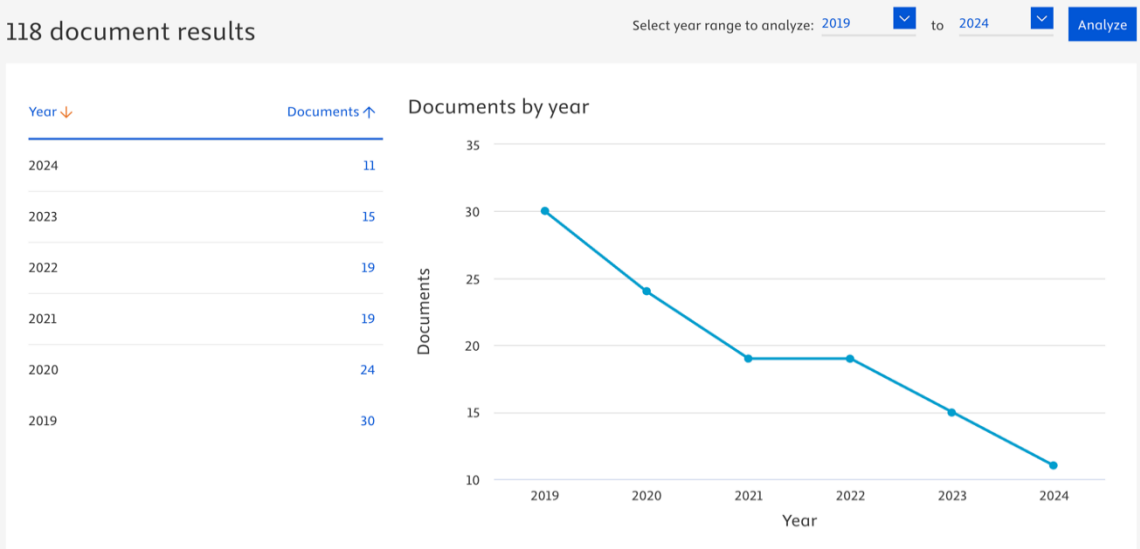
To ensure the relevance and comprehensiveness of the bibliometric data, a structured search strategy was developed. The search string was carefully formulated to capture publications that intersect Information Technology Infrastructure Library (ITIL), IT Service Management (ITSM), and Sustainable Development Goals (SDGs), particularly SDG 9 (Industry, Innovation, and Infrastructure).

Table 1: Search String in Scopus Database

No	Keywords	Justification
1	"ITIL" OR "Information Technology Infrastructure Library"	To comprehensively capture the body of literature related to the ITIL framework and its application within IT Service Management (ITSM)**.**
2	"IT Service Management" OR "ITSM" OR "Information Technology Service Management" OR "Service Delivery" OR "Service Support" OR "IT Operations Management"	To includes a range of commonly used terms that represent the broader domain of IT Service Management**:** "IT Service Management" and "ITSM" cover the general field and its acronym. "Service Delivery" and "Service Support" are core components of ITIL, frequently discussed in relation to its practical implementation. "IT Operations Management" captures literature focusing on operational aspects that often intersect with or are guided by ITIL practices.

4. Result and Analysis

Initial search returned 570 documents. After filtering only journal publications and limiting to year 2024, to ensure all publications are within full calendar year, the search return to 118 journal publications.



4.1 Citation Analysis

From the 118 documents, 61 meet the threshold, and the minimum number of citations of a document is 3.

Table 2: Top 10 Document Citation Analysis

Rank	Author	Title	Citation
1.	**Orta, E., & Ruiz, M. (2019).** Met4ITIL: A process management and simulation-based method for implementing ITIL. *Computer Standards & Interfaces, 61*, 1–19. https://doi.org/10.1016/j.csi.2018.01.006	Met4ITIL: A process management and simulation-based method for implementing ITIL	72
2.	Wang, D., Zhong, D., & Li, L. (2022). A comprehensive study of the role of cloud computing on the information technology infrastructure library (ITIL) processes. *Library Hi Tech*, *40*(6), 1954-1975.	A comprehensive study of the role of cloud computing on the information technology infrastructure library (ITIL) processes	41
3.	Blumberg, M., Cater-Steel, A., Rajaeian, M. M., & Soar, J. (2019). Effective organisational change to achieve successful ITIL implementation: Lessons learned from a multiple case study of large Australian firms. *Journal of Enterprise Information Management*, *32*(3), 496-516.	Effective organisational change to achieve successful ITIL implementation: Lessons learned from a multiple case study of large Australian firms	56

4.	Obwegeser, N., T. Nielsen, D., & M. Spandet, N. (2017). Continual process improvement for ITIL service operations: A lean perspective. *Information Systems Management*, *36*(2), 141-167. Chicago	Continual process improvement for ITIL service operations: A lean perspective	44
5.	Sarwar, M. I., Abbas, Q., Alyas, T., Alzahrani, A., Alghamdi, T., & Alsaawy, Y. (2023). Digital transformation of public sector governance with IT service management–A pilot study. *IEEE Access*, *11*, 6490-6512.	Digital transformation of public sector governance with IT service management–A pilot study	50
6.	Sukmana, H. T., Wardhani, L. K., Khairunnisa, S., Lee, K. O., & Wati, R. (2019). ITSM software ranking for small medium enterprises based on ITIL V3 quick win criteria using fuzzy SIR method. *Adv. Sci. Technol. Eng. Syst.*, *4*(2), 288-298.	ITSM software ranking for small medium enterprises based on ITIL V3 quick win criteria using fuzzy SIR method	21
7.	Dabboussi, D., Victor, F., & Prinz, W. (2021, May). BCDM-A decision and operation model for blockchains. In *2021 IEEE International Conference on Blockchain and Cryptocurrency (ICBC)* (pp. 1-3). IEEE.	BCDM-A decision and operation model for blockchains	13
8.	Yandri, R., Utama, D. N., & Zahra, A. (2019). Evaluation model for the implementation of information technology service management using fuzzy ITIL. *Procedia computer science*, *157*, 290-297.	Evaluation model for the implementation of information technology service management using fuzzy ITIL	65
9.	Herrera, M., & Van Hillegersberg, J. (2019, July). Using metamodeling to represent lean six sigma for IT service improvement. In *2019 IEEE 21st Conference on Business Informatics (CBI)* (Vol. 1, pp. 241-248). IEEE.	Using metamodeling to represent lean six sigma for IT service improvement	14
10.	Santosa, I., & Mulyana, R. (2023). The it services management architecture design for large and medium-sized companies based on itil 4 and togaf framework. *JOIV: International Journal on Informatics Visualization*, *7*(1), 30-36.	The it services management architecture design for large and medium-sized companies based on itil 4 and togaf framework. *JOIV*	20

4.2 Co-citation Analysis

Initial search returned 570 documents. After filtering only journal publications and limiting to year 2024, to ensure all publications are within full calendar year, the search return to 118 journal publications

Table 3: Top 10 documents with the highest co-citation and total link strength

Documents	Citation	Total link strength
Sergei, P. (2019). Cyber Resilience, ISBN: 978-87-7022-11-60 (Hardback) and 877-022-11-62 (Ebook)© 2019 River Publishers. *River Publishers Series in Security and Digital Forensics,*, *492*, 207.	74	99
Sergei, P. (2022). *Cyber security innovation for the digital economy: A case study of the Russian Federation*. River Publishers.	90	75
Sergei, P. (2018). *Big Data Technologies for Monitoring of Computer Security: A Case Study of the Russian Federation* (pp. 1-249). Cham: Springer International Publishing.	136	51
Sergei, P. (2020). Developing a Cybersecurity Immune System for Industry 4.0. *Developing a Cybersecurity Immune System for Industry*, *4*.	2	51
Cartlidge, A., Hanna, A., Rudd, C., Macfarlane, I., Windebank, J., & Rance, S. (2007). An introductory overview of ITIL V3. *The UK Chapter of the itSMF*, *64*.	362	17
Cater-Steel, A., Valverde, R., Shrestha, A., & Toleman, M. (2016). Decision support systems for IT service management. *International Journal of Information and Decision Sciences*, *8*(3), 284-304	26	17
Ganek, A., & Kloeckner, K. (2007). An overview of IBM service management. *IBM Systems Journal*, *46*(3), 375-385	42	17
Marrone, M., & Hammerle, M. (2017). Relevant research areas in IT service management: An examination of academic and practitioner literatures. *Communications of the Association for Information Systems*, *41*(1), 23	32	17
Sallé, M. (2004). IT Service Management and IT Governance: review, comparative analysis and their impact on utility computing. *Hewlett-Packard Company*, 8-17	255	17
Turban, E. A., Leidner, D. O. R. O. T. H. Y., Mclean, E. P. H. R. A. I. M., & Wetherbe, J. A. M. E. S. (2008). Transforming organizations in the digital economy. *Information Technology for Management*	3	17

Source: Author interpretation based on VOSviewer analysis

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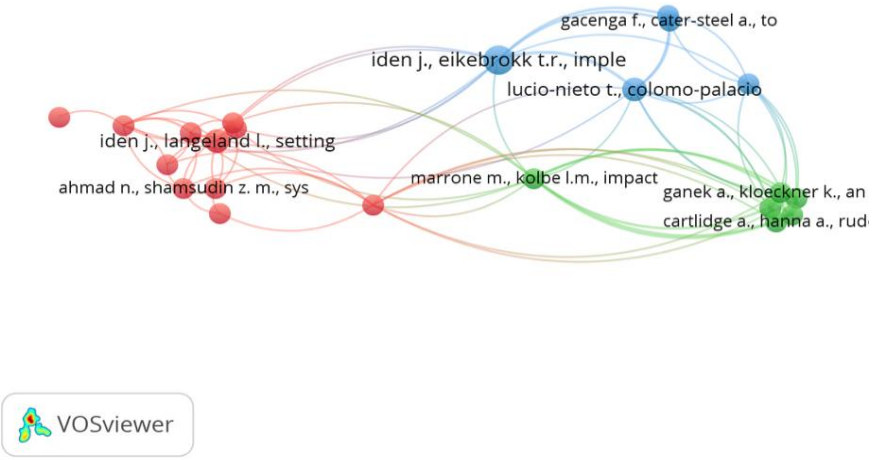

Figure 2: Co-citation analysis of SDG's on ITIL Based IT Service Management

Cluster 1 (red): *Strategic Foundations and Process Optimization in ITIL-Based ITSM*.

This cluster encapsulates foundational and strategic contributions to the implementation, evaluation, and continuous improvement of ITIL-based IT Service Management (ITSM) frameworks, forming a core knowledge base that aligns with the objectives of Sustainable Development Goal 9 (Industry, Innovation, and Infrastructure). Ahmad and Shamsudin (2013), along with Pollard and Cater-Steel (2009), emphasize structured and context-aware approaches to ITIL adoption, identifying critical success factors such as organizational readiness, leadership commitment, and staff engagement. These frameworks ensure the alignment of ITSM with long-term business innovation strategies. Similarly, Iden and Langeland (2010) provide empirical insights through a Delphi study, underlining expert consensus on phased and stakeholder-driven ITIL implementation models. In support of governance and policy alignment, Gervalla et al. (2018) position ITIL as a mechanism for enhancing IT governance structures. McNaughton et al. (2010) and Rouhani (2017) further this by offering evaluation and decision-making frameworks that enable performance measurement and intelligent tool selection—promoting innovation through data-informed ITSM. On the technical side, Mesquida et al. (2012) and Orta and Ruiz (2019) propose process improvement and simulation-based models (e.g., Met4ITIL), reinforcing ITIL's adaptability and scalability. Foundational texts from van Bon (2007) and Hunnebeck (2011) consolidate lifecycle understanding, particularly in service design. Together, this cluster advances ITSM maturity, fosters organizational resilience, and promotes sustainable digital infrastructure—key components of SDG 9.

Cluster 2 (green): *Foundations of ITIL-Based ITSM: Strategic Integration, Cross-National Adoption, and Decision Support in Support of SDG 9*

The second cluster in the co-citation analysis of ITIL-based IT Service Management (ITSM) reveals foundational contributions that shaped early ITSM research and its alignment with Sustainable Development Goal 9 (SDG 9: Industry, Innovation, and Infrastructure). Central to this cluster is Cartlidge et al. (2007), whose work introduced ITIL V3, establishing the standard framework that guided service management practices for over a decade. The co-citation of Ganek and Kloeckner (2007) highlights the strategic role of IBM's service management approach, emphasizing enterprise-level IT service integration. Salle and Rosenthal (2005) contribute to this strategic orientation, showing how frameworks like COBIT and HP ITSM were operationalized to align IT strategies with business goals, setting a precedent for governance-focused ITSM initiatives. Cater-Steel et al. (2016) extend this foundation by exploring decision support systems within ITSM, which support smarter service delivery aligned with innovation goals under SDG 9. Marrone et al. (2014) bring a global lens, analyzing cross-national ITIL adoption and identifying cultural and organizational factors influencing implementation success. Finally, Turban et al. (2008) offer a broader IT management perspective, providing theoretical underpinnings for ITSM practices in modern digital infrastructures.

The co-citation of these works suggests a cohesive intellectual base that has guided the evolution of ITSM from static frameworks to dynamic, strategic enablers of innovation. These early contributions are instrumental in understanding how ITSM can continue to support resilient infrastructure and sustainable industrialization in the context of the SDGs.

Cluster 3 (blue): *From Implementation to Impact: Organizational Culture and Benefits Realization in ITIL-Based ITSM*

The third cluster in the co-citation analysis represents the practical core of ITIL-based IT Service Management (ITSM), concentrating on implementation strategies, performance outcomes, and cultural readiness. Central to this cluster is the work of Eikebrokk and Iden (2016), who emphasize the critical role of organizational culture in enabling successful ITIL adoption. Their findings align with Sustainable Development Goal 9 by underscoring how internal cultural alignment fosters innovative infrastructure management. Gacenga et al. (2010) reinforce this theme by exploring international performance measurement and the tangible benefits of ITSM, providing early empirical evidence that linked ITIL implementation with improved operational efficiency—an essential aspect of building resilient infrastructure. Similarly, Galup et al. (2009) offer a foundational overview of ITSM, delineating key concepts that later works built upon for evaluating service value. The review by Iden and Eikebrokk (2013) systematically maps the landscape of ITSM implementation research, identifying success factors and barriers that inform best practices. Lucio-Nieto et al.

(2012) contribute a real-world case study from the oil and gas sector, demonstrating the practical application of an IT service information management framework.

Collectively, this cluster reflects a shift from theoretical development to empirical validation and operational integration. The frequent co-citation of these works indicates their centrality in shaping knowledge around how ITSM practices contribute to sustainable, efficient, and scalable digital infrastructures in support of SDG 9.

Table 4: Co-citation clusters on SDGs on ITIL-Based IT Service Management

Cluster	Cluster label	Number of articles	Representative publications
1 (red)	*Strategic Foundations and Process Optimization in ITIL-Based ITSM*	10	Ahmad and Shamsudin (2013), Pollard and Cater-Steel (2009), Iden and Langeland (2010), Gervalla et al. (2018), McNaughton et al. (2010), Rouhani (2017), Mesquida et al. (2012), Orta and Ruiz (2019), van Bon (2007), Hunnebeck (2011)
2 (Green)	*Foundations of ITIL-Based ITSM: Strategic Integration, Cross-National Adoption, and Decision Support in Support of SDG 9*	4	Cartlidge et al. (2007), Ganek and Kloeckner (2007), Salle and Rosenthal (2005), Cater-Steel et al. (2016), Marrone et al. (2014), Turban et al. (2008)
3 (Blue)	*From Implementation to Impact: Organizational Culture and Benefits Realization in ITIL-Based ITSM*	3	Eikebrokk and Iden (2016), Gacenga et al. (2010), Iden and Eikebrokk (2013

4.3-Co-word analysis

Applying the same database, the co-word analysis presents 25 items out of 746 keywords that met 49 thresholds, resulting in four clusters.

Table 7: Top 15 keywords in the co-occurrence of keywords analysis

Rank	Keyword	Occurrences	Total link strength
1.	itil	54	190
2.	service management	31	142
3.	it service management	44	141
4.	it services	35	122
5.	itsm	38	162

6.	information technology services	24	118
7.	information technology infrastructure library (itil)	19	88
8.	it service management (itsm)	15	85
9.	information technology service management	10	62
10.	it service management (itsm)	15	62
11.	information management	14	61
12.	information technology infrastructure library	11	56
13.	information technology infrastructure	9	50
14.	information systems	8	43
15.	information use	9	38

Figure 3 presents the network structure of the co-word analysis. It visibly shows four clusters representing four different themes. In accordance with the author's inductive interpretation, the four clusters are assigned the appropriate labels.

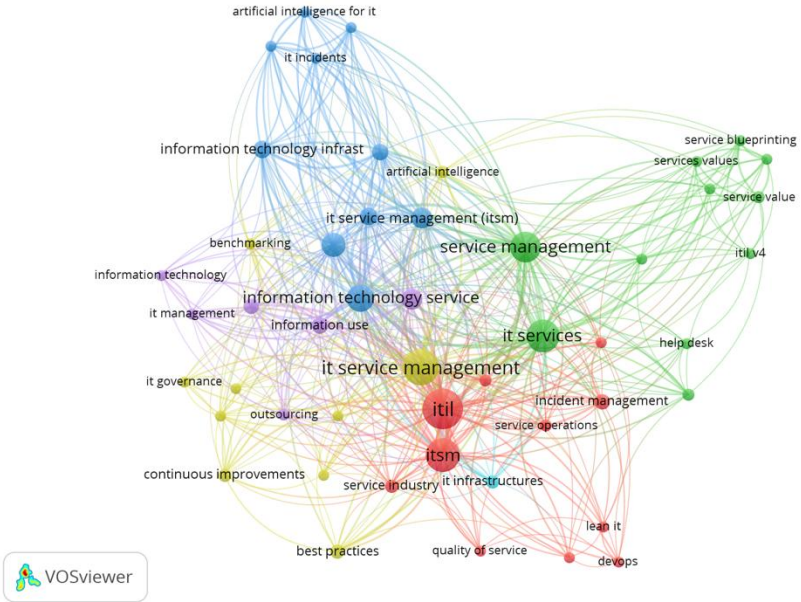

Figure 3: Co-word analysis of SDGs on ITIL-Based IT Service Management

Cluster 1 (red): *Automation-Driven Service Innovation in ITIL-Based ITSM: Aligning with SDG 9 and Industry 5.0*

The convergence of automation, incident management, and service operations within IT Service Management (ITSM) frameworks signals a transformative shift in IT

service delivery. The co-occurrence of terms such as *automation*, *incident management*, *information technology infrastructure library (ITIL)*, and *IT service management (ITSM)* reveals a strategic direction focused on intelligent, efficient, and proactive service operations. Organizations are increasingly adopting AI-driven solutions to streamline service workflows, minimize manual interventions, and enhance incident response times (Aluwala, 2023).

The integration of emerging technologies—such as cloud computing and machine learning—within ITIL processes is reshaping ITSM practices, enabling real-time diagnostics, predictive analytics, and autonomous decision-making (Eghbal Ghazizadeh et al., 2019). Automation, in particular, has been identified as a critical enabler for meeting the demands of digital-first enterprises, where repeatable and time-intensive tasks are systematically optimized (Krishnan & Ravindran, 2017). These technological advancements align with the vision of Industry 5.0 and Sustainable Development Goal 9 (SDG 9), which emphasize building resilient infrastructure and promoting sustainable industrialization through human-centric and intelligent systems (Costa, 2024). By embedding automation within ITIL-based ITSM frameworks, organizations can co-create value, foster innovation, and enhance service resilience. Nevertheless, this transition is not without challenges. Implementation costs, change management, and workforce reskilling require strategic alignment to fully harness these innovations. Future research should explore frameworks for scalable adoption, focusing on balancing technological capabilities with human adaptability in sustainable ITSM evolution.

Cluster 2 (green): *Integrating IT Service Management and Sustainable Manufacturing in the Era of Industry 4.0*

The second cluster reveals a future-oriented convergence between IT Service Management (ITSM) and Sustainable Manufacturing (SM), underpinned by automation, best practices, and digital transformation. The widespread adoption of ITIL as a guiding framework for ITSM has enabled organizations to standardize, govern, and continuously improve IT service delivery (Krishnan & Ravindran, 2017). As digital demands grow, automation is increasingly leveraged to enhance operational efficiency by minimizing human intervention in repetitive processes. In parallel, the manufacturing sector is undergoing a sustainability-driven transformation influenced by Industry 4.0 technologies. Research underscores the role of SM as a critical area shaped by global policies, environmental consciousness, and rapid technological innovation (Jamwal et al., 2021). Industry 4.0 tools—such as IoT, AI, and cyber-physical systems—are enabling smarter, more energy-efficient production processes, aligning closely with the goals of SDG 9. A shared theme across ITSM and SM is the commitment to continuous improvement and the integration of innovation to enhance resilience, efficiency, and sustainability. Both domains emphasize the application of structured frameworks (e.g., ITIL) and data-driven practices to adapt to evolving market and environmental pressures (Krishnan & Ravindran, 2017; Jamwal et al.,

2021). Looking forward, future research should explore synergies between ITSM and SM, especially in leveraging automation and analytics to foster sustainable digital and industrial ecosystems. Bridging these areas could catalyze cross-sector innovations aligned with Industry 5.0, placing human-centricity and sustainability at the core of digital service and production strategies.

Cluster 3 (blue): *Leveraging Artificial Intelligence for Sustainable ITSM in Alignment with the SDGs*

The third cluster emphasizes the transformative potential of Artificial Intelligence (AI) in advancing Sustainable Development Goals (SDGs) within ITIL-based IT Service Management (ITSM). Emerging literature reveals a growing interest in AI's role in achieving SDGs, particularly in domains such as healthcare (SDG 3) and clean energy (SDG 7), while also underscoring its relevance to innovation and infrastructure (SDG 9) (Singh et al., 2023). Within ITSM, AI technologies such as predictive analytics, intelligent automation, and decision-support systems are reshaping how services are designed, delivered, and governed, offering increased efficiency and scalability. Public service applications of AI are also gaining momentum, promising improved accessibility and responsiveness (Anshari et al., 2024). However, researchers caution that the current AI development trajectory is skewed toward economic outcomes, potentially sidelining social and environmental considerations (Nasir et al., 2023). This imbalance presents a critical challenge for organizations seeking to align ITSM innovations with the full spectrum of the SDGs. In the business and management literature, SDG-aligned research spans key areas such as technology adoption, corporate social responsibility, education, and strategic governance (Lee & Zhou, 2022). These trends highlight a need for ITSM frameworks to adopt a holistic perspective—embedding AI-driven service strategies that not only support operational excellence but also foster inclusive, equitable, and environmentally conscious outcomes. As AI becomes central to ITSM evolution, future research must explore integrative models that bridge technological innovation with sustainable, cross-sectoral impact aligned with all 17 SDGs.

Cluster 4 (yellow): *Integrating Circular Economy and Corporate Sustainability into ITSM for SDG Alignment*

The fourth cluster emerging from the co-occurrence analysis underscores a strategic pivot in ITIL-based IT Service Management (ITSM) toward embedding sustainability into core business and service delivery models. Bibliometric insights reveal a strong alignment between SDG research in business and management with themes such as corporate sustainability, circular economy, and sustainable supply chains (Wichaisri & Sopadang, 2018; Lee & Zhou, 2022; Gyimah et al., 2024). These evolving priorities signal the need for ITSM frameworks to move beyond operational efficiency and actively contribute to economic, social, and environmental sustainability. In this context, ITSM practices informed by ITIL can be instrumental in supporting circular

economy initiatives—through IT asset lifecycle management, green IT strategies, and responsible resource consumption. Additionally, corporate sustainability agendas are increasingly influenced by stakeholder engagement, transparency, and cross-sectoral collaboration (Gyimah et al., 2024), suggesting opportunities for ITSM to integrate governance models that reflect SDG values. Technological enablers such as AI, cloud services, and data analytics are becoming central to driving innovation in sustainable IT services, while universities and global organizations like the WHO play a pivotal role in shaping best practices (Yeh et al., 2022). Looking forward, embedding sustainability into ITSM demands a shift in mindset—from service optimization to strategic sustainability impact. Future research should explore how ITIL processes can facilitate stakeholder-aligned SDG strategies and how ITSM can act as a catalyst for circular, inclusive, and resilient business ecosystems.

Table 6: Co-word analysis on social media in disaster management

Cluster No and colour	Cluster label	Number of keywords	Representative Keywords
1 (red)	Intelligent Automation and Service Operations: Future Trajectories of ITIL-Based ITSM in Achieving SDG 9	9	automation, incident management, information technology infrastructure, information technology infrastructure library, information technology infrastructure library (itil), information technology service management, information technology services, it service management (itsm), service operations
2 (green)	Integrating IT Service Management and Sustainable Manufacturing in the Era of Industry 4.0	6	best practices, continous improvements, it infrastructures, itil, itsm, service industry
3 (blue)	Leveraging Artificial Intelligence for Sustainable ITSM in Alignment with the SDGs	6	artificial intelligence, it service management, it services, service delivery, service management, service value
4 (yellow)	Integrating Circular Economy and Corporate Sustainability into	4	information management, information systems, information use, outsourcing

	ITSM for SDG Alignment		

Discussion

The evolving demands of digital transformation have intensified the need for efficient and sustainable IT service delivery. Information Technology Infrastructure Library (ITIL), as a globally adopted framework for IT Service Management (ITSM), plays a pivotal role in optimizing IT processes, enhancing service quality, and enabling organizational innovation. Recent studies suggest that the integration of ITIL with advanced technologies such as AI, automation, and cloud computing not only improves service delivery but also aligns with Sustainable Development Goals (SDGs), particularly SDG 9: Industry, Innovation, and Infrastructure. This study conducts a bibliometric analysis to explore the intellectual landscape, emerging themes, and future directions of ITIL-based ITSM research in the context of SDG 9.

Recent studies highlight the growing importance of Sustainable Development Goal 9 (Industry, Innovation, and Infrastructure) in the context of IT Service Management (ITSM) and digital transformation. Bibliometric analyses reveal increasing research interest in SDG 9, with a 74% annual growth rate in publications from 2016 to 2022 (R. Raman et al., 2024). Key themes emerging include environmental protection, circular economy, and supply chain management (R. Raman et al., 2024). Challenges in achieving SDG 9 targets include poor awareness, funding issues, and implementation failures (Sanjeet Singh & Jayaram Ru, 2023). The integration of modern technologies like cloud computing, automation, and machine learning with ITIL frameworks is gaining traction in ITSM research and practice (Eghbal Ghazizadeh et al., 2019). Future research directions include addressing the digital divide, enhancing internet and mobile broadband subscription, and improving rural connectivity (Sanjeet Singh & Jayaram Ru, 2023). These studies collectively emphasize the need for innovative approaches in ITSM to align with sustainable development goals.

Implications

The findings of this bibliometric study suggest significant implications for both academic research and practical implementation in the field of IT Service Management (ITSM), particularly through the lens of Sustainable Development Goal 9 (SDG 9). The thematic clusters identified in the co-citation and co-occurrence analyses highlight a dynamic and evolving knowledge base that integrates ITIL-based ITSM with strategic innovation, organizational culture, and automation-driven practices. For practitioners, these insights affirm the value of ITIL as a scalable framework for fostering resilient digital infrastructures and enabling continuous service innovation in alignment with SDG 9. The convergence of automation, AI, and machine learning within ITSM frameworks points to a transformative trajectory in service delivery, underscoring the importance of reskilling the workforce and adopting human-centric approaches as emphasized by Industry 5.0. Policymakers and institutional leaders are urged to support initiatives that align ITSM practices with sustainable industrial policies, encourage cross-sector collaboration, and invest in capacity-building strategies that ensure inclusive and adaptive technology integration.

Conclusions

This study contributes to the growing body of literature on the intersection between ITIL-based ITSM and sustainable development by mapping its intellectual structure and emerging trends through a rigorous bibliometric analysis. The three major clusters identified—strategic and foundational frameworks, global integration and decision support, and implementation and cultural readiness—demonstrate the multifaceted role of ITSM in advancing SDG 9 objectives. In particular, automation and digital innovation emerged as critical enablers for building resilient infrastructures and promoting sustainable industrial practices. The alignment between ITSM evolution and sustainability goals highlights the potential of ITIL-based frameworks as strategic tools for innovation-driven development. As the global landscape continues to evolve, future research should explore integrative models that balance technological advancements with organizational adaptability, ensuring that ITSM not only supports operational efficiency but also contributes meaningfully to long-term sustainable development.

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