



BRIDGING BUSINESS PROCESS INNOVATION AND DATA ANALYTICS VALUE CREATION: A BIBLIOMETRIC AND THEMATIC REVIEW OF GOVERNANCE-ORIENTED RESEARCH

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ABSTRACT

The convergence of data analytics and Business Process Innovation (BPI) has become a key driver of organizational value creation. Despite significant investments in analytics capabilities, many organizations struggle to convert data-driven insights into sustainable business value. Existing research has largely examined data analytics, BPI, and governance separately, resulting in limited understanding of governance as the mechanism that aligns analytics with business processes to create value. This study addresses this gap through a bibliometric and thematic review of governance-oriented research linking data analytics, BPI, and value creation. A systematic search of the Scopus database identified 902 peer-reviewed publications published between 2016 and 2025. Scopus Analyzer was used for descriptive analysis, OpenRefine for data cleaning and standardization, and VOSviewer for keyword co-occurrence, citation, and co-authorship analyses. The findings reveal rapid publication growth after 2021, driven by increasing interest in digital transformation, artificial intelligence, and analytics-enabled organizational performance. However, governance-related concepts remain weakly connected to dominant research clusters, indicating fragmentation across governance, analytics, and process innovation research. Citation analysis further shows that influential studies primarily emphasize analytics capabilities and digital transformation, with limited attention to governance as a value-enabling mechanism. The study concludes that the field lacks a coherent governance framework integrating data analytics and BPI to support sustainable value creation. The findings provide a foundation for developing adaptive governance frameworks that better align analytics, business processes, and organizational objectives.

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1. INTRODUCTION

The convergence of Business Process Innovation (BPI) and data analytics has become a defining feature of contemporary organizational strategy, with governance emerging as the critical enabler that transforms technical potential into sustainable value creation. Over the past decade, organizations have increasingly recognized that the integration of advanced analytics into core business processes is not merely a technological upgrade but a fundamental shift in how value is generated, captured, and sustained in dynamic markets (Baijens et al., 2021; Chaudhuri et al., 2021; Mikalef et al., 2020; Mikalef & Krogstie, 2020; Rahman, 2025). This transformation is underpinned by robust governance frameworks that ensure data quality, integrity, and strategic alignment across functional boundaries (Bernardo et al., 2024; Bližňák et al., 2024; Joshi, 2024; Kanying et al., 2023). The literature consistently highlights that while data analytics can drive operational efficiency, informed decision-making, and innovation, these benefits are fully realized only when supported by mature governance structures that orchestrate people, processes, and technology toward common objectives (Fadler & Legner, 2021; Kohli, 2025; Vial, 2023). As organizations grapple with the challenges of digital transformation — ranging from data silos to regulatory complexity — the role of governance has evolved from compliance-focused oversight to a proactive catalyst for cross-functional collaboration and strategic agility (Balogun et al., 2025; Davidson et al., 2023; Gao & Feng, 2024). This review synthesizes foundational theories, empirical findings, and emerging frameworks to elucidate how governance-oriented research bridges the gap between BPI and the creation of value from data analytics.

Note that the theoretical foundations for linking BPI with data analytics value creation are deeply rooted in established management paradigms such as the Resource-Based View (RBV), Dynamic Capabilities Theory, Information Processing Theory (IPT), and the Technology-Organization-Environment (TOE) framework (Chaudhuri et al., 2021; Manoharan et al., 2024; Pathak et al., 2024; Rahman, 2025). These perspectives collectively argued that organizational resources — particularly those related to information and analytics — must be effectively governed to unlock their full potential for innovation and competitive advantage (Mikalef et al., 2020). Furthermore, empirical studies demonstrated that firms with high analytics maturity outperform their peers in profitability, process efficiency, decision quality, and return on investment (Rahman, 2025; Sridharlakshmi et al., 2024). Achieving such maturity requires more than technological investment as it demands an enterprise-wide commitment to integrating analytics into strategic planning, operational workflows, and performance measurement systems (Balogun et al., 2025; Menukhin et al., 2023). The literature also underscored the importance of cross-functional collaboration enabled by integrated data engineering and business analytics frameworks. Such integration breaks down departmental silos, aligns strategic objectives across business units, and fosters a culture where insights are rapidly translated into action (Balogun et al., 2025; Chaudhuri et al., 2021). Notably, case studies revealed that organizations adopting comprehensive frameworks — combining Extract, Transform and Load (ETL) processes with predictive analytics tools — are better positioned to capitalize on data-driven opportunities for revenue growth and customer satisfaction (Balogun, 2022).

Governance emerges as both a prerequisite and a driver for successful BPI through data analytics. Note that effective data governance encompasses policies, standards, roles, responsibilities, and relational mechanisms that ensure the availability, usability, integrity, security, and ethical use of organizational data assets (Baijens et al., 2021; Bernardo et al., 2024; Fadler & Legner, 2021; Kohli, 2025). Moreover, recent systematic reviews highlighted that robust governance practices are positively correlated with key efficiency metrics, including cost reduction, operational speed, decision-making quality, and new product development (Joshi, 2024; Kohli, 2025). Information governance moderates the impact of Big Data Analytics Capabilities (BDACs) on both incremental and radical innovation outcomes (Mikalef et al., 2020). Studies employing structural equation modeling confirmed that BDACs significantly enhance innovative capabilities when coupled with strong information governance — especially under conditions of environmental dynamism or uncertainty (Manoharan et al., 2024; Mikalef et al., 2020). The literature further identifies specific governance mechanisms — including structural (roles assignment), procedural (standardized workflows), and relational (cross-departmental collaboration) — as essential for overcoming fragmentation in analytics activities and maximizing value creation from big data investments (Baijens et al., 2020; Fadler & Legner, 2021). In practice-oriented contexts such as manufacturing or telecommunications, these mechanisms facilitate compliance and agility in responding to market shifts through rapid process adaptation or product innovation (Henaó-García et al., 2021; Mikalef & Krogstie, 2020).

Despite widespread agreement on the importance of governance for bridging BPI with data analytics value creation, significant challenges persist. Fragmented or ad-hoc approaches to governance often result in incompatible outcomes across departments or business units — undermining efforts to achieve enterprise-wide benefits from analytics initiatives (Baijens et al., 2020; Fadler & Legner, 2021). Organizational barriers such as legacy Information technology (IT) systems, poor interdepartmental communication, lack of executive sponsorship, staff skill deficits, and resistance to cultural change frequently impede progress toward integrated value-creation models (Oladeinde et al., 2024; Omar et al., 2019). Consequently, regulatory complexity adds another layer of difficulty: organizations must navigate evolving legal requirements around privacy (e.g., General Data Protection Regulation (GDPR)), security standards for AI-driven systems, cross-border data flows, and ethical considerations related to algorithmic bias or secondary use of data assets (Coche et al., 2023; Davidson et al., 2023; Janssen et al., 2020). The literature also identified gaps in construct standardization — such as inconsistent definitions of “analytics maturity” and “governance effectiveness” — which hinder benchmarking across sectors or geographies (Bližnák et al., 2024; Rahman, 2025). Furthermore, while many studies focus on technical enablers like cloud storage or machine learning algorithms for process optimization (Balogun et al., 2025), fewer addressed the human factors necessary for sustained transformation: leadership commitment to change management, workforce training in analytical literacy, stakeholder engagement, or fostering a culture where experimentation is encouraged. Meanwhile, risk is managed through clear accountability structures (Elugbaju et al., 2024).

Recent research advances offer promising pathways to address these challenges by proposing integrated frameworks that combine technical infrastructure with organizational enablers. For example, maturity models now assess technological

readiness and management attitudes toward analytics growth — distinguishing between current state assessment (“where we are”) and developmental guidance (“where we need to go next”) across dimensions such as leadership support, process standardization, workforce skills development, technology adoption rates — and most critically — governance alignment with strategic priorities (Menukhin et al., 2023). Conceptual models increasingly emphasize the mediating role of Value Creation Mechanisms (VCMs) between BDACs and firm-level innovation outcomes:

Table 1: Value Creation Mechanisms (VCMs) mediating the relationship between BDACs and firm-level innovation outcomes.

No.	Value Creation Mechanism (VCM)
i.	Transparency in decision-making processes
ii.	Access to high-quality datasets
iii.	Discovery through experimentation
iv.	Prediction via advanced modeling
v.	Optimization of resource allocation
vi.	Customization for targeted interventions
vii.	Continuous learning; monitoring performance metrics
viii.	Adaptation based on feedback loops

All underpinned by effective governance structures that balance flexibility with control (Namasivayam et al., 2025). On the other hand, case-based evidence from sectors such as fintech demonstrates how organizations operationalize these principles through standardized workflows, governance-oriented data practices, sophisticated risk controls shaped by both regulators and internal innovation incentives, and collaborative ecosystems in which participants benefit from shared insights under well-defined shared rules of engagement rather than dominated by single actor (Kalantar, 2018; Wang, 2022).

In conclusion, bridging BPI with data analytics value creation requires more than isolated technological upgrades — it demands an integrated approach grounded in robust governance-oriented research. The evidence reviewed here affirmed that organizations able to align their technical capabilities with mature governance frameworks consistently outperform their peers in terms of efficiency gains, innovative output (both incremental and radical), customer satisfaction metrics, and ultimately sustainable competitive advantage in volatile markets (Joshi, 2024; Mikalef et al., 2020; Rahman, 2025). Nonetheless, realizing this potential remains contingent on overcoming persistent barriers:

Table 2: Persistent barriers to realizing the potential of BDACs.

No.	Persistent Barrier
i.	Breaking down organizational silos
ii.	Investing in workforce skills development
iii.	Navigating regulatory complexity without stifling agility
iv.	Standardizing constructs for benchmarking progress
v.	And embedding ethical stewardship at every stage of the data lifecycle

Future research should continue refining conceptual models that capture these multidimensional dynamics while providing actionable guidance for practitioners seeking not just compliance but true transformation. As digital technologies evolve — and as regulatory landscapes become ever more complex — the imperative for adaptive yet principled governance will only intensify. Moreover, organizations

willing to invest strategically in both technical infrastructure and human capital will be best positioned to innovate and create enduring value from their analytic endeavors within an ethically sound framework attuned to societal expectations as well as shareholder interests (Agbodike, 2025; Davidson et al., 2023; Vial, 2023).

2. RESEARCH QUESTION

RQ1: How has the volume of scholarly publications on governance-oriented data analytics and BPI evolved from 2016 to 2025?

RQ2: Which publications represent the most influential contributions within governance-oriented research linking BPI and data analytics value creation, as evidenced by citation impact?

RQ3: What are the dominant and emerging research themes in governance-oriented data analytics and BPI based on keyword co-occurrence analysis?

RQ4: What are the patterns of international research collaboration in governance-oriented research linking data analytics, BPI, and value creation, as evidenced by country-level co-authorship networks?

3. METHODOLOGY

Bibliometric analysis involves the systematic identification, collection, organization, and quantitative examination of bibliographic data derived from scholarly publications (Alves et al., 2021; Assyakur & Rosa, 2022; Verbeek et al., 2002). Beyond conventional descriptive indicators—such as publication outlets, temporal publication trends, and influential authors (Wu & Wu, 2017) — bibliometric approaches increasingly incorporate advanced analytical techniques, including document co-citation and co-occurrence analyses, to uncover the intellectual structure and evolution of a research domain.

A rigorous bibliometric review requires a systematic, iterative methodological process encompassing the careful formulation of search keywords, comprehensive database retrieval, and detailed analytical evaluation. This structured approach facilitates the development of a robust and reproducible bibliographic dataset, thereby enhancing the reliability and validity of the findings (Fahimnia et al., 2015).

In line with this, the present study prioritizes high-impact publications to capture the most influential theoretical and empirical contributions shaping the field. To ensure data accuracy, consistency, and comprehensive coverage, the Scopus database was employed as the primary source for data retrieval (Al-Khoury et al., 2022; Di Stefano et al., 2010; Khiste & Paithankar, 2017). Furthermore, to maintain scholarly rigor, only peer-reviewed journal articles were included. At the same time, non-scholarly sources such as books and lecture notes were excluded (Gu et al., 2019). Leveraging the extensive coverage of Elsevier's Scopus database, relevant publications published between 2016 and 2025 were systematically retrieved for subsequent bibliometric and thematic analysis.

4. DATA SEARCH STRATEGY

Data collection for this bibliometric study was conducted using the Scopus database. As illustrated in Table 3, the search string was constructed using the TITLE-ABS-KEY field to capture publications related to governance, analytics, BPI, and value creation. Note that the query consisted of two main search blocks. The first block linked governance-related terms, such as “data governance”, “analytics governance”,

“data stewardship”, and “information governance”, with analytics and value-oriented terms, including “data analytics”, “business analytics”, “big data analytics”, “data-driven decision making”, “value creation”, “business value”, and “performance”. The second block linked analytics-related terms with business process and transformation-related terms, such as “business process”, “process innovation”, “process improvement”, and “digital transformation”. The search was further limited to English-language journal articles within the selected subject areas of computer science, engineering, business, management and accounting, social sciences, and decision sciences. Based on this search strategy, a final dataset of 902 publications was retrieved.

Consequently, the screening process was applied based on the criteria presented in Table 4. only English-language publications were included. Thus, non-English publications were excluded. The subject-area screening retained studies within computer science, engineering, social sciences, business, management and accounting, and decision sciences, while publications from unrelated subject areas were removed. In terms of timeline, the study focused on publications from 2016 to 2025, because the applied Scopus filter was “PUBYEAR > 2015 AND PUBYEAR < 2026”. Therefore, publications before 2016 and after 2025 were excluded from the final corpus. This structured approach ensured that the final dataset remained relevant, focused, and suitable for subsequent bibliometric and thematic analysis.

Table 3: The search string.

Scopus	(TITLE-ABS-KEY ("data governance" OR "analytics governance" OR "data stewardship" OR "information governance") AND TITLE-ABS-KEY ("data analytics" OR "business analytics" OR "big data analytics" OR "data-driven decision making" OR "value creation" OR "business value" OR "performance")) OR (TITLE-ABS-KEY ("data analytics" OR "business analytics" OR "big data analytics") AND TITLE-ABS-KEY ("business process" OR "process innovation" OR "process improvement" OR "digital transformation")) AND PUBYEAR > 2015 AND PUBYEAR < 2026 AND LIMIT-TO (DOCTYPE, "ar") AND LIMIT-TO (LANGUAGE, "English")
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Table 4: Inclusion and exclusion criteria.

Criterion	Inclusion	Exclusion
Language	English	Non-English
Subject	Computer Science Engineering Social Sciences Business, Management and Accounting Decision Sciences	Others
Timeline	2016 - 2025	<2016

5. DATA ANALYSIS

Bibliometric analysis and visualization were conducted using VOSviewer, a widely adopted tool developed by Nees Jan van Eck and Ludo Waltman at Leiden University (van Eck & Waltman, 2010; van Eck & Waltman, 2017). The software is specifically designed to support the construction, visualization, and exploration of bibliometric networks, offering advanced capabilities for mapping relationships across large-scale

scientific datasets. Its analytical functions enable the examination of multiple bibliometric structures, including co-authorship, co-citation, and keyword co-occurrence networks, thereby facilitating a comprehensive assessment of the intellectual landscape of a research domain.

A key strength of VOSviewer is its ability to transform complex bibliometric data into intuitive, interpretable visual representations. Through network visualization, clustering algorithms, and density mapping, the software allows for the identification of thematic groupings, research fronts, and knowledge structures within the literature. Its interactive interface further supports dynamic exploration of relationships among entities, enabling both exploratory and confirmatory analyses of research trends.

For this study, bibliographic records — including publication year, article title, author information, source journals, citation counts, and keywords — were retrieved from the Scopus database in Plain Text format, covering publications from 2016 to 2025. The dataset was subsequently analyzed using VOSviewer (version 1.6.20). Bibliometric maps were generated using VOS mapping and clustering techniques, enabling the identification of structural patterns and thematic clusters within the dataset.

Methodologically, VOSviewer employs the VOS mapping technique, which positions items within a low-dimensional space such that the distance between any two items reflects their degree of relatedness (van Eck & Waltman, 2010). While conceptually related to Multidimensional Scaling (MDS) (Appio et al., 2014), the VOS approach incorporates normalization procedures particularly suited to co-occurrence data. Specifically, the strength of association between two items is measured using the association strength index, denoted as $AS_{ij} = \frac{C_{ij}}{w_i w_j}$, which captures the relative co-occurrence frequency between items while accounting for their overall occurrence levels (van Eck & Waltman, 2007).

This normalization approach effectively adjusts for differences in item frequency, thereby ensuring that the resulting similarity measure reflects the relative strength of association rather than absolute occurrence counts. Consequently, it enables a more accurate representation of meaningful relationships within bibliometric networks, particularly in keyword co-occurrence analysis.

6. RESULTS AND DISCUSSION

6.1 How has the volume of scholarly publications on governance-oriented data analytics and business process innovation evolved over time from 2016 to 2025?

The temporal distribution of publications, as presented in Table 5 and illustrated in Figure 1, reveals a clear, sustained upward trajectory in research on governance-oriented data analytics and BPI. In the early phase (2016–2018), publication output remained relatively low, accounting for less than 3% annually, indicating that the field was still nascent and largely dispersed across independent research streams such as data governance, analytics capability, and process management. A gradual increase is observed from 2019 to 2021, where the number of publications rose from 50 (5.54%) to 69 (7.65%), reflecting growing academic interest driven by the expansion of data-driven decision-making practices and the early adoption of digital transformation initiatives. This trend suggests that organizations and researchers began recognizing

the importance of integrating analytics into operational and strategic processes, although governance considerations were still emerging.

Table 5: Annual distribution of publications (2016–2025).

Year	Number of publications	Percentage %
2025	295	32.71%
2024	158	17.52%
2023	114	12.64%
2022	98	10.86%
2021	69	7.65%
2020	60	6.65%
2019	50	5.54%
2018	24	2.66%
2017	21	2.33%
2016	13	1.44%

A pronounced acceleration is evident from 2022 onwards, as both Table 5 and Figure 1 demonstrate a sharp increase in publication volume, rising from 98 (10.86%) in 2022 to 295 (32.71%) in 2025. This rapid growth indicates a significant shift in the research landscape, as previously fragmented domains are converging into more integrated, governance-oriented studies. The steep upward curve in Figure 1 particularly highlights the surge in recent years, suggesting that the field has entered a phase of rapid expansion and maturation. This trend can be attributed to the increasing complexity of data ecosystems, the proliferation of Artificial Intelligence (AI) and advanced analytics, and the pressing need for structured governance frameworks to ensure accountability, consistency, and value realization. Consequently, the observed pattern strongly supports the premise of this study that bridging BPI and data analytics value creation through governance mechanisms has become a critical and timely research focus.

The Research Explosion: Post-2021 Surge

The field isn't just growing—it's accelerating.

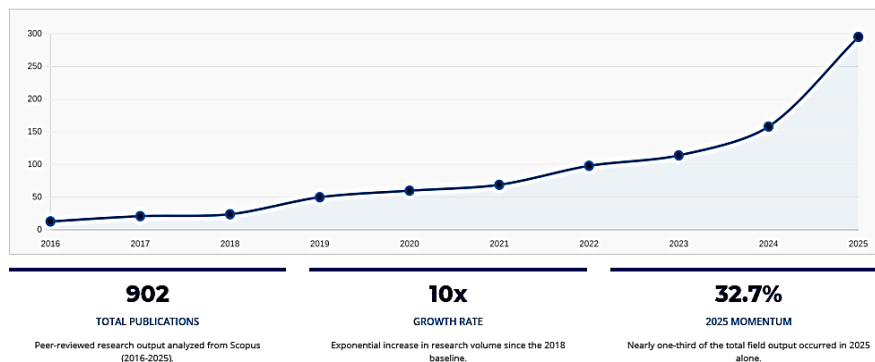


Figure 1: Annual publication trend (2016–2025).

6.2 Which publications represent the most influential contributions within governance-oriented research linking business process innovation and data analytics value creation, as evidenced by citation impact?

Table 6 presents the most influential publications in the domain, as indicated by citation counts, and reveals a clear concentration of high-impact work around digital

transformation, analytics capability, and performance outcomes. The most cited studies, such as Fatorachian and Kazemi (2021) and Feroz et al. (2021), focused on Industry 4.0 and digital transformation, highlighting their central role in shaping contemporary research. Similarly, works by Akter et al. (2022) and Olan et al. (2022) emphasized the integration of advanced technologies, such as AI and analytics, to drive organizational performance. The prominence of journals such as the Journal of Business Research, Production Planning and Control, and International Journal of Production Economics, as indicated in Table 6, suggests that this research is grounded in operations, management, and strategic decision-making disciplines. RQ2 indicates that this research is grounded in the disciplines of operations, management, and strategic decision-making. Collectively, these findings suggest that the field's intellectual foundation is heavily anchored in understanding how digital and analytics capabilities enhance firm performance and operational efficiency.

Table 6: Most cited author.

No	Authors	Title	Year	Source title	Cited by
1	Fatorachian and Kazemi (2021)	Impact of Industry 4.0 on supply chain performance	2021	Production Planning and Control	564
2	Feroz et al. (2021)	Digital transformation and environmental sustainability: A review and research agenda	2021	Sustainability	524
3	Akter et al. (2022)	Transforming business using digital innovations: the application of AI, blockchain, cloud and data analytics	2022	Annals of Operations Research	422
4	Olan et al. (2022)	Artificial intelligence and knowledge sharing: Contributing factors to organizational performance	2022	Journal of Business Research	389
5	Raut et al. (2019)	Linking big data analytics and operational sustainability practices for sustainable business management	2019	Journal of Cleaner Production	338
6	Kristoffersen et al. (2021)	The effects of business analytics capability on circular economy implementation, resource orchestration capability, and firm performance	2021	International Journal of Production Economics	325
7	Li et al. (2020)	How should we understand the digital economy in Asia? Critical assessment and research agenda	2020	Electronic Commerce Research and Applications	306
8	Aheleroff et al. (2020)	IoT-enabled smart appliances under industry 4.0: A case study	2020	Advanced Engineering Informatics	293
9	Mikalef and Krogstie (2020)	Examining the interplay between big data analytics and contextual factors in driving process innovation capabilities	2020	European Journal of Information Systems	277
10	Aydiner et al. (2019)	Business analytics and firm performance: The mediating role of business process performance	2019	Journal of Business Research	277

Nonetheless, a critical observation from Table 6 is that while these highly cited studies strongly address analytics capability, digital transformation, and performance outcomes, explicit governance-related discussions remain limited or implicit. For instance, studies such as Aydiner et al. (2019) and Mikalef and Krogstie (2020) examined the relationship between analytics and business process performance. However, they did not explicitly frame governance as a central construct. This indicates that the field has evolved through parallel, loosely connected streams — analytics-driven value creation, BPI, and digital transformation — without a strong, unifying governance perspective. The high citation counts of these works suggest that they are widely recognised for their contributions. Nevertheless, their limited integration of governance highlights a significant research gap. This gap provides strong justification for the present study, which aims to bridge these domains by positioning governance as a critical enabler of aligning analytics capabilities with BPI to achieve sustained value creation.

6.3 Are the dominant and emerging research themes in governance-oriented data analytics and business process innovation based on keyword co-occurrence analysis?

The keyword co-occurrence network illustrated in Figure 2 reveals a highly interconnected research landscape, with several central themes, including digital transformation, big data analytics, and data analytics, emerging as the most influential nodes, as indicated by their high occurrence and total link strength values. These keywords act as the core of the network, suggesting that the literature is strongly anchored in understanding how digital technologies and analytics capabilities drive organizational change and performance. The prominence of AI, Industry 4.0, machine learning, and the Internet of Things (IoT) further indicates that the field is deeply embedded in the broader context of advanced digital technologies. Additionally, the presence of data governance, data-driven decision-making, and business process management within the network highlights that governance and process perspectives are increasingly being integrated into analytics research. However, they are not yet the most dominant themes. This pattern suggests that while analytics and digital transformation form the technical foundation of the field, governance and process integration are emerging as important but still secondary areas of focus.

A closer examination of Figure 2 also demonstrated multiple thematic clusters that reflect the fragmented yet converging nature of the research domain. One cluster centres on governance and data management concepts, including data governance, data quality, cybersecurity, and data privacy, emphasizing control, accountability, and risk management. Another cluster is oriented towards analytics capability and performance, incorporating keywords such as business analytics, predictive analytics, organizational performance, and decision support, highlighting the role of analytics in value creation. A third cluster focuses on business process and operational transformation, represented by business process management, process innovation, digitalization, and supply chain management. The relatively lower occurrence of keywords such as value creation and business value compared to core analytics and transformation terms suggests that value realization is often treated as an outcome rather than a primary research focus. This reinforces the argument that the literature remains fragmented across governance, analytics, and process domains, thereby

justifying the need for an integrated framework that explicitly bridges BPI and data analytics value creation through governance-oriented mechanisms.

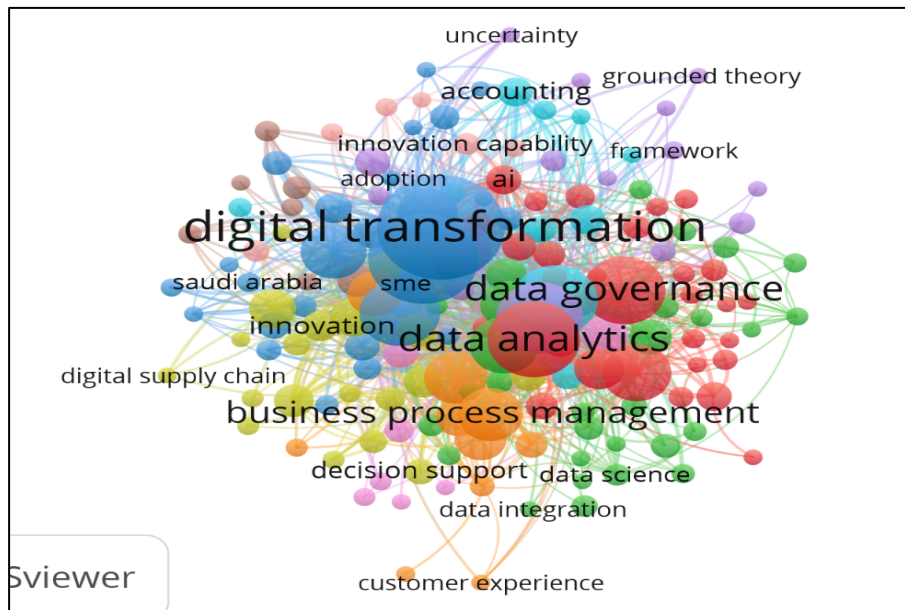


Figure 2: Keyword co-occurrence network.

6.4 What are the patterns of international research collaboration in governance-oriented research linking data analytics, business process innovation, and value creation, as evidenced by country-level co-authorship networks?

The country-level co-authorship network presented in Figure 3 established a highly interconnected yet uneven global research landscape in governance-oriented data analytics and BPI. Leading contributors such as the United States (119 documents), China (107), India (90), and the United Kingdom (84) dominate in terms of publication volume, reflecting their strong research ecosystems, funding capacity, and early adoption of digital technologies. Notably, the United Kingdom records the highest total link strength (95) and citations (5,187), indicating its central role as a collaboration hub and its ability to produce high-impact research. Similarly, the United States and China exhibit strong link strengths (71 and 70, respectively), suggesting extensive international collaboration networks. These patterns indicate that research in this domain is largely driven by technologically advanced and economically developed nations, where digital transformation and analytics adoption are more mature, thereby generating greater scholarly output and influence.

At the same time, Figure 3 highlights the growing participation of emerging and developing countries such as Malaysia (46 documents), Saudi Arabia (38), Jordan (30), and Indonesia (26), although their citation impact and link strength remain comparatively lower. This suggests that while these countries are increasingly contributing to the field, their research influence and integration into global collaboration networks are still developing. The relatively lower total link strength observed in some regions (e.g., Indonesia with 14 and South Africa with 0) indicates limited international co-authorship, which may constrain knowledge exchange and impact. Conversely, countries like Australia, Italy, and Germany demonstrate a balanced profile of moderate publication output and strong collaboration links,

suggesting effective integration into global research networks. Overall, the co-authorship structure in Figure 3 reflected a core-periphery dynamic, with a few leading nations serving as central knowledge hubs while others remained on the periphery. This imbalance reinforced the need for broader international collaboration to advance governance-oriented research and ensure more inclusive knowledge development in bridging the BPI and data analytics value creation gaps.

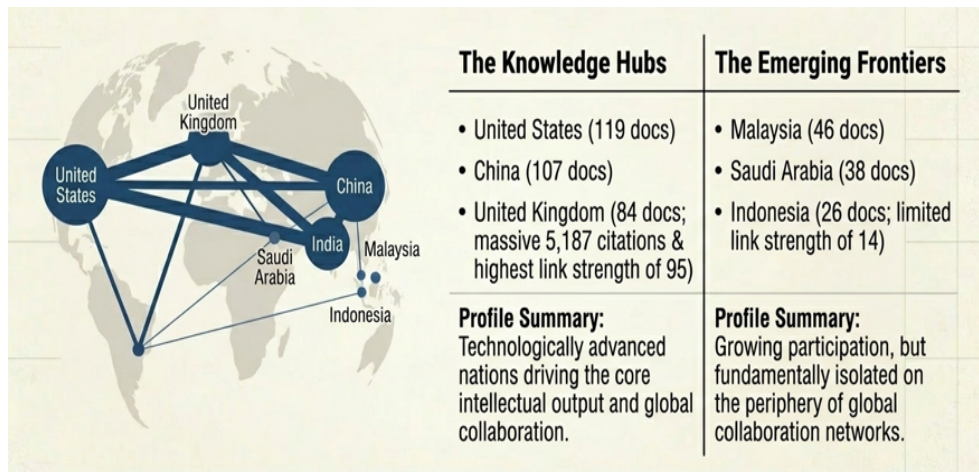


Figure 3: Country-level co-authorship network.

9. CONCLUSION

This study examined the intellectual structure and development of governance-oriented research linking data analytics and BPI for value creation. Specifically, the analysis addressed four key aspects: the evolution of publication trends, the identification of influential studies, the exploration of dominant and emerging research themes, and the examination of global collaboration patterns. By employing a bibliometric and thematic approach on a dataset of 902 publications, the study provides a structured overview of how this research domain has evolved.

The findings indicate a rapid and sustained growth in scholarly output, particularly after 2021, reflecting increasing academic and practical interest in analytics-driven transformation. Citation analysis indicates that the most influential contributions are primarily concentrated in areas related to digital transformation, analytics capability, and organizational performance. Keyword co-occurrence analysis further reveals that dominant themes are centred on digital technologies, big data analytics, and AI. At the same time, governance-related concepts appear less prominent within the overall research structure. In addition, the co-authorship analysis demonstrates a global research landscape characterised by a core-periphery structure, in which a small number of developed countries act as central collaboration hubs, while emerging economies contribute at relatively lower levels of integration and impact.

This study contributes to the field by highlighting the structural fragmentation that exists across governance, analytics, and BPI research streams. Although these domains are inherently interconnected in enabling value creation, they continue to evolve in parallel rather than as an integrated body of knowledge. The analysis provides new insight into the limited centrality of governance within the literature, despite its critical role in aligning data, processes, and organizational objectives. By systematically mapping these gaps, the study establishes a foundation for future

research to explore governance not merely as a supporting function, but as a strategic mechanism for enabling analytics-driven value creation through BPI.

From a practical perspective, the findings suggest that organizations should move beyond isolated investments in analytics technologies and instead focus on developing governance structures that align data initiatives with business processes. Emphasis on data quality, accountability, standardization, and cross-functional coordination is essential to translate analytical capabilities into tangible business outcomes. The results indicated that without such alignment, the potential value of analytics may remain underutilised despite technological advancement.

Correspondingly, several limitations should be acknowledged. The analysis is restricted to publications indexed in a single database and limited to English-language journal articles, which may exclude relevant studies from other sources or regions. In addition, the study relies on bibliometric techniques that capture patterns and relationships. However, these techniques do not provide an in-depth qualitative interpretation of individual studies. Future research may extend this work by incorporating multiple databases, applying mixed-methods approaches, or empirically validating governance frameworks in specific industry contexts.

In conclusion, this study demonstrates that while research on data analytics and BPI is expanding rapidly, the integration of governance within this domain remains insufficiently developed. Bibliometric analysis is a valuable approach for uncovering structural patterns and identifying research gaps in complex, evolving fields. The findings underscore the importance of advancing governance-oriented perspectives to bridge existing divides and support more effective and sustainable value creation in data-driven environments.

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