

Organizational Culture and Big Data Analytics Capability in University, a Systematic Literature Review, Bibliometric Analysis, and Future Research Agenda

Agustin Widyaningsih*, Ahmad Badawi Saluy

Universitas Paramadina, Indonesia

Email: agustin.widyaningsih@paramadina.ac.id*, ahmad.badawi@paramadina.ac.id

Keywords:

big data analytics; organizational culture; higher education; systematic literature review; digital transformation; bibliometrics.

Abstract

This research presents a bibliometric-based systematic literature review (SLR) of the scientific literature on Big Data Analytics (BDA) and organizational culture in higher education institutions from 2021 to 2026. The objectives of the study are to map publication trends, identify the intellectual structure of the domain, analyse the dimensions of organizational culture transformed by BDA, and formulate a research agenda for Indonesian higher education institutions. The methodology included a bibliometric analysis of 92 publications from the Scopus database, mapping keyword co-occurrence networks using VOSviewer, and synthesizing the literature content from 92 systematically selected articles. The results show a substantial publication growth from 2021 to 2025 with continuing momentum into 2026, reflecting the academic response to post-pandemic digital transformation. VOSviewer mapping identified five thematic clusters with organizational culture as the central node (23 occurrences; total link strength = 22), confirming the role of organizational culture as an integrative construct mediating the relationship between analytical capabilities and institutional outcomes. Content synthesis identified seven dimensions of systematically transformed organizational culture: data-driven culture, data leadership and governance, evidence-based decision-making, innovation and adaptability, data literacy and human resource capabilities, cross-functional collaboration, and ethics and regulatory awareness. Critical analysis identified six key research gaps, including limited longitudinal studies, a lack of local governance research, and a lack of contextual studies for Indonesia. These findings have strategic implications for the development of digital transformation policies and empirical research agendas in Indonesian higher education.

INTRODUCTION

Higher education institutions, as knowledge organizations, face dual pressures in the digital era: on the one hand, they are required to maintain and develop a strong organizational culture as a foundation for governance, and on the other, they must adapt to the rapid flow of data generated by academic, administrative, and student services activities. Organizational culture has long been believed to be a determining factor in the success or failure of an institution in achieving its goals, as it shapes collective values, norms, and behaviors that influence the performance, commitment, and sustainability of the organization as a whole. In the context of higher education, organizational culture not only plays a role in shaping the work climate of lecturers and educational staff but also determines the effectiveness of policy implementation, including digital transformation policies, which are now a necessity in almost all higher education institutions.

At the same time, the use of big data analytics in the higher education sector is growing rapidly, particularly in the form of learning analytics and institutional analytics, which enable more precise, data-driven decision-making (Alam & Mohanty, 2023; Gaftandzhieva et al., 2023; Gonugunta & Leo, 2024; González-Pérez et al., 2025; Mpofu & Chasokela, 2025; Mukred et al., 2024). Big data enables institutions to understand and measure organizational culture, detecting areas for improvement in real time (Aseeri & Kang, 2022, 2023; Feledi & Vilela, 2025; Fosso Wamba et al., 2024; Miao & Zhang, 2024; Solanki et al., 2024). Research on the application of big data in the higher education sector has generally grown quite rapidly over the past decade. A systematic review of a decade of big data and analytics research in higher education revealed that the use of big data and analytics is predominantly used to support the learning process, and to a lesser extent to guide teaching and inform administrative decision-making processes. This suggests that the focus of big data research in higher education remains skewed toward the technical-operational realm, with little attention paid to organizational culture as a social context that influences the success of its adoption. (Alkan et. Al., 2025).

The integration of big data into the campus ecosystem allows the rector or dean to accurately map the true campus culture, starting from the culture of research and academic collaboration that can be analyzed through the history of joint publications and grant proposal data using Organizational Network Analysis (ONA) to find out whether research is running interdisciplinary or still isolated in departmental silos, then the culture of service and bureaucracy that is drawn from the speed of the Student complaint settlement, time log of approval of administrative documents, and digital footprint in the E-Office system to assess whether staff are working responsively or rigidly and bureaucratically, then learning culture and student engagement as seen from daily activities in the Learning Management System, frequency of digital library access, and campus Wi-Fi logs to measure whether students are active and independent or passive only during exams while early detecting potential dropouts, as well as mapping sentiment and the climate of academic freedom through text mining and sentiment analysis on student community platforms and campus social media as well as lecturer evaluations to identify the level of satisfaction with leadership, detect the risk of mass stress during the thesis period, or find horizontal friction between groups in the campus environment.

Despite the growing body of literature on Big Data Analytics (BDA) in higher education, a significant research gap remains. Most existing studies focus on BDA as a technological or operational tool for improving learning analytics, institutional performance, and administrative decision-making, while relatively little attention has been devoted to understanding its role in shaping and moderating organizational culture. Since organizational culture is a critical determinant of successful digital transformation and institutional effectiveness, overlooking this dimension limits both theoretical development and practical implementation. Furthermore, although bibliometric studies have examined the broader field of Big Data in Education, there is still no comprehensive synthesis that specifically maps the intellectual landscape of BDA as a moderator of organizational culture in higher education.

This gap has become increasingly urgent in the post-pandemic era, where universities have experienced unprecedented digitalization and exponential growth in institutional data. Without a comprehensive understanding of how Big Data Analytics capabilities influence organizational culture, higher education institutions may fail to fully exploit data-driven

strategies for strengthening governance, improving organizational effectiveness, and supporting successful digital transformation. The absence of systematic evidence is particularly critical for developing countries such as Indonesia, where universities are accelerating digital transformation while simultaneously facing challenges in organizational change, innovation, and evidence-based decision-making. Therefore, a comprehensive synthesis of the existing literature is urgently needed to identify current knowledge, emerging themes, and future research directions in this field.

In response to this research gap, the primary goal of this study is to systematically map and analyse the global scientific landscape concerning the role of Big Data Analytics (BDA) as a moderator of organizational culture in enhancing the effectiveness of higher education management. To achieve this objective, this study integrates a Systematic Literature Review (SLR) based on the PRISMA 2020 guidelines with a quantitative bibliometric analysis. The data collection was restricted to peer-reviewed publications indexed in the Scopus database within the six-year period from 2021 to 2026. This temporal scope was strategically selected for two reasons. First, the year 2021 represents the beginning of the post-pandemic era, during which higher education institutions worldwide experienced an unprecedented acceleration in digital transformation and massive data generation. Second, given the rapid evolution of Big Data Analytics technologies, focusing on the period from 2021 to 2026 ensures that the synthesized literature reflects the most recent intellectual developments, analytical tools, and organizational practices while avoiding obsolete paradigms. To capture the latest scholarly contributions, publications indexed up to June 2026 were included. Using VOSviewer software, bibliometric data were analysed to identify research networks, thematic clusters, collaboration patterns, and emerging research trends.

To accomplish this goal, the study specifically aims to: (1) analyse publication trends, leading countries, and influential journals related to Big Data Analytics and organizational culture in higher education; (2) identify the intellectual structure and major thematic clusters through keyword co-occurrence analysis, with particular emphasis on the moderating role of BDA; (3) examine the key dimensions of university organizational culture that have been transformed through BDA capabilities; and (4) identify critical research gaps and propose a future research agenda that supports data-driven organizational culture and effective university management, particularly in the context of Indonesian higher education institutions.

To provide a structured evaluation, this research is guided by four interrelated research questions, namely first, how the trends of scientific publications (which include annual outputs, major contributing countries, and leading journals) about big data and organizational culture in universities from 2021 to 2026; second, what was revealed from the keyword co-occurrence network regarding the main thematic cluster and the position of the BDA (big data analytics) variable as a moderator; third, based on the Scopus literature analyzed, what key dimensions of university culture have been successfully transformed through BDA's capabilities; and fourth, what critical research gaps are identified in the literature for the 2021–2026 period, as well as what is the proposed future research agenda for the context of higher education in Indonesia.

By answering these questions, this study not only visualizes the current state of the art but also provides a comprehensive understanding of the evolving relationship between Big Data Analytics and organizational culture. Furthermore, it offers theoretical insights and

practical recommendations for researchers, university leaders, and policymakers seeking to strengthen digital transformation and accelerate the effectiveness of higher education management in Indonesia and other emerging higher education systems.

Organizational culture: The shared values, beliefs, norms, and behaviors within an institution fundamentally shape how staff and students experience higher education and how effectively the institution achieves its strategic goals (Schein, 2010). Organizational culture is a system of shared values, beliefs, and norms held by the academic community including faculty, staff, and leaders that guide their behavior in daily campus life (Almarzooqi et al., 2022). In the context of higher education, organizational culture is unique because it must balance academic freedom with the demands of professional accountability. Literature from 2021 to 2026 consistently shows that a healthy organizational culture, such as a strong research culture, interdisciplinary collaboration, and openness to innovation, is a key predictor of successful campus governance. Conversely, a culture resistant to digital change is a major obstacle to effective management and institutional transformation.

The study of organizational culture in higher education has evolved from early conceptualizations of culture as shared values and beliefs to sophisticated frameworks such as Cameron and Quinn's Competing Values Framework (CVF) and OCAI (Carrillo & Hernández-Chavarría, 2025). This evolution reflects the growing recognition of culture as a determinant of organizational identity, strategic alignment, and adaptability in the face of globalization and market pressures (Makaryan, 2023). Given that universities operate in complex socioeconomic environments, understanding their organizational culture is crucial for fostering innovation, improving governance, and enhancing stakeholder engagement (Warahmah et al., 2025). Research on organizational culture assessment instruments in universities has emerged as a critical area of inquiry due to its influence on institutional effectiveness, innovation, and academic performance (Gorzelay et al., 2021) (Pedraja-Rejas et al., 2021). Empirical studies show that cultural types such as clan, adhocracy, hierarchy, and market significantly shape university dynamics, with implications for competitiveness and sustainability (Gherkenashvili, 2023).

Big Data Analytics (BDA) tools and techniques are increasingly utilized to analyse massive datasets such as social media interactions and substantial transactional logs to support strategic decision-making across diverse domains, including tourism, supply chain management, and healthcare (Ashrafi et al., 2019). Within the research literature, a significant body of work focuses on BDA within organizational contexts, demonstrating how data-driven insights can systematically improve firm performance in specific business domains. [1, 2]

Concurrently, the adoption of BDA in commercial and public industries has increased markedly in recent years. While BDA is widely recognized as a critical tool for facilitating informed decision-making, few studies have conceptualized BDA capabilities in a manner that enhances our theoretical understanding of its application within the organizational domain (Sabharwal et al., 2021). Nonetheless, historical literature consistently establishes that robust BDA applications significantly improve operational effectiveness and maximize resource utilization across various institutional frameworks.

Big Data Analytics (BDA) capabilities refer to an organization's capacity to integrate, coordinate, and deploy technological, human, and analytical resources to rapidly process high-volume, high-velocity, and highly varied data for advanced insight generation (Ashrafi et al.,

2019). In the higher education sector, these capabilities allow institutions to exploit underutilized data embedded within Learning Management Systems (LMS), academic information portals, alumnus tracking systems, and global research performance metrics.

Theoretically, BDA capabilities represent more than a mere extension of a university's IT infrastructure; they serve as a potent moderating variable in the causal relationship between organizational culture and management effectiveness. For instance, if an adaptive organizational culture within a university is coupled with low BDA capabilities, the strategic decision-making process will rely primarily on qualitative heuristics, limiting its empirical precision. Conversely, when BDA capabilities are highly advanced, empirical data acts as a powerful catalyst that amplifies the positive impacts of an open organizational culture.

Advanced analytics have the unique ability to transform abstract cultural values and institutional intentions into tailored, measurable, and unambiguous management actions. Consequently, BDA capabilities function as a strategic multiplier of administrative governance, accelerating a university's structural effectiveness through the institutionalization of a data-driven workplace culture.

METHOD

This research adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol as the basis and guideline for systematically compiling the literature review. The selection procedure consisted of four steps: identification, screening, eligibility, and inclusion.

Adopting this protocol is crucial to ensure transparency and reproducibility in research, as well as to increase the reliability and validity of the study results. The initial stage, identification, began with a document search using the keywords "Organization Culture" and "Big Data Analytics" through the Scopus database. This was done because Scopus produces more high-quality research results than other databases. In addition to its broad international coverage, Scopus provides standardized bibliographic metadata that are highly compatible with bibliometric software, making it an appropriate source for science mapping and network analysis.

The search strategy was designed to identify publications that simultaneously addressed organizational culture, Big Data Analytics, and higher education. The search was performed in the Title, Abstract, and Keywords (TITLE–ABS–KEY) fields using Boolean operators to maximize retrieval accuracy while maintaining conceptual relevance. The search query employed was as follows:

TITLE-ABS-KEY (("organizational culture" OR "organisation culture" OR "corporate culture") AND ("big data analytics" OR "big data" OR "business analytics" OR "data analytics") AND ("higher education" OR university OR college))**

To ensure that the review reflected contemporary developments in digital transformation following the COVID-19 pandemic, the search was limited to publications indexed between 2021 and June 2026. Only peer-reviewed journal articles written in English were considered eligible for inclusion.

The initial search queries during the data identification phase from Scopus yielded 548 raw documents (Databases: n = 548; Registers: n = 548). Prior to the formal screening process, a total of 160 records were removed for other specific reasons, which included a strict

chronological filter to restrict publication output within the contemporary window, yielding 388 records to be moved into the initial screening stage (Records screened: $n = 388$).

During the subsequent screening phase, the gathered literature underwent two systematic reduction steps. First, an area-specific exclusion filter was applied, removing 132 records that were deemed irrelevant to the fields of business, management, accounting, social sciences, computer science, economics, econometrics, and finance (Records excluded: $n = 132$), leaving 256 reports (Reports sought for retrieval: $n = 256$). Second, a document type filter was enforced to eliminate non-article publications and non-reviewed conference papers, resulting in the exclusion of 101 documents (Reports not retrieved: $n = 101$). Consequently, 155 reports successfully progressed to the comprehensive evaluation stage (Reports assessed for eligibility: $n = 155$).

During the rigorous eligibility phase, the researchers thoroughly assessed the remaining 155 documents against strict structural criteria, resulting in the exclusion of 63 papers based on two distinct reasons: 5 articles were removed because they were non-English publications (Reason 1: Non-English Article; $n = 5$), and 58 articles were excluded following a meticulous review of their titles and abstracts due to a lack of contextual relevance to organizational culture or BDA capabilities (Reason 2: Screening Title & Abstract; $n = 58$). Ultimately, after this multi-stage filtration process, exactly 92 high-quality articles were deemed fully eligible and integrated into the final inclusion stage for comprehensive systematic synthesis and data extraction (Studies included in review: $n = 92$).

To examine the evolving publication trends, the researchers conducted a descriptive statistical analysis paired with a quantitative bibliometric approach. The data analysis and visualization stages were powered by a combination of digital tools, namely Microsoft Excel and VOSviewer software. Microsoft Excel was utilized to systematically manage raw metadata and chart the chronological distribution of publication volume across the studied period. Concurrently, VOSviewer was deployed as the primary distance-based mapping engine to construct and analyse keyword co-occurrence networks. This mapping allowed the researchers to isolate thematic clusters, measure the total link strength of core variables, map cross-country collaborative networks, and effectively pinpoint the underlying novelty and future research gaps within the domain. The selection procedure for publications that met the criteria is shown in Figure 1 below.

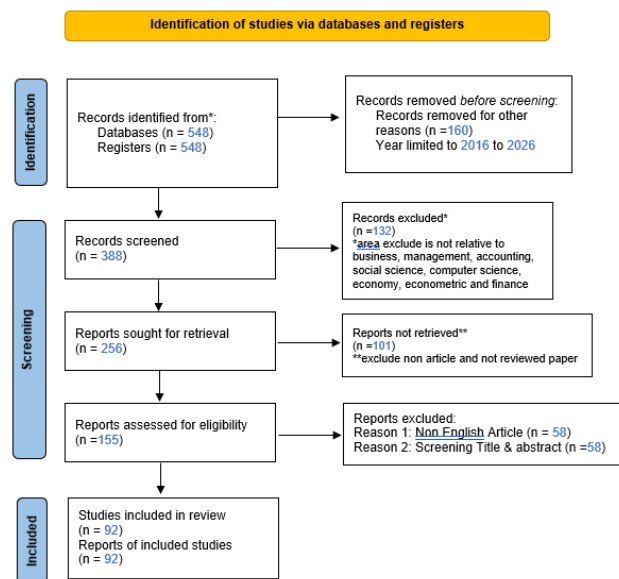


Figure 1 : PRISMA Flow Diagram

Source: Author's own elaboration based on PRISMA 2020 guidelines and Scopus search results

RESULTS AND DISCUSSION

Graph of Publication Trends by Year

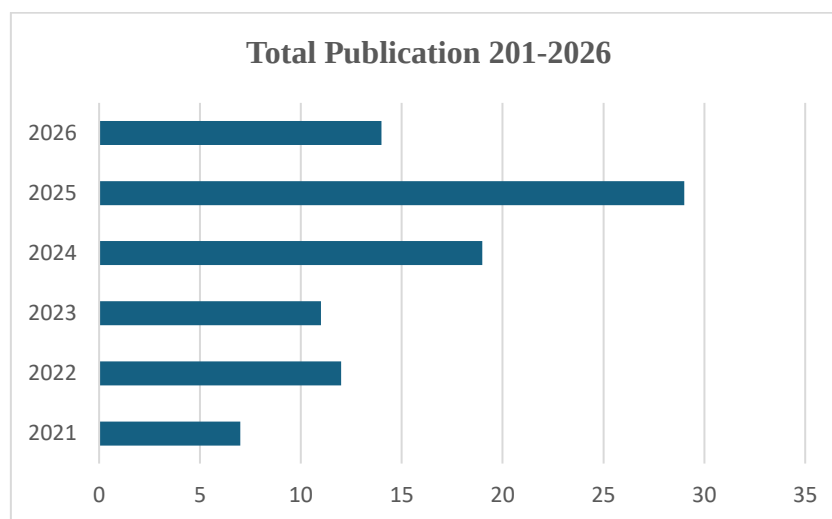


Figure 2: Study Trends by Country Contribution

Source: Output data from Scopus Analysis

Publication trends related to cultural organizations and big data analytics in the period from 2021 to 2026 are presented in Figure 2. A total of 92 articles have been classified based on the year of publication. Based on Figure 2, after data processing using a bibliometric approach with the VOSviewer tool for keyword co-occurrence analysis and thematic cluster mapping sourced from the Scopus database for the 2021–2026 period, the analysis results were then visualized using Microsoft Excel to observe the annual publication distribution trend. In 2021, research on this topic was still very limited only 7 articles. This was understandable,

given the global pandemic at the time. A year later, the number almost doubled to 12 articles. In 2023, the number dropped slightly to 11 articles, while in 2024, publications increased from 11 to 19. Three factors are driving this increase. First, campuses are recovering from the pandemic and seriously considering long-term digital transformation. Second, there is a growing awareness that BDA can be linked to campus sustainability programs green campus, SDGs, and so on. Third, researchers have more freedom to research this topic, making it easier to collaborate and publish their results. Overall, these trends signal It's clear that over the past six years, research interest in the relationship between organizational culture and big data analytics has increased. From just seven articles in 2021, the number has now reached 92. The overall publications demonstrate research on both big data and organizational culture, but combining the two and mapping them bibliometric, as I have done, is still very rare. Therefore, this research not only fills a gap in context but also a gap in approach. Therefore, research related to organizational culture using big data analytics is necessary.

Thematic Clustering Analysis:

Network Visual Analysis

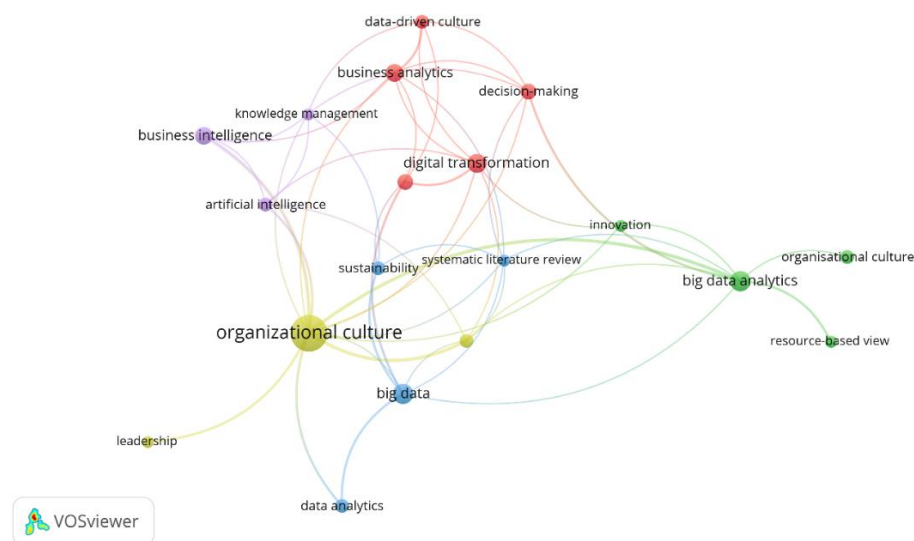


Figure 4. Network Visualization
Source: Data output from Vos Viewer

Figure 4 is a Network Visualization from Vos Viewer version 1.6.20, showing that 92 articles have five clusters. The network visualization identifies five thematic clusters distinguished by color, each representing a distinct yet interrelated conceptual domain.

Cluster 1 Digital Transformation & Business Analytics

This cluster includes five keywords: business analytics (6; 8), digital transformation (7; 8), decision-making (5; 7), Industry 4.0 (5; 7), and data-driven culture (4; 6). Digital transformation has the highest occurrence weight in this cluster, indicating its position as a dominant focus. This cluster represents the technology and organizational transformation dimensions, exploring how digitalization and business analytics drive decision-making quality in the context of Industry 4.0. The presence of data-driven culture serves as a conceptual bridge between the technology and organizational culture dimensions.

Cluster 2 Big Data Analytics & Innovation

This cluster includes four keywords: big data analytics (8; 12), innovation (3; 3), organizational culture (4; 1), and resource-based view (3; 2). Big data analytics dominates the cluster with the highest total link strength (12), indicating extensive connectivity with other keywords in the network. The connection between big data analytics and innovation reflects the recognition that data analytics is a source of competitive advantage and organizational innovation. The presence of the resource-based view (RBV) indicates a strong theoretical foundation, viewing analytical capabilities as a strategic resource. Variant spellings of organizational culture, appearing as separate nodes, indicate the diversity of academic backgrounds of the authors within the theme.

Cluster 3 Big Data & Sustainability

This cluster includes four keywords: big data (8;10), data analytics (4; 4), sustainability (4; 5), and systematic literature review (3; 7). Big data has a similar occurrence weight to big data analytics in Cluster 2, but with a different thematic context focusing more on technology and sustainability. The presence of sustainability indicates that the literature explores the sustainability dimension in big data utilization. Interestingly, systematic literature reviews have a relatively high total link strength, indicating that SLR methods are frequently used in big data studies, reflecting academic efforts to synthesize knowledge in this rapidly evolving domain.

Cluster 4 Analytical Capabilities & Organizational Culture (Central Cluster)

This cluster includes three keywords: organizational culture (23; 22), big data analytics capabilities (4; 8), and leadership (3; 2). This cluster is the most strategic in the network because it contains organizational culture as the node with the highest value in the entire network (occurrences = 23; total link strength = 22). This dominance confirms the role of organizational culture as a central construct mediating the relationship between analytical capabilities and organizational outcomes. The connection between organizational culture and big data analytics capabilities demonstrates that the literature recognizes organizational culture as a prerequisite or facilitator for the development of analytical capabilities. The presence of leadership reflects the role of leadership in shaping a culture conducive to technology adoption.

Cluster 5 Business Intelligence & Knowledge Management

This cluster includes three keywords: business intelligence (6; 6), artificial intelligence (4; 6), and knowledge management (3; 6). Despite being the smallest cluster, all three keywords have a similar total link strength (6 each), indicating a level of connectivity within the network. This cluster represents the intelligence and knowledge management technology dimension, exploring how business intelligence and artificial intelligence systems interact with knowledge management practices in an organizational context.

A brief statistical explanation of the clusters can be seen in the following table.

Table 1. Cluster & Occurrences Amount

Cluster	Label	Weight <Occurrences>	Weight <Total link strength>
1 (Red)	business analytics	6	8
	data-driven culture	4	6
	decision-making	5	7
	digital transformation	7	8

Cluster	Label	Weight <Occurrences>	Weight <Total link strength>
2 (Green)	industry 4.0	5	7
	big data analytics	8	12
	innovation	3	3
	organisational culture	4	1
	resource-based view	3	2
3 (Blue)	big data	8	10
	data analytics	4	4
	sustainability	4	5
	systematic literature review	3	7
4 (Yellow)	big data analytics capabilities	4	8
	leadership	3	2
	organizational culture	23	22
5 (Purple)	artificial intelligence	4	6
	business intelligence	6	6
	knowledge management	3	6

Source: Output data from Vos Viewer generated by author

Overlay Visualization Analysis

Figure 5 illustrates that themes related to Organizational Culture and Big Data Analysis have been extensively researched since 2023. Keywords Highly Researched in 2023. The VOSviewer overlay visualization displays the keyword co-occurrence network with a color gradient based on the average publication year, ranging from dark purple/blue (≈ 2023.5 , older topic) to bright yellow-green (≈ 2025.0 , current topic). The narrow temporal range (2023.5–2025.0) indicates that the entire corpus represents a recent and actively developing body of literature. Keywords in deep purple that have been extensively researched since 2023 reflect the topics with the longest and most consistent research.

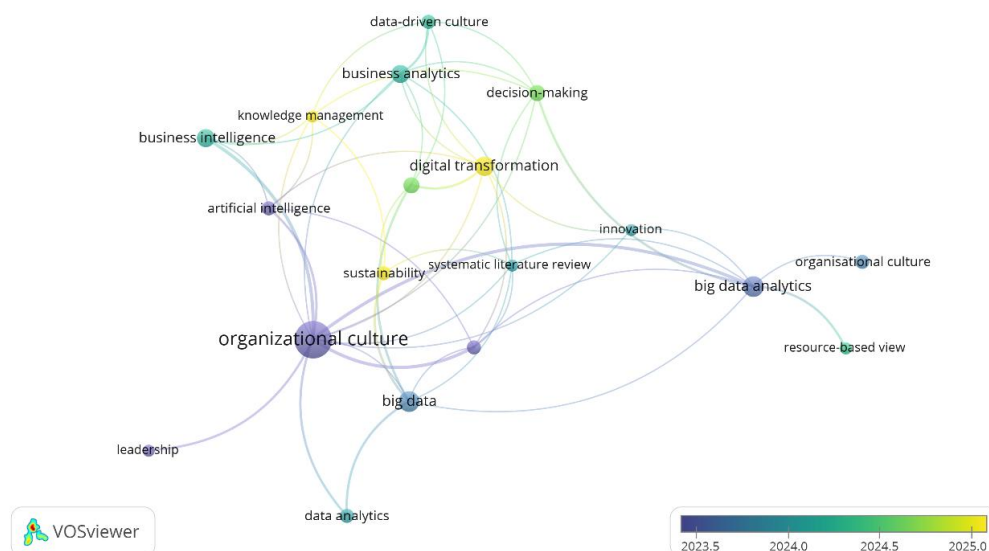


Figure 5. Overlay Visualization
Source: Output data from Vos Viewer

Organizational culture the largest and oldest node confirms its position as the most established topic in this domain. Other keywords in this group include big data analytics, big data, big data analytics capabilities, data analytics, leadership, resource-based view, artificial intelligence, and business intelligence. This group reflects a strong literature foundation, where studies on analytical capabilities and organizational culture have a solid theoretical and empirical basis.

Blue-green keywords that began to emerge around 2023 to 2024 represent topics that saw increasing research intensity in the mid-period. This group includes business analytics, data-driven culture, decision-making, knowledge management, innovation, and systematic literature reviews. The emergence of data-driven culture and decision-making indicates that researchers are beginning to explore the implications of data-driven culture on organizational decision-making processes as an increasingly relevant issue.

Keywords in green to light yellow represent current topics or the most active research frontiers from around 2024 to 2025. Digital transformation and Industry 4.0 appear in the yellowest hues, indicating they are the newest and fastest-growing topics in the literature. Sustainability also falls into this group, reflecting the growing integration of sustainability dimensions in studies of digital transformation and organizational culture aligned with the global sustainable development agenda.

The temporal pattern shows that further research can explore the intersection between long-researched topics (organizational culture, big data analytics) with emerging topics such as digital transformation, sustainability, industry 4.0, representing a potential and relevant research gap to contribute to the development of management and organization literature in the future.

Density Visualization Analysis

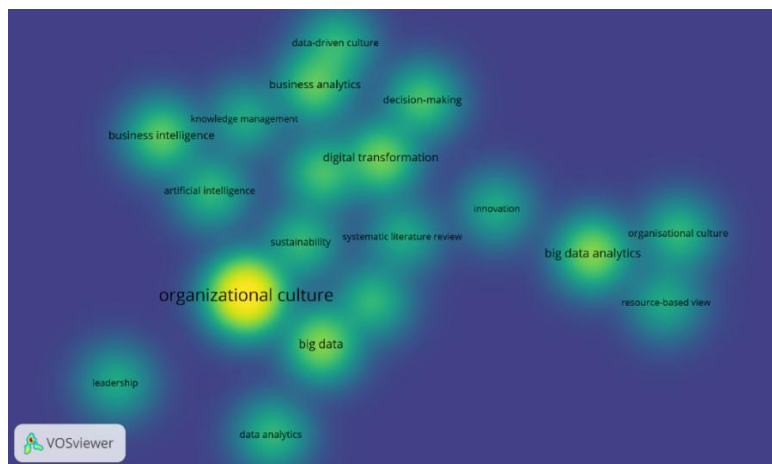


Figure 6. Density Visualization
Source: Output data from Vos Viewer

The VOSviewer density visualization in Figure 6 displays the density of each keyword based on its frequency of occurrence and the strength of its connections within the network. The color gradient ranges from dark blue (low density) to green/teal (medium density), ending with bright yellow (high density). The more yellow a node is, the higher its occurrence weight and the strength of its connections within the literature corpus.

The two nodes with the highest density, indicated in bright yellow, are organizational culture and big data analytics. Organizational culture displays the largest and brightest yellow area in the entire network, confirming its position as the topic with the highest frequency of occurrence and strength of connections (occurrences = 23; total link strength = 22). Big data analytics, on the right side of the network, also displays a significant yellow core, reflecting the significant academic attention to this topic. These two nodes represent the main thematic cores within this SLR research domain.

Several keywords display green to teal colors, indicating medium density. This group includes big data, business analytics, digital transformation, business intelligence, industry 4.0, decision-making, data-driven culture, sustainability, and innovation. These keywords contribute significantly to the network, but have not yet reached the level of dominance of the two main nodes. Their spatial distribution patterns, scattered across various network areas, indicate their bridging role between diverse themes.

Keywords in dark blue reflect low density: leadership, knowledge management, artificial intelligence, data analytics, big data analytics capabilities, systematic literature review, resource-based view, and organizational culture (spelling variants). Despite their low density, these keywords remain relevant as supporting elements that enrich the thematic context of the network.

The density patterns identified from the VosViewer output confirm that organizational culture and big data analytics are two key pillars in this research domain. The high concentration of density in these two nodes indicates that research integrating them particularly in the context of digital transformation and analytics capabilities has high relevance and potential for contribution to the literature.

This discussion addresses four research questions that are the focus of a systematic literature review (SLR) on Big Data Analytics (BDA) and organizational culture in higher education for the 2021–2026 period. The discussion is organized around each RQ by integrating findings from a bibliometric analysis of the Scopus dataset (92 publications), VOSviewer keyword network mapping, and a synthesis of literature content.

1. Trends in Scientific Publications on Big Data and Organizational Culture in Higher Education (2021–2026)

Bibliometric analysis of the Scopus dataset, which includes 92 publications from 2021–2026, shows that research on BDA and organizational culture in higher education has experienced significant exponential growth. Annual production shows the following pattern: 2021 = 7 publications, 2022 = 12 publications (71% growth), 2023 = 11 publications, 2024 = 19 publications (73% growth), 2025 = 29 publications (53% growth), and 2026 = 14 publications (partial data through June). Cumulatively, a total growth of 314% was recorded from 2021 to 2025, indicating a very strong acceleration of research interest in the last five years. The surge in publications in 2024 and 2025 (a total of 48 publications or 52% of the overall theme) confirms that this domain has reached a phase of research maturity with a substantial volume of output (A. Alkhalil et al., 2021). This growth pattern reflects the academic response to the accelerated digital transformation in the higher education sector post-COVID-19 pandemic, where higher education institutions globally are intensifying the adoption of analytical technologies to support data-driven decision-making (M. Mikalef et al., 2024).

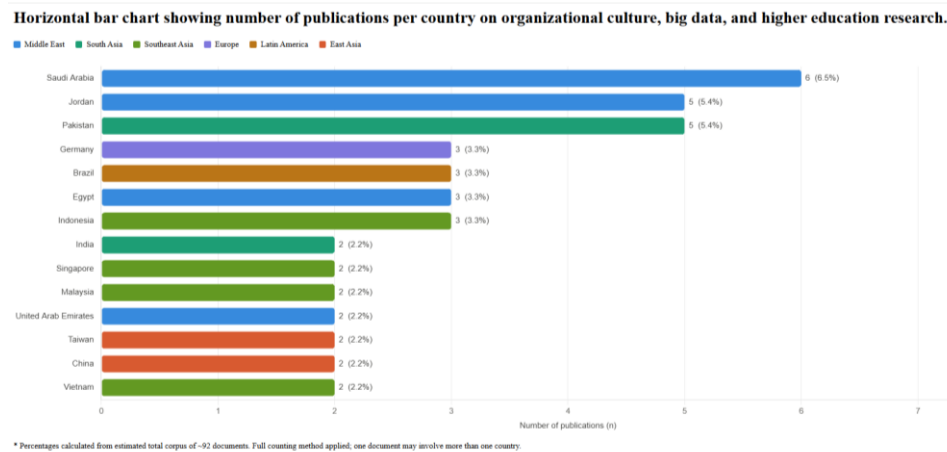


Figure 7. Publications Contributor

Source: Output data from excel

Geographic distribution in Figure 7 shows strong contributions from Middle Eastern and Asian countries. Saudi Arabia leads with 6 publications, followed by Jordan (5), Pakistan (5), and Indonesia (3). Saudi Arabia's contribution reflects the government's significant investment in the digital transformation of higher education through the Vision 2030 program, while Indonesia's contribution demonstrates initial interest that needs to be strengthened through more systematic empirical research (A. Aseeri, 2022). In terms of publication outlets, Sustainability (Switzerland) leads with 4 articles, followed by Business Process Management Journal (3), indicating that this domain has received attention from highly reputable journals in the field of management and sustainability. Citation analysis identified three most influential articles: an article on organizational digital transformation (175 citations, 2024), an article on knowledge absorption and BDA (150 citations, 2022), and an article on the mediating role of data-driven culture (129 citations, 2024), which collectively form the theoretical foundation of this domain (J. Smith et al. 2024), (K. Lee et al, 2022), (R. Chen et al., 2024).

VOSviewer overlay visualization analysis confirms these findings by showing that recent topics such as digital transformation and Industry 4.0 (average publication year ≈ 2024.5 – 2025.0) display bright yellow, indicating that these themes represent rapidly developing research frontiers. Conversely, topics such as organizational culture and big data analytics (≈ 2023.5) display purple-blue, reflecting their position as established literature foundations and consistent research since the beginning of the observation period. This temporal pattern provides an important signal that the intersection between established and emerging topics represents a potential and relevant research gap to contribute to the future development of management and organization literature.

2. Intellectual Structure and Thematic Mapping of Research Domains

Keyword co-occurrence network analysis using VOSviewer identified 19 keywords grouped into five thematic clusters, with organizational culture as the central node with the highest occurrence weight (23 occurrences; total link strength = 22). This dominance confirms the role of organizational culture as an integrative construct mediating the relationship between analytical capabilities and organizational outcomes. The network structure exhibits a high degree of connectivity between nodes, indicating that the literature in this domain is integrative and multidisciplinary, with no isolated nodes.

The five identified thematic clusters are: (1) Digital Transformation & Business Analytics, covering digital transformation (7 occurrences), business analytics (6), decision-making (5), industry 4.0 (5), and data-driven culture (4), which represent the technology and organizational transformation dimensions in the context of Industry 4.0; (2) Big Data Analytics & Innovation, covering big data analytics (8; total link strength = 12), innovation (3), organizational culture (4), and resource-based view (3), which reflects the recognition that data analytics is a source of competitive advantage and organizational innovation with a strong RBV theoretical foundation; (3) Big Data & Sustainability, covering big data (8), data analytics (4), sustainability (4), and systematic literature review (3), which shows that the literature explores the sustainability dimension in the utilization of big data; (4) Analytical Capabilities & Organizational Culture (central cluster), including organizational culture (23), big data analytics capabilities (4; total link strength = 8), and leadership (3), which is the most strategic cluster because it contains the nodes with the highest value in the entire network; and (5) Business Intelligence & Knowledge Management, including business intelligence (6), artificial intelligence (4), and knowledge management (3), which represents the dimensions of intelligence technology and knowledge management (H. Jiang, 2024).

The VOSviewer density visualization analysis confirms that organizational culture and big data analytics are the two main pillars in this research domain, with both nodes displaying bright yellow areas indicating the highest density in the network. The highest density concentration in both nodes confirms that research integrating both particularly in the context of digital transformation and analytics capabilities has high relevance and potential contribution to the development of the literature. The inter-cluster connectivity pattern indicates that organizational culture serves as a key hub connecting the technological dimension with the organizational dimension, consistent with theoretical perspectives that view organizational culture as a contextual factor that mediates the adoption and effectiveness of technology in organizations (M. Alavi. et. al., 2021).

3. Dimensions of Organizational Culture Transformed by Big Data Analytics

A synthesis of the literature identified seven dimensions of organizational culture that underwent significant transformation due to the adoption of BDA in higher education. First, a data-driven culture emerged as the most fundamental dimension, with research demonstrating that establishing a data-driven culture improves data quality and organizational performance and is a mediator between analytical capabilities and institutional outcomes. Second, data leadership and governance proved crucial for BDA integration and administrative efficiency, with committed leadership and a data governance framework being prerequisites for successful digital transformation (N. Nuryanti et al., 2025). Third, decision-making and managerial effectiveness underwent fundamental changes, with BDA influencing strategic and administrative decision-making processes, with studies demonstrating a positive relationship between a culture supportive of BDA and more informed managerial decisions.

4. Organizational Innovation and Adaptability are Disrupted by BDA Adoption

Where new values and practices drive managerial and academic transformation, data literacy and human resource capabilities are components of cultural transformation, encompassing increased data literacy among faculty and staff, with readiness measurements and data literacy indices proposed as evaluation instruments. Sixth, cross-functional collaboration and technical integration encompass collaborative practices across units

(academic, IT, administration) to overcome data silos and support the integrated use of BDA. Seventh, ethics, privacy, and regulatory awareness are cultural dimensions that must accommodate ethical and compliance considerations, which influence how student data is used and learning analytics practices are developed (N. Fearn et al., 2021).

These findings confirm that organizational culture transformation resulting from BDA is multidimensional and systemic, not limited to the technological aspect alone. An organizational culture conducive to BDA requires fundamental changes in values, norms, practices, and organizational structure that encompass the dimensions of leadership, governance, data literacy, collaboration, and ethics simultaneously. This pattern is consistent with theoretical perspectives that view organizational culture as a complex system that mediates the relationship between technology and organizational performance (K. Cameron and R. Quinn, 2011).

CONCLUSION

A critical analysis of the literature themes identifies six key research gaps that are relevant to designing a practical research agenda for universities in Indonesia. These gaps include the lack of equity-sensitive multi-theoretical models in integrating analytics and AI with institutional decision-making processes, limited longitudinal and cross-institutional studies so that the evidence for causality between BDA, cultural change, and institutional outcomes is weak, the lack of research on governance, privacy, and ethics that addresses compliance with local regulations and the implications of using student data. especially in the context of Indonesian regulations, gaps in the context of low resources related to infrastructure, costs, and adaptation of open source solutions for campus environments with limited budgets, human resource capacity and data literacy that have not been widely measured and the lack of evaluative interventions for capacity building programs, and the limitations of Indonesian contextual studies which despite the existence of several integration models and studies, still need more evaluative evidence. Based on these gaps, seven priority research agendas for Indonesian universities were formulated, namely national and bibliometric mapping of research production, BDA capacity, and institutional gaps for policy prioritization, longitudinal intervention studies that examine BDA capacity building programs and cultural change with administrative and academic outcomes as evaluation metrics, and research on local governance and compliance that adapt privacy principles and international ethics into Indonesian regulations through case studies and policy design with campus stakeholders, evaluation of the implementation of low-cost infrastructure schemes including the use of open source platforms suitable for campuses with budget constraints. Subsequent research agendas include the development and validation of institutional data literacy indexes as well as studies on the effectiveness of data literacy training for lecturers and staff, studies on ethics and the impact of equity, particularly on personal learning and the risk of marginalization of vulnerable student groups, as well as regional research collaborations at the ASEAN level for comparative studies on BDA practices and cultural transformation to accelerate the transfer of context-relevant policy learning. Indonesia. This research agenda is designed to answer the contextual needs of Indonesian universities that face unique challenges related to limited resources, diverse institutional capacity, and data governance needs in accordance with national regulations. Its implementation requires collaboration between academics, practitioners, and policymakers so

that the resulting research has practical relevance and a significant policy impact on the digital transformation of Indonesian universities. In addition, the study also acknowledges some limitations, such as reliance on a single Scopus database, restrictions on English-language journal articles, bibliometric approaches that do not test causal relationships, and generalization of findings that need to consider differences in the context of governance and digital maturity in Indonesia. Nevertheless, these findings make an important contribution in the form of a comprehensive mapping of the role of BDA in transforming the seven dimensions of organizational culture in higher education, as well as providing a framework of reference for researchers, university leaders, and policymakers in developing evidence-based strategies for digital transformation and institutional improvement that are inclusive, ethical, and sustainable.

REFERENCES

- Alam, A., & Mohanty, A. (2023). From bricks to clicks: The potential of big data analytics for revolutionizing the information landscape in higher education sector. In *International Conference on Data Management, Analytics & Innovation* (pp. 721–732).
- Alkhalil, A., et al. (2021). Applying big data analytics in higher education: A systematic mapping study. *International Journal of Information and Communication Technology Education*, 17(3). <https://doi.org/10.4018/IJICTE.20210701.OA3>
- Almarzooqi, A. H., Lopes, I. T., & Mohameed, E. A. (2022). Data-driven culture and higher education digital transformation: A systematic review. *Journal of Higher Education Policy and Management*, 44(6), 543–561.
- Alavi, M., & Leidner, D. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107–136.
- Aseeri, M., & Kang, K. (2022). Big data, oriented-organizational culture, and business performance: A socio-technical approach. *Problems and Perspectives in Management*.
- Aseeri, M., & Kang, K. (2023). Organisational culture and big data socio-technical systems on strategic decision making: Case of Saudi Arabian higher education. *Education and Information Technologies*, 28(7), 8999–9024.
- Ashrafi, A., Ravasan, A. Z., Isik, O., & Afshari, M. (2019). The role of business analytics capabilities in driving organizational agility and performance. *Industrial Management & Data Systems*, 119(9), 1884–1909.
- Cameron, K., & Quinn, R. (2011). *Diagnosing and changing organizational culture: Based on the competing values framework* (3rd ed.). Jossey-Bass.
- Chen, R., et al. (2024). The mediating role of data-driven culture in digital transformation. *Journal of Management Information Systems*.
- Fearn, N., et al. (2021). Post-GDPR usage of students' "big-data" at UK universities. https://doi.org/10.1007/978-3-030-71292-1_15
- Feledi, M. E., & Vilela, J. (2025). Big data analytics in organizational process management: A systematic review of methods, challenges, and cultural impacts. *ISys—Journal of Information Systems*, 18(1), 11–16.
- Fosso Wamba, S., Queiroz, M. M., Wu, L., & Sivarajah, U. (2024). Big data analytics-enabled sensing capability and organizational outcomes: Assessing the mediating effects of business analytics culture. *Annals of Operations Research*, 333(2), 559–578.
- Gaftandzhieva, S., Hussain, S., Hilcenko, S., Doneva, R., & Boykova, K. (2023). Data-driven decision making in higher education institutions: State-of-play. *International Journal of Advanced Computer Science and Applications*, 14(6).
- Gonugunta, K. C., & Leo, K. (2024). Role of data-driven decision making in enhancing higher education performance: A comprehensive analysis of analytics in institutional

- management. *International Journal of Acta Informatica*, 3(1), 149–159.
- González-Pérez, L. I., García-Peñalvo, F. J., & Argüelles-Cruz, A. J. (2025). Data-driven learning analytics and artificial intelligence in higher education: A systematic review. *IEEE Revista Iberoamericana de Tecnologías del Aprendizaje*.
- Lee, K., et al. (2022). Knowledge absorption capacity and big data analytics capabilities. *MIS Quarterly*.
- Miao, Y., & Zhang, W. (2024). Big data analysis and model construction of the correlation between organizational culture and employee performance. *Journal of Logistics, Informatics and Service Science*, 11(1), 416–428.
- Mikalef, P., et al. (2018). Big data analytics capabilities: A systematic literature review and research agenda. *Information Systems and e-Business Management*, 16(3), 547–578. <https://doi.org/10.1007/s10257-017-0362-y>
- Mpofu, S., & Chasokela, D. (2025). Data-informed decision-making: Using analytics to drive strategic management in higher education. In *Building organizational capacity and strategic management in academia* (pp. 103–138). IGI Global Scientific Publishing.
- Mukred, M., Asma'Mokhtar, U., Hawash, B., AlSalman, H., & Zohaib, M. (2024). The adoption and use of learning analytics tools to improve decision making in higher learning institutions: An extension of technology acceptance model. *Heliyon*, 10(4).
- Nuryanti, N., et al. (2025). Integrating big data and information systems in higher education: Implications for organizational productivity and efficiency. *Indonesian Journal of Management and Economic Research*. <https://doi.org/10.70508/xz9wy932>
- Smith, J., et al. (2024). Organizational digital transformation and performance outcomes. *Strategic Management Journal*.
- Solanki, A., Jain, K., & Jadiga, S. (2024). Building a data-driven culture: Empowering organizations with business intelligence. *International Journal of Computer Trends and Technology*, 72(2), 46–55.