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The Role of Sociotechnical Theory in Digital Transformation: A Systematic Literature Review

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Abstract

Aim: As digital transformation reshapes organizational structures, work, and value creation, understanding its socio-technical foundations becomes critical. Although socio-technical theory offers a lens for analysing the interplay of social and technical elements, its role in digital transformation research remains fragmented. Using the Bostrom and Heinen socio-technical systems model as an analytical framework, this article examines how socio-technical theory is applied in contemporary digital transformation research, identifies dominant patterns across the People, Tasks, Structure, and Technology dimensions, and uncovers conceptual gaps.

Methodology: The study followed the PRISMA protocol for systematic literature reviews. Data were collected from Scopus, Web of Science, and EBSCO. After applying inclusion and exclusion criteria, 66 peer-reviewed articles (2020-2026) were analysed, and classified according to socio-technical elements (People, Tasks, Structure, Technology) and modes of theory use (interpretive, analytical, theoretical, discussion).

Results: The findings showed that research predominantly focuses on People and Tasks, especially role reconfiguration, work redesign, and human–technology interaction, whilst structural and technological dimensions were less consistently integrated. Socio-technical theory was most often used as an interpretive or theoretical lens, while fewer studies operationalised it analytically. The review revealed uneven theoretical integration and identified gaps related to cross-element alignment, ecosystem-level dynamics, and shifting system boundaries. These findings suggest the need to reinterpret socio-technical theory for digitally complex environments. The review also showed that the depth of theoretical integration varied depending on the focal transformation element, with People--oriented studies applying socio-technical theory more consistently than technology-centred research.

Implications and recommendations: The findings highlight the importance of treating digital transformation as a process of continuous socio-technical alignment rather than isolated technological implementation. For researchers, the study identified underexplored relationships between the elements of the Bostrom and Heinen model, calling for more integrative and multi-level research. For practitioners, it emphasised balancing technological investments with organizational structures, work processes, and human capabilities when designing digital transformation initiatives and digital maturity models.

Originality/value: This article systematically maps how socio-technical theory is applied in digital transformation research through the Bostrom and Heinen socio-technical systems model, and identifies recurring patterns of theoretical application, highlighting uneven integration across transformation elements, and providing a conceptual framework that synthesizes these relationships. The findings clarify how the model is currently used in digital transformation research and identify areas requiring further conceptual development.

Keywords: digital transformation, socio-technical theory, organizational change, socio-technical alignment, work redesign

1. Introduction

In today's environment of increasing automation, digital technologies are fundamentally reshaping how organizations coordinate activities, communicate, and create value (Ali & Haikal, 2025; Asokan et al., 2026). Technologies such as artificial intelligence, cloud computing, and advanced analytics have become central to organizational functioning, leading to the widespread use of the concepts of digitalisation and digital transformation. While the former refers to the conversion of analogue data and the integration of digital tools into existing processes (Manresa et al., 2024; Principato et al., 2023), the latter involves deeper, systemic changes in organizational structures, roles, and value creation processes (Gillani et al., 2024; Imran et al., 2021). Digital transformation is inherently multidimensional: it enhances efficiency, innovation, and flexibility, but also introduces challenges such as tensions between human and algorithmic decision-making, resistance to change, and skill polarisation (Landmark et al., 2024; Shahzad et al., 2025; Tangi et al., 2020). This complexity highlights the need for strong theoretical grounding (Anglin et al., 2022; Levine & Markowitz, 2024). Existing research draws on perspectives such as TAM, RBV, dynamic capabilities, and institutional theory, which provide valuable insights but often treat technology as an external driver or resource, overlooking its embeddedness in social contexts (Ahmad et al., 2025; Kuzior & Sira, 2024; Siriwardhana et al., 2025). Socio-technical theory offers a more integrated lens by emphasising the interdependence of social and technical systems (Chen et al., 2025; Kolade & Owoseni, 2022). Among the various socio-technical perspectives, this study adopted the Bostrom and Heinen (1977) socio-technical systems model as its analytical framework. The model conceptualises organizations through the interdependence of People, Tasks, Structure, and Technology, providing a structured basis for examining how socio--technical theory is applied in digital transformation research. This is particularly relevant as it underpins many contemporary approaches to assessing organizational digital maturity, making it an

appropriate framework for analysing digital transformation research. However, the classical assumptions underlying the model, rooted in stable industrial settings, may not fully capture the dynamics of contemporary digital ecosystems (Lundgren et al., 2023; Thomas, 2024), and its application in digital transformation research remains fragmented and inconsistent (Albouti & Balaji, 2025; Hu et al., 2026). Against this background, this study aimed to systematically examine how socio-technical theory is applied in digital transformation research, identifying key application areas, patterns of use, and conceptual gaps. To achieve this, the authors employed a systematic literature review following the PRISMA protocol, enabling a structured synthesis of existing research and an assessment of whether socio-technical theory functions primarily as an interpretive lens or as a comprehensive analytical framework for explaining transformation processes.

2. Methodology

A systematic literature review design was adopted to examine how socio-technical systems theory is applied in contemporary digital transformation research. Since the authors aimed to synthesise and interpret the existing scholarly work, the process was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure methodological rigor, transparency, and replicability. This approach enhanced the credibility of the review by clearly reporting the search strategy, filtering procedures, and final sample selection. Figure 1 presents the PRISMA flow diagram examining the selection process.

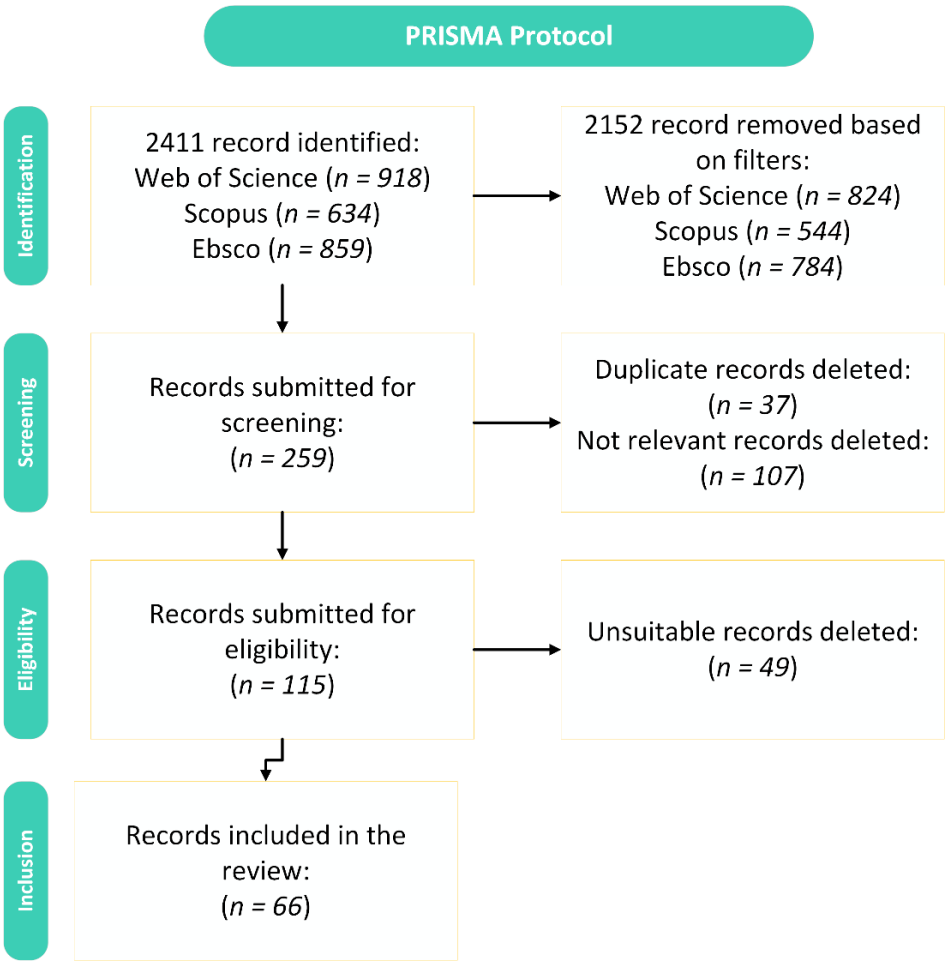

Fig. 1. PRISMA Protocol showcasing the analysis of the articles

Source: own elaboration.

2.1. Identification, Screening, Eligibility, Inclusion

The literature search was conducted across three major academic databases: Scopus, Web of Science, and EBSCO, selected for their broad coverage of high-quality research in management, information systems, and organizational studies. The search strategy combined keywords related to digital transformation and socio-technical perspectives ("digital transformation OR digitalisation OR digitisation AND sociotechnical OR socio-technical OR sociotechnical systems"). The identification focused on the broader concept of digital transformation, as AI transformation is increasingly discussed in the literature as one of its technological manifestations rather than as a distinct organizational transformation paradigm. Consequently, studies addressing AI-enabled transformation were captured where they explicitly positioned AI within the broader digital transformation context. The initial search, conducted without restrictive filters, yielded 634 records from Scopus, 918 from Web of Science, and 859 from EBSCO. To ensure relevance and alignment with the research scope, filters were applied, including publication date (2020-2026), document type (articles and conference papers), language (English), and availability (full-text or open access). Additionally, database-specific subject filters were used (e.g. Business, Management, Computer Science, Decision Sciences), along with keyword-based restrictions. Restricting the analysis in this way ensured that the review reflected contemporary developments in digital transformation and reduced the inclusion of studies addressing purely technical or engineering aspects without an organizational perspective. This reduced the sample to 90 records in Scopus, 94 in Web of Science, and 75 in EBSCO. Following the identification stage, all the records were merged into a single dataset and 37 duplicates were removed. The remaining studies underwent title and abstract screening, where articles were excluded if they lacked organizational context, focused solely on technical systems, did not address digital transformation, or did not incorporate socio-technical considerations. In several borderline cases, distinguishing between studies addressing organizational digital transformation and those focusing primarily on technology implementation required interpretive judgement. To improve consistency, potentially relevant articles were retained for full-text assessment whenever their relevance could not be determined from the title and abstract alone. This stage resulted in the exclusion of 107 articles, leaving 115 studies for full--text assessment. During the eligibility phase, full texts were examined to assess the substantive relevance of socio-technical theory and the centrality of digital transformation. Articles were excluded if socio-technical concepts were only superficially mentioned, if the analysis was purely technological or economic, or if digital transformation was not a primary focus. Based on these criteria, 49 articles were excluded. Ultimately, a final sample of 66 articles was included in the review, forming the empirical basis for the systematic literature analysis.

2.2. Identification of Socio-Technical Theory Use

The use of socio-technical theory was systematically identified and classified based on its role in each study's research design and analytical logic. Rather than treating it as a uniform construct, the analysis examined its function across theoretical, methodological, and discussion sections. Studies were categorised according to whether the theory served as a primary framework, an interpretive lens, or a secondary reference. The classification aimed to capture differences in theoretical deployment without imposing predefined hierarchies, with ambiguous cases resolved based on the theory's overall role in the article.

2.3. Classification of Digital Transformation Domain

To ensure conceptual consistency, the classification of digital transformation domains (Figure 2) was based on the socio-technical systems model of Bostrom and Heinen (1977), which conceptualises organizations as interdependent configurations of People, Tasks, Structure, and Technology. This framework was used as an analytical taxonomy to organize the literature, where each article was

classified according to the dominant locus of transformation: human actors (People), work processes (Tasks), organizational arrangements (Structure), or technological systems (Technology). When multiple elements were addressed, classification followed the primary analytical emphasis. This approach enabled digital transformation to be interpreted as a reconfiguration of interdependent socio-technical components rather than a purely technological phenomenon.

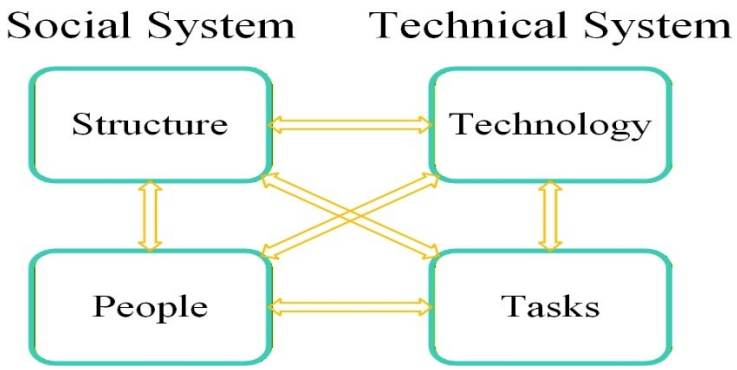

Fig. 2. Elements of socio-technical system

Source: (Bostrom & Heinen, 1977).

3. Results

3.1. Characteristics of the Papers

The final sample comprised 66 scientific articles published between 2020 and 2026. In the early period (2020-2022), publication activity was relatively limited, with three articles in 2020, five in 2021, and seven in 2022, accounting for less than 23% of the total sample. A marked increase is observed from 2023 onwards, with the highest share recorded in 2025 (38%). This temporal distribution suggests that socio-technical perspectives on digital transformation constitute a relatively recent but rapidly growing research stream. The surge in publications may be linked to the need to understand the organizational consequences of the COVID-19 pandemic and the acceleration of digitalisation. More than 75% of the reviewed studies were published between 2023 and 2025, indicating a growing reliance on socio--technical theory to address the emerging challenges associated with advanced digital technologies. Although only one article from 2026 was identified at the time of the search, which indicates a continuing upward trend in publication activity. Overall, the distribution reflects increasing academic interest in socio-technical approaches within digital transformation research. A similarly clear pattern emerged when the articles were categorised by the geographical context of the studies (Table 1).

Table 1. Distribution of articles by region

Region	Number of articles	Percentage
Europe	34	51.5
Asia	8	12
Africa	3	4.5
South America	1	1.5
Australia	1	1.5
Not specified	19	29

Note: The data presented in this table reflect the state of the literature as of 25 January 2026, corresponding to the completion of the database search.

The reviewed studies show a strong geographical concentration in Europe, which accounts for approximately 51% of the sample, including both cross-European and country-specific research (e.g.

Germany, France, the Netherlands, and Italy). A notable share of the articles (29%) did not specify a precise geographical context, as these were primarily conceptual or multi-context studies, limiting their regional classification. Empirical research from Asia, Africa, and emerging economies remains underrepresented, indicating that socio-technical analyses of digital transformation are still largely shaped by European perspectives. The table below presents the distribution of studies by research subject (Table 2).

Table 2. Distribution of articles based on research levels

Research level	Number of articles	Percentage
Micro level (actors & roles)	10	15
Meso level (organizational structures & functions)	53	80
Macro level (ecosystems & platforms)	3	5

Note: The data presented in this table reflect the state of the literature as of 25 January 2026, corresponding to the completion of the database search.

The reviewed studies were categorised across three analytical levels: micro (actors & roles), meso (organizational structures & functions), and macro (ecosystems & platforms), reflecting the multi-level nature of digital transformation. At micro level, ten articles focused on individual actors such as employees, managers, volunteers, and specific job roles, examining how digital transformation shapes experiences, responsibilities, and interactions with technologies. Employees were most frequently studied (5), followed by managers (3), while volunteers and specific roles appeared in one study each. The meso level dominated the literature, comprising 53 articles. This level includes organizations as a whole, specific types (e.g. hospitals, universities, public administration), functional units (e.g. sales, accounting), projects, and sectoral contexts. Most studies focused on the organization as the primary unit of analysis (38 articles), with additional contexts including projects (3), universities (2), harbours (2), and single cases such as hospitals, hotels, public administration, and sectors such as the flower industry. This concentration highlights the strong emphasis on organizational structures, processes, and functional reconfigurations. In contrast, the macro level is underrepresented, with only three articles addressing inter-organizational and ecosystem contexts such as B2B platforms, ecosystems, and business models. Table 3 presents the classification of articles by research design and methodological tools.

Table 3. Distribution of articles based on research tools

Research method	Tool used	Number of articles	Percentage
Qualitative	Case study	20	30
	Interviews	8	12
	Workshop	1	1.5
	Focus groups	1	1.5
Quantitative	Survey	13	20
Mixed	Survey + Interviews	1	1.5
	Data analysis	1	1.5
Other	Systematic Literature Review	11	17
	Conceptual Framework	7	10.5
	Theoretical Essay	1	1.5
	Content analysis	1	1.5
	Framework development	1	1.5

Note: The data presented in this table reflect the state of the literature as of 25 January 2026, corresponding to the completion of the database search.

From a methodological perspective, qualitative approaches dominated the sample (45%), with case studies being the most common design (30%). Quantitative studies accounted for 20% and were primarily survey-based, while mixed-method approaches remained marginal. Notably, 30% of the sample comprised systematic literature reviews, conceptual frameworks, and theoretical papers, highlighting the strong role of socio-technical perspectives in theory-building and conceptual development within digital transformation research.

3.2. Findings

Applying the socio-technical element framework, the reviewed studies were mapped onto the four core components of the system, enabling identification of which aspects of digital transformation received the most attention and the way they were distributed (Table 4). This approach allowed for assessing both thematic prevalence and the balance of analytical focus. The following sections present findings for each element, highlighting dominant research orientations and recurring transformation patterns.

Table 4. Distribution of articles based on digital transformation through socio-technical elements

Digital Transformation area	Number of articles	Percentage
People	16	24
Tasks	20	30
Structure	15	23
Technology	15	23

Note: The data presented in this table reflect the state of the literature as of 25 January 2026, corresponding to the completion of the database search.

The most frequently represented element concerned the task transformation (30%), focusing on how digital technologies reshape workflows, decision-making routines, and operational practices. A recurring theme was the reconfiguration of work under Industry 4.0 and AI-enabled systems, where responsibilities are redistributed between humans and technologies (Grosse, 2024; Radović et al., 2025). Kutz et al. (2025) showed that smart shop-floor management augments rather than replaces human coordination, with digital tools supporting operational decision-making while preserving human oversight (Landmark et al., 2024; Ruiz et al., 2024; Zhang & Dong, 2024). A substantial share of studies (24%) addressed the human element, including leadership, roles, competencies, and well-being. They frame digital transformation as a redefinition of professional identities, authority structures, and human–machine interaction (Shaba et al., 2023). For instance, Iden and Bygstad (2025) demonstrated that digital transformation capabilities emerge from interactions between employees and digital resources rather than from technology deployment alone. (Kilinc et al., 2025; Oltra-Rodríguez et al., 2025). Structural transformation was addressed in 23% of studies, covering governance, coordination, and organizational arrangements (Andersson & Eidenskog, 2023; Colombo et al., 2023; Uhri et al., 2023). It was found that technological change often outpaces structural and cultural adaptation, leading to socio-technical misalignments. Williams et al. (2021) showed that digital knowledge transfer depends on trust and collaborative infrastructures in addition to technological solutions. Other authors further highlighted shifts in institutional dynamics, coordination, and governance, often destabilising the existing hierarchies and necessitating structural redesign (Albouti & Balaji, 2025; Imran et al., 2021; Trabert et al., 2022). The technological element (23%) focused on AI, digital twins, BIM, analytics, and platforms, examining system capabilities and performance implications (Almeida & Okon, 2025; Bahna & Szalay, 2025; Ciobanu, 2025; Hetemi et al., 2020). Although often technology-driven, these studies increasingly emphasised that outcomes depend on social and organizational conditions. Ortolano and Gallegos (2026) interpreted human-AI collaboration through socio-technical theory, highlighting that

organizational practices shape the effectiveness of AI adoption (Rijswijk et al., 2023; Shojaei & Burgess, 2022).

Finally, the analysis was extended to relational interfaces between socio-technical components, reflecting the core premise of interdependence rather than isolated subsystems (Table 5).

Table 5. Distribution of articles based on socio-technical interface

Socio-Technical Interface	Number of articles	Percentage	Typical Focus
People ↔ Technology	21	32%	Human–AI collaboration, digital skills, leadership, employee well-being
Tasks ↔ Technology	17	26%	Automation, AI decision support, workflow redesign
Structure ↔ Technology	11	17%	Governance, digital strategy, coordination systems
People ↔ Structure	9	14%	Role redefinition, leadership, cultural adaptation
Tasks ↔ Structure	5	8%	Process formalization, workflow governance
Full-system integration	3	3%	Holistic socio-technical transformation models

Note: The data presented in this table reflect the state of the literature as of 25 January 2026, corresponding to the completion of the database search.

The most frequently addressed interface was the People-Technology relationship (32%), reflecting strong interest in human–AI collaboration, digital skills, and employee adaptation, showing how technologies reshape identities, authority, and well-being. The Tasks-Technology interface (26%) focused on automation and redesign of work processes, highlighting data-driven workflows and shifting responsibilities between humans and machines. The Structure-Technology interface (17%) addressed governance, strategy alignment, and coordination, whilst People-Structure (14%) examined leadership, roles, and cultural adaptation. Tasks-Structure interactions were least represented (8%), indicating limited attention to the joint evolution of workflows and governance. The dominance of People-Technology and Tasks-Technology relationships suggested that digital transformation research primarily examines immediate technology adoption and work redesign. In contrast, the limited attention to Structure-Tasks interactions and full-system integration indicated that organizational coordination and systemic alignment remain underexplored. This imbalance may contribute to digital transformation models that emphasised technological capabilities while underrepresenting organizational redesign and governance. Moreover, the use of socio-technical theory varies significantly, ranging from peripheral references to fully developed frameworks. The most common mode of its application was as an interpretive framework (35%), where socio-technical theory was used to explain empirical findings, particularly tensions, misalignments, and the unintended consequences of digital transformation. In such cases, it is typically applied in the discussion phase. The second most frequent use was as a theoretical framework (26%), shaping research design, data collection, and analysis by conceptualising digital transformation as the interaction of social and technical subsystems. Additionally, 21% of studies applied the theory as an analytical frame, structuring empirical analysis around socio-technical constructs. Its less frequent uses included treating it as a reference point (9%) or conceptual background (3%), with only marginal application at the discussion or project level. Overall, while socio-technical theory is widely acknowledged, the depth of its application varied considerably, with interpretive uses dominating and fully integrated analytical approaches remaining limited. The cross-tabulation of system elements and application modes revealed systematic asymmetries in how socio-technical theory is deployed, indicating that its epistemological role differs across studies and levels of analysis. Within the People dimension, socio-technical theory was most often applied as an interpretive frame, followed by theoretical uses. Research focused on how digital transformation reshapes leadership, employee experiences, and human-AI collaboration, using the theory to interpret tensions between autonomy and control, well--being and efficiency, and human agency versus algorithmic governance, rather than operationalising

subsystems (Ahmad et al., 2025; Ardito et al., 2023; Aulia & Lin, 2025; Smit et al., 2024). In the Tasks dimension, socio-technical theory more frequently served as an analytical frame, whereas here it was specifically operationalised to examine task redesign, workflow automation, and decision-support systems, distinguishing between technological affordances and human adaptation, particularly in studies on Industry 4.0 and AI-enabled processes (Kassem et al., 2024; Kutz et al., 2025; Pescatore, 2022; Smania et al., 2026). The Technology dimension showed a more fragmented application. Socio-technical theory was typically used as an analytical frame or discussion reference rather than a core foundation, with studies focusing on implementation, capabilities, and performance while acknowledging social conditions such as skills, trust, and governance, which indicates a persistent techno-centric orientation (Bemgal & Haggerty, 2025; Casas et al., 2025; Pedota et al., 2023; Stohr et al., 2024; Tonnesen et al., 2025). Within the Structure dimension, the use of socio-technical theory was more balanced between analytical and theoretical applications. Research integrates it into analyses of governance, coordination, and organizational alignment, often treating it as a foundational framework for understanding structural adaptation to technological change (Aryee et al., 2021; Colabianchi et al., 2025; Rezaey et al., 2020; Wuersch et al., 2023). In general, the findings show that the role and depth of socio-technical theory vary systematically across system elements, ranging from peripheral reference to core conceptual foundation. The distinction between referencing and fully operationalising the theory remains a key characteristic of the literature.

4. Discussion and Conclusions

This study examined how socio-technical theory is applied in digital transformation research across the People, Tasks, Structure, and Technology dimensions by using the Bostrom and Heinen (1977) model as the analytical framework. The findings confirm that digital transformation is a multi-layered socio--organizational phenomenon, yet it remains unevenly theorised, with research primarily emphasising task reconfiguration and human-technology interaction. For example, Ahmad et al. (2025) demonstrated that organizational performance depends on aligning digital technologies with communication and knowledge-sharing practices, while Shaba et al. (2023) showed that digital ecosystems require new governance mechanisms and structural adaptation. Govers and van Amelsvoort (2023) argued that digitalisation blurs the boundaries between technical infrastructures and social coordination, making both dimensions mutually constitutive. Together, these studies demonstrate that digital transformation emerges from the continuous alignment of people, tasks, structures, and technologies rather than from technological change alone. The review also revealed considerable variation in how socio-technical theory is applied. Rather than serving as a single analytical framework, it is used as an interpretive lens, an analytical framework, or, less frequently, as the primary research framework. Studies such as Aisyah and Tjandrakirana (2025) and Uhri et al. (2023) integrated socio-technical theory into their analytical designs, whereas Holmström (2022) reframed it as a diagnostic tool for AI readiness. Cimino et al. (2025), Aulia and Lin (2025), and Rezaey et al. (2020) used it as the primary research framework to examine employee well-being, human-AI collaboration, and participatory system development, respectively. This diversity of usage patterns highlights the flexibility of socio-technical theory but also raises questions about conceptual coherence across studies. A key finding is that the depth of theoretical integration depends on the focal element of digital transformation. Studies centred on People generally apply socio-technical theory more coherently, whereas technology-oriented research often treats it as contextual background. For example, Kassem et al. (2024) and Radović et al. (2025) specifically used joint optimisation and socio-technical alignment to explain how managerial practices, organizational culture, and human agency shape transformation outcomes. In contrast, technology-oriented studies often refer to socio-technical theory only as contextual background. Bahna and Szalay (2025) relied primarily on the Technology-Organization--Environment framework, while Ali and Haikal (2025) acknowledged socio-technical issues such as ethics and inclusivity without integrating the theory into their empirical models. This imbalance suggests that current research prioritises human-technology interactions while giving less attention to

relationships involving organizational structures and task design. The diverse applications of socio--technical systems theory in digital transformation research highlight both its strength and its limitations. Its conceptual flexibility allows researchers to explain phenomena ranging from individual interactions to organization-wide transformation. At the same time, this flexibility increases the risk of conceptual fragmentation, as the theory is frequently extended, combined with other perspectives, or applied only partially. For example, Iden and Bygstad (2025) introduced the concept of socio-technical micro-foundations, shifting the focus from system-level design to individual interactions with digital resources. In contrast, Kolade and Owoseni (2022) combined socio-technical theory with political economy and labour market perspectives, arguing that socio-technical systems theory alone cannot fully explain structural inequalities and power dynamics associated with digital transformation. Wuersch et al. (2023) further demonstrated how socio-technical theory can serve as a domain-specific framework for digital internal communication, improving analytical clarity while illustrating a broader trend toward increasingly specialised applications. The review further showed that socio-technical theory is evolving in response to emerging digital contexts. Recent studies extend its application to areas such as AI-enabled education (Zhang & Dong, 2024), digital knowledge management (Thomas, 2024), and temporally oriented AI implementation (Christensen & Andersson, 2025). These developments suggest that, within the context of digital transformation, the Bostrom and Heinen socio-technical systems model should be interpreted as a dynamic analytical framework capable of capturing evolving relationships between social and technological elements. To synthesise these findings, a conceptual framework was developed that links the four elements of the Bostrom and Heinen model with patterns of socio-technical theory usage identified across the reviewed studies. Rather than treating digital transformation as a homogeneous organizational shift, the framework demonstrates how different analytical foci lead to different forms of socio-technical reasoning and identifies areas where future research should strengthen integration across system elements (see Figure 3).

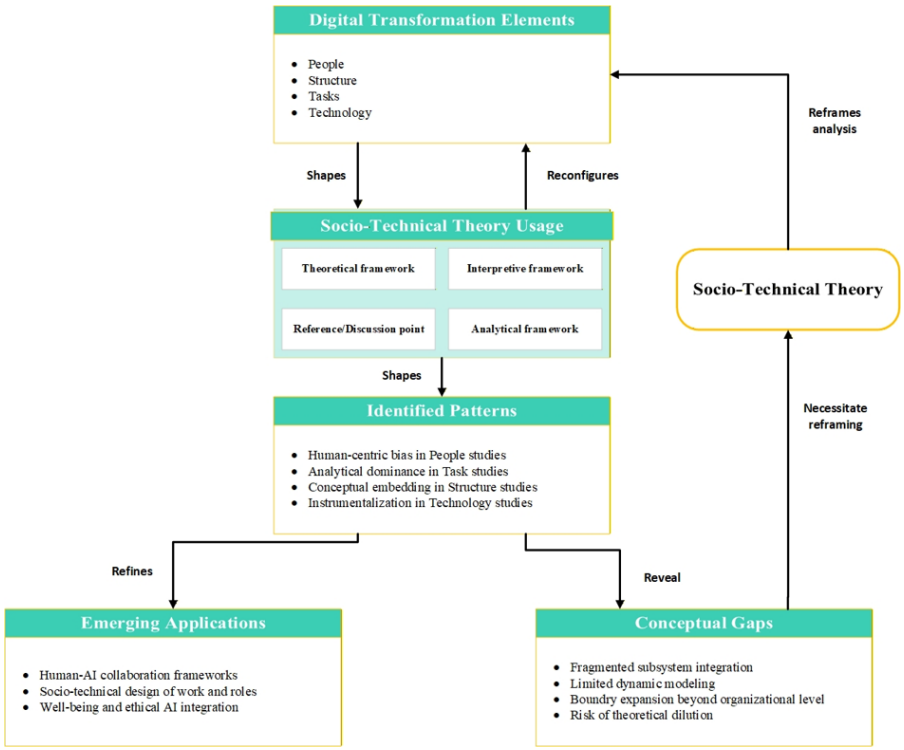

Fig. 3. Conceptual Framework

Source: own elaboration.

The proposed framework shows that the way digital transformation is analysed shapes how socio-technical theory is applied and, consequently, the explanations it provides. The review indicated that theoretical depth varies depending on whether research focuses on people, organizational structures, tasks, or technology. As a result, socio-technical theory performs different roles, ranging from explaining relational dynamics to supporting the analysis of organizational processes and system implementation. Rather than functioning as a static interpretive framework, it emerges as a flexible analytical resource whose contribution depends on the focal dimension of transformation. At the same time, the review highlighted both the strengths and limitations of these diverse applications. While socio-technical theory is increasingly applied to areas such as human-AI collaboration, work redesign, and ethical digitalisation, inconsistent subsystem integration and limited attention to system evolution reduce its explanatory coherence. To sum up, the findings suggest that socio-technical theory should be viewed as an evolving framework that continues to adapt to the challenges of digital transformation.

4.1. Theoretical Contribution

This article contributes by synthesising the way socio-technical systems theory is applied in digital transformation research and identifying recurring patterns in its use across studies. The review revealed that the theory is most consistently applied when research adopts an integrated perspective on People, Tasks, Structure, and Technology, whereas technology-centred studies often use it only as a contextual reference. These findings suggest that digital transformation is better understood as a process of socio-technical alignment than as technological implementation alone. Instead of proposing an extension of socio-technical theory, this review highlighted how the Bostrom and Heinen socio-technical systems model is currently interpreted and applied in contemporary digital transformation research, while identifying areas that require further conceptual development, particularly regarding AI-enabled and data-driven organizational change. From a practical perspective, the findings provide guidance for researchers and practitioners designing digital transformation initiatives and digital maturity models. They also suggest that transformation efforts should assess the balance between People, Tasks, Structure, and Technology instead of focusing primarily on technological deployment, helping organizations identify overlooked organizational and human factors that influence transformation outcomes.

4.2. Limitations and Future Research

This study has several limitations. The review is limited to peer-reviewed journal articles indexed in selected databases and therefore may have omitted relevant studies using alternative terminology or published outside the academic literature. In addition, the classification of studies according to the Bostrom and Heinen model involved interpretive judgment, which could influence the categorisation of socio-technical dimensions. Future research should examine the consequences of the current dominance of the People and Technology-oriented perspectives in digital transformation research and explore the underrepresented interactions involving Tasks and Structure. A more balanced investigation of relationships among all four dimensions of the Bostrom and Heinen model could improve the development of digital transformation theory and support the design of more comprehensive digital maturity models.

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Rola teorii socjotechnicznej w badaniach nad transformacją cyfrową: systematyczny przegląd literatury

Streszczenie

Cel: W obliczu rosnącej roli transformacji cyfrowej w przekształcaniu struktur organizacyjnych, sposobów pracy i mechanizmów tworzenia wartości kluczowe staje się zrozumienie jej podstaw społeczno-technicznych. Choć teoria społeczno-techniczna dostarcza ram analizy współzależności elementów społecznych i technicznych, jej rola we współczesnych badaniach nad transformacją cyfrową pozostaje fragmentaryczna. Wykorzystując model systemów społeczno-technicznych Bostroma i Heinena jako ramę analityczną, w artykule przeanalizowano sposób wykorzystania teorii społeczno-technicznej we współczesnych badaniach nad transformacją cyfrową, zidentyfikowano dominujące wzorce odnoszące się do wymiarów *People*, *Tasks*, *Structure* i *Technology* oraz wskazano istniejące luki koncepcyjne.

Metodyka: Badanie opiera się na systematycznym przeglądzie literatury zgodnym z protokołem PRISMA. Dane pozyskano z baz Scopus, Web of Science oraz EBSCO. Po zastosowaniu kryteriów włączenia i wyłączenia do analizy zakwalifikowano 66 artykułów naukowych opublikowanych w latach 2020-2026. Publikacje sklasyfikowano według elementów systemu społeczno-technicznego (ludzie, zadania, struktura, technologia) oraz sposobów wykorzystania teorii (interpretacyjny, analityczny, teoretyczny, pomocniczy).

Wyniki: Wyniki wskazują, że badania koncentrują się głównie na wymiarach ludzi i zadań, zwłaszcza w kontekście zmiany ról, reorganizacji pracy oraz interakcji człowiek–technologia. Wymiary strukturalne i technologiczne są analizowane rzadziej i mniej spójnie. Teoria społeczno-techniczna najczęściej pełni funkcję ramy interpretacyjnej lub teoretycznej, natomiast rzadziej jest operacjonalizowana jako narzędzie analityczne. Przegląd ujawnia nierównomierny stopień integracji teoretycznej oraz wskazuje luki dotyczące współzależności między elementami modelu, dynamiki ekosystemów oraz zmieniających się granic systemów. Wykazano również, że stopień integracji teorii zależy od analizowanego wymiaru transformacji – badania skoncentrowane na czynniku ludzkim wykorzystują teorię społeczno-techniczną w sposób bardziej spójny niż badania zorientowane głównie na technologię.

Implikacje i rekomendacje: Wyniki analizy podkreślają znaczenie postrzegania transformacji cyfrowej jako procesu ciągłego dostosowywania elementów społecznych i technicznych, a nie wyłącznie

wdrażania nowych technologii. Z perspektywy badawczej zidentyfikowano niedostatecznie rozpoznane relacje pomiędzy elementami modelu Bostroma i Heinena oraz wskazano potrzebę prowadzenia bardziej zintegrowanych badań wielopoziomowych. Z punktu widzenia praktyki wyniki wskazują na konieczność równoważenia inwestycji technologicznych z dostosowaniem struktur organizacyjnych, procesów pracy oraz kompetencji pracowników podczas projektowania inicjatyw transformacji cyfrowej i modeli dojrzałości cyfrowej.

Oryginalność/wartość: Artykuł w sposób systematyczny przedstawia, jak teoria społeczno-techniczna jest wykorzystywana w badaniach nad transformacją cyfrową z zastosowaniem modelu Bostroma i Heinena. Identyfikuje powtarzające się wzorce wykorzystania teorii, wskazuje na nierównomierny poziom jej integracji pomiędzy poszczególnymi elementami transformacji oraz proponuje ramę koncepcyjną syntetyzującą te zależności. Uzyskane wyniki pokazują, w jaki sposób model jest obecnie wykorzystywany w badaniach nad transformacją cyfrową, oraz wskazują obszary wymagające dalszego rozwoju koncepcyjnego.

Słowa kluczowe: transformacja cyfrowa, teoria społeczno-techniczna, zmiana organizacyjna, dopasowanie społeczno-techniczne, reorganizacja pracy