



**Visiting and Exploring Digital Transformation Management:
A Bibliometric Analysis and Review Study**

Journal:	<i>Internet Research</i>
Manuscript ID	INTR-12-2023-1152.R4
Manuscript Type:	Research Paper
Keywords:	Digital Transformation, Digital Transformation Management, Bibliometric Analysis, Structured Review, Planning, Leading

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Visiting and Exploring Digital Transformation Management: A Bibliometric Analysis and Review Study

Abstract

Purpose

This study aims to explore and understand the literature on Digital Transformation (DT) research that will lead to developing a conceptual and thematic structure of DT management.

Design/Methodology/Approach

The research approach employed a hybrid approach of bibliometric analysis and a structured review of DT Management research studies from 2017 to 2023 was employed. Although systematic reviews and bibliometric analysis are distinct methods, they complement one another in research by enabling the synthesis and analysis of existing literature. Scopus and Web of Science (WoS) were selected as the bibliographic databases for this study since they are generally accepted as the most comprehensive data sources for various purposes.

Findings

Findings revealed 186 publications during these periods, with the top three publications being the Journal of Business Research, Business Horizons, and California Business Review. Top-ranking researchers hailed from Germany, Japan and Spain. Keywords that appeared were innovation, digital transformation, artificial intelligence, and DT. In the management area, there are fewer studies conceptualising DT Management that led to this study forming a conceptual framework using a qualitative, interpretative, and thematic analysis approach.

Originality/Value

These findings are relevant for understanding the phenomenon of DT and DT Management. The study contributes to the emerging body of knowledge in Management and DT.

Keywords: Digital Transformation, Digital Transformation Management, Bibliometric Analysis, Structured Review, Planning, Leading.

1. Introduction

Digital transformation (DT) captures many socio-technical changes attributed to the adoption and use of information technologies (IT) (Jarvenpaa and Selander, 2023; Tana *et al.*, 2023). Even though the concept of DT has gained significant traction in both academic and practitioner circles, it remains challenging to define and conceptualize it theoretically and operationally. More specifically, the distinction between DT and IT-enabled organisational transformation (ITOT) (Wessel *et al.*, 2021). At the organisational level, DT involves the use of digital technologies in redefining value propositions, leading to a new organisational identity, while ITOT is the use of digital technologies to support and reinforce the existing value proposition and identity (Wessel *et al.*, 2021) . Contending that restricting DT conceptualisation to the organisation frame is limiting, some studies have indicated that the main difference between DT and ITOT is that, unlike ITOT, DT extends beyond organisational boundaries to include social actors (Tana *et al.*, 2023).

DT as a process creates disruptions that trigger strategic responses from organisations (Carroll *et al.*, 2023; Vial, 2019). However, such strategic responses are usually difficult to obtain correctly since over 70 percent of DT strategies fail (Loonam *et al.*, 2018). For organisations seeking to develop new strategies, business models, and organisational structures supporting DT, the challenges of acquiring new resources, addressing the risks involved, and managing resistance from different stakeholders are critical (Li, 2020). While there is a need to understand how DT can be implemented successfully, research in various facets of DT remains largely fragmented and at their infancy (Kraus *et al.*, 2022) . This heterogeneity can be attributed to the fact that researchers approach DT from various disciplinary and conceptual perspectives, such as business management (Kraus *et al.*, 2022), knowledge management (Machado *et al.*, 2022), manufacturing (Jones *et al.*, 2021), urban infrastructure (Lafioune *et al.*, 2023), and information systems (Baiyere *et al.*, 2020; Wessel *et al.*, 2021). However, management concepts are often overlooked in these discussions.

Several studies have attempted to conceptualise DT from different perspectives. For example, DT and organisational change (Hanelt *et al.*, 2021; Zoppelletto *et al.*, 2023), models for DT (Gray and Rumpe, 2017), DT as a collective social action (Tana *et al.*, 2023), managing DT from organisation inertia perspective (Kaganer *et al.*, 2023), leading DT (Li, 2020), paradoxical tensions and responses to shaping DT pathways (Soh *et al.*, 2023), DT

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3 preparedness (Kumar *et al.*, 2023) and the role of digital affordances in overcoming DT
4 paradoxes (Qin, 2023). There has also been an effort to understand DT through literature
5 reviews to consolidate research progress in this area. These studies include: overview of DTs
6 state of the art and research (Kraus *et al.*, 2022, 2021a), an understanding DT (Vial, 2019),
7 DT from a strategy and organisation perspective (Hanelt *et al.*, 2021), and organisational DT
8 (Omol, 2024). The literature on DT persistently remains fragmented (Loonam *et al.*, 2018),
9 with most studies primarily providing guidance on certain isolated aspects of DT and little
10 attention to a holistic approach when developing a company-wide DT strategy (Matt *et al.*,
11 2016). Additionally, Matt *et al.* (2016) emphasised that while the building blocks of DT
12 strategy are known, guidelines for managers on implementation are still lacking.
13 Consequently, studies need to explore the managerial actions required when implementing
14 DT within organisations (Loonam *et al.*, 2018).

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25 The above background motivates a multidimensional and transdisciplinary systematic review
26 to synthesise and evaluate the large and diverse existing literature to enhance our
27 understanding of DT management. For this purpose, this study aims to address the following
28 research questions (RQ):
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33 RQ 1: What are the publication dynamics of DT management research?

34 RQ 2: How is DT management conceptualised from the DT literature?

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38 A review of DT research using a systematic review of abstracts and a bibliometric analysis of
39 articles' titles, abstracts, and keywords was pursued to answer these research questions. The
40 articles were extracted from the Scopus and Web of Science (WoS) databases using a well-
41 defined search string.
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46 This study contributes to the understanding of DT management in three ways. First, by
47 amalgamating previous research in DT management from various contexts such as artificial
48 intelligence (AI) (Zupic and Čater, 2015), Enterprise social media (Li *et al.*, 2021), telehealth
49 (Sahoo *et al.*, 2023), or virtual brand communities (Zheng *et al.*, 2022), which affect various
50 disciplines like, Marketing, Human Resource Management and organisations in various
51 sectors. Second, by explaining the conceptual structure of DT management research through
52 various themes. Third, by using the themes to propose a DT management conceptual
53 framework that can provide future research directions following Zheng *et al.* (2023).
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4 The next section provides the literature review of this study. This is followed by the research
5 approach description, research analysis and findings. Thereafter, descriptions of the
6 conceptual framework are offered, then implications, conclusion, limitations, and future
7 directions.
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11 12 **2. Research Background**

13 14 **2.1 Digital Transformation**

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16 Recently, the phenomenon of DT has attracted the interest of practitioners and researchers
17 from philosophy, (Rowe, 2018), finance (Chanias *et al.*, 2019), operations management (Li,
18 2020), software modelling (Gray and Rumpe, 2017), entrepreneurship (Keller *et al.*, 2022),
19 and policy (World Economic Forum 2017). Despite the varied interests and opportunities
20 around DT, its conceptualisation is still elusive, as illustrated by various studies (Appio *et al.*,
21 2021; Hanelt *et al.*, 2021; Vial, 2019). Researchers who are drawn from disciplines such as
22 Information Systems (IS) and practitioners still struggle to grasp the essence of DT (Carroll *et al.*,
23 2023) since it is not a straightforward process or an end in itself (Guo *et al.*, 2023; Smith
24 and Watson, 2019). To some researchers, DT involves fundamentally rethinking an
25 organisation's processes, services, and roles from a technology-enabled perspective (Eden *et al.*,
26 2019).
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37 Despite the scholarly attention towards DT, it is not yet clear whether DT is a new
38 phenomenon or is it merely a new label to the old concept (Wessel *et al.*, 2021), i.e., a case of
39 old wine in a new wine skin. Extant studies have attempted to differentiate digital innovation
40 from IT innovation (Keller *et al.*, 2022; Yoo *et al.*, 2010), or tried to delineate DT from
41 ITOT. To disentangle the two “transformations”, researchers have teased out some of the
42 differences between them as summarised in Table 1. From these explanations, DT has some
43 old flavours such as Business Processes, value proposition, and contexts. However, the
44 technologies utilised for DT are considered novel and emerging. This study considers DT
45 management as a novel frontier for theorising and conceptualising DT. Management is a
46 concept that leads to success or failure in organisations, projects, and individuals, just like
47 DT. Ineffective management often results in poor strategic decisions, leading to financial
48 losses and, ultimately, organisational failure (Hambrick and Mason, 1984). Additionally,
49 senior executives believe that DT is critical for being competitive (Kumar *et al.*, 2023).
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Table 1: Differences between ITOT and DT (Source – Author(s) own)

Business Logics	ITOT	DT	References
Business Processes	Improves efficiency and effectiveness of the processes	Fundamentally changes the business processes	Parviainen <i>et al.</i> (2017)
Value creation	Leverages digital technology to support value proposition	Leverages digital technologies to redefine value proposition	Wessel <i>et al.</i> (2021)
Organisational Identity	Leverages digital technologies to enhance an existing organisational identity	Leverages digital technologies to facilitate emergence of new organisational identity	Wessel <i>et al.</i> (2021)
Business models	Sustains the existing business models	Sustains existing business models while crafting new variations of them	Baiyere <i>et al.</i> (2020)
Operational context	Operates mainly within the context of an organisation	Operates within a broader context that include organisational, economic, political and socio technical contexts	Baiyere <i>et al.</i> (2020)

2.2 Digital Transformation Management

DT is believed to be making strategic contributions to an overall business. It is viewed as essential for organisational growth by exploiting new digital technology capabilities for entrepreneurship in new and existing markets (Caroll *et al.*, 2021). The absence of a formal definition of DT management is problematic for its conceptualisation. The transition to DT should not be underestimated as it is a complex issue affecting many, if not all, segments of an organisation (Matt *et al.*, 2016). Like every change process, DT contains several risks and challenges like employee resistance, change in organisation structure, or a shift in

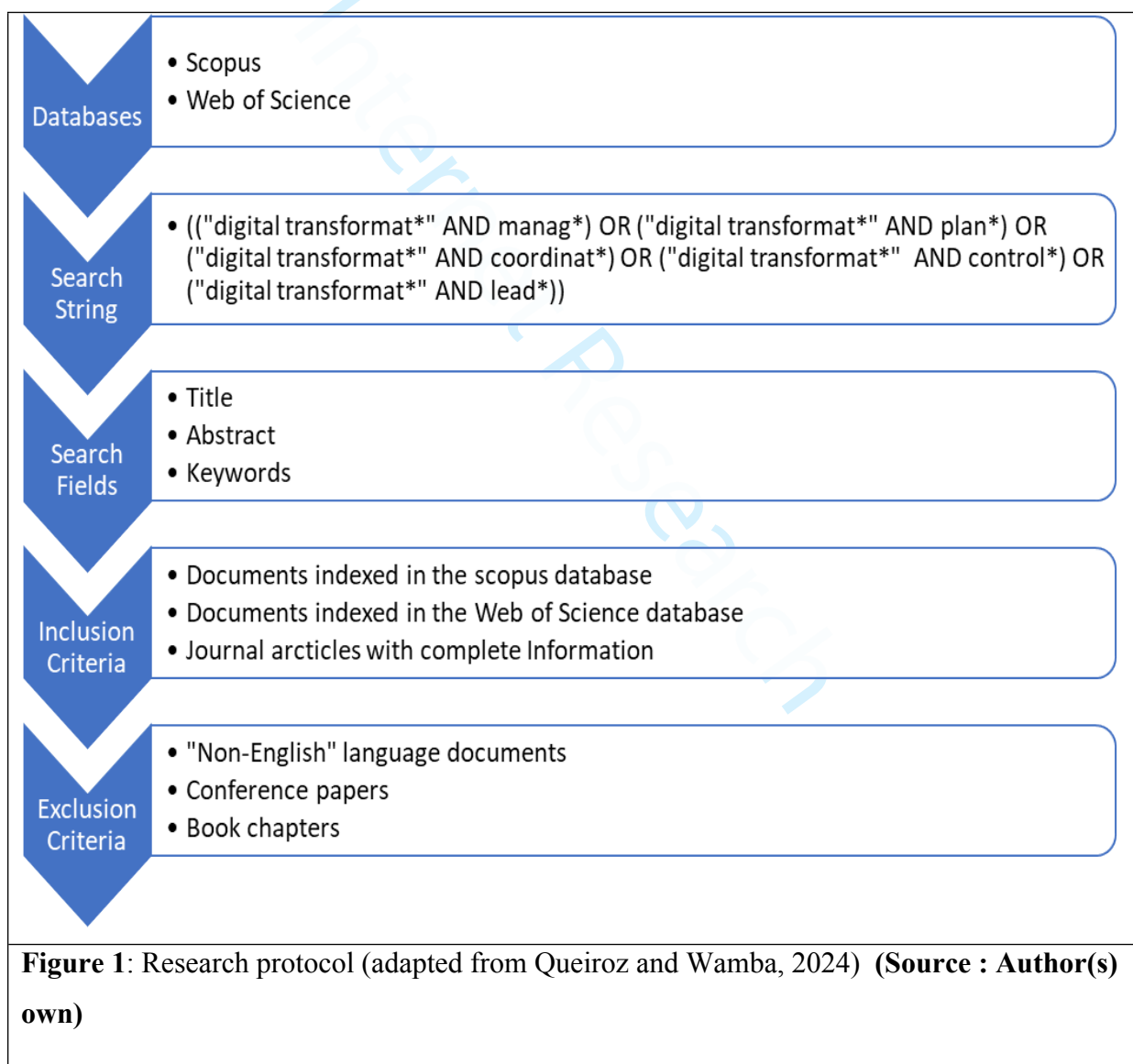
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3 management planning (Nambisan *et al.*, 2019). Even though extant literature has identified
4 some aspects of DT (Hansen and Kien, 2015), managers still lack clarity about the different
5 options and elements they need to consider in their DT agenda (Matt *et al.*, 2016). Therefore,
6 DT presents a high-priority management challenge not only to business leaders (Matt *et al.*,
7 2016) but also to organisations and national economies (Švarc *et al.*, 2020). To define DT
8 management, we relied on the standard definition of management that implies planning,
9 organising, commanding, coordinating, and controlling (with “commanding” replaced by
10 “leading” in modern definitions) (Cole and Kelly, 2015, p. 18). Thus, DT management is
11 defined as the process of “planning, organising, coordinating, and leading” DT
12 implementation in an organisation.
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22 **3. Research Design and Approach**

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24 This study used a hybrid approach that combines systematic literature review (SLR) and
25 bibliometric analysis. The hybrid approach enhanced the quality and quantity of the retrieved
26 data (information) (Tudoran, 2024) on DT and DT management. SLRs are considered
27 superior to narrative reviews because they follow a replicable, scientific, and transparent
28 process that reduces bias (Tranfield *et al.*, 2003). Due to the nature of DT, managers still face
29 uncertainty regarding the factors to consider in their DT strategies (Matt *et al.*, 2016). As a
30 result, management research in the field of DT is evolving independently, with limited focus
31 on the management perspective. Given that bibliometric analysis uses scientific mapping, and
32 addresses meta-level trends, it enables the identification of broad patterns of academic
33 interest related to a specific phenomenon.
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43 Although systematic reviews and bibliometric analysis are distinct methods, they
44 complement one another in research by enabling the synthesis and analysis of existing
45 literature. This study employed systematic literature review techniques to identify, select, and
46 analyse the available literature on DT management using an evidence-based approach.
47 Meanwhile, bibliometric techniques allowed for a quantitative analysis to evaluate
48 publication patterns in the field. This hybrid methodology, combining systematic literature
49 review and bibliometric analysis, aimed to produce high-quality results by harnessing the
50 strengths of both approaches (Sahoo *et al.*, 2023). Numerous studies across various fields
51 have leveraged this hybrid approach to produce high-quality research outcomes (Inamdar *et*
52 *al.*, 2020; Linnenluecke *et al.*, 2019, 2019; Rojas-Sánchez *et al.*, 2023).
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Scopus and WoS were selected as the bibliographic databases for this study. These two bibliographic databases are generally accepted as the most comprehensive data sources for various purposes (Laato *et al.*, 2022; Zhu and Liu, 2020). A research protocol was developed in the second step, as shown in Figure 1. In the search protocol, the inclusion or exclusion criteria did not limit publications to a specific time period following Webster and Watson (2002) recommendation regarding an emerging concept like DT management. Furthermore, emerging fields like DT management may have a limited body of literature, so excluding studies based on time period could result in missing foundational insights (Okoli, 2015).



3.1 Document Source Selection

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3 Following transparency and replicability procedures (Aguinis and Solarino, 2019) and to
4 ensure data consistency and relevance across the databases, document selection was guided
5 by the research protocol presented in Figure 1. Additionally, documents from the fields of
6 computer science, business, management, and social sciences were included since DT is
7 considered a socio-technical change (Tana *et al.*, 2023)By incorporating business,
8 management, and social sciences, the literature covered additional topics such as
9 entrepreneurship, policy, and education. Rayyan (<https://www.rayyan.ai/>) was used to
10 identify duplicates and screen abstracts for inclusion or exclusion. Finally, two authors
11 independently screened the abstracts to ensure relevance and minimise potential bias.
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20 The screening criteria were based on the presence of any of the keywords from the search
21 string. To ensure objectivity, Rayyan's blind screening feature was utilised. After this
22 process, 186 documents were selected for analysis. The 186 documents were considered an
23 adequate sample following some previous systematic reviews. For example, Inamdar *et al.*
24 (2020) reviewed 79 articles, Lafioune *et al.* (2024) reviewed 63, and Khare *et al.* (2022)
25 examined 291 articles. Figure 2 presents a summary of the document selection process
26 following the PRISMA review protocol (Moher *et al.*, 2009).
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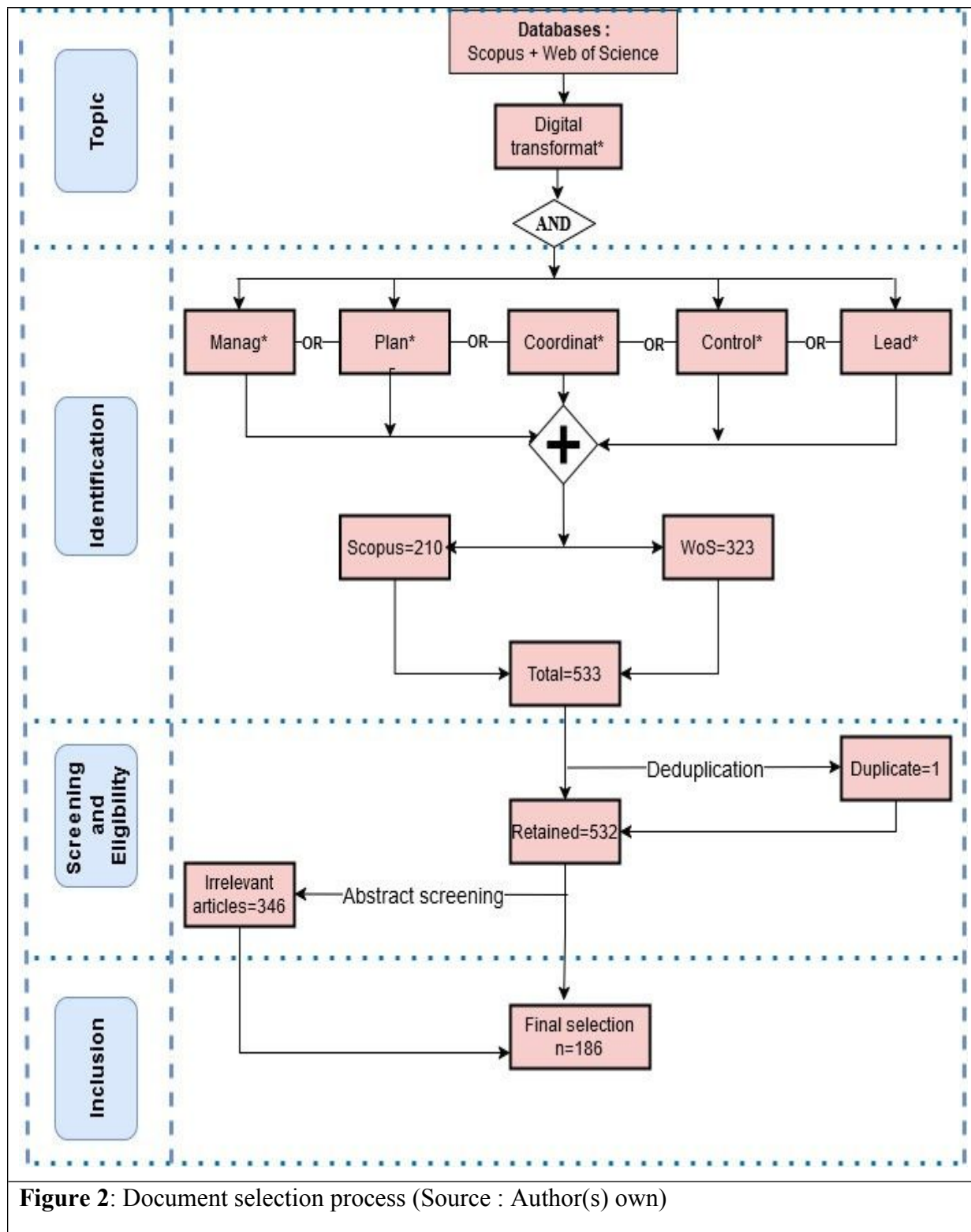


Figure 2: Document selection process (Source : Author(s) own)

3.2 Document Analysis

The document analysis was carried out in two phases. The first phase utilized bibliometric analysis to explore the publication trends in DT management research (RQ1), while the second phase involved an SLR review, where the abstracts were examined to understand how

DT management is conceptualised (RQ2). For the first phase, a bibliometric analysis, following a methodology similar to that of Petrescu *et al.* (2022), was conducted using VOSViewer (van Eck and Waltman, 2010) and Bibliometrix (Aria and Cuccurullo, 2017). The second phase of analysis involved conducting a structured review of the literature through content analysis on the selected documents. Content analysis is widely used to reduce large corpus of text into smaller, manageable components such as concepts and themes (Bahoo *et al.*, 2020).

4. Findings

4.1 Publication Dynamics of DT Management Research

This study aimed to explore the dynamics underlying DT management research (RQ1). Bibliometric analysis was conducted to address this research question, focusing on publication history, citation analysis, source analysis, author analysis, and document analysis.

4.1.1 Data Summary

A total of 186 documents published between 2017 and September 2023 were selected for analysis. Although the search protocol did not specify a particular time frame due to the emerging nature of the DT management concept, the first relevant publication, Tay and Low (2017), appeared in June 2017. DT management is a relatively new research area since the average age of the documents is 1.86 years. Table 2 provides a summary of the documents.

Table 2: Descriptive bibliometric analysis (Source : Author(s) own)

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2017:2023
Sources (Journals, Books, etc.)	118
Documents	186
Annual Growth Rate %	45.95
Document Average Age (Year)	1.86
Average Citations per Document	18.3
References	11148
DOCUMENT CONTENTS	
Automatically Generated Keywords (ID)	183
Author's Provided Keywords (DE)	675

AUTHORS	
Authors	606
Authors of Single-Authored Documents	15
AUTHORS COLLABORATION	
Single-Authored Documents	15
Co-Authors per Document	3.38
International Co-Authorships %	7.527
DOCUMENT TYPES	
Article	183
Book Chapter	3

4.1.2 Publications History

The publication history illustrates the number of articles published each year from 2017 to September 2023, as shown in Table 3. From the table, interest in DT management began in 2017. A notable rise in publications on this topic occurred starting in 2019, and 29 articles were already published in the first three quarters of 2023. Given that this paper was written in September 2023 and considering the growing number of special issues focusing on digital transformation, it is anticipated that the total number of publications for 2023 could exceed those of 2022.

Table 3: Yearly publication count (2017 to September 2023)

(Source : Author(s) own)

Year	No. of Articles
2017	3
2018	5
2019	18
2020	25
2021	50
2022	56
2023	29
Total	186

4.1.3 Average Citations Per Year

Average citation metrics are expressed in terms of mean total citations per article and mean total citations per year. The highest Mean Total Citations per Article occurred in 2019, indicating significant attention on DT management during this period (Table 4).

Table 4: Average citations per article and year to (2017 to September 2023) (Source : Author(s) own)

Year	Mean Total Citations per Article	No of Articles	Mean Total Citations per Year	Citable Years
2017	21	3	3	7
2018	44	5	7	6
2019	42	18	8	5
2020	36	25	9	4
2021	18	50	6	3
2022	7	56	3	2
2023	3	29	3	1

4.1.4 Most Influential Sources

The most influential sources in DT management research were identified based on the total number of articles published between 2017 and 2023 (Table 5). The *Journal of Business Research*, *Business Horizons*, and *California Management Review* were the top sources. However, recent calls for papers in journals like the *European Journal of Information Systems*, *Journal of Strategic Information Systems*, *Journal of Information Technology*, and *Information Systems Journal* suggest that mainstream IS journals are beginning to focus more on DT. Additionally, the call for papers in *Internet Research* is expected to increase attention on DT (Wang *et al.*, 2023).

Table 5: Most influential document sources (3 articles or above) (Source : Author(s) own)

Sources	No. of Articles	No. of Local Citations
Journal of Business Research	19	12
Business Horizons	5	2
California Management Review	5	5
Industrial Marketing Management	4	10
International Journal of Early Childhood Special Education	4	0
Management Revue	4	0
Business Process Management Journal	3	3
International Journal of Entrepreneurial Behaviour and Research	3	0
International Journal of Information Management	3	12
Journal of Business Strategy	3	6
Pacific Asia Journal of The Association for Information Systems	3	0

Supply Chain Management	3	1
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4.1.5 Most Impactful Document Sources (Citations)

The impact of a journal is assessed by the number of citations its articles receive. *Government Information Quarterly* was the most cited (n=51), followed by *MIS Quarterly* (n=48). As shown in Table 6, DT research is slightly dominated by IS outlets.

Table 6: Most impactful document sources (20 local citations or above) (Source : Author(s) own)

Sources	No. of Citations
Government Information Quarterly	51
MIS Quarterly	48
Harvard Business Review	35
Journal of Strategic Information Systems	34
MIS Quarterly Executive	34
Strategic Management Journal	31
MIT Sloan Manage Review	27
Business Information Systems	26
International Journal of Information Management	26
Public Administration Review	26
Sustainability	23

4.1.6 Most Relevant Authors

Researchers often seek information about authors working on a specific research topic, especially when organizing special issues, calls for papers, or evaluating a topic from an expert's perspective. Table 7 highlights the researchers actively researching the area of DT management. The top four academics, Bouncken from Germany, Brock from Japan, and Ancillo and Gavrila, both from Spain, illustrate the global nature of this research field.

Table 7: Most relevant authors (2 articles or above) (Source : Author(s) own)

Authors	No. of Articles	Articles Fractionalised
Bouncken, R.	3	0.916666667
Banciu, D.	2	0.533333333
Bartsch, S.	2	0.583333333
Brock, J.	2	1
Büttgen, M.	2	0.583333333
Chatterjee, S.	2	0.5
Chaudhuri, R.	2	0.5
Ancillo, L.A.	2	1

Deist, M.	2	0.666666667
Gavrila, G.S.	2	1
Gilli, K.	2	0.666666667
Kowalkowski, C.	2	0.416666667
Kraus, S.	2	0.45
Liu, H.	2	0.5
Sklyar, A.	2	0.416666667
Sörhammar, D.	2	0.416666667
Tronvoll, B.	2	0.416666667
Vrontis, D.	2	0.5
Wang, Y.	2	0.285714286
Weber, E.	2	0.583333333
Xu, H.	2	0.476190476

4.1.7 Authors Local Impact

Table 8 shows the impact of the authors' research within an academic community, based on the total number of local citations.

Table 8: Authors local impact (top 11 by Total Citations) (Source : Author(s) own)

Author	Total Citations	No. of Articles	Starting Publication Year
Fernandes, C.	221	1	2019
Ferreira, F.	221	1	2019
Ferreira, J.	221	1	2019
Kraus, S.	197	2	2021
Invernizzi, A.	193	1	2021
Pluzhnikova, A.	193	1	2021
Schiavone, F.	193	1	2021
Kowalkowski, C.	181	2	2020
Sklyar, A.	181	2	2020
Sörhammar, D.	181	2	2020
Tronvoll, B.	181	2	2020

4.1.8 Most Important Author Institutions

When analysing the institutions of the publishing authors, Table 9 reveals that the top institutions are the University of Agder in Norway, Illinois State University in the USA, and the University of Bayreuth in Germany. This result is surprising, given that the top-ranking authors hail from Spain, Germany, or Japan. Additionally, it is notable that Norway follows a unique funding model, where institutions, rather than individuals, receive research funding. This approach reflects a collective rather than individualistic focus for researchers. As stated

on Norway's funding website: "The Research Council of Norway funds research organisations, businesses, and public sector entities" (Warrender, 2023).

Table 9: Most important author institutions (4 articles or above) (Source : Author(s) own)

Institution	No. of Articles
University of Agder	6
Illinois State University	5
University of Bayreuth	5
University of California San Francisco	4
Aalto University	4
Bina Nusantara University	4
Free University of Bozen-Bolzano	4
Linköping University	4
Politecnico Di Milano	4
Radboud Universiteit	4
Technical University of Munich	4
Technische Universität Kaiserslautern	4
Universiti Utara Malaysia	4
University of Basilicata	4
University of Hohenheim	4
University of Nicosia	4
University of Padova	4

4.1.9 Highly Cited Publications

Table 10 presents the most cited publications in DT management. Ferreira (2019) leads with 221 citations, followed by Kraus (2021b) with 193 citations in second place, and Tronvoll (2020) with 170 citations in the third. These authors are all from Europe.

Table 10: Highly cited publications (top 10 publications by total citations) (Source : Author(s) own)

Study	Total No. of Citations
Ferrari (2019)	221
Kraus <i>et al.</i> (2021a)	193
Tronvoll <i>et al.</i> (2020)	170
Schwarz Müller <i>et al.</i> (2018)	156
Björkdahl (2020)	155
Brock and Von Wangenheim (2019)	144
Bartsch <i>et al.</i> (2020)	139
Fletcher and Griffiths (2020)	100
Schrotter and Hürzeler (2020)	100

(Tekic and Koroteev 2019)

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4.1.10 Most Locally Cited References

Results in Table 11 reveal that the top two publications focused entirely on Digital Transformation (Matt *et al.*, 2015; Vial, 2019). It was from the third publication that aspects of management began to emerge (Bharadwaj *et al.*, 2013). Within the most cited publications, two were obscure (Eisenhardt, 1989; Fornell and Larcker, 1981) since they were published in the 1980s.

Table 11: Most locally cited publications (top 10 publications by No. of Citations (Source : Author(s) own)

Study	No. of Citations
Vial (2019)	16
Matt <i>et al.</i> (2015)	11
Bharadwaj <i>et al.</i> (2013)	9
Nambisan <i>et al.</i> (2017)	8
Singh and Hess (2017)	8
Eisenhardt (1989)	6
Fornell and Larcker (1981)	6
Li (2018a)	6
Nambisan <i>et al.</i> (2019)	6
Warner and Wäger (2019)	6

4.1.11 Research Productivity by Country

Germany leads the research on DT and DT management, followed by the USA and Italy. Table 12 presents research productivity by country.

Table 12: Major contributing countries (more than 10 articles) (Source : Author(s) own)

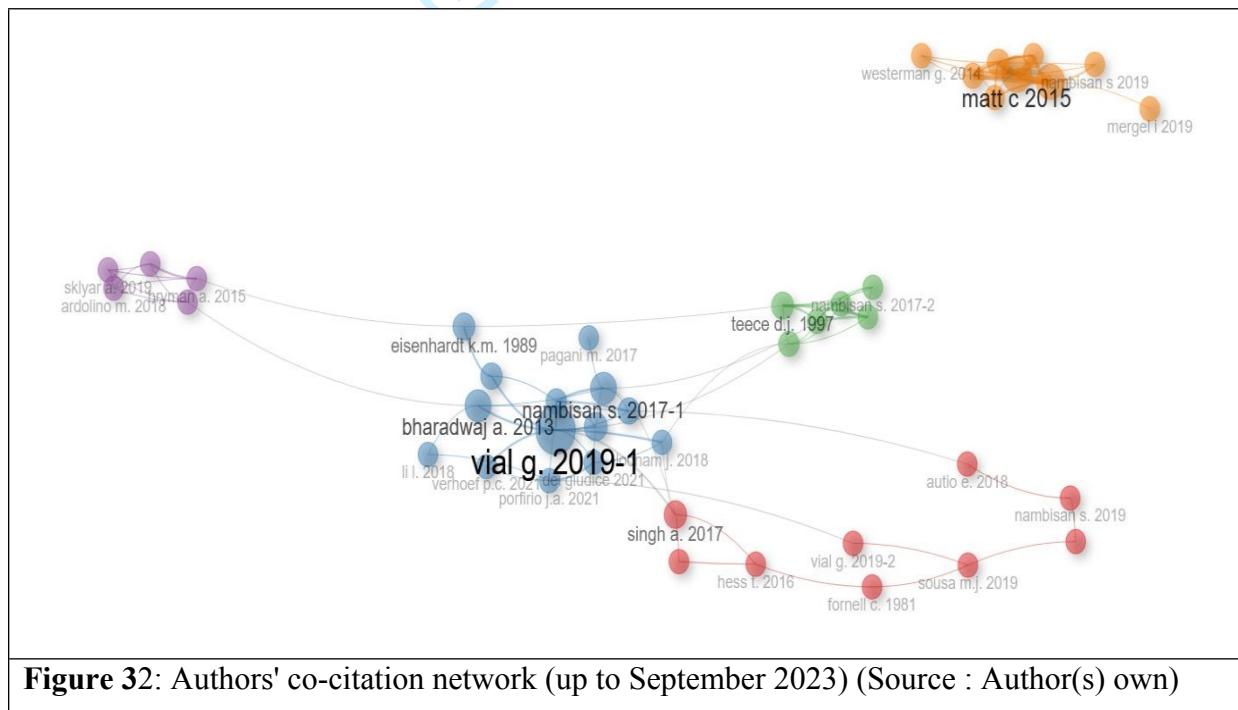
Country	No. of Articles
Germany	36
USA	22
Italy	20
Russia	16
China	14
Spain	14
UK	14
Norway	12
Switzerland	11
Belgium	10

4.2 Conceptual Structure of the Digital Transformation Management Field

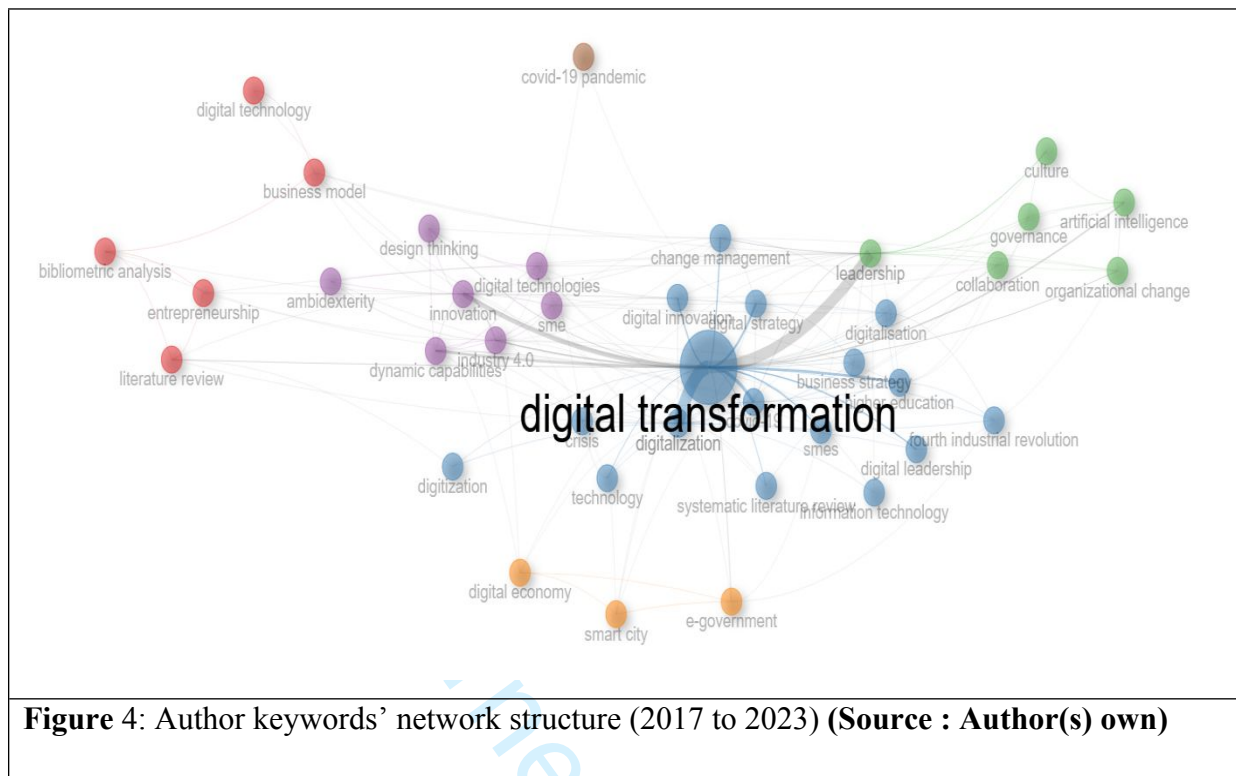
This section aims to conceptualise DT management (RQ2). Bibliometric analysis was employed to examine the conceptual structure of DT management research and identify its key themes, sub-themes, and research patterns.

4.2.1 Co-Citation Network

To understand the intellectual structure of DT management research, a co-citation network analysis of the authors was conducted. For this analysis, an authors' co-citation network (Figure 3) and an authors' keyword network structure were generated using the most frequently occurring keywords.

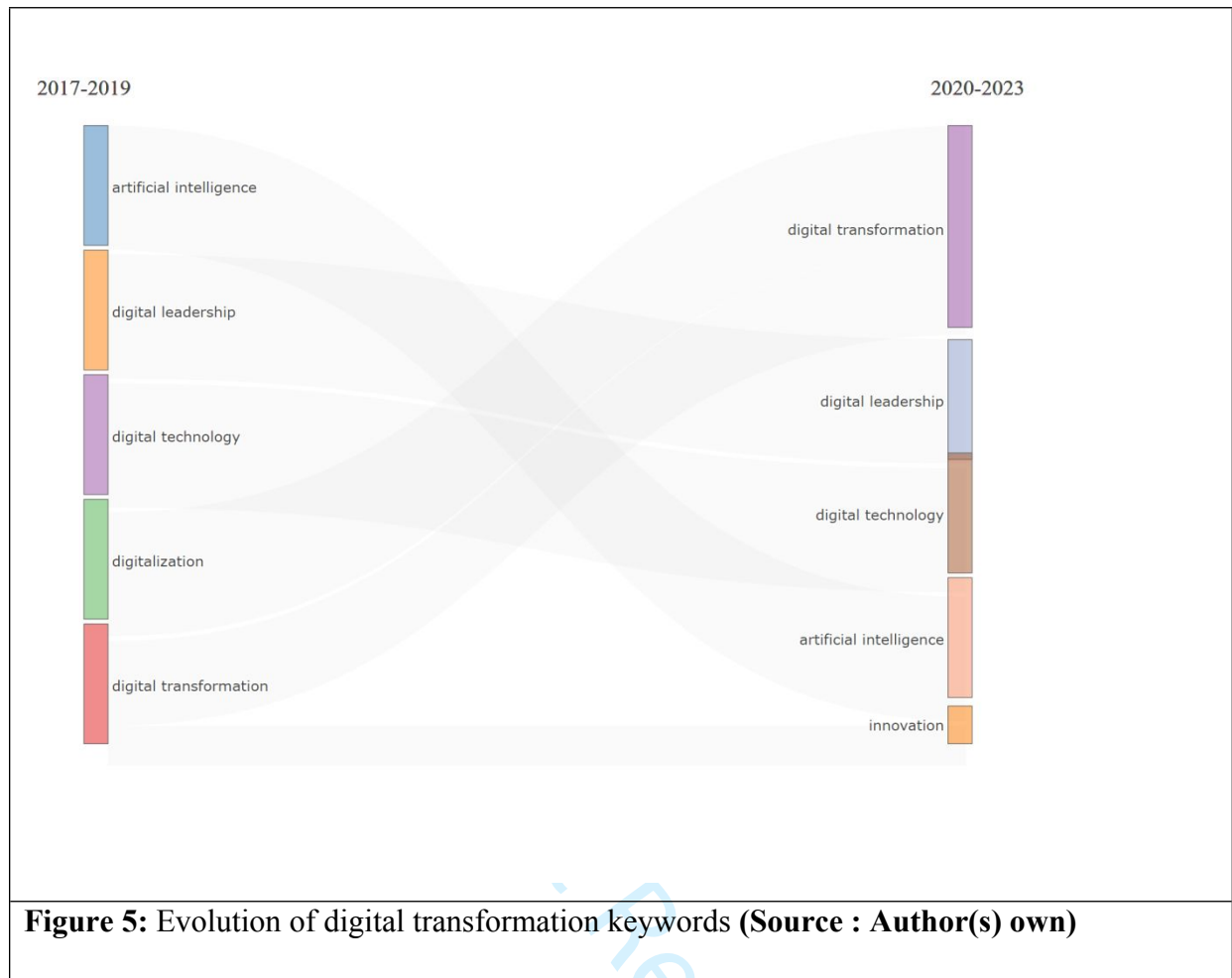


In Figure 4, terms like "digital technology," "change management," "leadership," and "artificial intelligence" were frequently used between 2017 and 2023 and are depicted as core nodes. Additionally, keywords such as "artificial intelligence (AI)," "collaboration," "organisational change," "culture," "governance," "business models," "strategy," "dynamic capabilities," "entrepreneurship," "digital innovation," and "digital economy" featured prominently.



4.2.2 Keyword Evolution

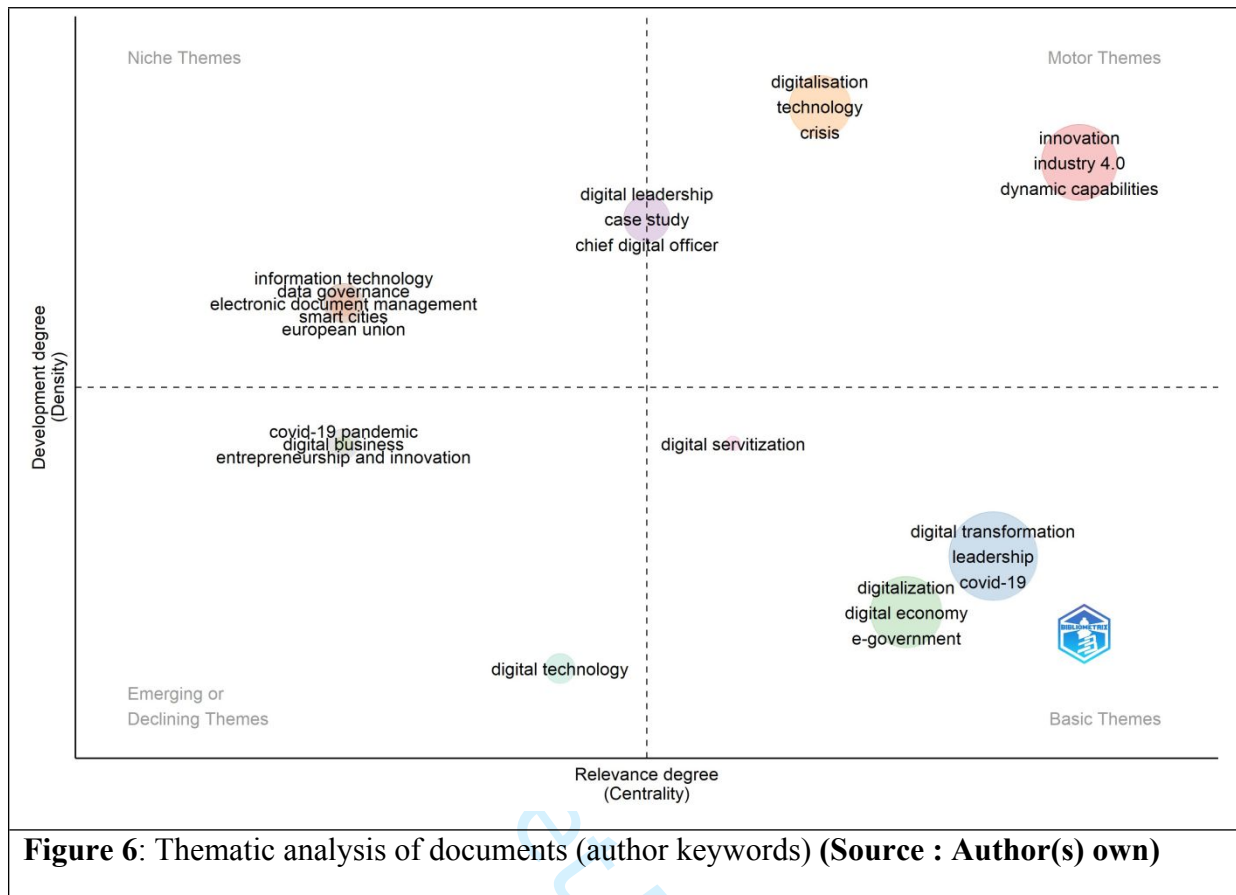
The evolution of DT management keywords was conducted using words like digital leadership, digital technology, AI, and digitalisation in the earlier years of 2017 to 2019 (Figure 5). From these earlier years' keywords, the emphasis of DT management was not only on digital technology but also on the role of digital leadership. From 2019 onwards, DT management began to be associated with innovation, digital transformation, AI, and DT. In the years 2020 to 2023, there was more attention on DT and digital leadership rather than AI.



4.2.3 Thematic Analysis: Themes of importance

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Clusters of authors' keywords and their interconnections manifested significant themes in DT management research. Figure 6 displays the themes in terms of their density and centrality. "Motor themes" are in the upper right quadrant. They are highly developed and have strong internal connections and external ties, making them central to the evolution of the topic. In the lower right quadrant are "basic" or "transversal" themes. While these themes have weaker internal development, they maintain strong external connections and can be critical for advancing the topic over time. "Emerging" or "declining" are in the lower left quadrant, and they exhibit weak internal and external ties, suggesting they receive relatively little attention from authors. In the upper left quadrant are "specialised" or "niche" themes. They are well-developed internally but have weaker connections to other themes in the research field, indicating they are more narrowly focused but still critical in their specific areas.



An analysis of authors keywords (Figure 6) revealed some keywords appearing in the thematic analysis. For example, DT and leadership were identified in the basic theme of Cluster 1 in Table 13 and emerged in Figure 6. DT had a frequency of between 50 and 75, but leadership had 25, reflecting a small number of articles being published with this keyword. Innovation, as an emerging theme, is being emphasised due to recent developments and the emphasis on AI in academia and industry. Digitalisation appears in the basic themes of Cluster 1 and the motor theme of Cluster 2. Digitalisation and DT are affiliated with all the keywords that the authors used.

In the journals' keywords analysis (Figure 7), Digital Strategy, and Change Management are two keywords not appearing in the four quadrants (Figure 6). Just as in the author's keywords, DT is most prominent. The difference between the thematic map and these keywords is that some of the keywords are in diverse quadrants in the thematic map. For instance, innovation and entrepreneurship are emerging themes in Table 13, which suggests that they could still be emerging in DT management research. Comparatively, Figure 8 shows that innovation is still increasing in DT management research, but on its own and not alongside entrepreneurship,

organising, or planning. Table 13 and Figure 6 also reveal that there are niche areas not appearing at all in Figure 8. For example, the European Union is not mentioned at all in the journal keywords of Figure 8. Another term, is Case Study that, appears in Figure 6, but did not appear at all in Figure 8.

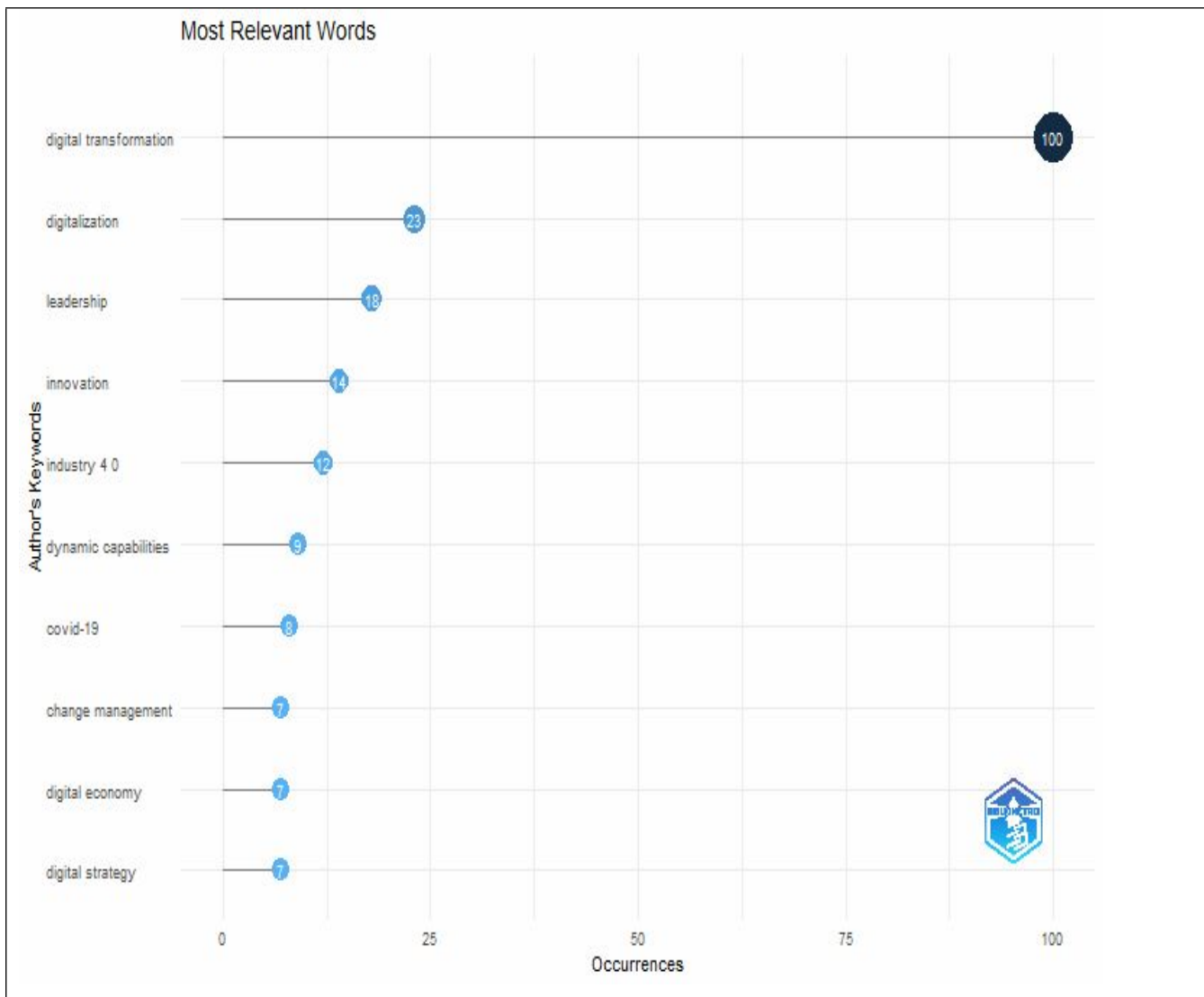


Figure 7: Keywords that journals use when DT is published (Source : Author(s) own)

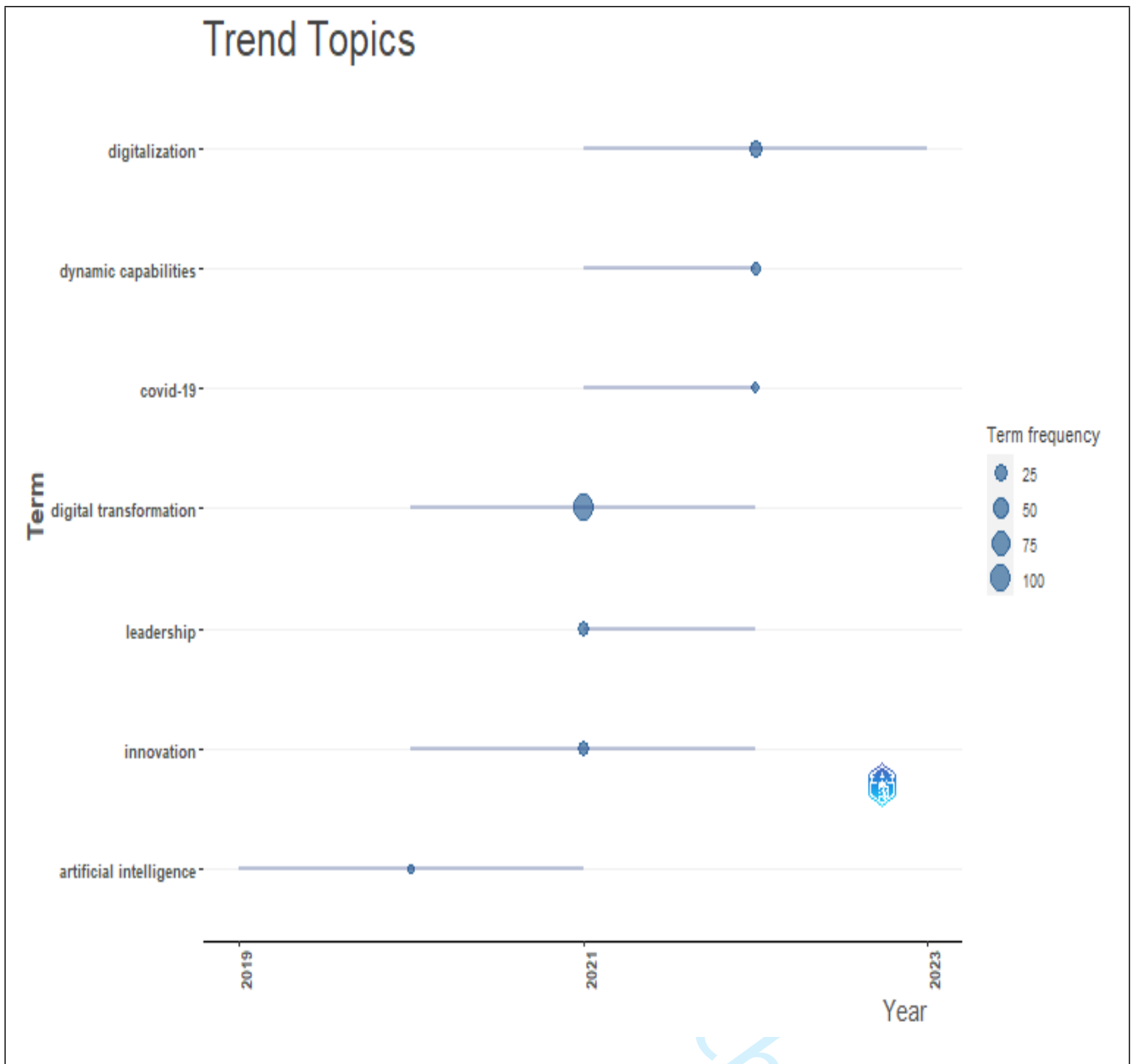


Figure 8: Keywords that authors entered when publishing DT research (Source : Author(s) own)

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Table 13: Themes and clusters arising from the keywords (Source : Author(s) own)

Cluster	Theme	Keywords	Page Rank Centrality
Cluster 1	<i>Basic Themes</i>	Digital Servitisation	0.00418221
		Digital Transformation	0.12423946
		Leadership	0.02640305
		Covid-19 pandemic	0.01129195
		Digitalisation	0.00785991
		Digital Economy	0.00903119
		E-government	0.00766211
Cluster 2	<i>Motor Themes</i>	Innovation	0.018979424
		Industry 4.0	0.012110158
		Dynamic Capabilities	0.012840401
		Digitalisation	0.030212422
		Technology	0.008799266
		Crisis	0.004654931
		Digital leadership	0.007901683
		Case Study	0.004875178
		Chief Digital Officer	0.00350274
Cluster 3	<i>Niche Themes</i>	Information Technology	0.004099037
		Data Governance	0.004977161
		Electronic Document Management	0.00226305
		Smart Cities	0.005274183
		European Union	0.004612947
		Digital leadership	0.007901683
		Chief Digital Officer	0.00350274
Cluster 4	<i>Emerging or declining themes</i>	Covid-19 pandemic	0.00455455
		Digital business	0.003020371
		Entrepreneurship and Innovation	0.003749087
		Digital Technology	0.007004005

5. Discussion

In this study, we aimed to explore and understand the publication dynamics of DT management research (RQ1) and to examine how DT management is conceptualized (RQ2) by developing a DT management conceptual framework. We conducted an SLR of abstracts and performed a bibliometric analysis of article titles, abstracts, and keywords to achieve this. The articles were sourced from the Scopus and WoS databases using a well-defined search string.

5.1 Digital Transformation Management Research Dynamics

The dynamics underlying DT management research (RQ1) were established in this study. The findings revealed that the first articles on DT management were published in 2017 (Nambisan *et al.*, 2019; Singh and Hess, 2017), indicating that DT management is still an emerging field. Since then, the number of publications has steadily increased, peaking in 2022 with 56 articles. This growing interest can be attributed to the gradual shift of industries towards a digital world (Parviainen *et al.*, 2017), a trend accelerated by the Covid-19 pandemic (Priyono *et al.*, 2020). Furthermore, DT has evolved from a technological opportunity to an essential component for managing the needs and expectations of the world's expanding population (Kraus *et al.*, 2021a).

In terms of document sources, the *Journal of Business Research* emerged as the leading outlet with 19 articles, while *Government Information Quarterly* was the most impactful source with 51 citations, followed by *MIS Quarterly* with 48 citations. The increasing prominence of DT in business research reflects its significance as both a challenge and an opportunity for businesses in the digital age (Kutzner *et al.*, 2018). Additionally, the large body of DT literature in the IS field underscores DT's socio-technical nature, involving people, organisations, processes, and technology. *MIS Quarterly* and *Government Information Quarterly* remain key platforms for disseminating IS research related to DT.

In the context of DT management, countries that publish research in this field are typically those investing in emerging areas such as AI and Industry 4.0, which are highly sought-after research topics. This observation is supported by a UNCTAD report (UNCTAD 2023), which highlights Germany, the home country of Bouncken, and Sweden, where Tronvoll is based, as top investors in technology and innovation. However, these publications often lack a clear definition or theoretical framework for DT or DT management.

An analysis of DT management dynamics reveals several gaps. Markus and Rowe (2021) noted that there is insufficient emphasis on a concrete definition of DT or DT management, indicating a lack of a standardised understanding in the field. This gap underscores the need for research focused on DT from a management perspective, as emphasised by Markus and Rowe (2021) and Carroll *et al.* (2023). The absence of a clear definition and the ambiguity

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3 surrounding the distinct characteristics of DT (Carroll *et al.*, 2023) and DT management can
4 create conceptual uncertainties that may limit their application and significance in both
5 research and practice (Haj-Bolouri *et al.*, 2024), ultimately impeding theoretical
6 advancements (Carroll *et al.*, 2023).
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10 11 12 **5.2 DT Management Conceptualisation** 13

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15 To address the gap in the conceptualisation of DT management, this study explored how DT
16 management is defined and understood in the literature (RQ2). Due to the lack of a
17 standardised definition for DT, the conceptualisation, structures, and boundaries of DT and
18 DT management are often inconsistent and unclear. For example, different publications
19 approach DT management from various angles. In one case, Tronvoll *et al.* (2020) examined
20 transformational shifts through the lens of digital servitisation, focusing primarily on
21 technology and overlooking other factors like organisational culture or conflict. Notably, this
22 publication did not reference the term "DT" or "DT management." Similarly, the study on
23 The Digital Twin of the City of Zurich for Urban Planning (Schrotter and Hürzeler, 2020)
24 also lacked direct reference to "DT" or DT management. Moreover, there has been a
25 noticeable increase in DT management research since around 2017, coinciding with the
26 growing influence of broadband and high-speed internet on daily life, society, and
27 organisations. DT management intersects with various topics such as change management,
28 entrepreneurship, organisational change, collaboration, and artificial intelligence (see Figure
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42 To identify the next steps leading to a definition or theory affiliated with DT management, a
43 thematic analysis was pursued. This led to several emerging keywords, but no theory or study
44 that clearly identified the definition to DT or DT management. While studies have attempted
45 to develop DT related frameworks or models, for example, DT strategy (Matt *et al.*, 2016),
46 DT leadership (Ly, 2024), and key drivers of DT (Tangwaragorn *et al.*, 2024). There is still a
47 need for holistic DT management frameworks. This need motivated this study to attempt to
48 develop a conceptual framework (Figure 9) as an initial step to narrow the gap.
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55 56 **5.2.1 DT Management Conceptual Framework**

57 To construct the conceptual framework, three categories related to 'digital' were
58 established—Digital Business, Digital Economy, and E-Government. This approach was
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3 informed by Gall and Pigni (2021) and employs a technique outlined by Vosniadou (2013).
4 These categories were chosen due to their significant impact on DT management. They are
5 viewed as themes derived from Figures 4, 5, 6, 7, 8, and Table 13. Given our reliance on an
6 inductive approach, we did not base our framework on any existing theoretical background.
7 Instead, the themes emerged as open codes from qualitative analysis, in line with the
8 principles of grounded theory, and exhibited substantial connections to the term DT. The
9 subsequent sections provide a detailed explanation of the identified themes.
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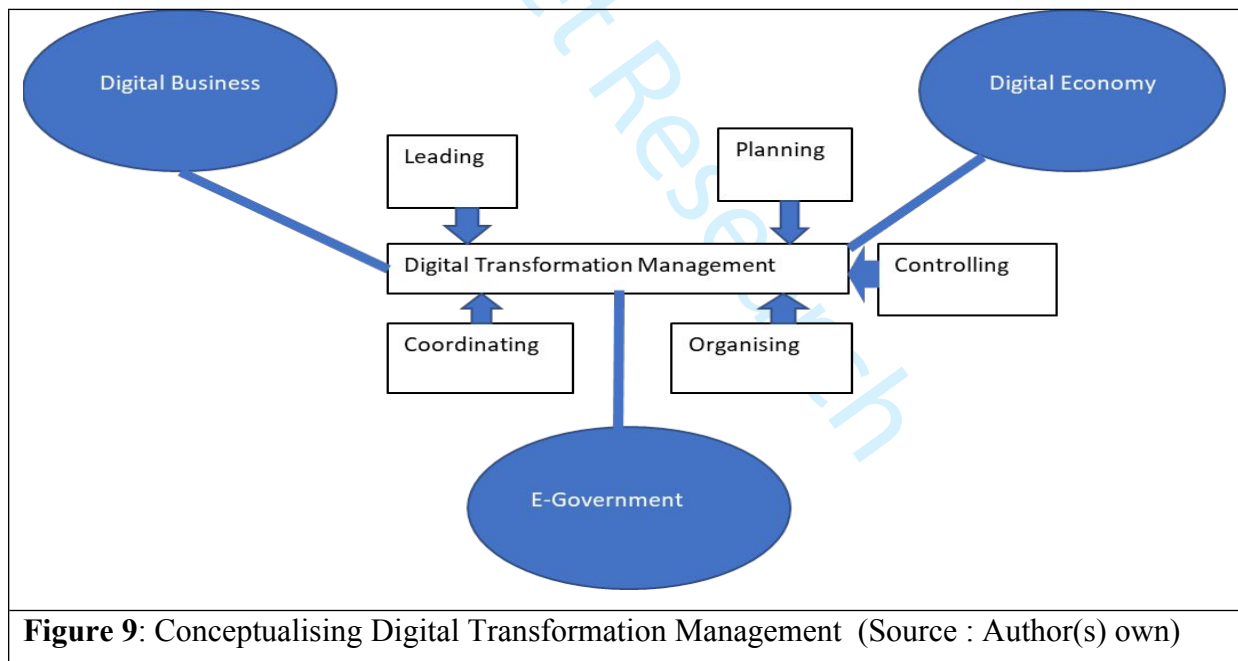
17 The digital economy emerged as a key category within DT management. It represents the
18 transformation of traditional economic activities through the use of digital technologies to
19 improve efficiency, effectiveness, and competitiveness (Bharadwaj *et al.*, 2013). In the
20 literature, the digital economy is also referred to by various terms such as the platform
21 economy, creative economy, or sharing economy (Kenney and Zysman, 2016). Unlike the
22 industrial economy, where management was organised around the organisation itself,
23 management in the digital economy is centred around platforms. This concept is central to
24 DT management, as it encompasses digitally enabled activities across business, politics, and
25 social interactions (Kenney and Zysman, 2016).
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34 Digital business, a subset of the digital economy, also emerged as a significant category in
35 DT management. It involves integrating digital technologies across all aspects of business
36 operations, leading to a transformation in how businesses operate and deliver value to
37 customers. DT management plays a critical role in helping businesses utilise digital assets—
38 such as data analytics, artificial intelligence, cloud computing, social media, and customer
39 relationship management—to design and implement business models that personalise and
40 enhance customer experiences.
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48 E-government also emerged as a significant category within DT management, serving as an
49 important enabler of both the digital economy and digital business. In terms of research, the
50 *Journal of Government Information Quarterly* had the highest number of citations (51
51 citations), indicating its influence on DT and DT management. The aim of e-government is to
52 rethink and re-engineer government processes and public services to respond to citizens
53 needs and expectations OECD (2020). There is a dyadic relationship between e-government
54 and DT in a country. Through e-government initiatives, the government can transform public
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governance using digital assets to build an empowered citizenry. An empowered citizenry is able to participate in public service design and policy decision-making that are meaningful and variable through co-creation (Khan and Krishnan, 2021). Value co-creation draws on the understanding that citizens are not merely consumers of value but rather play a crucial role in value creation due to personalisation preferences and intermediaries (Scutella *et al.*, 2024). Through e-government initiatives, the government also provides leadership and vision in DT management.

Additionally, DT management can be defined by three pillars. The first pillar is Planning, organising, commanding, and controlling (with "commanding" often replaced by "leading" in modern definitions) (Cole and Kelly, 2015). The second pillar involves utilising people or, more broadly, resources. The last pillar is aimed at achieving results or goals, although these goals are rarely specified. Figure 9 illustrates how these three pillars and DT management categories are interconnected.



6. Implications of this Study

For this study, the academic, social, and practical implications are offered. The academic implications include both conceptual and theoretical implications. This is then followed by social and practical implications.

6.1. Academic Implications

By employing a multidisciplinary approach, we enhance the ongoing discussion about DT in the management context. Additionally, we use a robust bibliometric analysis to mitigate subjectivity and validate the conclusions of DT experts. To advance the field, we propose new research themes in DT management with a focus on digital business, digital economy, and e-government. While there are some studies on DT related frameworks or models, for example, DT strategy (Matt *et al.*, 2016), DT leadership (Ly, 2024), and key drivers of DT (Tangwaragorn *et al.*, 2024), our results show that there is inadequate attention to the formulation of DT management frameworks. The proposed framework aims to advance research in DT management by providing defensible choices and a source of stability for theorizing and research (Hassan *et al.*, 2022)

6.2 Social Implications

Our study highlights a shift towards exploring various management aspects of DT within organisational contexts, such as DT planning, structure, team leadership, and global management. The proposed framework serves not only as a valuable tool for academics but also provides a practical reference for practitioners. Moreover, our findings reveal a growing interest in DT research across different disciplines, particularly in the post Covid-19 era. This burgeoning interest is likely to foster novel research into the effectiveness and stakeholder engagement in DT management, thereby broadening the current understanding of DT and DT management concepts.

6.3 Practical Implications

From the comprehensive bibliometric analysis and structured review, practitioners gain valuable insights into the areas of DT management within organisational contexts that require further exploration. This study provides a detailed overview of relevant keywords and source documents, facilitating a deeper understanding and investigation into DT management. It is

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3 clear that the DT management literature needs to evolve towards more critical and practice-
4 oriented research. The paper identifies three emerging pillars of DT management—Digital
5 Business, Digital Economy, and E-government—that impact various levels, including
6 individual, organisational, and group aspects. As business environments are increasingly
7 influenced by advances in artificial intelligence, machine learning, big data, and interconnected
8 networks, both global and local firms must prioritize DT management (Koo *et al.*, 2022).
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14 **7. Limitations and Future Directions**

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16 This study was limited to two databases, WoS and Scopus amongst many other databases.
17 This may have resulted into publication bias (Egger *et al.*, 2001) or omission of foundational
18 insights (Okoli, 2015). Future research should consider incorporating a broader range of
19 databases to explore more diverse areas and contexts, given that DT management is still an
20 emerging field. The bibliometric analysis used in the study was effective for analysing large
21 volumes of published research but may not adequately identify theories, methods, and
22 constructs (Paul and Criado, 2020). Future studies can use the framework review approach to
23 identify theories, constructs, characteristics, and methodologies used in DT management
24 research (Paul and Singh, 2017).
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34 **8. Conclusions**

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36 In this study, we aimed to explore DT management research and to develop a conceptual
37 framework. We conducted a hybrid literature review and discovered that there are minimal
38 studies associated with DT management. With this analysis, there is now a clear and
39 structured way of understanding DT management. With the proposed framework, it can be
40 learnt that there are three categories of DT management: Digital business, digital economy,
41 and e-government. The study also identified attributes that can be used to conceptualise DT
42 management by academics and practitioners.
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3 **Visiting and Explaining Digital Transformation Management: A**
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6 **Bibliometric Analysis and Review Study**
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41 **Abstract**

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43 **Purpose**

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46 This study aims to explore and understand the literature on Digital Transformation (DT)
47 research that will lead to developing a conceptual and thematic structure of DT management.
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51 **Design/Methodology/Approach**

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53 The research approach employed a hybrid approach of bibliometric analysis and a structured
54 review of DT Management research studies from 2017 to 2023 was employed. Although
55 systematic reviews and bibliometric analysis are distinct methods, they complement one
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3 another in research by enabling the synthesis and analysis of existing literature. Scopus and
4 Web of Science (WoS) were selected as the bibliographic databases for this study since they
5 are generally accepted as the most comprehensive data sources for various purposes.
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8 9 **Findings**

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11 Findings revealed 186 publications during these periods, with the top three publications being
12 the Journal of Business Research, Business Horizons, and California Business Review. Top-
13 ranking researchers hailed from Germany, Japan and Spain. Keywords that appeared were
14 innovation, digital transformation, artificial intelligence, and DT. In the management area,
15 there are fewer studies conceptualising DT Management that led to this study forming a
16 conceptual framework using a qualitative, interpretative, and thematic analysis approach.
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23 **Originality/Value**

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25 These findings are relevant for understanding the phenomenon of DT and DT Management.
26 The study contributes to the emerging body of knowledge in Management and DT.
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30 **Keywords:** Digital Transformation, Digital Transformation Management, Bibliometric
31 Analysis, Structured Review, Planning, Leading.
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