Gordon Institute of Business Science
University of Pretoria

Digital transformation at for-profit firms in countries behind the technology frontier: A scoping review

BY

21849219

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SUPERVISOR

Professor

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ABSTRACT

There is a dearth of scholarship on digital transformation at for-profit firms in countries behind the technology frontier. However, digital transformation has been at the centre of disruptions of business practice and organisational theorising. To understand digital transformation at for-profit firms in countries behind the technology frontier a scoping review was conducted to map the most cited and influential theoretical foundations, emergent themes and the thematic evolution of digital transformation for the period 2012 – 2022. In conducting the scoping, the study adopted the Arksey and O'Malley Framework for scoping reviews and customised it with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Theories like the resource-based view (RBV) of the firm, the institutional theory, the global value chain (GVC) governance theory and the catch-up perspectives are some of the commonly cited. Five themes emerged namely the epistemological evolution of digital transformation, digital technology diffusion and adoption, technological capability accumulation, value creation, capture and distribution, and digital platform ecosystem. As a result of mapping the theoretical foundations and the emergent themes the study contributed to theory by providing the descriptive outline of the theories cited in scholarship on digital transformation in countries behind the technology frontier as a foundation for future theorising. Secondly, mapping the themes contributes to contextualising the conceptualisation of digital transformation, confirming conceptual convergence and divergence and thematic stabilisation. The study contributes to practice by clarifying the influential theories and themes thereby enabling management and policy makers in firms and countries behind the technology frontier to infuse dynamism in the pursuit for the digital transformation of operations, opportunities and competencies.

KEYWORDS

Digital transformation, Technology Frontier, For-profit Firms, Theoretical Foundations, Thematic Evolution

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Philosophy in Evidence Based Management at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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Name & Surname Signature

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Chapter 1: Introduction

1.1 Background of the study

Digital transformation is changing business. Digital technologies have become embedded in business routines and they positively and negatively disrupt how individuals, firms, institutions and society function (Furr et al., 2022; Hanelt et al., 2021). Underlying its ubiquity are generative capabilities powered by invisible and intangible algorithms (Hanelt et al., 2021). These capabilities have improved socio-technical dynamics from managerial and organisational perspectives (Wessel et al., 2021). They have resulted from factors as diverse as increased availability of data, the homogenisation of digital information, miniaturisation of work dynamics, tools and production processes, increased processing power and storage capacity of mobile work devices as well as the increase in accessibly priced bandwidth (Teubner & Stockhinger, 2020).

Consequently, the ubiquity of digital transformation is both an opportunity and threat to business practice (Ferreira et al., 2018). This necessitates scholarly exploration, understanding and rethink of digital transformation at for-profit firms in latecomer countries (Ferreira et al., 2019; Hanelt et al., 2021; Peerally et al., 2022). Despite the global spread of digital transformation, in both the for-profit and not-for-profit organizational sectors, research on for-profit firms is shaped and conceptualized through the theoretical lens of countries that lead the technology frontier (Avgerou et al., 2016). On the contrary, research on digital transformation in countries that lag behind the technology frontier largely focusses on developmental interventions of the not-for-profit firms (Chipidza & Leidner, 2019). Therefore, what do we know about scholarship on digital transformation at for-profit firms in countries lagging behind the technology frontier?

Digital transformation has far-reaching implications on the for-profit firms in the countries that lag behind the technology frontier as global supply and value chains become interconnected and interdependent (Adner et al., 2019; Autio et al., 2022; Strange et al., 2022). Therefore, there is need to advance context-specific theory (Adner et al., 2019; Ferreira et al., 2018; Hanelt et al., 2021). However, there is scant literature on firm level digital transformation in those countries (Avegrou et al., 2016; Li et al., 2020). Peerally et al. (2022) theorise through a qualitative systematic literature review, on for-profit firm level technological capabilities necessary to endorse and actualise the Fourth Industrial Revolution (FIR) in emerging economies, most of which lag behind the technology frontier. They propose for further studies

to be conducted to examine the dynamism of digital transformation as it is driven by rapidly changing digital technologies. Similarly, Gaglio et al. (2022), in a hypothetico-deductive empirical study, argue for the need to extend theory on the digital divide between technologically sophisticated firms and the medium and small enterprises (MSEs) that lack the technological nous and readiness. Guided by such propositions, this structured literature review will seek to gather and systematise insights on digital transformation in for-profit firms in countries that lag behind the technology frontier.

1.2 Problem statement

Since extant literature reviews have focussed largely on digital transformation in countries leading the technology frontier, there is a gap to examine the firm level theoretical foundations and thematic anatomy of digital transformation in the for-profit sector in countries behind the technology frontier (Avgerou et al., 2016). As transferrable and generalisable as the extant reviews are, the contextual scope of the countries lagging behind the technology frontier remains an opportunity for theoretical advancement (Cornelissen, 2017; Hanelt et al., 2021). The question of digital technology creation and adoption at the for-profit firm level is of strategic necessity as it underpins the ability to survive and create and capture value for firms (Gaglio et al., 2022). In that regard, the phenomenon-based research on digital transformation has thus far provided and confirmed and/or disconfirmed, only to a limited extent, contextually relevant theoretical foundations for the for-profit firms in the countries lagging behind the technology frontier (Avgerou et al., 2016; Van Maanen et al., 2007). The dearth of context-specific theorising in the settings lagging behind the technology frontier present challenges in so far as the descriptive, explanatory, predictive and prescriptive roles of theory to real world phenomena runs (Hanelt et al., 2021; Makadok et al., 2018).

The asymmetries between and within the leading and emergent countries on the technology frontier especially for the for-profit firms merit deeper focus. Scholarship by Adner et al. (2019), Avegrou et al. (2016) and Peerally et al. (2022) confirms the dearth of extant reviews on digital transformation on the for-profit firms in countries behind the technology frontier. The dominance of the literature streams from the leading countries necessitates the re-contextualisation of the reviews (Hanelt et al., 2021; Teubner & Stockhinger, 2020). For the purpose, the following section outlines the research questions and the methodological brief on the theoretical foundations and thematic architecture of digital transformation in in for-profit firms in countries behind the technology frontier.

1.3 Research questions

Main research question:

What is known about scholarship on digital transformation at for-profit firms in countries behind the technology frontier?

The research question matches the need for a scoping review wherein the initial epistemological foundation is laid out and the identification of research gaps (Paré et al., 2015; Teubner & Stockhinger, 2020).

Sub Research Questions:

1. What are the theoretical foundations of scholarship on digital transformation at for-profit firms in countries behind the technology frontier?

   This sub-question feeds into the main research question by examining the nature and extent of the conceptual and empirical research for the theoretical foundations. It aims to describe the current state of scholarship on the theoretical foundations of digital transformation at for-profit firms in countries behind the technology frontier (Avgerou et al., 2016; Furr et al., 2022; Peerally et al., 2022). Since this frames the initial indication of the research on theoretical foundations it provides the scope of digital transformation within the context of for-profit firms in countries behind the technology frontier (Paré et al., 2015; Teubner & Stockhinger, 2020).

2. What are the emergent themes in scholarship on digital transformation at for-profit firms in countries behind the technology frontier?

   This sub-question will be addressed by inducto-deductive thematic mapping of digital transformation in for-profit firms in countries behind the technology frontier (Chipidza & Leidner, 2019; Paré et al., 2015). The mapping of the emergent themes in both extant conceptual and empirical research is aimed at making epistemological contribution as the basis for future research (Paré et al., 2015; Teubner & Stockhinger, 2020).

3. What has been the thematic evolution of scholarship on digital transformation at for-profit firms in countries behind the technology frontier?

The thematic evolution of scholarship on digital transformation at for-profit firms in countries behind the technology frontier will cover the period from 2012 to 2022. (Paré et al., 2015; Teubner & Stockhinger, 2020).

1.4 Purpose of the study

This scoping literature review explores and identifies the extent, range and nature of scholarship on digital transformation at for-profit firms in countries behind the technology frontier and depicts theoretical foundations, emergent themes, thematic evolution, and offers discussions for theory development and future research. The purpose of the review builds on the research questions, and they relate in setting a coherent and consistent chain of processes to explore the extent, range and nature of scholarship at for-profit firms in countries behind the technology frontier (Westphaln et al., 2021).

1.5 Objectives of the study

Therefore, this structured literature review seeks to achieve the objectives specified below:

Main objective:

1. To explore the epistemological base for scholarship on digital transformation in for-profit firms in countries behind the technology frontier as a foundation for further theorising.

Sub-objectives:

1. To explore the theoretical foundations for scholarship on digital transformation in for-profit firms in countries behind the technology frontier using the scoping literature review method.
2. To identify the emergent themes in scholarship on digital transformation at for-profit firms in countries behind the technology frontier.
3. To map the thematic evolution of scholarship on digital transformation at for-profit firms in countries behind the technology frontier over the period (2012 – 2022) using the scoping literature review approach.

1.6 Theoretical anchor

Digital transformation has thus far been theorised through the lenses of organisational theories (Appoio et al., 2021; Hanelt et al., 2021; Peerally et al., 2022; Vial, 2019; Wessel et al., 2021). In that regard, this scoping review seeks to establish the theoretical foundations and thematic conceptualisations that have hitherto been used in scholarship on digital transformation at for-profit firms in countries behind the technology frontier.

1.7 Significance of this study

a. Theoretical significance

Firstly, the theoretical contribution from the review is envisaged to provide an anchor for future research through its detailed descriptive contribution (Makadok et al., 2018) wherein the theoretical foundations underlying the digital transformation phenomenon at for-profit enterprises in countries behind the technology frontier are explored and identified. The theoretical foundations are critical for laying the framework for further theorising (Makadok et al., 2017; Paré et al., 2015; Teubner & Stockhinger, 2020) and, therefore, will guide the future studies. As the digital transformation field drifts into scholarly maturity, these theoretical foundations will provide a basis for situating digital transformation within the realm of organisational theories as proposed by Hanelt et al. (2021) or the paradigmatic realm or new theorising to explain the phenomenon (Appoio et al., 2021; Dabrowska et al., 2022).

Secondly, the thematic mapping aims to identify the common themes in the current scholarship on digital transformation at for-profit firms in countries behind the technology frontier. In identifying, analysing and interpreting the themes, this study will address the shortcomings and incongruencies on the conceptualisation of digital transformation (Appoio et al., 2021; Hanelt et al., 2021; Vial, 2019) at for-profit firms in countries behind the technology frontier (Peerally et al., 2022). The pattern of themes will provide, as a foundation, analysis for future research and theory building (Shepherd & Suddaby, 2018; Snyder, 2019).

Thirdly, thematic mapping brings to the fore the different perspective of different scholarly work mapping out the points of conceptual convergence and divergence (Gong & Ribiere, 2021; Shaffer & DeGeest, 2016; Vial, 2019). Conceptual convergence and divergence provide a basis for developing unified conceptual definitions and boundary conditions for digital

transformation at for-profit firms in countries behind the technology frontier (Busse et al., 2018; Gong & Ribiere, 2021; Hanelt et al., 2021; Shaffer & DeGeest, 2016; Vial, 2019; Wessel et al., 2021).

Fourth, the thematic mapping of the for-profit digital transformation in the countries behind the technology frontier can expand the theorising toolkit by confirming and expanding the epistemological base (Teubner & Stockhinger, 2020). The epistemological clarity that will emanate from thematic mapping will shape how we understands the nature of digital transformation at for-profit firms in countries behind the technology frontier and, as a result, influence how we might research the phenomenon in similar settings (Ashkanasy, 2016). Lee and Malerba (2017) posit that digital transformation at for-profit firms in countries behind the technology frontier is a heterogenous and paradoxical phenomenon, that is, countries leading the technology frontier may lag behind in terms of certain individual technologies. Similarly, countries behind the technology frontier may lead the frontier in certain digital technologies or digital organisational processes. Therefore, this study aims to provide a theoretical understanding of the phenomenon in different contexts (Appoio etal., 2021; Figueirado & Cohen, 2019; Hanelt et al., 2021; Koseoglu et al., 2016).

Finally, the mapping of the thematic evolution of scholarship at for-profit firms in countries behind the technology frontier seeks to reveal patterns in the conceptual development of the phenomenon for the period 2012 to 2022. This is aimed to expand the scope for the epistemological and ontological structure of theory building and testing in the domain. Essentially, the thematic evolution will provide an understanding of the development of the phenomenon and its conceptual underpinnings in pursuit for theoretical stabilisation (Nunes et al., 2019).

b. Practical significance

In exploring the theoretical foundations and emergent themes on digital transformation at for-profit firms in countries behind the technology frontier this will help narrow or close the gap between academia and practice. This will help management and policy making in various organisations, public or private, to understand the research output, interpret relationships being theorised on and apply the propositions in strategic and operational functions.

The results from the study of the thematic evolution will prime management at for-profit firms in countries behind the technology frontier to strategically evaluate the state of digital readiness of their respective organisations. Therefore, management will deliberately and strategically infuse dynamism in responding to the multiple opportunities and challenges associated with digital transformation, especially by building digital competencies so that the employees, internal systems and structures are digitally ready (Gfrerer et al., 2021; Nielsen et al., 2019; Opland et al., 2021).

1.8 Scope and delimitations of the study

The study falls within the scope of organisation and management science and will focus on for-profit firms in countries behind the technology frontier. These for-profit firms can be small micro and medium enterprises (SMMEs), large corporates, public (such as state-owned enterprises) and private organisations, multi-national enterprises (MNEs) operating in these countries and domestic firms.

1.9 Definition of key terms

Digital transformation – 'A fundamental change process, enabled by the innovative use of digital technologies accompanied by the strategic leverage of key resources and capabilities, aiming to radically improve an entity and redefine its value proposition for its stakeholders.' (Gong & Ribiere, 2021, p. 12).

Digital technologies – '…the combination and connectivity of innumerable, dispersed information, communication and computing technologies…' (Hanelt et al., 2021, p. 1160).

Technological frontier – the indication of the maximum level of the potential of firm related productivity that results from the development of technology (Benhabib et al., 2021; Das & Drine, 2020; Smith, 2014). In defining technological frontier, the emerging economies and/or developing nations are sometimes defined as countries behind the technology frontier or laggards or followers or latecomers (Abramovitz, 1955; Peerally et al., 2022). Furthermore, the three common technological frontiers categories for countries and/or firms behind the frontier are: 1. Forging ahead; 2. Falling behind 3. Catching up (Peerally et al., 2022)

1.10 Organisation of this study

This chapter outlined the introduction on the scholarship on digital transformation at for-profit firms in countries behind technology frontiers. It gave a brief overview of digital transformation and then delved into a sample of selected extant literature reviews on digital transformation as part of defining the research problem. Thereafter, the research questions were formulated followed by the research purpose then the envisaged theoretical and practical contribution by the review. The definitions of key terms followed to close the chapter. Chapter 2 outlines the methodology for the scoping review, starting off with the justification of the choice, then followed by the source identification, sampling method and inclusion and exclusion criteria, data gathering and analysis processes, the coding process, the measurement of quality and rigour as well as the limitations of the research design and methods, all presented through the Arksey and O'Malley Framework for scoping reviews (Arksey & O'Malley, 2005). Chapter 3 summarises the entirety of the selected sample of journals for the literature review while Chapter 4 discusses the findings of the literature review by outlining the theoretical foundations, thematic mapping and thematic evolution. Chapter 5 presents the recommendations for reflective component of the study, the recommendation of future studies, conclusions and limitations of the study.

Chapter 2: Method and analysis

2.1 Introduction

The definition of the problem, research question and research purpose in pursuit of making theoretical and practical contribution builds around the ability of research to understand and explain phenomena in a manner that builds new theory, extends, or tests existing theory and/or propositions. Therefore, after the identification of the research gap the choice of the methodology must allow for fit, coherence and consistency to enhance the theorizing process (Cornelissen, 2017; Edmondson & McManus, 2007; Shepherd & Suddaby, 2017). The methodology should ensure rigour, systematicity and transparency to ensure internal validity hence credibility of the results and reliability hence reproducibility of the research process (Pare et al., 2016).

Therefore, the scoping review logically, coherently, and consistently addresses the objective to explore and identify the theoretical foundations, map the emergent themes and their respective evolutionary trajectory of digital transformation at for-profit firms in countries behind the technology frontier over a ten-year period extending from 2012 to 2022 (Barrett et al., 2021; Pare et al., 2015). In that regard, this chapter outlines the choice of the scoping review methodology especially as guided by the Arksey and O'Malley Framework (Arksey 7 O'Malley, 2005) including the use of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart for selecting studies for review (Barrett et al., 2021), data extraction and coding the thematic content analysis framework for data analysis (Peerally et al., 2022). This flows into quality assessment and limitations of the review.

2.2 Choice of review methodology

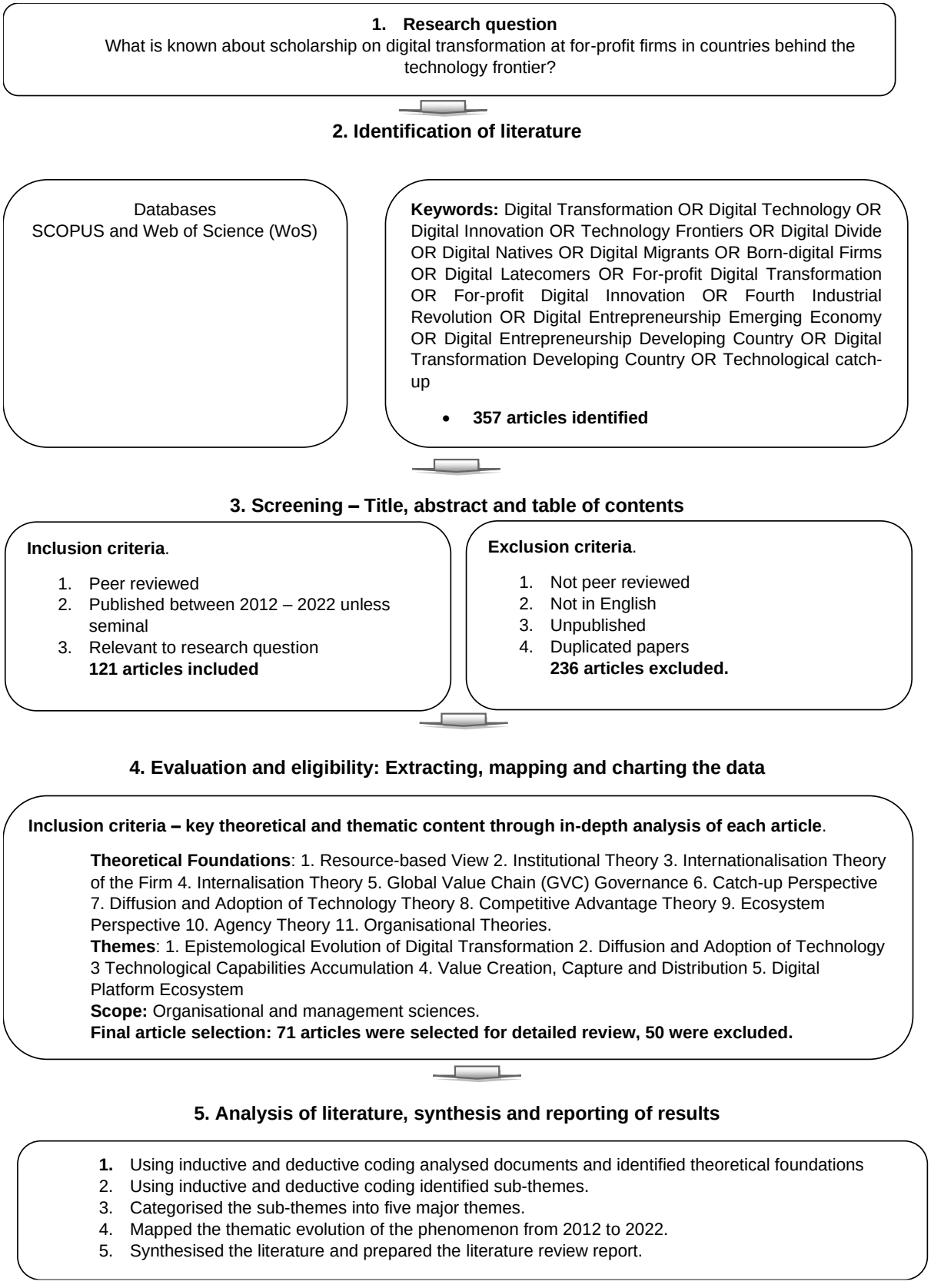
I adopted the scoping review methodology as conceptualised by Arksey and O'Malley (2005) to systematically and coherently address the research questions and purpose (Arksey & O'Malley, 2005; Edmondson & McManus, 2007; Makadok et al., 2018; Westphaln et al., 2021). I customised Arksey and O'Malley Framework as proposed by Westphaln et al. (2021) to incorporate instruments that can enhance the methodological rigour and quality of the results (Barrett et al., 2021; Tranfield et al., 2003; Westphaln et al., 2021) and will include the thematic content analysis framework.

The scoping review is a descriptive-analytical review approach which responds to the research question of this study. The choice of the scoping review methodology is because digital transformation at for-profit firms in countries behind the technology frontier is relatively an underexplored phenomenon (Avgerou et al., 2016; Peerally et al., 2022). Furthermore, scoping reviews aim to provide a broad and diverse overview of a complex and heterogenous phenomena like digital transformation (Arksey & O'Malley, 2005). Teubner and Stockhinger (2020) advance that the scoping review lays the foundation for further theorising by enabling the mapping of the theoretical and thematic foundations of a phenomenon especially in fields where scholarship is not well-developed, is complex and heterogenous. Unlike full systematic reviews which tend to be narrow and deep in scholarly focus, scoping reviews seek to capture a wide extent, range and nature of a field of research, in this case the scholarly field of digital transformation at for-profit firms in countries behind the technology frontier. Paré et al. (2015) posit that scoping reviews provide the initial indication of research on a particular phenomenon. In that regard, this aligns with the purpose of this review as reflected by the observation by Avegrou et al. (2016) and as Chipidza and Leidner (2019) recommend for future theorising that there is a dearth of research on theoretical foundations and thematic construction on digital transformation at for-profit firms in countries behind the technology frontier.

The mapping of the thematic evolution of digital transformation at for-profit firms in countries behind the technology frontier helps define and contextualise the landscape of the extant epistemological foundations (Barrett et al., 2021; Hanelt et al., 2021) and the identification of gaps for further theorising (Paré et al., 2015; Teubner & Stockhinger, 2020.

I integrated the PRISMA flowchart into the Arksey and O'Malley Framework for scoping review. Guided by the PRISMA flowchart in Figure 1, I iteratively and reflexively conducted the scoping review. I started off by developing the research question as represented by the first stage of the Arksey and O'Malley Framework for scoping reviews. Secondly, I identified the literature and then screened the article. Thereafter, I evaluated the articles for eligibility by conducting in-depth review of each article. I then coded and analysed the data in Atlas.ti and mapped out the theoretical foundations and emergent themes. Finally, I prepared the literature review report including undertaking the discussion of the findings, identifying the gaps for future studies and concluding the review.

Figure 1: **The PRISMA Flowchart for the scoping review**



Source: Adapted from Barrett et al. (2020) and Pham et al. (2014).

2.3 Data collection

2.3.1 Stage 1 of the Arksey and O'Malley Framework: Identifying the research question

The main research question for this scoping review is represented in Figure 1: PRISMA Flowchart for the Scoping Review, as the initial trigger for the research process and is presented as follows:

i. What is known about scholarship on digital transformation at for-profit firms in countries behind the technology frontier?

The research question is broad within the defined context which permits for broad summarisation of relevant literature (Barrett et al., 2021). Additionally, the research question has been refined and satisfies the population, concept and context framework (PCC) in identifying:

a. the population as the for-profit firms;
b. the concept as scholarship on digital transformation and;
c. context as countries behind the technology frontier (Westphaln et al., 2021).

The sub-questions refine and improve on the main question to address the purpose and all the objectives of the research (Arksey & O'Malley, 2005; Westphaln et al., 2021). The sub-questions expand the focus to capture the theoretical foundations, thematic architecture and thematic evolution. This satisfies the descriptive-analytical approach which include both the quantitative descriptive mapping and qualitative interpretive analysis (Barrett et al., 2021; Davis et al., 2009; Teubner & Stockhinger, 2020).

2.3.2 Stage 2 of the Arksey and O'Malley Framework: Identifying relevant studies

I identified the relevant literature by initially defining the scope as a timeframe of 10 years, that is, from 2012 to 2022 following indications by Paré et al. (2015) and Teubner and Stockhinger (2020) as presented in Figure 1 above. The time range between the years 2012 and 2022 reflects the peak of research on digital transformation which Appoio et al. (2021) position around the year 2017 and Teubner and Stockhinger (2020) graphically presented as captured in Figure 2 below. In the diagram, the evolution of the information systems or information technology scholarship is mapped from 1970 outlining how it transitions from management

information systems to strategic information systems then e-business and, currently, digital business. Digital business has conceptually been known as digital transformation according to extant literature (Appoio et al., 2021; Eriksson & Agerfalk, 2022; Hanelt et al., 2021; Vial, 2019; Wessel et al., 2021). However, Teubner and Stockhinger (2020) map out the evolution of digital transformation in a general context.

Figure 2: The evolutionary trajectory of Information Systems/Technology and Digital Transformation research.

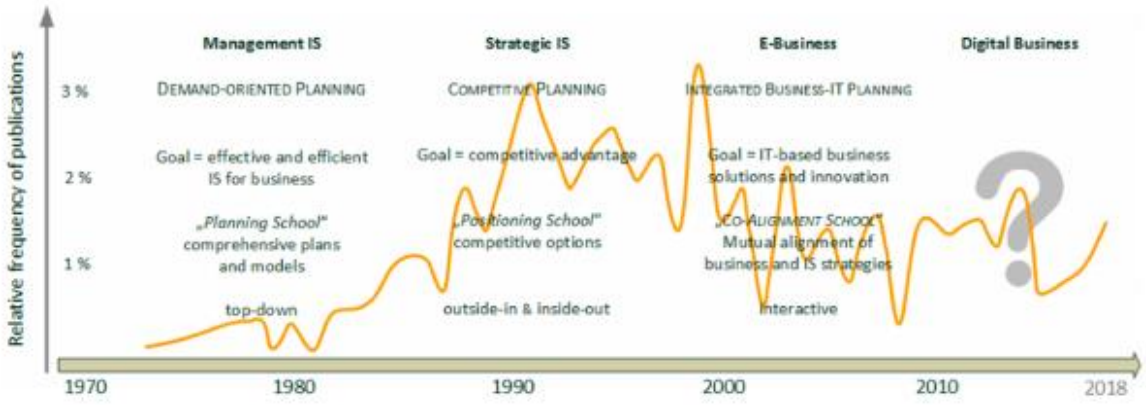


Fig. 2. The evolution of the academic debate on IT/IS strategy and strategy development.

Source: Teubner and Stockhinger (2020) p. 2

The evolution of the scholarly debate on digital transformation notwithstanding, the overarching and primary selection criteria over and above satisfying the measures above was whether the article addressed the research questions and research purpose (Agee, 2009; Barrett et al., 2021; Cornelissen, 2017; Makadok et al., 2018). The journals had to be written in the English language because of the limitations to get translations services from other languages (Pham et al., 2014). In that regard, I iteratively and reflexively ensured that every stage and process of my literature search cohered with the research question and purpose. In developing the search strategy, I was guided by the variables of interest captured by the research question, and these included digital transformation, for-profit firms, countries behind the technology frontier (Westphaln et al., 2021).

These variables guided how I formulated the key search words for the first stage of the literature identification and selection. Therefore, I searched for the literature using the

Boolean method with search strings like Digital Transformation OR Digital Technology OR Digital Innovation OR Technology Frontiers OR Digital Divide OR Digital Natives OR Digital Migrants OR Born-digital Firms OR Digital Latecomers OR For-profit Digital Transformation OR For-profit Digital Innovation OR Fourth Industrial Revolution OR Digital Entrepreneurship Emerging Economy OR Digital Entrepreneurship Developing Country OR Digital Transformation Developing Country OR Technological catch-up, among others.

The search strings yielded a lot of literature on a lot of countries most of which were classified as emerging economies or developing nations (Brouthers et al., 2016; Buckley et al., 2020; Peerally et al., 2022). However, because of the pervasiveness of digital transformation, it was also likely that literature would be found on digital transformation in emerging economies or developing nations and also in adjacent literatures. Therefore, I applied the classification according to Das and Brine (2020) to identify the countries behind the technology frontier by including the literature on digital transformation in emerging economies or developing nations which Abramovitz (1955), Buckley et al. (2020) and Peerally et al. (2022) adopt as well.

Additionally, I included literature on the digital transformation of global value chains (GVCs) that spanned across the emerging economies or developing nations (Lee & Gereffi, 2021). I also considered literature on the digital transformation of firm internationalisation and multinational corporations (MNCs) or multinational enterprises (MNEs) that have affiliates in emerging economies or developing nations (Rong et al., 2022; Strange et al., 2022). In this literature, the technological asymmetries across the frontier would be clearly identified with themes on technology diffusion and adoption, catch-up dynamics, technological capabilities, latecomer or follower or laggard technological innovators (Abramovitz, 1986; Adner et al., 2019; Brouthers et al., 2016; Buckley et al., 2020; Tamvada et al., 2022).

As presented in Figure 1 above, this process yielded a sample of 357 articles. I carried out backward and forward citation tracing of articles like Furr et al. (2022), Peerally et al. (2022), Teubner and Stockhinger (2020) and Vial (2019), among others, to pick out any relevant academic literature published before and after the sampled articles

(Cobben et al., 2022; Rojon et al., 2021). I relied on the SCOPUS and Web of Science (WoS) databases.

2.3.3 Stage 3 of the Arksey and O'Malley Framework: Screening the studies

In extracting such perspectives on digital transformation, I leveraged, iteratively and reflexively, on a set of measures to ensure quality of the articles I selected. I applied inclusion and exclusion criteria as conceptualised by Snyder (2019) and Wolfswinkel et al. (2013) and summarised in Figure 1 to screen, select and refine the final sample of the literature. I applied the inclusion and exclusion criteria in Stage 2 and I selected 121 articles and excluded 236 articles (Westphaln et al., 2021). I used the title, abstract and table of contents of the articles screen in the relevant articles and screen out the irrelevant articles Essentially, I only used peer reviewed articles published in journals irrespective of the rating by the Academic Journal Guide (AJG) and the Australian Business Deans Council (ABDC) Journal Quality. I, however, classified the journals according to the rating in either of the two rating guides. The initial objective was to use every article irrespective of the quality rating. This is because scoping reviews seek to be comprehensive to ensure that the full extent, range and nature of the scholarship is covered. However, scoping reviews allow flexibility on the quality requirement (Barrett et al., 2021; Westphaln et al., 2021). However, the selection process for the articles was rigorous and transparent to ensure validity, reliability of the research process and credibility of the results (Arksey & O'Malley, 2005; Barrett et al., 2021; Davis et al., 2014; Westphaln et al., 2021). As a result of the flexibility, I included articles by Balazka & Rodighiero (2020) and Vaska et al. (2021) could not be picked from the journal quality rating guide databases.

2.4 Data analysis

2.4.1 Stage 4 of the Arksey and O'Malley Framework: Extracting, mapping and charting the data

The stage four of the Arksey and O'Malley framework is divided into two sections. The first on is the descriptive analysis of the scholarship and the second on the content analysis.

Descriptive summary

In total, 71 articles on digital transformation at for-profit firms in countries behind the technology frontier were used for the final data collection, analysis and synthesis (see Figure 1 above). The articles were drawn from 45 academic journals. While the inclusion and exclusion criteria of the study allowed for flexibility to include grey literature, all the articles were peer reviewed and rated on the Chartered Association of Business Schools (CABS) Academic Journal Guide (AJG) or the Australian Business Deans Council (ABDC) Journal Quality List. Only two articles, one by Balazka & Rodighiero (2020) and another by Vaska et al. (2021) are from journal that did not yield a rating on the two quality guides. However, they are peer reviewed. All the articles were published between 2012 and 2022 except for the article by Abramovitz (1986) which is seminal in shaping the typology of countries on the technology frontier.

The articles covered countries like Brazil, China, India, Kenya, Rwanda, South Africa, South Korea, Taiwan and Vietnam. Additionally, some articles covered the entire regions like Asia, Sub-Sharan Africa or simply covered the emerging economies or developing nations.

Content analysis

I embarked on data abstraction and analysis where I applied the iterative three-stage coding process to enable the differentiation, categorisation, integration, and refinement of the identified theories and themes. I started off with first order coding, which was open coding, in Atlas.ti. I undertook this process inductively and I differentiated and categorised concepts and themes through high level conceptualisation built from insights from findings (Wolfswinkel et al., 2013; Gaur & Kumar, 2018; Hanelt et al., 2021). For instance, as shown in Table 1: Coding Table – Emergent Themes, I inductively abstracted first order codes like Third Industrial Revolution, Fourth Industrial Revolution, Information Systems/Technology and Technology. I used complete sentences as analytical units and consistently applied and reviewed the codes to enhance coding reliability and validity. The codes, as well as the memos, are captured in Atlas.ti for verification, falsification, and refinement (Wolfswinkel et al., 2013; Gaur & Kumar, 2018). I conducted constant comparative analysis of the themes, concepts and constructs as well as verification of texts across the various studies as a way to identify further relevant literature and improve the theoretical sampling (Wolfswinkel et al., 2013; Hanelt et al., 2021). At this stage, I developed conceptual

codes with the objective to validate the data since these are largely descriptive and of low inferential effect (Elliott, 2018) and, I differentiated and categorised concepts and themes through high level conceptualisation built from the emergent insights from the preliminary findings (Gaur & Kumar, 2018; Hanelt et al., 2021).

Table 1. Coding Table – Emergent Themes

Coding Table - Emergent Themes Adopted fromm Gioia et al. (2013)			
Code Groups	**Code (First order concepts)**	**Categories (Second order concepts)**	**Themes (Aggregate dimensions)**
A1	Third industrial revolution	1. Information Technology-enabled Transformation (ITOT) v Digital Transformation	1. Epistemological Evolution of Digital Transformation
A1	Fourth industrial revolution		
A1	Information Systems/Technology Literature		
A1	Technology frontiers		
A2	Digitisation	2. Digital transformation	
A2	Digitalisation		
A2	Digital assets		
A2	Digital infrastructures		
A3	Digital infrastructures	1. Digital technology diffusion and adoption enablers	2. Digital technology diffusion and adoption
A3	Reprogrammability of digital technologies		
A3	Fungibility of digital technologies		
A3	Intangibility and ubiquity of digital technologies		
A4	Financial risks	2. Digital technology diffusion and adoption risks	
A4	Operational risks		
A4	Business risks		
A4	Technological risks		
A4	Supply chain risks		
A4	Cybersecurity risks		
A4	Societal and environmental risks		
A5	Technological capability gaps	Innovative and productive digital technology capability	3. Technological capability accumulation
A5	Technological capability frameworks		
A5	Drivers of technological accumulation		
A6	Business model innovation	1. Multilateral digital interactivity	4. Value creation, capture and distribution
A6	Business to Business (B2B) interaction		
A6	Business to Customer (B2C) interaction		
A6	Customer centricity		
A7	Value co-creation	2. Value proposition	
A7	Globalisation of value chains		
A7	Digitalisation paradox		
A8	Interoperability	1. Digital Platforms	5. Digital platform ecosystems
A8	Modularity		
A8	Vertical v horizontal integration		
A8	Virtualisation		
A8	Real time capabilities		
A9	Decentralisation	2. Ecosystem-specific advantages (ESAs) v Firm-specific advantages (FSAs)	
A9	Digitalisation of value chains/global value chains		
A9	Asset specificity		
A9	Location specificity		

Source: Author

I then aggregated the themes in the second order coding, wherein I deductively conceptualised theoretical foundations and the second/higher order thematic and conceptual categories. Table 1: Coding Table – Emergent Themes summarises the first order codes or concepts, the second order codes or categories, and the aggregate dimensions or themes.

The objective was to identify both the themes like epistemological evolution of digital transformation, digital technology diffusion and adoption, for instance, and the relationships between and among such higher order categories, like digital transformation and sub-categories like technology frontier. (Gaur & Kumar, 2018; Hanelt et al., 2021). This process was largely interpretive and inferential as I systematically looked out for patterns (Bradley et al., 2007). At this stage, I was grouping first order thematic and conceptual codes into mutually exclusively higher order thematic categories. The immediate but iterative objective sought to build relationships among the higher order and lower order codes (Gaur & Kumar, 2018) in the process delineating mutually exclusive conceptual distinctions of the recurrent themes (Polites et al., 2012).

Thirdly, I applied deductive third order coding iteratively and reflexively. I integrated, refined, and sought to verify the relationships among the higher-level thematic codes. These captured the concepts, dimensions and theories shaping the thematic outline in scholarship on digital transformation at for-profit firms in countries behind the technology frontier. For instance, the relationship between customer centricity and multilateral interactivity which builds into the theme value creation, capture and distribution as presented in Table 1: Coding Table – Emergent Themes. I paid systematic attention to the conceptual and theoretical sensitivity of the emergent themes and how they relate to each other. Essentially, I investigate the how the emergent themes and theoretical foundations confirm or challenge existing theoretical assumptions with regards to digital transformation at for-profit firms in countries behind the technology frontier. At the same time, I sought for theoretical and thematic inadequacies and inconsistencies and gaps they expose (Busse et al., 2017; Pournader et al., 2020).

2.4.2 Stage 5 of the Arksey and O'Malley Framework: Synthesising and reporting results

Finally, I presented the findings in a logical theoretical flow whereby I elucidate how the research questions relate to the extant literature for methodological validity, the reliability, and applicability of the findings (Gaur & Kumar, 2018). In response to the research question, I undertook a scoping literature review and synthesised the results of the data analysis through a summary in Table 2: Synopsis of Institutional Theory.

Thereafter, I then prepared the literature review and the discussion of the findings where research gaps for future studies are presented.

Table 2: Synopsis of Institutional Theory

Institutional Theory					
Author(s)	**Year**	**Title**	**Journal**	**Key Perspectives**	**Key Findings/Contributions**
Brieger et al.	2022	Digitalization, institutions and new venture internationalization	Journal of International Management	1. Digitalisation on the internationalisation of new ventures	1. Digitalisation positively contribute to firm internationalisation
				2. Institutional quality/voids	2. Relationship between digitalisation and firm internationalisation is strong in countries with institutional voids
				3. Digital infrastructures	3. Weak digital infrastructure lessen the positive relation between digitalisation and firm internationalisation
				4. Social capital and networks	4. Digital infrastructures lessen the impact of institutional voids on the digitalisation-internationalisation linkage.
				5. Boundary conditions	
Ghulam	2021	Institutions and firms' technological changes and productivity growth	Technological Forecasting & Social Change	1. Firm level productivity growth	1. Significant role of institutions and institutional quality on firm productivity and technological changes
				2. Technological changes	2. In high-risk political regimes firms invest in high technological changes which lead to improved productivity
				3. Formal and infomal institutions	3. Regional institutions (in-country) have as much a role to play on firm productivity and technology change as national institutions
					4. Heterogeneity of ownership (through ownership change) impacts firm response to institutional quality
Das and Brine	2020	Distance from the technology frontier: How could Africa catch-up via socio-institutional factors and human capital?	Technological Forecasting & Social Change	1. Technological/digital capability gaps	1. Countries with huge technological gaps/behind the technology frontier will fill the gap by imitating technology created elsewhere
					2. The ability to adopt new technologies depend on socio-institutional factors
				2. Technological catch-up	3. The ability to adopt new technologies/close the technological gap depends on cross-border digital/technological globalisation
					4. Knowledge capabilities are essential to close the technological gap
Wong & Goh	2015	Catch-up models of science and technology: A theorization of the Asian experience from bi-logistic growth trajectories	Technological Forecasting & Social Change	1. Catch-up models - i - New Start-ups for Product Technology Pioneering Model; ii - FDI leveraging model	1. Institutional dynamics of new start-ups for product technology pioneering approach are important to drive self-propagating behaviour
				2. National Innovations Systems	2. FDI leveraging firms may find themselves locked-in in supporting MNEs operations without corresponding firm technological growth
				3. Knowledge-based economies	3. Building sustainable indigenous firm capabilities essential to technological catch-up
				4. Global Value Chains (GVCs)	4. Building institutions for science and technology enhanced the indigenous technological innovation capabilities

Source: Author

2.5 Limitations of the scoping review

The Arksey and O'Malley Framework for scoping reviews has an additional and optional review stage where the researcher seeks expert input through consultation (Westphaln et al., 2021). The objective of consulting experts is to strengthen the intercoder reliability hence validity of the study. In this study, apart from carrying out expert consultation, all the checks and balances for ensuring validity and reliability were observed. Essentially, starting off with the formulation of the research question, the primary trigger for the research process, methodological rigour was at the heart of the process (Makadok et al., 2018). Secondly, I ensured that there is coherence and consistence through the research thread by aligning the research question to the research methodology, the results of the scoping review, and the discussion and conclusion (Barrett et al., 2021; Cornelissen, 2017; Edmondson & McManus, 2007).

The scoping review emphasised breadth over depth of the scholarship (Davis et al., 2009; Westphaln et al., 2021). This was in line with the purpose of the study which is to map out what is known about scholarship on digital transformation at for-profit firms in countries behind the technology frontier. As Teubner and Stockhinger (2020) advance, scoping reviews provide the epistemological foundation for future studies to be undertaken. This scoping review seeks to achieve those objectives.

2.6 Conclusion

In this chapter, I presented the structured literature review methodology which is the scoping review. I was guided by the Arksey and O'Malley Framework for scoping reviews. I systematically and coherently aligned the methodology with the research question (Cornelissen, 2017; Edmondson & McManus, 2007; Makadok et al., 2018). In the methodology, I outlined the review protocol including the inclusion and exclusion criteria. With the final selection of 71 articles, I undertook a three-phase coding process and abstracted the themes and theories.

In the next chapter, I will present the results of the scoping review by outlining the literature review as outlined by the research questions. The literature review will provide a descriptive and analytical outline of the theoretical foundations, the thematic mapping and the thematic evolution.

Chapter 3: Structured literature review

3.1 Introduction

There is a significant body of literature on digital transformation at for-profit firms particularly in countries leading the technology frontiers. However, the study of digital transformation at for-profit firms in countries behind the technology frontier has been widely neglected (Avgerour et al., 2016; Vaska et al., 2021). Therefore, this literature review traces the epistemological evolution of digital transformation to map out the common theoretical foundations and themes (Ferreira et al., 2018). The scope for reviewing the theoretical foundations and themes is defined by organizational theories (Hanelt et al., 2021). In that regard, this scoping review outlines the theoretical foundations used in the scholarship on digital transformation at for-profit firms in the countries lagging behind the technology frontier. It maps out the thematic evolution of the phenomenon and how that has shaped theoretical development on digital transformation.

The theoretical framework of this study is built on the perspectives on digital transformation. This draws from the review by Hanelt et al. (2021) which defined the boundary conditions for digital transformation as well as the reviews by Gong and Ribiere (2021) and Vial (2019) which proposed a conceptual definition for digital transformation. Furthermore, the empirical study by Wessel et al. (2021), which extends the conceptual clarity of digital transformation by unpacking how it differs from information technology-enabled organization transformation (ITOT), provides useful insights. As an extension to existing scholarship, this scoping review theorises on digital transformation by clarifying the contextual scope of the phenomenon at for-profit firms in countries behind the technology frontier (Hanelt et al., 2021; Peerally et al., 2022).

Warner and Wager (2019) have underlined the ubiquity of digital technologies in organisations, societies, and institutions as the fundamental feature of digital transformation (Appoio et al., 2021; Ferreira et al., 2019; Lanzolla et al., 2021; Verhoef et al., 2021; Wessel et al., 2021). The digital technologies have been transformative to sociotechnical dynamics (Colbert et al., 2016; Lanzolla et al., 2021; Smith & Beretta, 2021; Wimelius et al., 2021). They have redefined the relationships between and among organisations, processes and people in ways that have disrupted the traditional inter- and intra-organisational relational practices (Baptista et al., 2020; Solberg et al., 2020).

The disruptions in the interdependencies have opened up opportunities and tensions in organisational practice and competencies (Smith & Beretta, 2020; Wimelius et al., 2021). The emergent family of technologies and processes get fueled by data-centric algorithms that drive the constitutive and augmentative functions that hitherto were undertaken by humans and relied on human judgment (Faraj et al., 2019; Knoben et al., 2019; Nielsen et al., 2018). The changes enable and/or challenge organisational and managerial digital competencies and digital readiness (Colbert et al., 2021; Opland et al., 2022; Solberg et al., 2020) in the sphere of decision making and problem solving (Gferer et al., 2021; Hanelt et al., 2021; Wessel et al., 2021). Correspondingly, the theoretical and conceptual underpinnings of digital transformation have been disrupted (Ferreira et al., 2018; Hanelt et al., 2021; Peerally et al., 2022).

Digital transformation at for-profit firms in countries behind the technology frontier is an underexplored field (Avegrou et al., 2016; Peerally et al., 2022). In large part, this is because most countries behind the technology frontier imitate the countries leading the technology frontier in adopting emergent technologies (Figueiredo, 2014; Stallkamp et al., 2022). Peerally et al. (2022) further argue that the dearth of analysis of firm-level data on digital transformation in the countries behind the technology frontier in the category of emerging economies results from the low uptake of emergent digital technologies. However, Lee and Gereffi (2021) posit that the adoption of the emergent digital technologies varies at country, sector and firm level. Therefore, a for-profit firm in a country behind the technology frontier may be ahead of a for-profit firm in a leading country. This result from the internationalisation of value chains through affiliation to multinational enterprises (MNEs) and digital platforms (Dalenogare et al., 2018; Furr et al., 2022; Lee & Gereffi, 2021). In that regard, paradoxical complexities arise in scholarship as conceptualized by Appoio et al. (2021), Smith and Beretta (2021) and Wimelius et al. (2020). This compounds the challenges to both the practice and scholarship of digital transformation at for-profit firms in countries behind the technology frontier. Added to that, the exponential growth of digital technologies has expanded the conceptual scope and much of it is underexplored, thus far (Adner et al., 2019).

This review therefore aims at scoping current theories that have been applied in scholarship in advancing theory on digital transformation at for-profit firms in countries behind the technology frontier. In line with the proposal by Hanelt et al. (2021), the current organisational theories provide a developmental and intellectual base for epistemological reconceptualization and advancement. Hence, what are the theoretical foundations upon which scholarship on

digital transformation at for-profit firms in countries behind the technology frontier is built and tested?

3.2 Theoretical foundations

1. **What are the theoretical foundations of scholarship on digital transformation at for-profit firms in countries behind the technology frontier?**

Introduction to theoretical foundations

There is a number of organisational theories that have been applied variously in the scholarship on digital transformation at for-profit firms in countries behind the technology frontier. The theories have been used to understand and explain phenomena either at the theory-building or at the theory-testing phase (Ployhart & Bartunek, 2019; Shepherd & Suddaby, 2017). Despite relying on organisational theories, digital transformation as a phenomenon of both revolutionary and evolutionary technological impact (Ferreira et al., 2018; Vaska et al., 2021) has disrupted the conceptualisation of the theoretical underpinnings of organisational science (Hanelt et al., 2021). The current organisational theories provide the conceptual and interpretive scope for identifying research gaps and opportunities for future theorising (Harteis et al., 2020; Haveman et al., 2021; Wessel et al., 2021).

Major theoretical foundations

The most cited and influential theories in scholarship on digital transformation at for-profit firms in countries behind the technology frontier are the resource-based view of the firm (RBV) (Leão & da Silva, 2021; Lee & Gereffi, 2021; Liu et al., 2017; Reinauer & Hansen, 2021; Stallkamp et al., 2022), the institutional theories (Rodrigues et al., 2020; Wu et al., 2017), the agency theory (Huang et al., 2017) and the global value chain governance (GVC) theory (Autio et al., 2021; Lee & Gereffi, 2021; Sturgeon, 2021). Other theories and perspectives have been applied in theorising on digital transformation at for-profit firms in countries behind the technology frontier.

The intersection among theories and perspectives in scholarship

Apart from the major theories, the scholarship on digital transformation at for-profit firms in countries behind the technology frontier has commonly cited other theories. For instance, the

catch-up theory (Binz et al., 2020; Lee & Gereffi, 2021; Wu et al., 2017) enriches scholarship on defining the typology of countries and firms based on their technological readiness or maturity (Abramovitz, 1986; Peerally et al., 2022). The firm's or country's internal resources and competitive advantages and the institutional quality are necessary conditions that drive digital technology catch-up dynamics (Seo et al., 2019; Wong & Goh, 2015). In addition, Figueirado and Cohen (2019), build on the theoretical contribution by Lee and Malerba (2017) application of the sectoral systems innovation (SSI) model to study the technological capabilities accumulation (TCAs) and how they shape the digital innovative and productive capabilities of for-profit firms in countries behind the technology frontier. Dutrénit et al. (2019) and Figueirado (2014) similarly apply the technological capabilities accumulation (TCAs) to understand the firm capabilities necessary for innovative and productive digital technology adoption. Meanwhile, Reinauer and Hansen (2021) build a conceptual framework for capability-building for technology adoption in latecomer for-profit firms in countries behind the technology frontier using the resource-based view (RBV). Butt (2020) conceptualises the catch-up dynamics through the business process management (BPM) perspective which falls under the resource-based view (RBV) of the firm.

The dynamics capabilities theory is an extension of the resource-based view (RBV) (Teece, 2012) that Li et al. (2017) applies to understand how digital transformation of Chinese for-profit firms enables them to partake in the cross-border e-commerce (CBEC) business. The cross-border e-commerce (CBEC) business invokes the global value chain (GVC) dynamics which Lee and Gereffi (2021) combine with the sectoral systems innovation (SSI) model to conceptually understand digital technology catch-up by developing countries or countries behind the technology frontier. Buckley et al. (2020) posit that the countries behind the technology frontier are catching up faster in productive physical technologies but are slower on knowledge-intensive digital technologies. Underlying the catch-up dynamics in the context of global value chains (GVCs), is the balance between the firm internationalisation (Brouthers et al., 2022; Liu et al., 2022; Stallkamp et al., 2022) versus firm internalisation (Hennart & Humhrey, 2019; Strange et al., 2022). Similarly, the balance between location-specificity of physical assets (Verbeke & Hutzschenreuter, 2021) versus the intangibility, fungibility and non-location boundedness of digital assets (Autio et al., 2021) is not only influential to catch-up dynamics, but the international diffusion of innovation, comparative and advantages and competitiveness (Buckley et al., 2020; Lee & Gereffi, 2021). These dynamics and the underlying theoretical foundations applied in current scholarship are essential in exploring digital transformation at for-profit firms in countries behind the technology frontier (Avgerou et al., 2016; Hanelt et al., 2021). In light of the outline of common theories, the deep perusal of

the theories and perspectives commonly used in scholarship on digital transformation at for-profit firms in countries behind the technology frontier follows.

The theoretical foundations used in each study cohere with the heterogeneity of firm-level dynamics as well as the focus research question and research gap (Cornelissen, 2017; Makadok et al., 2018). Firstly, the distance of the country from the technological frontier is associated with a varying degree and nature of technological and digital characteristics Das & Brine, 2020). Similarly, the context and conditions in which the for-profit firms operate apply in so far as the theoretical foundations are anchors for theorising carries weight.

The resource-based view (RBV) of the firm

The resource-based view (RBV) of the firm is one of the influential and commonly applied theory in explain digital transformation as a phenomenon. The resource-based view of the firm explains, predicts or prescribes the competitiveness of a firm as driven by a set of internal resources including capabilities (Kraaijenbrink et al., 2010). These resources must be an '…idiosyncratic arrangement of valuable, rare, and hard to imitate resources—VRIN...' (Leão & da Silva, 2021, p. 421). The internal resources are fundamental to the firm's ability to explore and exploit opportunities (Dalenogare et al., 2018) and, in that regard, the digital resources (assets), are essential to the firm's ability to capitalise on the emergent digital technologies (Hanelt et al., 2021; Verbeke & Hutzschenreuter, 2021). The centrality of data and algorithms as the technological resources that power the digital transformation processes highlights the relevance of the resource-based view of the firm theories in theorising the phenomenon (Adner et al., 2019; Verbeke & Hutzschenreuter, 2021).

Several studies on digital transformation at for-profit firms in countries behind the technology frontier have cited the resource-based view (RBV) notably Reinauer and Hansen (2021) on linkages on technological capability-building, Leão and da Silva (2021) in a systematic review on the impact of digital transformation on competitiveness and the digitalisation of global value chains (GVCs), Stallkamp et al. 2022) on resource orchestration on firm internationalisation in light of conflicting demands by digital and non-digital resources, and Liu et al. (2017) on technology diffusion and adoption as summarised in Table 3: Synopsis of the Resource-based View (RBV) p. 26.

Table 3: Synopsis of the Resource-based View (RBV) of the Firm

Resource-based View (RBV)					
Author(s)	**Year**	**Title**	**Journal**	**Key Perspectives**	**Key Findings/Contributions**
Reinauer and Hansen	2021	A conceptual framework for latecomer linkage capabilities	Industrial and Corporate Change	1. Linkages in technological capability-building in latecomer firms.	1. Extension to Lall's (1992) original framework on technological capabilities building for latecomer firms to operate successfully in competitive markets
				2. Linkages in industrial marketing and supply-chain management	2. Extension on Teece's (1997; 2007) dynamic capabilities model on capabilties to use external sources of knowledge, the difference between engagement and exploitation.
					3. Distinguishing capabilities that latecomer firms require to effective use external sources of knowledge
Leão and da Silva	2021	Impacts of digital transformation on firms' competitive advantages: A systematic literature review	Strategic Change	1. Competitive advantage	1. Specialisation dimension - firms focus on dedicated value chain activities
				2. Impact of digital transformation	2. Geographic scope - digitalisation of GVCs expand opportunities for firm internationalisation
				3. Digitalisation of global value chains (GVCs)	3. Upgrading - firms integrate upstream in GVCs
					4. Governance - GVCs require strategic reorientation
Stallkamp et al.	2022	Scaling, fast and slow: The internationalization of digital ventures	Journal of Business Research	1. Dynamic capabilities	1. Extension of asset and resource orchestration theory by highlighting the demands by both digital and non-digital resources in firm internationalisation
				2. Resource orchestration - (Digital v non-digital resources)	2. Demand heterogeneity challenges digital firm internationalisation and localisation
				3. Firm digitalisation/digital transformation (Pre-digitals, born digitals, digital B2B & B2C)	3. Tensions between digital and non-digital resources complementarity affect supply side dynamics in firm internationalisation
				4. Firm internationalisation	
Liu et al.	2017	The delicate balance: Managing technology adoption and creation in multinational affiliates in an emerging economy	International Business Review	1. Technology adoption	1. Technology creation significantly dependent on technology creation
				2. Technology creation	2. Technology adoption does not relate to technology creation
				3. Multinational enterprises (MNEs)	3. MNEs R&D support to affiliates helps technology adoption though not technology creation
				4. Technology -based resources	4. External network support to under-resourced firms helps the adoption and creation of new technology

Source: Author

In other studies captured in Table 3: Synopsis of the Resource-based View (RBV) of the Firm which are anchored on the resource-based view (RBV) Rai et al. (2013) and Tamvada et al. (2022) characterise resource limitations for the for-profit firms in countries behind the technology frontier as the one of the barriers or risks towards the digital transformation of the firm. Figueirado (2014) further argues that the lack of internal resources to invest digital transformation affects the ability of for-profit firms in countries behind the technology frontier to contribute to the innovation of new technologies. Instead, they imitate and use existing technologies developed in countries leading the technology frontier to enhance the existing production activities and processes.

However, as Figueirado (2014) argues, some for-profit firms in countries behind the technology frontier are not laggards in digital transformation. The emergence of the digital platform business ecosystems (de Reuver et al., 2018) has enabled for-profit firms in countries behind the technology frontier to explore and exploit opportunities driven by digital

transformation. Digital transformation, through technologies like digital platforms, has promoted the non-location boundedness of resource orchestration and competitive advantages instead of those that are specific to location and human capital availability (Bathelt et al., 2022; de Reuver et al., 2018; Song, 2022; Verbeke & Hutzschenreuter, 2021). Hence, digital assets drive the exploration and exploitation of market opportunities in for-profit firms has benefited from the connectivity (Eriksson & Agerfalk, 2022) and ubiquity (Huang et al., 2022) of digital technologies whose real-time capabilities, virtualisation, and interoperability (Tamvada et al., 2022) have underlined the decentralisation and modularity of value creation and capture (Besson & Rowe, 2012; Lee & Gereffi, 2021; Sturgeon, 2019).

The importance for resources is not eliminated, however. Teubner and Stockhinger (2022) argue that they get cheaper and more accessible. This leaves a lot of firms in the countries behind the technology frontier in the catch-up mode (Adner et al., 2019; Binz et al., 2020) wherein they adopt and use but do not innovate the digital technologies imported from countries leading the technology frontier (Figueirado, 2014; Reinauer & Hansen, 2021). In leveraging off the digital technologies developed in countries leading the technology frontier, the for-profit firms in latecomer countries do not bear the burden of the in situ digital infrastructures which are the centre of the vortex of diffusion of digital capabilities (Autio et al., 2021). They, as a result, drive their operational and production processes to create and capture value by riding on the wave of high knowledge centripetal digital technologies that gravitate towards and are dependent on the core digital infrastructure (Autio et al., 2021; Dabrowska et al., 2022; de Reuver et al., 2018). The modular, decentralised and interoperable capabilities of digital assets (Tamvada et al., 2022; Verbeke & Hutzschenreuter, 2021) enable the for-profit firms in countries behind the technological frontier with resource constraints to participate and benefit from digital transformation (Gaglio et al., 2022; Peerally et al., 2022). Verbeke and Hutzschenreuter (2021) further substantiate that the for-profit firm's internal digital and non-digital resources, and the capabilities to use them, shape the ability to enhance the strategic innovative and productive functions of the firm buoying its competitiveness and sustainability.

Thus, the resource-based view of the firm has anchored scholarship on digital transformation at for-profit firms in countries behind the technology frontier. In spite of that, the theory does not adequately address some scholarly gaps and other theories either as extensions of the resource-based view of the firm or in combination. Thus, the review proceeds to scope out the

institutional theory and its application in scholarship of for-profit firms in countries behind the technology frontier.

The institutional theory of the firm

The capability of the for-profit firms to adopt or transition to digital transformation is influenced by the institutional quality of the given country (Autio et al., 2021; Brieger et al., 2022; Luthra et al., 2020; Malerba & Lee, 2021). The institutional theory of the firm captures the formal and informal governance quality of a country and how they shape the strategic priorities of firms (Bu et al., 2022; Ghulam, 2021). The formal institutions underpin the tenets of rule of law, the political environment, and government policies and their legal enforceability, among others, while the informal institutions are characterised by shared beliefs and norms that are self-enforced (Bu et al., 2022; Ghulam, 2021). The characteristics of institutions in the countries behind the technology frontier are different from countries leading the technology frontier. The majority of countries behind the technology frontier are emerging economies that are dominated by weak and informal institutions (Ayentimi & Burgess, 2019; Bu et al., 2022).

The institutional quality provides the framework for a for-profit firm to attract investments, digital assets and capabilities for the firms in the countries behind the technology frontier to exploit (Ayentimi & Burgess, 2019; Wong & Goh, 2015; Yoruk, 2019). From a scholarly perspective, this interpretation provides a theoretical intersection among the theories of the resource-based view of the firm, the institutional theory and the dynamic capabilities theory. Therefore, the limited capabilities of incorporating digital transformation at for-profit firms in countries behind the technology frontier are not entirely constrained by intra-firm human capital inadequacies, but by institutional voids (Li et al., 2018; Liu et al., 2017). Verbeke and Hutzschenreuter (2021) add that even though the digital platforms allow for non-location boundedness of digital assets, the formal institutional structure may restrict access to digital technologies, or investments thereof, through laws and regulations. Similarly, informal institutions lack the systems and structures to adequately respond to the complexities of the blurriness, generativity and self-referential effect of digital transformation (Bu et al., 2022; Peerally et al., 2022).

However, despite institutional voids, some for-profit firms succeed on the digital transformation journey in countries behind the technology frontier (Binz et al., 2019; Dutrénit et al., 2019; Figueirado, 2014; Lee & Gereffi, 2021). The digital platform ecosystem, despite the institutional challenges in certain countries (Ayentimi & Burgess, 2019; Bu et al., 2022), has enabled for-profit firms in countries behind the technology frontier to catch-up and close the technological and digital gaps (Figueiredo, 2014; Lee & Gereffi, 2021; Vaska et al., 2021; Verbeke & Hutzschenreuter, 2021). Digital platform ecosystems allow for non-locational boundedness of digital assets (de Reuver et al., 2018; Song, 2022; Verbeke & Hutzschenreuter, 2021) through the decentralisation and modularity of business processes, and interoperability of the digital technologies (Tamvada et al., 2022). According to Autio et al. (2021), the digital infrastructures underlying the digital platform ecosystems as the centrifugal technologies that are located in countries with strong institutions transcended the location specificity of the relevant digital and non-digital assets. The for-profit firms in countries behind the technology frontier with weak institutions specialised in knowledge-based and digitally intensive activities of the value chain that are less affected by institutional limitations (Autio et al., 2021; Gaglio et al., 2022; Teubner & Stockhinger, 2020).

The non-location specificity and human capital specificity of digital assets (Verbeke & Hutzschenreuter, 2021) allow for the digital core (Huang et al., 2022) to be located in a leading country with the centrifugal digital technologies (Autio et al., 2021) and be utilised by for-profits in laggard and follower countries (Figueiredo, 2014). This reconceptualises the digital business model as an international phenomenon that transcends geographic and institutional boundaries (Eriksson & Agerfalk, 2022). In that sense, the theoretical scope expands beyond the resource-based and institutional perspectives of the firm. The firm internationalisation perspective (Brieger et al., 2022; Liu et al., 2022; Rong et al., 2022; Strange et al., 2022) or resource-based theory of internalisation (Hennart, 2019; Strange & Humphrey, 2019), the global value chain (GVC) governance theory (Lee & Gereffi, 2021) and the ecosystem theory (Li et al., 2019) redefine digital transformation as a multi-faced and multi-dimensional phenomenon (Verbeke & Hutzschenreuter, 2021) especially from the perspective of the for-profit firm in countries behind the technology frontier. The multi-nationality of such dynamics shapes the interface and conceptualisation of digital transformation at for-profits between countries leading and behind the technology frontier. In addition, it extends the perspectives on the resource-based view of the firm and the institutional theory (Adner et al., 2019).

The internationalisation perspective of the firm

The internationalisation perspective on digital transformation of the firm centres around the digital connectivity, decentralisation and modularity of digital technology and business process in a multi-national polycentric architecture (Strange et al., 2022). The resultant business interactions are multi-faceted including the establishment of multinational enterprise (MNEs) affiliates in host countries that are behind the technology frontier (Figueirado, 2014; Hennart, 2019; Song, 2022). The interactions include the global value chain integration and alliances between non-affiliated firms in lead, laggard and follower countries in the technology frontier (Brieger et al., 2022; Lee & Gereffi, 2021; Strange et al., 2022). Through dependence on digital technologies like Internet of Things (IoT) and additive manufacturing or 3D printing, for-profit firms in countries behind the technology frontier imitate and use production technologies and processes rather undertake innovation, which is mainly done in lead countries (Autio et al., 2022; Figueirado, 2014). The international business interactions facilitate the transfer of resources and capabilities to the for-profit firms, affiliates or alliance partners in the laggard and follower countries (Stallkamp et al., 2022). Thus, the digital transformation of the for-profit firm in countries behind the technology frontier elicits the rethinking of the resource-based view of the firm (Strange et al., 2022).

The internalisation theory

Similarly, the internalisation theory focusses on the firm-specific advantages wherein knowledge-based resources and capabilities for value creation are internalised (Strange et al., 2022). The theory explains, predicts and prescribes phenomena in vertically integrated firms, local or multinational, and these are characteristic of traditional value chain participation (Lee & Gereffi, 2021; Strange et al., 2022). However, the blurring of institutional boundaries brought about by digital transformation (Eriksson & Agerfalk, 2022), has enabled for-profit firms in countries behind the technological frontier to gain technological capabilities to internationalise their operations and processes (Brieger et al., 2022; Liu et al., 2022; Peerally et al., 2022). Digital transformation disrupts the vertical and horizontal asset specificity especially as the for-profit firms participate in the global value chains (Lee & Gereffi, 2021; Strange et al., 2021).

The inadequacy of the internalisation theory to explain internationalisation in the context of digital transformation of the for-profit firms in countries behind the technology frontier underlie the paradigmatic challenges on value creation and distribution (Lee & Gereffi, 2021; Liu et al., 2022). The ubiquity of digital technologies (Mansell, 2021) and the technological modularity

and decentralisation of value creation and appropriation processes (Tamvada et al., 2022) challenges the internalisation of digital resources for competitive advantage (Strange et al., 2022). The internationalisation perspective drifts towards the ecosystem theory for the for-profit firms in countries behind the technology frontier wherein digital platforms allow for business model innovation (de Reuever et al., 2018; Hanelt et al., 2021; Li et al., 2019). The ecosystem-specific advantages (ESAs) become the core elements of digital business models (Strange et al., 2022) unlike the firm-specific advantages (FSAs) (Verbeke & Hutzschenreuter, 2021) under the internalisation theory. However, the internalisation theory and the internationalisation perspective do not adequately address the paradox of digitalisation, wherein the value creation is enhanced under digital transformation, but the value distribution is inequitably undertaken, if at all it is distributed among the for-profit firms and actors (Figueirado, 2014; Stallkamp et al., 2022; Verbeke & Hutzschenreuter, 2021).

The global value chain (GVC) governance theory

Given the institutional dissimilarities and power asymmetries among the lead, follower and laggard countries in the technology frontier (Ahlstrom et al., 2020; Ayentimi & Burgess, 2019; Lee & Gereffi, 2021; Yoruk, 2019), the global value chain (GVC) governance theory attends to the inadequacies of the internationalisation and internalisation theories (Strange et al., 2022) with regards to the digitalisation paradox. The global value chain (GVC) governance theory is important in addressing the challenges of access to knowledge and innovation for countries behind the technology frontier (Lee & Gereffi, 2021). Therefore, the GVC addresses the digital architectural advantages that platform owners (de Reuver et al., 2018) and the leaders of the centrifugal digital technologies like platforms and the internet of things (IoT) (Autio et al., 2021) upon which the for-profit firms in countries behind the technology frontier build their businesses. The GVC governance approach emphasises the value creation and capture in the technological modular architecture (Lee & Gereffi, 2021) through cross-sectoral and cross-national knowledge and capabilities transfer (Peerally et al., 2022; Strange et al., 2021; Sturgeon, 2021; Yoruk, 2019).

In the study by Lee and Gereffi (2021), they extend the global value chain (GVC) governance theory by combining it with the sectoral systems innovation (SSI) theory, to incorporate the cross-sectoral governance of the for-profit firm interrelationships that transcend the traditional sectoral boundaries being disrupted by digital transformation. The interconnectedness and interdependence of firms in the digital era places a greater burden on the for-profit firms in the

countries behind the technology frontier to catch up with their counterparts in the lead countries (Figueirado, 2014; Lee & Gereffi, 2021; Peerally et al., 2022). The resource constraints and institutional voids in the countries behind the technology frontier (Autio et al., 2022; Bu et al., 2022; Wu et al., 2017) mean that the for-profit have to catch up in terms of technological and digital capabilities (Figueirado, 2014; Lee & Gereffi, 2021; Peerally et al., 2022).

The catch-up perspective

The literature on the catch-up dynamics that for-profit firms in the countries behind the technology frontier encounter to be competitive in the digital transformation paradigm cut across many theoretical foundations. The technological capabilities are fundamental resources for for-profit firms in laggard and follower countries to catch up and Malerba and Lee (2021) and Peerally et al. (2022) propose the evolutionary economics theory as the basis for conceptualising the process. Dutrénit et al. (2019) and Figueirado (2014) theorise the catch-up perspective through the technological capability accumulation (TCA) perspective. Lee and Gereffi (2021) build on the combination of the global value chain (GVC) governance theory and the sectoral systems innovation (SSI) perspective to examine the catch-up capabilities of for-profit firms in countries behind the technology frontier in the global value chains disrupted by digital transformation.

Malerba and Lee (2021) place emphasis on institutional quality, capability building and exogenous drivers for for-profit firms in latecomer countries to participate competitively in the digital transformation paradigm. However, while Peerally et al. (2022) concur on the importance of accumulation of technological capabilities, the capability framework they develop does not respond to the requirements of the for-profit firms in the latecomer countries. As a result, while technological and digital capabilities play an important role in enabling the for-profit firms in latecomer countries to catch up with for-profit firms in the lead countries, the current theories are not explicit on how that can be achieved (Peerally et al., 2022). Dalenogare et al. (2018), Dutrénit et al. (2019) and Figueirado (2014) argue that, as a result of lack of technological capabilities, for-profit firms in latecomer countries invest in established technologies to enhance their current productivity and do not invest in advanced digital technologies and innovation capabilities. The firms are users and imitators of technological capabilities developed by lead countries who do not create new digital technologies and products.

The development of digital technologies and digital innovation is dominated by the countries and firms leading the technology frontier and, as a result, they hold ownership and control of the core digital infrastructure (Adner et al., 2019; Autio et al., 2021; Figueirado, 2014; Yoruk, 2019). Beyond the development of the digital technologies by the lead countries and firms, their diffusion and adoption are essential to digital transformation (Hanelt et al., 2021) of for-profit firms in latecomer countries (Dalenogare et. al., 2018; Dasgupta & Gupta, 2019; Huang et al., 2022; Tamvada et al., 2022). Figueiredo (2014) observed that in the evolutionary technological development from the Third Industrial Revolution (3IR) to the Fourth Industrial Revolution (4IR), most latecomer countries and for-profit firms did not transition to the Fourth Industrial Revolution (4IR). The failure to transition emanates from lack of digital maturity or readiness (Ferreira et al., 2018; Issa et al., 2022; Tortora et al., 2021). To be ready to adopt the digital technologies at firm-level it is necessary that there are sufficient resources (Reinauer & Hansen, 2021), there are functional institutions (Ahlstom et al., 2020; Bu et al., 2022; Ghulam, 2021), there are technological capabilities (Figueiredo, 2014; Peerally et al., 2022) especially through knowledge transfer (Strange et al., 2022). Dutrénit et al. (2019) concur that the technological capabilities that enhance technology diffusion and adoption include the micro-economic forces, macro-economic forces, market conditions, and the international knowledge frontier.

Tamvada et al. (2022) theorised the adoption of digital technologies by small and medium enterprises (SMEs) in emerging economies through the risk perspective and identified six risk categories namely “financial risks, operational risks, technological risks, business risks, societal and environmental risks, supply chain risks, and cybersecurity risks” (p. 3). In spite of the risks, the diffusion and adoption of digital transformation thrives because of the homogenisation and interoperability of digital technologies and information, the miniaturisation of digital work dynamics and tools, the increased processing power and storage capacity of mobile work devices. Furthermore, the increase in accessibly priced bandwidth (Teubner & Stockhinger, 2020), and as a result of digital transformation being seamlessly ubiquitous (Eriksson & Agerfalk, 2022) promote digital technology adoption. Adner et al. (2019) further advance that the diffusion and adoption of the digital transformation at for-profit firms in latecomer countries builds on the hyper-customisation and hyperconnectivity of the digital technologies and the capability for self-improvement and to be predictive. In light of the above factors and despite the heterogeneity of the for-profit firms and countries behind the

technology frontier, Dalenogare et al. (2018) argue that the for-profit firms have to rethink the digital adoption in pursuit of competitiveness.

The dynamic capabilities theory

The dynamic capability theories have been applied in the scholarship on digital transformation at for-profit firms in countries behind the technology frontier as an extension of the resource-based view (RBV) of the firm (Teece, 2012). Liu et al. (2018) applies the dynamic capabilities theory in exploring, understanding and explaining the influence of digital transformation on dynamic managerial capabilities and organisational capabilities in Chinese SMEs on sensing, seizing and transforming opportunities in cross-border e-commerce (CBEC). As the anchor theory, the application of the dynamic capabilities theory underscored the perspectives by Figueirado (2014) and Peerally et al. (2022) on how technological capabilities drive the transition to digital transformation in for-profit firms in countries behind the technology frontier. Furthermore, the perspectives on the internationalisation, the internalisation and institutional theories added dimensionality to the study even though they were not emphasised (Bu et al., 2022; Song et al., 2022; Strange et al., 2022).

Conclusion – Theoretical foundations

The application of the theoretical foundations in exploring, understanding and explaining digital transformation at for-profit firms in countries behind the technological frontier. As Besson and Rowe (2012) pointed out, the transition from information systems or technologies to digital transformation opened a field of uncharted territories in organisational studies. As a result, the theoretical foundations provide the basis for understanding and contextualising digital transformation as an organisational and managerial phenomenon (Hanelt et al., 2021) and therefore should not be abandoned (Adner et al., 2019). The conceptual scope is expanding with attention drifting towards understanding digital transformation as a paradigm (Appoio et al., 2021). This includes the perspective of the digitally enabled and globally distributed meta-organisations (Du et al., 2018), an ecosystem perspective (Dabrowska et al., 2022; Li et al., 2019) and the paradoxical view (Appoio et al., 2021; Smith & Beretta, 2021). This further helps explore, understand and explain digital transformation at for-profit firms in countries behind the technology frontier.

3.3 Emergent themes

Introduction

In the pursuit of what is known of the scholarship on digital transformation at for-profit firms in countries behind the technology frontier there is thread of emergent themes. This section delves into five themes in extant literature which I have conceptualised as:

i. Epistemological evolution of the scholarship on digital transformation at for-profit firms in countries behind the technology frontier.
ii. Digital technology adoption and diffusion.
iii. Technological capability accumulation.
iv. Value creation, capture and distribution.
v. Digital platform ecosystems.

Theme 1: Epistemological evolution of digital transformation

One interesting theme is the epistemological evolution of digital transformation which is variously conceptualised and explored (Adner at al., 2019; Balazka, & Rodighiero, 2020; Besson & Rowe, 2012; Hanelt et al., 2021; Teubner & Stockhinger, 2020). Digital transformation is a phenomenon whose scholarly development evolved from the information systems or information technology scholarship (Appoio et al., 2021; Besson & Rowe, 2012; Eriksson & Agerfalk, 2022; Teubner & Stochninger, 2020). In that regard, the conceptual and practical boundaries between the digital transformation and information systems/information technology are still an epistemological paradox (Appoio et al., 2021; Furr et al., 2022). Instead, the boundaries are blurred, and this has resulted in calls for scholarship to rethink the theoretical configuration of organisational theorising of digital transformation in general (Hanelt et al., 2021) and in the countries behind the technological frontier in particular (Adner et al., 2019).

Peerally et al. (2020) conceptually situates digital transformation at for-profit firms in relation to the transition from the Third Industrial Revolution(3IR) to the Fourth Industrial Revolution (FIR). The technological capabilities necessary for digital transformation and entry into the Fourth Industrial Revolution (4IR) have to be viewed in juxtaposition with the technological capabilities that drive/drove the Third Industrial Revolution (3IR). Lee and Gereffi (2021) and Strange et al. (2022) conceptualise the digitalisation of the pre-digital traditional global value

chains as an evolutionary process that the for-profits firms in the latecomer economies have to adapt to through digital transformation.

The evolution of digital transformation is data driven (Adner et al., 2019; Balazka, & Rodighiero, 2020) and data permeates through boundaries seamlessly as long as the underlying infrastructure allow for interoperability (Tamvada et al., 2022). That has redefined and remediated intra- and interfirm relationships and institutional, socio-technical, biological and techno-economic boundaries (Adner et al., 2019; Eriksson & Agerfalk, 2022). This has disrupted the traditional concept of an organisation and business models (Adner et al., 2019; Eriksson & Agerfalk, 2022; Hanelt et al., 2021). Additionally, the literature on digital transformation at for-profit firms in countries behind the technology frontier has not yet matured such that it is variously conceptualised as digitalisation (Autio eta., 2021; Brieger et al., 2022; Hennart, 2019), i-business (Brouthers et al., 2016), Fourth Industrial Revolution (4IR) (Ayentimi & Burgess, 2019; Peerally et al., 2022), Industry 4.0 (I4.0) (Dalenogare et al., 2018; Luthra et al., 2020; Tamvada et al., 2020). However, despite being a multi-dimensional, trans-disciplinary, multi-level and ambiguous phenomenon, digital transformation is yet to be comprehensively conceptualised (Appoio et al., 2021). Furthermore, in spite of that, literature on digital transformation at for-profit firms in latecomer countries tend to focus on individual digital technologies like data analytics (Balazka, & Rodighiero, 2020), smartphones (Lee & Gereffi, 2021) and Internet of Things (IoT) (Strange et al., 2022). Some literature focuses on specific sectors like the digital transformation of manufacturing (Butt, 2020; Figueiredo, 2014), the digital transformation of small and medium enterprises (SMEs) (Li et al., 2017; Tamvada et al., 2022), clean-tech industry (Binz et al., 2020), digital ventures (Huang et al., 2017; Stallkamp et al., 2022) and multinational enterprises (MNEs) (Hennart, 2019; Song, 2022). Notably, there is some transdisciplinary literature on digital transformation at for-profit firms in countries behind the technology frontier (Ahi et al., 2021; Furr et al., 2022; Huang et al., 2022; Lu et al., 2018).

Since digital transformation as a phenomenon at for-profit firms in latecomer countries is following the evolutionary path of being taken by digital technologies, its corresponding epistemological evolution is observed in literature (Balazka, & Rodighiero, 2020; Ferreira et al., 2018; Hanelt et al., 2021).

Theme 2: Digital technology adoption and diffusion

Digital technologies are the nexus for digital transformation (Hinings et al., 2018; Nambisan et al., 2017). They drive the business model innovativeness and competitiveness at for-profit firms through value creation, capture and distribution (Dalenogare et al., 2018; Stallkamp et al., 2022; Vaska et al., 2021). The adoption of digital technologies by the for-profit firms in countries behind is therefore a key factor in their ability to be innovative and competitive. The digital technologies are mainly developed in countries leading the technology frontier (Adner et al., 2019; Avgerou et al., 2016). According to Figueirado (2014) most of the countries in the developing world are latecomer countries which are behind the technology frontier and they start off as users and imitators of digital technology. Furthermore, they rarely lead in the innovation process for digital technology but adopt the technologies for the enhancement of business and production processes (Adner et al., 2019; Figueirado, 2014; Wong & Goh, 2015).

The diffusion of digital technologies from the lead countries, the global centripetal forces for digital innovation (Autio et al., 2022), and their adoption by for-profit firms in latecomer countries (Dasgupta & Gupta, 2019; Figueirado, 2014), the centrifugal forces for digital technologies (Autio et al., 2022), are fundamentally influenced by the characteristics of digital transformation. The characteristics are the reprogrammability of digital technology, the elementality of digital infrastructures and the intangibility of digital assets (Autio et al., 2022).

The reprogrammability of digital technologies

The reprogrammability of digital technologies have enabled the diffusion and adoption of digital technologies or assets at the for-profit firms in countries behind the technology frontier (Autio et al., 2022). The non-location boundedness of digital assets has minimized the challenges related to geographical and spatial disparities (Bathelt & Li, 2022). The location-specificity and human capital-specificity of physical assets which was the foundation of competitive capabilities in traditional pre-digital domestic and global value chains have been neutralised by the reprogrammability of digital technologies (Autio et al., 2022; Song, 2022; Verbeke & Hutzschenreuter, 2021). Unlike physical asset-intensive operations that are location-bound, digital assets are hyper-fungible and drive the knowledge-based organisational functions of the for-profit firms in countries behind the technology frontier at minimal costs (Adner et al., 2019; Autio et al., 2022; Figueirado, 2014). The for-profit firms in countries behind the technology frontier, therefore, have low-cost access to the digital technologies (Teubner & Stockhinger, 2020) and cybernated data resources (Ahlstrom et al.,

2020) which are downloadable and adaptable (Lee & Gereffi, 2021). Additionally, the hyper-customisability, interoperability and scalability properties of digital resources (Adner et al., 2019) promote smooth integration into the production processes of the for-profit firms in countries behind the technology frontier (Figueirado, 2014; Gaglio et al., 2022).

Digital infrastructures

The elementality of digital infrastructures like digital platforms and the Internet of Things (IoT) is essential for the coordination of intra- and inter-firm operations (Autio et al., 2022; de Reuver et al., 2018). Coupled with the homogeneity and interoperability of digital information properties, the barriers to entry into the digital transformation of the firm by the for-profit firms in countries have been minimised (Adner et al., 2021; Eriksson & Agerfalk, 2022; Lee & Gereffi, 2021; Teubner & Stockhinger, 2020). Due to the predictive and self-improvement capabilities of digital technologies (Adner et al., 2021; Lee & Gereffi, 2021; Rong et al., 2022; Tamvada et al., 2022) the firms become digitally ready by adapting to ambidextrous organisational forms (Hanelt et al., 2021) and mutually reinforcing digital interactions (Adner et al., 2021; Strange et al., 2022).

The intangibility of digital technologies

The intangibility of digital technologies underlies their ubiquity (Autio et al., 2021; Eriksson & Agerfalk, 2022; Huang et al., 2022). The ubiquity of digital technologies means that proximity to physical resources and the institutional challenges which are location-bound (Bathelt & Lee, 2022; Song, 2022; Verbeke & Hutzschenreuter, 2021) does not impede the for-profit firms in countries behind the technology frontier from adopting the digital core as the fulcrum of their operations (Huang et al., 2022). Furthermore, the intangibility of the digital core (Huang et al., 2022) facilitates the internationalisation of firms and the internalisation of capabilities by limiting the challenges of the liability of foreignness (LoF) and liabilities of outsidership (LoO) (Brouthers et al., 2016).

Digital technology adoption risks

However, Tamvada et al. (2022) investigation of the adoption of digital technology by for-profit firms in countries behind the technology frontier identified risks that may deter the adoption of digital transformation by for-profit firms. The "…financial risks, operational risks, technological risks, business risks, societal and environmental risks, supply chain risks, and cybersecurity

risks…" (Tamvada et al., 2022, p. 3), to varying degrees, influence the firm-level capabilities to adopt digital technologies and transition into the digital transformation of the firm (Peerally et al., 2022). Rong et al. (2022) posit that off-line dynamics in relation to user interaction, dependence and proximity to non-digital infrastructure still play a major role in business interactions and transactions hence influence the adoption and diffusion of digital technologies.

Theme 3: Technology capabilities accumulation (TCA)

Technological gaps

The for-profit firms in the countries behind the technology frontier face technological capabilities gap in relation to firms in countries leading the technology frontier (Malerba & Lee, 2021). From the perspective of the global economy, the value chain boundaries are getting disrupted and blurred as digital transformation becomes the strategic cornerstone of business models (Hanelt et al., 2021; Lee & Gereffi, 2021; Wu et al., 2017). Since the elemental digital infrastructure that powers digital transformation is developed in the countries leading the technology frontier, the participation of the for-profit firms in countries behind the technology frontier is a catch-up approach (Autio et al., 2021; Lee & Malerba, 2017). In that regard, the for-profit firms from countries behind the technology frontier rarely lead the innovation of digital technologies but imitate and use them for enhancing the current production processes (Figueirado, 2014; Malerba & Lee, 2021; Peerally et al., 2022). The catch-up process behoves upon the firms to accumulate technological capabilities in order to improve their innovative performance and competitive capabilities (Dutrénit et al., 2019; Figueirado, 2014; Peerally et al., 2022).

Technological capabilities accumulation depends upon whether the technological gap for the for-profit firm or the relevant organisational function is in a low, medium or high intensity technological sector (Peerally et al., 2022). Figueirado (2014) argues that for production functions the technological capabilities accumulation is built by using or operating current technology to enhance efficiency while the innovation function involves the disruption of current technologies to create new path creating technologies, products and processes. The potential of the digital technology to be mass customised (Adner et al., 2019), scalable (Stallkamp et al., 2022) and its intersectionality (Peerally et al., 2022) or interoperability (Tamvada et al., 2022) with other digital and non-digital technologies also determine the technological capability accumulation a firm can invest in. Peerally et al., (2022) posit the

perspective that the interaction with leading foreign firms on digital technology or born digital firms (Strange et al., 2022) or participating in a digital global value chain (Lee & Gereffi, 2021; Rong et al., 2022) positions the for-profit firms in countries behind the technology frontier on a strong capability building path (Reinauer & Hansen, 2021).

Technological capability frameworks

A number of technological capability frameworks have been proposed notably the ones by Das and Drine (2020), Dutrénit et al. (2019), Figueirado (2014), Lee and Malerba (2017), and Peerally et al. (2022). The framework by Das and Drine (2020) uses a meta-frontier approach to measure the technology gap and test its relationship with indicators like the quality of education, the amount of foreign direct investment and openness to trade. Their findings reveal the drivers and barriers to technological capabilities accumulation within Sub-Saharan Africa. Dutrénit et al. (2019) frame the technological capabilities gap through the techno-economic sphere (TES) which incorporates the science technology and innovation (STI) capabilities and the economic performance of both a firm and a country, and the socio-political sphere (SPS) which encompasses the social and political dimensions. While their findings revealed heterogenous results, countries with higher score for the socio-political sphere (SPS) tended towards a higher technological capabilities accumulation (TCA) on routine production processes and lower on advanced technological innovation. These results correspond with the findings by Figueirado (2014). Lee and Malerba (2017) adopt a sectoral system framework (SSF) in which the windows of opportunity brought about by technological changes are conceptualised in terms of the three dimensions namely changes in knowledge and technology, changes in demand and institutional changes. In their findings, Lee and Malerba (2017) observed that technological shifts opened windows of opportunity for the for-profit firms in countries behind the technology frontier to leapfrog the incumbent leading technological firms. Peerally et al. (2022) applied the evolutionary theory to develop a framework for technological for testing micro-level technological capabilities accumulation through the empirical collection of primary data and developing strategies for the for-profit firm to grow towards digital maturity. However, the framework by Peerally et al. (2022) has some inadequacies since it may not explain technological capabilities accumulation in countries behind the technology frontier due to the scarcity and challenges of collecting empirical data.

Drivers of technological capabilities accumulation

The drivers for technological capabilities accumulation include firm-specific microeconomic dynamics (Dutrénit et al., 2019), the socio-institutional factors (Das & Drine, 2022; Dutrénit et al., 2019), macro-economic factors (Peerally et al, 2022), infrastructural dynamics (Autio et al., 2022; Dutrénit et al., 2019), the knowledge frontier (Dutrénit et al., 2019; Lee & Malerba, 2017) and the acquisition of technological skills and non-digital assets (Lee & Malerba, 2017).

Theme 4: Value creation, capture and distribution

The trifecta – Digitisation, digitalisation and digital transformation

Digital transformation is a sum total of digitisation and digitalisation wherein digitisation is value addition to data and/or information, digitalisation is value enhancement of business systems, processes and operations, and digital transformation focuses on strategic orientation of the firm (Adner et al., 2019; Alhstrom et al., 2020; Verhoef et al., 2021). The three processes are, in and of themselves, necessary but not sufficient unless when conceptualised as a whole. Whilst digitisation and digitalisation are technological anchors, digital transformation consolidates the value proposition particularly at the firm level (Wessel et al., 2021). Therefore, the digital transformation of the for-profit firms in the countries behind the technology frontier is driven by the need to enhance organisational and managerial capabilities in value creation, capture and distribution (Autio et al., 2022; Cappa et a., 2021; Li et al., 2017). With the focus on the value proposition, digital transformation redefines the for-profit firm in latecomer countries as a customer centric agent (Cappa et al., 2021; Stallkamp et al., 2022; Strange et al., 2022).

Business model innovation

The value creation, capture and distribution processes have been disrupted by digital transformation in countries leading the technology frontier (Autio et al., 2022; Cappa et al., 2021; Hanelt et al., 2021). As a result, firms have undertaken business model innovation to maintain their competitive edge (Vaska et al., 2021). The resultant value creation, capture and distribution models have equally been disrupted by digital transformation in the for-profit firms in countries behind the technology frontier (Autio eta l., 2022; Cappa et al., 2021; Huang et al., 2017). This is through the ubiquity and non-location boundedness of digital assets (Verbeke & Hutzschenreuter, 2021), the modularity of digital technologies especially digital platforms (Autio et al., 2022; de Reuver et al., 2018; Tamvada et al., 2022). In addition,

knowledge transfer (Huang et al., 2022; Sturgeon, 2021), the hyper-connectivity and interoperability of digital and non-digital technologies (Adner et al., 2019Tuebner & Stockhinger, 2020) and hyper-customisation and miniaturisation of digital tools (Peerally et al., 2022; Tuebner & Stockhinger, 2020) play an influential role. Other contributory factors are the virtualisation of business proceses (Adner et al., 2019), the exponential increase in processing capacity of mobile digital technology devices (Teubner & Stockhinger, 2020), the reduction in costs of digital access and increase in the number of users of digital technologies (Farmer & Lafond, 2016; Ferreira et al., 2019; Figueiredo, 2014; Hanelt et al., 2021). The autogenic and cybernated data powered by predictive and self-correcting and self-reinforcing algorithms (Adner et al., 2019; Alhstrom et al., 2021; Faraj et al., 2018; Huang et al., 2017; Lee & Gereffi, 2021) have disrupted the interactions between the biological, the physical, and the digital spheres of business operations. In this regard, the virtualisation of business processes has reduced the need to transform physical products across markets but transfer business models that will drive decentralised, modularised and localised production activities (Brouthers et al., 2016; Figueirado, 2014).

Business interactions

The disruptions by digital transformation to the value creation, capture and distribution have reconfigured the business-to-business (B2B) and business-to-customer (B2C) relationships minimising or eliminating barriers to entry into lucrative value chains by for-profit firms in countries behind the technology frontier (Li et al., 2018). In addition, customer digital readiness (Ayentimi & Burgess, 2019; Radenković et al., 2020) has grown in terms of number of users and/or consumers of digital technologies and related products (Farmer & Lafond, 2016; Ferreira et al., 2019; Figueiredo, 2014) and the time spent online has grown exponentially (Mansell, 2021; Teubner & Stockhinger, 2020). In that sense, the for-profit firms in countries behind the technology frontier have to develop and strengthen their digital cores and organisational agility so that they create, capture and distribute value flexibly in line with customer-centric dynamics (Huang et al. 2022; Tamvada et al., 2022).

The internationalisation of the digital firm and multi-lateral interactivity among the economic actors has reconfigured the country, industry and firm-level interaction variables (Strange et al., 2022; Vieira et al., 2019). The for-profit firms do not necessarily need to set up physical operations in foreign territories, be they in the countries leading or behind the technology frontier, due to the digital transformation of the firm (Autio et la., 2021; Strange et al., 2022).

The result has been the disruption and blurring between market-seeking and resource-seeking boundaries of the firm through decentralised production, accelerated servicification and extended disintermediation (Du et al., 2018; Liu et al., 2022). However, such a reconfiguration in the business-to-business (B2B) and business-to-customer (B2C) interactions realigns the properties infusing firm-specific advantages (FSAs) like governance, resources and customer value focus as the digital ecosystem becomes the platform for value creation and distribution (Rong et al., 2022; Verbeke & Hutzschenreuter, 2021; Vieira et al., 2019).

Value co-creation

With data as resource for the digitally enabled for-profit firm (Adner et al., 2019), the multi-directional flow of data as an input into the firm-level innovative and production processes has transformed users and/or consumers into co-creators of firm value (Cappa et al., 2021; Ebbing & Luthje, 2021). Hence, opportunity recognition and monetisation of data and innovation is a collaborative and transformative component of business model innovation for the for-profit firms (Adner et al., 2021; Vaska et al., 2021). However, Peerally et al. (2021) posited that there are challenges for empirical data collection in countries behind the technology frontier therefore this may affect the capabilities for value co-creation and capture enabled by the digital transformation at for-profit firms. Pacchini et al. (2019), in developing a framework for testing the degree of firm readiness to implement Industry 4.0 (digital transformation), identify the need for enabling technologies for firms to drive value creation. Digital readiness places the for-profit firms in a position to respond to empirical data collection concerns raised by Peerally et al. (2022). To this end, Lee and Malerba (2017) give evidence of for-profit firms in countries behind the technology frontier that led the catch-up cycles due to their technological capabilities or readiness which enhanced the value creation, capture and distribution.

Globalisation of value chains

The globalisation of value chains through the internationalisation of firms (Brieger et al., 2022; Lee & Gereffi, 2021; Rong et al., 2022) has disrupted the location-specificity and human-capital specificity of value creation capabilities (Verbeke & Hutzschenreuter, 2021). Autio et al. (2022) attribute the internationalisation of value chains to the digital technology properties like reprogrammability, elementality of infrastructure and intangibility. The intangibility of digital assets disrupts the location-boundedness of physical assets which reduces the costs of setting up and conducting business in host countries (Strange et al., 2022; Verbeke & Hutzschenreuter, 2021). In Li et al. (2018), the digital transformation of small and medium

enterprises (SMEs) in China through building the dynamic managerial capabilities enabled the for-profit firms to enhance their value proposition through the Alibaba platform. From a manufacturing perspective, most for-profit firms in countries behind the technology frontier have not yet upgraded their value creation, capture and distribution capabilities to the innovation level (Figueirado, 2014; Peerally et al., 2022). As Autio et al. (2022) argue, they are users and imitators which rely on their knowledge base to enhance the existing operations and business processes and not create new process and products. In the multi-national enterprises (MNEs) configuration, digital transformation results in a customer-centric value proposition through a combination of routine, low knowledge activities and specialised, high knowledge activities (Autio et al., 2022). Digital value creation, capture and distribution in routine and low knowledge activities is moderated by institutional quality and location dependence (Autio et al., 2022; Verbeke & Hutzschenreuter, 2021). On the contrary, the digital value proposition in specialised and high knowledge activities is enhanced by the modularity of digital technologies (Autio et al., 2022).

The paradox of digitalisation

However, the paradox of digitalisation exposes tensions between value creation and distribution, and this is characteristic of global value chain (GVCs) where there exist power and capability asymmetries (Strange et al., 2022; Vaidya & Myers, 2021; Verbeke & Hutzschenreuter, 2021). The paradox of digitalisation conceptualises the misalignment between digital value creation and the corresponding financial value capture (Stallkamp et al., 2022). Lee and Gereffi (2021) combine the global value chain (GVC) governance theory and the sectoral systems of innovation (SSI) to investigate the governance of value creation, capture and distribution in digital global value chains in light of the paradox of digitalisation. Given the centrality of digital platforms in global value chains, they raise the question of who controls the operations and distribution of opportunities and resources on digital platforms, recognition and exploitation of innovation and value creation opportunities and value distribution. Lee and Gereffi (2021) propose a fivefold typology for global value chain (GVC) governance with a sectoral orientation. However, the scholars further point out that the disruption of sectoral by digital technologies renders the typology inadequate.

Theme 5: Digital platform ecosystem

The digital platform is the digital core of the digital transformation process at for-profit firms in countries behind the technology frontier (Brouthers et al., 2016; de Reuver et al., 2018; Huang

et al., 2018; Lee & Gereffi, 2021; Vaska et al., 2021). The ubiquity of the digital technologies is powered by digital platforms (Adner et al.,2019; Eriksson & Agerfalk, 2022; Vaska et al., 2021). The digital platforms have disrupted the location-specificity of knowledge-base productive and innovative activities (Seo et al., 2019; Strange et al., 2022; Verbeke & Hutzschenreuter, 2021).

Butt (2020) posits that digital platforms have enhanced the capabilities of for-profit firms in the countries on both side of the technology frontier to integrate their business processes into global value chains (GVCs). As a result, this opens up new markets to be exploited by the firms (Vieira et al., 2019) expanding the opportunities for business model innovation (Vaska et al., 2021) and the scope for value creation, capture and distribution (Rodrigues et al., 2020; Tamvada et al., 2022).

The digital platforms have expanded the avenues for for-profit firms in countries behind the technology frontier to circumvent the institutional and resource constraints (Ahlstrom et al., 2020; Ghulam, 2021). Most for-profit firms in countries behind the technology frontier fail to be competitive because of institutional and resource barriers which therefore limits their abilities to improve their value proposition (Tamvada et al., 2022).

Digital platforms provide opportunities for innovation-based capacity and competitiveness to distributed along the value chain (Brouthers et al., 2016; Buckley et al., 2020; Peerally et al., 2022). They provide the enhancement to the innovative and productive capabilities to a firm's resource base (Rong et al., 2022; Strange et al., 2022; Teece, 2012). They build the firm’s dynamic capabilities which consist of three broad clusters: (1) sensing capabilities, (2) seizing capabilities, and (3) transforming capabilities (Peerally et al., 2022; Teece, 2012). The digital platforms, as a result, allow for collaborative innovative approaches to value creation and capture since the underlying digital technologies are intangible (Autio et al., 2021), hyper-fungible (Adner et al., 2021; Figueirado, 2014) and ubiquitous (Brouthers et al., 2016; Buckley et al., 2020).

Given that the for-profit firms in countries behind the technology frontier need alliances and partnerships to accumulate capabilities to produce, innovate and conduct trade (Figueirado, 2014; Figueirado & Cohen, 2019), digital platforms provide the digital infrastructures which convert ecosystem-specific advantages (ESA) to accrue to individual firms (Strange et al.,

2022; Verbeke & Hutzschenreuter, 2021). Digital platforms run on uniform digital information (Eriksson & Agerfalk, 2022) and interoperability (Tamvada et al., 2022) and, as a result, they facilitate the technology spill overs and knowledge transfers (Brouthers et al., 2016) among the heterogenous participants int the business platform ecosystem. The net effect of that is the minimisation of technology differentials which affect the ability to be productive and innovative (Figueirado, 2014; Figueirado & Cohen, 2019; Lee & Malerba, 2017).

3.4 Thematic evolution 2012 - 2022

The epistemological and thematic evolution of scholarship on digital transformation at for-profit firms in countries behind the technology frontier from 2012 to 2022 has been growing exponentially as reflected in Figure 3 (Balazka & Rodighiero, 2020). The digital transformation field has evolved from the information systems or information technology field (Teubner & Stockhinger, 2020). Appoio et al. (2021) classifies digital transformation as a nascent field wherein 85% of the literature was published from 2017. Despite the growing importance of digital international scholarship globally, there still is scant literature on digital transformation at for-profit firms in countries behind the technology frontier (Avgerou et al., 2016; Peerally et al., 2022). As captured in Figure 3, scholarship on digital transformation at for-profit firms was very low between 2012 and 2016 and gradually increased from 2018. The evolution of the phenomenon mapped in Figure 3 was extracted from the sample of 71 publication that were used in this scoping review.

Information technology-enabled transformation (ITOT) versus digital transformation

The evolution and transition of scholarship on digital transformation from information technology to digital transformation builds is characterised by conceptual paradoxes (Appoio et al., 2021) For example, the difference between information technology-enabled organisational transformation (ITOT) and digital transformation is widely debated in scholarship (Hanelt et al., 2021; Vial, 2019; Wessel et al. 2021). Wessel et al. (2021) differentiates digital transformation by using the value proposition and organisational design perspectives.

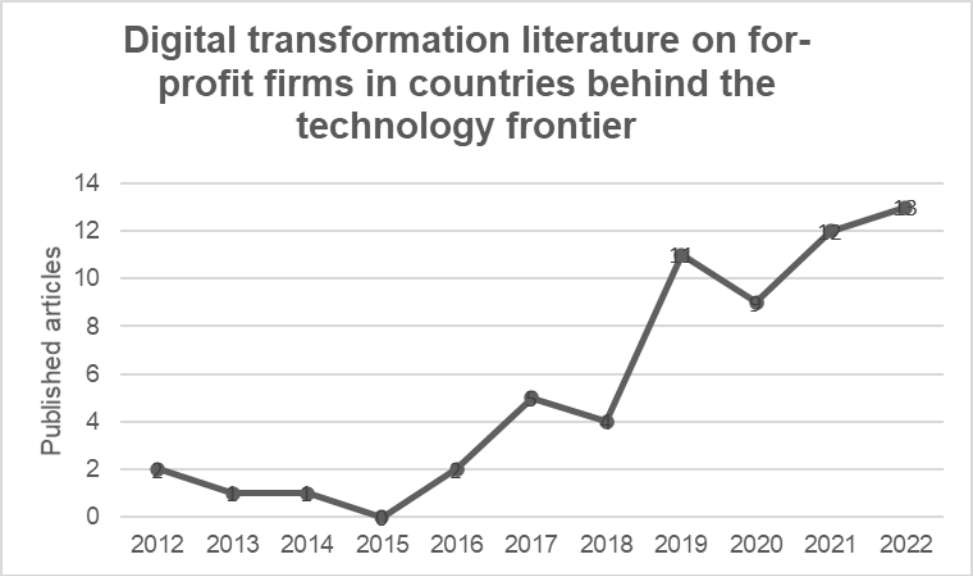


Figure 3: The literature on digital transformation at for-profit firms in countries behind the technology frontier for the period from 2012 to 2022

Digital transformation disrupts the existing organisational design and value proposition and engenders new products, new processes and new organisational forms. Meanwhile, Information technology-enabled organisational transformation (ITOT) is conceptualised as the enhancement of the existing organisation which only provides support to the existing value proposition of a firm. (Figueirado, 2014; Vaska et al., 2021).

In line with the postulations by Figueirado (2014) and Peerally et al. (2022) with regards to digital transformation at for profit-firms in countries behind the technology frontier, digital transformation is a transformative, innovative and generative process while information technology-enabled organisational transformation (ITOT) is an enhancement process which only results in or from use or imitation of digital technologies. The conceptualisation of digital transformation combines digitisation as a data-centric process and digitalisation as a process-driven organisational capability (Verhoef et al., 2021). Both information technology-enabled organisational transformation (ITOT) and digital transformation are built on the common foundation, but the outcomes differ (Wessel et al., 2021). Digital transformation, by extension, is strategically oriented and customer centric (Peerally et al., 2022; Tamvada et al., 2022). Therefore, the critical point for the investigation and understanding of the thematic evolution of digital transformation at for-profit firms in countries behind the technology frontier builds

from such conceptual clarity (Busse et al., 2018; Shepherd & Suddaby, 2017; Balazka & Rodighiero, 2020; Shaffer et al., 2016).

In a transdisciplinary review of literature on information systems/technology-enabled organisational transformation (ISOT/ITOT) spanning twenty years (1991 – 2012), Besson and Rowe (2012) propose a scholarly exploration of how digital infrastructures would disrupt the organisational transformation field. The digital infrastructures represented the organisational resources that have powered the performance of organisations and/or firms since the advent of Internet (Brouthers et al., 2016). Like the information technologies, the digital infrastructures evolved or revolutionised the transformation of organisations or firms as they pursue competitiveness through business model innovation and value creation. Unlike information technology, digital transformation revolves around the socio-technical capabilities that are built around modularity, interoperability, connectivity and scalability (Besson & Rowe, 2012). Additional to the socio-technical dimensions, Besson and Rowe (2012) advance the economic dimension, which centres on the reconfiguration of value chains, and the political dimension, in which questions of agency and power in business interactions are factors. Such conceptualisation was the nascent attempt at differentiating information systems/technology organisational transformation (ISOT/ITOT) from digital transformation (Wessel et al., 2021).

Emergence of digital transformation-related themes

As the scholarship advanced, the context for digital transformation at for-profit firms in countries behind the technology frontier emerged from the dynamics of firm internationalisation and global value chains (Avgerou et al., 2016; Brouthers et al., 2016). The themes that emerged as technology evolved were on organisational ordinary capabilities versus technological capabilities and these were viewed through the lens of dynamic capabilities (Teece, 2012). The technological capabilities which were built on digital infrastructures (Besson & Rowe, 2012) went beyond the resource orchestration and routinisation of organisational functions (Teece, 2012) to shaping the strategic innovative and productive capabilities (Figueirado, 2014).

As digital transformation became widely accepted as a scholarly phenomenon, the scholarship on diffusion and adoption of the digital infrastructures, in the form of platforms which Brouthers et al. (2016) conceptualise as *i-business,* extended the knowledge base. More and more insights grew out of early scholarship for example, Brouthers et al. (2016) conceptualisd digital

platforms, as *i-business*, which spreads from lead innovator countries to for-profit firms in countries behind the technology frontier. The diffusion and adoption theory is similar and complementary to the technological capability accumulation perspective advanced by Figueirado (2014) as an exploration of the diffusion of technology.

In the sphere of global value chains, knowledge is transferred from the lead innovator countries to the countries behind the technology frontier (Autio et al., 2022). The technological capabilities determine the maturity or readiness (Dalenogare et al., 2018; Tamvada et al., 2022) of the for-profit firms to adopt and diffuse digital technology (Peerally et al., 2022). In this regard, the theme of technological diffusion and adoption has anchored literature on digital transformation at for-profit firms in countries behind the technology frontier. The technological capabilities, whether innovative or productive (Figueirado, 2014), enabled the firms to use the *i-business* or digital platforms, to tap into global markets. Brouthers et al. (2016) argue that *i-business* transformed communication into multilateral interactivity between firms and the users. Such multilateral interactivity or communication has played a major role in influencing the diffusion and adoption of digital technologies both through the home-based or foreign-based networks (Autio et al., 2021; Huang et al., 2022). From the perspective of the internationalisation of the firm, the *i-business* or digital platforms were the enabling factors of technological diffusion (Brouthers et al., 2016).

The growth of literature on digital transformation at for-profit firms in countries behind the technology frontier saw the emergence of themes like the catch-up cycles and the ability of those firms to leapfrog the lead innovator firms and countries (Figueirado, 2014; Lee & Malerba, 2017). As the catch-up theories anchored the scientific explanations of the technological gaps and competitive advantages (Lee & Malerba, 2017; Liu et al., 2017; Wu et al., 2017), the adoption and use of innovative and productive technological capabilities play an important role in determining whether a for-profit firm will leapfrog firms in lead innovators countries (Figueirado, 2014; Wu et al., 2017). Autio et al. (2021) argue that, in light of the digital divide between the countries leading the technology frontier and those behind it, there are centripetal and centrifugal forces in the global digital business model that shape the ability for technological diffusion and adoption especially in the context of global value chains. The location-boundedness of digital in situ technologies and the non-location boundedness of digital assets like business models that are transferrable as knowledge drive innovation and productivity at for-profit firms in countries behind the technology frontier (Bathelt at al., 2022; Song et al., 2022). As firms mature in using digital technologies to enhance their productive

processes, they develop their innovative capabilities and shorten their catch-up cycles thereby leapfrogging lead firms and/or countries on particular digital technologies (Lee & Malerba, 2017).

Digital innovation and digital business model

Digital innovation and business model innovation are the major themes evolving from the digital transformation at for-profit firms in countries behind the technology frontier. The algorithm-driven generativity and autogenic nature of data as the underlying resource in digital transformation has disrupted the innovation process and digital business models (Adner et al., 2019; Vaska et al., 2021). The disruption to the traditional global and domestic value chains has redefined the value propositions especially in terms of value creation, capture and distribution (Lee & Gereffi, 2021). The interconnected functionality of digital technologies, non-digital technologies and the human dimensions of business has blurred boundaries of institutions affecting agency, specialisation, and productivity (Brouthers et al., 2016; Dutrénit et al., 2019; Huang et al., 2017; Lee & Gereffi, 2021). Furthermore, the interactivity between, within and among firms and customers has evolved from two-way non-interactive and reactive to communication to multilateral interactivity (Brouthers et al. 2016). This has redefined the business-to-business (B2B) and business-to-customer (B2C) relationships especially as the customers have real time direct access to suppliers (Brouthers et al., 2016; Tamvada et al., 2022; Teubner & Stockhinger, 2020; Vieira et al., 2019).

The capabilities to be hyper-customisable, predictive and self-improving and offer interconnected functionality of digital technologies combined with the multilateral interactivity between firms and customers behoves upon firms to prioritise customer-centricity in the digital business models (Adner et al., 2021; Brouthers et al., 2016; Vaska et al., 2021). The digital business model, which defies the asset and location specificity with respect to non-physical digital assets (Verbeke & Hutzschenreuter, 2021), is built on inter-firm collaboration, customer-to-customer interaction, business-to-customer (B2C) cooperation and human-to-algorithm collaboration (Adner et al., 2019; Dalenogare et al., 2019). Therefore, the digital business model for the for-profit firms in the countries behind the technology frontier has taken a collaborative approach where value co-creation is gaining traction in both local and global value chains (Adner et al., 2019; Autio et al., 2022; Brouthers et al., 2016; Lee & Gereffi, 2021).

As the digital business models and organisational function become intertwined across firm boundaries, value capture and distribution transcend the firm-specific advantages (FSAs) (Verbeke & Hutzschenreuter, 2021) and is conceptualised at the ecosystem level (Dabrowska et al., 2022; Strange et al., 2022). The thematic focus on digital ecosystems lifts the debate on for-profit firm level digital transformation particularly in countries behind the technology frontier from the command-and-control context of traditional hierarchical value chains to the fluid, self-organised and unbounded scope of ecosystems (Elia et al., 2020; Tan et al., 2020; Rong et al., 2022). The ecosystem as a unit of analysis (Du et al., 2017) for the for-profit firms in countries the technology frontier extends from the elementality of digital infrastructures (Autio et al., 2022; Besson & Rowe, 2012), the ubiquity and interoperability of digital technologies (Adner et al., 2019) and the modularity, decentralisation, and virtualisation of business systems and processes (Tamvada et al., 2022). The ecosystem opens up opportunities for for-profit firms in countries behind the technology frontier to enhance their innovative and productive capacity (Figueirado, 2014) through the transfer of knowledge and business models as part of the ecosystem-specific advantages (ESAs) (Brouthers et al., 2016; Huang et al., 2022; Strange et al., 2022). However, Rong et al. (2022) advance that in the context of firm internationalisation, there are liabilities of ecosystem integration (LoEI) as for-profit firms in countries behind the technology frontier may be become heavily dependent on the ecosystem infrastructure and lose autonomy and control.

Digital platform ecosystems (DPEs)

The digital platform ecosystems (DPEs) facilitate cross-boundary integration across firms, organisational functions and geographies (Brieger et al., 2022; Vaska et al., 2021) and disrupt the value creation, capture and distribution dynamics (Stallkamp et al., 2022). Given that the in situ physical components of digital technology are location-specific and controlled by innovator firms while the digital assets not location-bound and highly transferrable, digital governance issues emerge as pain points (Autio et al., 2021; Du et al., 2017; Lee & Gerefii, 2021; Stallkamp et al., 2022). The question of the institutional framework that governs the multiparty business relations presents tensions between for-profit firms and ecosystems (Furr et al., 2022; Lee & Gereffi, 2021). The institutional and resource asymmetries across geographic boundaries especially in light of data being a resource of transactional and monetary value (Adner et al., 2021; Ahlstrom et al., 2020) present challenges with regard to data generation and monetisation. Stallkmamp et al. (2022) argue that the paradox of digitalisation is a persistent digital ecosystem liability because value creation from digital systems and revenue generation may not be aligned equitably. Peerally et al. (2022) posit that

data generation for digital processes is more challenging in countries behind the technology frontier therefore the for-profit firms in those countries may bear the heavier burden of the ecosystem liability in so far as revenue generation and distribution goes. In this case, the emergent themes of digital platform ecosystems (DPEs), value creation, capture and distribution, digital governance, institutional and resource dynamics are intertwined.

The emergence of the techno-economic paradigm

The techno-paradigm (TEP) is when technological change transforms the economic and socio-institutional structures (Perez, 2010). It not only enables intra- and interfirm learning, but customer learning and co-evolution of the socio-technical business relationships (Peerallly et al., 2022). Notably, the blurring of institutional boundaries (Eriksson & Agerfalk, 2022) and multilateral interactivity (Brouthers et al., 2016). Tamvada et al. (2022) under the digital transformation of for-profit firms in countries behind the technology frontier, customer-centric value propositions are adaptable, self-correcting and predictive. The customer of the digital transformation era has technological savvy and therefore the for-profit firm and all the other relevant business actors generate a digital ecoverse that promotes high level value co-creation and co-evolution despite customer heterogeneity (Adner et al., 2019; Viera et al., 2019).

3.5 Conclusion

In this chapter I conducted the literature review on digital transformation at for-profit firms in countries behind the technology frontier. The departure point was reviewing the theoretical foundations of the current scholarship. I then embarked on a review of the emerging themes on the phenomenon. Lastly, I undertook an evolutionary review of the development of the themes on digital transformation at for-profit firms in countries behind the technology frontier by focussing on the period 2012 to 2022. The next chapter discusses the results of the review, and the theoretical contribution of the scoping review.

Chapter 4: Discussion of literature review

4.1 Introduction

The scoping review on digital transformation at for-profit firms in countries behind the technology frontier has explored the scholarship on the phenomenon for the period ranging from 2012 to 2022. The theoretical foundations provide a background of the lenses through which scholarship on digital transformation at for-profit firms in countries behind the technology frontier has interpreted, understood and explained the phenomenon. Theories like the resource-based view (RBV) of the firm, the institutional theory and the catch-up perspective are common across the scholarship. There is a multiplicity of theories and heterogeneity of contexts for for-profit firms and countries behind the technology frontier has enriched the scholarship. Similarly, the emergence of themes as the field grows and the theoretical scope gets wider helps focus scholarship towards conceptual and construct clarity and convergence. As a result, the thematic mapping and review of the thematic evolution for the period 2012 to 2022 helps scholarship to attain theoretical stabilisation.

Does digital transformation mean the same across the technology frontier?

Scholarship on digital transformation in general is still in the nascent phase with almost 85% of the literature published since 2017 (Appoio et al., 2021; Dabrowska et al., 2022; Hanelt et al., 2021). In that sense, what is known about digital transformation lacks conceptual clarity (Eriksson & Agerfalk, 2022; Hanelt et al., 2021; Vial, 2019; Wessel et al., 2021). Since theoretical evolution is built on good practice (Balazka & Rodighiero, 2020; Ferreira et al., 2018; Ployhart & Bartunek, 2019), and digital transformation at for-profit firms in countries behind the technology frontier is a late arrival (Brouthers et al., 2016), scholarship in that context is a late arrival as well. There is scarcity of scholarship on digital transformation at for-profit firms in countries behind the technology frontier (Avgerou et al., 2016).

The nascency of the digital transformation scholarly field, particularly in countries behind the technology frontier, means that the field is characterised by conceptual paradoxes (Appoio et al., 2021; Furr et al., 2022; Smith and Beretta, 2021). In that regard, does digital transformation at for-profit firms in countries behind the technology frontier mean the same as that in countries leading the frontier? There is no evidence of differences in conceptual definitions of digital transformation at for-profit firms in countries leading and behind the technology frontier. As a result, the review relied on mainstream definitions proposed by Gong and Ribiere (2021) and

Vial (2019). This aids the understanding of the theoretical underpinnings and conceptualisation of the themes through the same lens across scholarship.

Therefore, informed by extant literature on the conceptualisation of digital transformation, this study sought to scope out the scholarship on digital transformation at for-profit firms in countries behind the technology frontier as a basis for further theorising (Teubner & Stockhinger, 2020). In achieving that objective, my approach included mapping out the theoretical foundations that the current scholarship has relied on in understanding and interpreting the phenomenon (Cornelissen, 2017; Shepherd & Suddaby, 2018).

What is known about theoretical foundations of scholarship on digital transformation at for-profit firms in countries behind the technology frontier?

There is debate in scholarship about the adequacy of the current organisational theories to help interpret, understand and explain digital transformation as a phenomenon. Despite scholars applying the current organisational and management theories to study digital transformation calls for new theories to be developed have been raised. Appoio et al. (2021) argue that digital transformation lacks a unified conceptualisation on key dimensions, constructs and themes. Digital transformation has been so complex, multidimensional and transdisciplinary such that it may result in extreme and disruptive changes on one hand whilst it engenders unintended rigidities in organisational systems and processes at the same time. Therefore, the attendant paradoxical dynamics challenge the theoretical adequacy of current organisational theory (Appoio et al., 2021; Dabrowska et al., 2022; Hanelt et al., 2021).

Underlying this debate, are the properties of the digital technologies which have disrupted the traditional boundaries in terms of processes, systems, institutions, relations and concepts (Eriksson & Agerfalk, 2022). Since they are built on autogenic data that is powered by algorithms with even more generative capabilities, digital technologies have a taken a life of their own apart from human agency (Adner et al., 2019; Eriksson & Agerfalk, 2022) which was traditional responsible for organisational processes and systems (Hanelt et al., 2021). Essentially, that has further result in causal complexities, thereby challenging the pre-eminence of correlational theorising in preference of configurational theorising (Furnari et al., 2021). The multilateral hyperconnectivity, interactivity and interdependencies inherent in

digital transformation challenges the assumption of symmetry which are central to correlational theorising – the assumption of symmetry assumes that causality is reversible (Adner et al., 2019; Furnari et al., 2021; Vieira et al., 2019). In that regard, correlational theorising, as applied through the theoretical foundations in much of the current scholarship on digital transformation at for-profit firms in latecomer countries fails to account for causal complexity and multi-finality (Furnari et al., 2021). To that end, scholars like Furr et al. (2022), Smith and Beretta (2021), and Wimelius et al. (2020) theorise on digital transformation through paradoxical lenses. Appoio et al. (2021) and Dabrowska et al. (2020) argue that the paradoxical perspective dominates the nascent phase of the development of a research field before it attains conceptual convergence.

Furthermore, Avgerou et al. (2016) and Peerally et al. (2022) argue that theorising on digital transformation at for-profit firms in countries behind the technology frontier faces the challenge of the inadequacy of quality data due to data collection limitations. Peerally et al. (2022) further points out that the theoretical contributions emanating from countries leading the technology frontier may, as a result, not be adequately applicable to the contexts of countries lagging or falling off the technology frontier. However, as much as Adner et al. (2019) and Hanelt et al. (2021) concur on the limitations of current organisational theories, they suggest that the current organisational theories provide a relevant and solid background for theorising even as the scholarship drifts towards treating digital transformation as a new research paradigm. In that regard, this scoping review paves the way for future theorising by mapping out the theoretical and thematic foundations (Barrett et al., 2022; Teubner & Stockhinger, 2020) that have hitherto been applied in the scholarship on digital transformation at for-profit firms in countries behind the technology frontier.

Different theories have been applied to the scholarship given the heterogeneity of the contexts (Hanelt et al., 2021) and the complexity, multi-disciplinarity and multi-dimensionality of digital transformation (Appoio et al., 2021; Verhoef et al., 2021; Vial, 2019). Furthermore, digital transformation is constantly evolving, in both scholarship and practice, though scholarship lags behind practice (Adner et al., 2019; Balazka & Rodighiero, 2020; Ferreira et al., 2018; Hanelt et al., 2021). The complexity and multidimensionality digital transformation, in some cases, is best explained through a combination of theories. Similarly, the different stages of the evolvement of the phenomenon matures into stages where different theories add better conceptual or theoretical value (Adner et al., 2019; Buckley et al., 2020; Lee & Gereffi, 2021; Strange et al., 2022). And, as the scholarship on digital transformation evolves from

information systems or information technology literature where information systems or information technology-enabled organisational transformation (ISOT/ITOT) was the phenomenon of interest, new insights about the adequacy of current theoretical foundations in scholarship emerge (Besson & Rowe, 2012; Wessel et al., 2021). However, even as the technology evolves widening the scope for theoretical contribution, the countries behind the technology frontier lag behind the technological and scholarly evolution (Abramovitz, 1986; Avgerou et al., 2016; Brouthers et al., 2016; Figueirado, 2014; Figueirado & Cohen, 2019; Peerally et al., 2022).

The resource-based view (RBV) remains one of the influential and most cited theory in the scholarship on digital transformation at for-profit firms in countries behind the technology frontier. Its adequacy in explain phenomena in the digital transformation era has been questioned as it emphasises the value and rarity of internal firm resources as drivers of firm competitiveness (Nason & Wiklund, 2018). Furthermore, the inimitability and non-substitutability of the resources underlie the firm's unique value proposition. However, digital transformation has opened avenues for for-profit firms in countries behind the technology frontier to digital platform ecosystems which are powered by ubiquitous, intangible and fungible digital resources (Autio et al., 2021). Therefore, while the resource-based view (RBV) emphasises the firm-specific advantages (FSAs), digital transformation re-orients for-profit firms in latecomer countries towards ecosystem-specific advantages (ESA) (Strange et al., 2022; Verbeke & Hutzschenreuter, 2021).

The resultant blurring of boundaries (Eriksson & Agerfalk, 2022) and non-location boundedness of digital resources (Verbeke & Hutzschenreuter, 2021) drive interfirm collaboration which contrasts the rarity, inimitability and non-substitutability of resources under resource-based view (RBV) (Nason & Wiklund, 2018). Kraaijenbrink et al. (2010) argue that such tensions emanate from the historical origin of the resource-based view (RBV). They argue that it originated as a complement to the industrial organisation (IO) view, which was built on the structure–conduct–performance paradigm. However, resources are differentiated as VRIN (Valuable, Rare, Inimitable, Non-substitutable) resources (Barney, 1991; Barney, 2018) and versatile resources (Penrose, 1955). In that sense, digital resources would be the versatile resources. To adopt the conceptualisation by Autio et al. (2021), the combination of the VRIN and versatile resources fit in the digital transformation at for-profit firms in countries behind the technology frontier as they represent the physical location-bound digital resources and fungible non-location bound digital assets, respectively. Therefore, in that sense, the

resource-based view (RBV) provides foundational orientation to theorising on digital transformation at for-profit firms in countries behind the technology frontier given its simplicity and face validity (Adner et al., 2019; Hanelt et al., 2021; Kraaijenbrink et al. 2010).

Similarly, the institutional theory is another much cited and influential in scholarship on digital transformation at for-profit firms in countries behind the technology frontier. The role of institutions in driving digital transformation at for-profit firms in countries behind the technology frontier has been widely researched (Brieger et al., 2022; Das & Brine, 2020; Ghulam, 2021; Wong & Goh, 2015). However, as digital transformation results in non-location boundedness of production processes and value creation, capture and distribution, challenges emerge over geographic and institutional heterogeneity (Verbeke & Hutzschenreuter, 2021). Furthermore, the ubiquity, intangibility and fungibility of digital technologies have facilitated the integration of for-profit firms in latecomer countries into global value chains (GVCs). Thus, as firm internationalisation unfolds, and to get a multidimensional understanding of the phenomenon the institutional theory requires an extension with other theories or perspectives (Strange et al., 2022).

In line with the complexity, multidimensionality and trans-disciplinarity of digital transformation, scholars like Lee and Gereffi (2021), Peerally et al. (2022) and Wong and Goh (2015) have combined perspectives from a number of theories to interpret, understand and explain the context for for-profit firms in latecomer countries. Such theoretical extension has broadened the understanding of the phenomenon to cover the inadequacies that some correlational theorising may reflect (Furnari et al., 2021).

4.2 Theoretical contributions

However, despite the concerns about the dominance of the theoretical foundations cited most in the scholarship on digital transformation at for-profit firms in countries behind the technology frontier, theoretical development has not been stalled (Nason & Wiklund, 2018). The theoretical foundations were not cited just for their simplicity and elegancy (Kraaijenbrink et al., 2010) but due to their realism (Furnari et al., 2021). Scope remains, though, for broadening the theoretical apparatus to encourage scholarship on phenomena where standard tools may not be adequate like digital transformation (Appoio et al., 2021; Dabrowska et al., 2022; Furnari et al., 2021; Hanelt et al., 2021).

i. Therefore, in light of the first sub-research question of this scoping review, this study contributes to theory to provide a synoptic descriptive account of the theoretical foundations of the theories used in current scholarship on digital transformation in countries behind the technology frontier. The descriptive scope for the theoretical foundations on the scholarship on digital transformation at for-profit firms in countries behind the technology frontier provides the framework for future theorising (Makadok et al., 2017; Paré et al., 2015; Teubner & Stcokhinger, 2020). There is debate on the direction of theoretical foundations to be used in scholarship on digital transformation. Adner et al. (2019) and Hanelt et al. (2021) recognise the contentions raised by Appoio et al. (2021) regarding the adequacy and/or limitations of the current organisational theories to help understand, interpret and explain digital transformation. However, as a building block, Adner et al. (2019), Hanelt et al. (2021) and Smith and Beretta (2021) propose the use of current organisational theories to map out the extant theoretical gaps. Appoio et al. (2021) and Dabrowska et al. (2022) propose the paradigmatic approach to theorising as an avenue to capture the complexity, multidimensionality and trans-disciplinarity of digital transformation. In that sense, this study provides the descriptive function or fact of the current use of theoretical foundations as a theoretical contribution that lays the groundwork for future theorising (Barrett et al., 2021; Paré et al., 2015; Teubner & Stockhinger, 2020).

The thematic mapping, when viewed through the lenses of the theoretical foundations, confirms and expands the conceptual scope of the scholarship on digital transformation at for-profit firms in countries behind the technology frontier (Barret et al., 2021; Teubner & Stockhinger, 2020). The themes provide contextualised insights on what digital transformation is and how scholarship has understood it over the course of the study period. Therefore, this study contributes to the theoretical gaps represented by the second and third sub-research questions and the contribution is broken down into four:

ii. In identifying, analysing and interpreting the themes, the scoping review mapped out a pattern of the themes in the context of for-profit firms in countries behind the technology frontier. The thematic patterns reveal the conceptual shortcomings and incongruencies (Appoio et al., 2021; Hanelt et al., 2021; Vial, 2019) which may result in conceptual or construct proliferation and subsequent

redundancy in research (Shepherd & Suddaby, 2018). In that regard, the conceptualisation of the themes corresponds with the scholarship on firm-level digital transformation in countries leading the technology frontier therefore the similar theoretical foundations and themes may be replicable (Appio et al., 2021; Hanelt et al., 2021; Shepherd & Suddaby, 2018; Snyder, 2019).

iii. The third theoretical contribution maps out the points of conceptual convergence and divergence (Gong & Ribiere, 2021; Shaffer & DeGeest, 2016; Vial, 2019). Conceptual convergence and divergence provide a basis for developing unified conceptual definitions and boundary conditions for digital transformation at for-profit firms in countries behind the technology frontier (Busse et al., 2018; Gong & Ribiere, 2021; Hanelt et al., 2021; Shaffer & DeGeest, 2016; Vial, 2019; Wessel et al., 2021). Therefore, the theme convergence and divergence add clarity to the denotative and connotative properties of conceptual definitions which strengthens the interpretive and predictive function of the definitions (Gong & Ribiere, 2021; Morton et al., 2022; Vial, 2019; Wacker, 2004). Furthermore, the themes fortify the clarification of boundary conditions which enables the reliable empirical theorising in the future (Busse et al., 2018; Gong & Ribiere, 2021; Morton et al., 2022; Vial, 2019; Wacker, 2004).

iv. Fourth, the thematic mapping helps expand the theorising toolkit by confirming and expanding the digital transformation epistemological base in the context of the for-profit digital transformation in the countries behind the technology frontier (Hanelt et al., 2021; Teubner & Stockhinger, 2020). The epistemological clarity that emanated from thematic mapping influences how we conceptually understand the nature of digital transformation at for-profit firms in countries behind the technology frontier and we must conduct research in similar settings (Ashkanasy, 2016). Lee and Malerba (2017) posit that digital transformation at for-profit firms in countries behind the technology frontier is a heterogenous and paradoxical phenomenon, that is, different context generate different findings which might even seem contradictory. Hence, as heterogenous as digital technologies and digital organisational processes are, the different context for the research provided a theoretical understanding of the phenomenon in different contexts and therefore the conditions for its generalisation (Appoio etal., 2021; Figueirado & Cohen, 2019; Hanelt et al., 2021; Koseoglu et al., 2016).

v. Finally, the mapping of the ten-year thematic evolution of scholarship at for-profit firms in countries behind the technology frontier revealed the temporal patterns and progression in the conceptual development of the phenomenon. This helped track the maturity trajectory and process for the epistemological and ontological structure of theory building and testing in the domain (Balazka & Rodighiero, 2020; Hanelt et al., 2021). Essentially, the thematic evolution provided an understanding of the development of the phenomenon and its conceptual underpinnings in pursuit for theoretical stabilisation (Nunes et al., 2019). As the phenomenon reaches theoretical stabilisation, it also attains methodological stability which strengthens the validity and reliability of research processes and outcomes (Balazka & Rodighiero, 2020; Hanelt et al., 2021; Teubner & Stockhinger, 2020).

4.3 Practical contributions

The results from the study clarify the influential theories and key themes in scholarship on digital transformation at for-profit firms in countries behind the technology frontier and therefore will prime management and policy makers to strategically evaluate the state of digital readiness of their respective organisations. Therefore, management and policy makers will deliberately and strategically infuse dynamism in responding to the multiple opportunities and challenges associated with digital transformation, especially by building digital competencies so that the employees, internal systems and structures are digitally ready (Gfrerer et al., 2021; Nielsen et al., 2019; Opland et al., 2021).

4.4 Conclusion

This chapter discussed the theoretical foundations and thematic mapping and evolution. Digital transformation at for-profit firms is an area that is largely underexplored therefore the scoping review laid the foundations for further theorising. In the next chapter, I will outline the limitations of the review, and make recommendations for future research as the conclusion to the review.

Chapter 5: Conclusion, research limitations and recommendations for further research

Introduction

Chapter one of this scoping structured literature review argued that scholarship on digital transformation at for-profit firms in countries behind the technology frontier is an underexplored phenomenon (Avgerou et al., 2016; Peerally et al., 2022). As a result of that problem identification, this study sough to find out what is known about scholarship on digital transformation in countries behind the technology frontier.

Having identified the problem, research questions were formulated as the primary trigger for the research process. The following questions then guided he research process:

Main research question:

What is known about scholarship on digital transformation at for-profit firms in countries behind the technology frontier?

Sub Research Questions:

1. What are the theoretical foundations of scholarship on digital transformation at for-profit firms in countries behind the technology frontier?
2. What are the emergent themes in scholarship on digital transformation at for-profit firms in countries behind the technology frontier?
3. What has been the thematic evolution of scholarship on digital transformation at for-profit firms in countries behind the technology frontier?

Thereafter, chapter two provided an overview of the methodology for the structured literature review which is the scoping review. In this chapter the methodological choice, data collection and analysis process were justified.

In chapter three, I conducted the scoping review and summarised the theoretical foundations, the emergent themes and thematic mapping.

I then undertook discussion of the findings, that is, the literature review in chapter four where I outlined the theoretical and practical contributions.

Finally, I concluded the scoping in this chapter by outlining the limitations of the review, and make recommendations for future research as the conclusion to the review.

Conclusions to the findings of the research questions

The study identified, described and analysed the most cited and influential theoretical foundations and perspectives in the scholarship on digital transformation at for-profit firms in countries behind the technology frontier. Notably, these are the resource-based view (RBV), the institutional theory, the global value chains (GVCs) governance theory the internalisation theory, the dynamic capabilities theory, the catch up and internationalisation perspectives. Furthermore, it identified five themes namely:

i. Epistemological evolution of digital transformation.
ii. Digital technology diffusion and adoption.
iii. Technological capability accumulation.
iv. Value creation, capture and distribution.
v. Digital platform ecosystem.

Finally, the study mapped out the thematic evolution of the phenomenon of interest for the period 2012 to 2022. In that sense, the scoping review descriptively and analytically outline the theoretical foundations, the emergent themes and the thematic evolution.

Research limitations

In as much as the study met its objective, there are some limitations. Scoping reviews are broad and diverse and therefore do not restrict the literature to be reviewed (Arksey & O'Malley, 2005; Barret et al., 2021; Westphaln et al., 2021). However, despite the flexibility, only peer reviewed articles were selected. Despite an upside in terms of the quality of literature, the review was not sufficiently though necessarily broad since it included peer reviewed articles that are not rated by both the Association of Business Schools Academic Journal Guide and the Australian Business Schools Deans Council Journal Quality List (Gaur & Kumar, 2018; Snyder, 2019).

Despite being methodologically rigorous throughout the process, the study included some articles which did not specifically mention digital transformation but dealt with advanced technologies, among others. The author determined the eligibility of each such article upon full reading of the article in accordance with the approach adopted by Barrett et al. (2021) and Westphaln et al. (2021).

Arksey and O'Malley (2005) Framework includes a sixth optional stage in the scoping review wherein the coding and analysis is reviewed by experts to moderate intercoder reliability and thematic review quality. This stage was not undertaken for this study therefore it may compromise the quality of the results. However, the author ensured methodological rigour, consistency and coherence throughout the research process. Additionally, the study methodology was transparently outlined.

Recommendations for future studies

There is greater scope and gaps for conducting scoping reviews for each theoretical foundation to provide the descriptive and analytical reviews of the relevant findings. The findings of a study provide a basis for the theoretical contribution (Cornelissen, 2017; Makadok et al., 2018) therefore, a scoping review on the findings of the scholarship on digital transformation at for-profit firms in countries behind the technology frontier provides the descriptive snapshot of the incremental theoretical contribution. This facilitates the mapping out of the research gaps and potential for future research (Barrett et al., 2021; Westphaln et al., 2021). For example, mapping out the findings on the studies that cited the resource-based view (RBV) helps carve out the inadequacies and opportunities for extending the theory.

This scoping review has identified the need to develop conceptual frameworks on technological capability accumulation (TCA) on digital transformation in for-profit firms in countries behind the technology frontier. According to Peerally et al. (2022), the technological capability framework (TCA) they developed may not adequately apply in the context of countries behind the technology frontier. In that regard, there is gap to test if the framework is applicable in the context of countries behind the technology frontier or, to extend the framework so that it becomes contextually adequate and relevant (Hanelt et al., 2021).

The thematic mapping went only as far as aggregating the themes and did not build any conceptual framework or theoretical postulations. Notably, scoping review are descriptive and analytical and do not seek to build or test theory (Arksey & O'Malley, 2005; Barrett et al., 2021; Westphaln et al., 2021). However, they lay the foundations for future theorising (Arksey & O'Malley, 2005; Teubner & Stockhinger, 2020). As a result, the study recommends future theorising on each of the themes that have emerged from the scoping review to deepen and enrich the scholarship on digital transformation at for-profit in countries behind the technology frontier.

Conclusion

This scoping review sought to understand what is currently known about scholarship on digital transformation at for-profit firms in countries behind the technology frontier. The study was built from the research question which informed the methodology for the structured literature review. Thereafter, the results of the review were presented in the form of a literature and the discussed and resultant theoretical and practical contributions specified. Finally, to close the study, the limitations of the study and suggestions for future studies were made.

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