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Ana Paula dos Santos Tavares

Getulio Vargas Foundation, anapaula.dstavares@gmail.com

Luiz Antônio Joia

Getulio Vargas Foundation, luiz.joia@fgv.br

Marcelo Fornazin

Fluminense Federal University and Oswaldo Cruz Foundation, fornazin@gmail.com

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Digital Transformation for Development: A Multilevel Conceptual Framework

Ana Paula Tavares
Getulio Vargas Foundation
anapaula.dstavares@gmail.com

Luiz Antonio Joia
Getulio Vargas Foundation
luiz.joia@fgv.br

Marcelo Fornazin
Fluminense Federal University and Oswaldo Cruz Foundation
fornazin@gmail.com

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ABSTRACT

This article aims to address the underlying challenges and opportunities associated with digital transformation for development. One intends to identify the main impacts of digital technologies in developing countries and how it is possible to extend their benefits to mitigate the digital divide and enable development. As such, based on a review, interpretation, and synthesis of both digital transformation and ICT4D¹ literature and through a structured narrative literature review, this study proposes a Digital Transformation for Development (DT4D) conceptual model. Grounded on a critical interpretive approach, this model pinpoints how digital transformation scholarship has focused on organizations and overlooked the potential of existing digital technologies to enable development at a societal level. That way, the main objective of the model developed is to investigate the role and impact of digital transformation in supporting development at a societal level and propose avenues for future research.

Keywords: Digital Transformation; Development; Digital Divide; Digital Transformation for Development; Information and Communication Technology for Development

INTRODUCTION

Are digital technologies enabling sustainability, inclusive growth, and social justice in developing countries? Digital transformation (DT) has become a strategic phenomenon in recent years (Vial, 2019) and the interest on it has been growing across academia and practitioners at an exponential rate (Wessel et al., 2021). However, there is a lack of understanding on DT conceptualization, nature, and implications. Essentially, the mainstream literature on digital transformation seems more focused on the organization-level from a business perspective, thereby putting little attention on the context in which companies operate (Mergel et al., 2019; Vial, 2019). In fact, digital transformation initiatives emerge from an appropriate environment with infrastructure, systems, and institutional, political, and cultural conditions, thereby enabling development, inclusion, and growth (Gigler, 2015; Heeks, 2019). Thus, it is necessary to take into account a broader context when thinking about digital transformation initiatives in developing countries.

Despite the multiplicity of technological novelties and recipes for their implementation, digital transformation initiatives are taking much longer and facing more difficulties than it has been expected (Reis et al., 2018). Simultaneously, there has been growth in the importance of resilience - the ability of systems to cope with external shocks and trends (Heeks and Ospina, 2019) - accelerated drastically by the Covid-19 pandemic (Soto-Acosta, 2020). The relevance of addressing complex social problems and generating social value mainly for marginalized communities is addressed by inclusive innovation (Peerally et al., 2018). Foster and Heeks (2013, p.335) define inclusive innovation as “the means by which new goods and services are developed for and/or by vulnerable populations living on lowest incomes. Contrasting conventional views of innovation, inclusive innovation explicitly conceives development in terms of active inclusion of those who are excluded from the mainstream of development and refers to the inclusion within some aspect of innovation of groups who are currently marginalized”. Therewith, society is supposed to rely on digital technologies to develop an environment capable of dealing with this pace of change (Avgerou, 2017).

¹ ICT4D is an acronym for Information and Communication Technology for Development.

The abovementioned issues have led to some questions still unanswered, such as: how is digital transformation enabling and supporting development? And how does digital transformation for development evolve over time to foster sustainability, inclusiveness, and growth? In order to try to answer these questions, some studies have examined the differences between digital transformation and IT-enabled organizational transformation (Wessel et al., 2021), the role of inclusive innovation policy and practice for development (Heeks et al., 2014), the assessment of digital inclusion via the actor-network theory (Joia and Teles, 2010), the definition of conceptual modeling research in a digital world (Recker et al., 2021), and a progress report about theories of digital transformation (Markus and Rowe, 2021). However, little is known about the dark side of digital transformation initiatives in developing countries, so that a conceptual framework for digital transformation for development (DT4D) can be proposed. In fact, the unintended effects of DT initiatives driven by economic and commercial interests have so far been little addressed by academia (Zheng et al., 2018).

This study aims to fill this gap, identifying the peculiarities of digital transformation initiatives in developing countries and how the actors involved with them appropriate the available technologies, through socio-technical approaches, to generate impacts at the social level. Thus, this work intends to shed light on the categories of negotiation as these categories take into account the different interests, commitments, plans, perspectives and positions of the network of social groups interacting with the digital technology, as well as how they influence the process and outcomes of technologies-in-practice and the emergent social structures (Walsham, 1995).

This article is structured as follows. After this introduction, the second section presents the research method. The third section presents a literature review related to the concept of digital transformation for development. The fourth section proposes a multilevel conceptual framework based on the review and interpretation of both DT and ICT4D literature. Finally, in the fifth section, concluding remarks and future research avenues are set forth.

RESEARCH METHOD

This research is based on qualitative methodology (Alvesson and Sandberg, 2011), designed as a structured narrative literature review (Paré et al., 2015) on Information Systems, Management,

and Organizational Science research, and grounded on a critical interpretive approach (Klein and Myers, 1999; Pozzebon, 2004; Walsham, 1995). Thereby, one intends to propose a conceptual framework of DT4D. The research method was developed engaging in a dialectical argument looking back and forward to recognize and challenge field assumptions and beliefs about the central aspects of DT (Alvesson and Sandberg, 2011). Hence, based on review, interpretation, and synthesis of both DT and ICT4D literature, one proposes a multilevel meta-model for digital transformation for development. That way, this article is aimed at revamping the theoretical foundations of digital transformation for development research by improving understanding of the digital technologies' dynamics through a review of ICT4D models accrued from the Information Systems (IS) field. Accordingly, this study proposes a multilevel meta-model that merges DT, IS, and ICT4D issues from the perspective of society.

The methodological procedure adopted sought consistent and trustworthy data collected through (i) search in scientific libraries and databases (e.g., AIS library, Web of Science, and Google Scholars), (ii) successive readings and discussions, (iii) conferences and webinars participation, and (iv) suggestions of references made by other researchers. As a result, the study comprises a dataset of 58 articles (24 articles about DT and 34 articles about ICT4D) that were analyzed from two dimensions: levels of analysis (Viale-Pereira et al., 2020; Gigler, 2015; Joia, 2004; 2010) and types of ICT4D theories (Sein et al., 2019; Avgerou, 2017; Walsham, 2017). From this inquiry, a multilevel model is proposed by articulating three main dimensions: levels of analysis, types of theory, and outcomes, as presented later in Figure 4.

DIGITAL TRANSFORMATION AND DEVELOPMENT

Complexity and hyperconnectivity permeate increasingly the digital world with the rise of social media, robotic process automation, digital business platforms, algorithmic decision making, global digital infrastructure, to name but a few (Benbya et al., 2020). Such hyperconvergence of technologies fosters connections and collaborations in many dimensions among humans, artifacts, processes, organizations, and societies. In such a context, digital transformation has become a central topic, presenting challenges, opportunities and vulnerabilities that impact developmental factors, society, and individuals (Viale Pereira et al., 2020). As DT has become a strategic phenomenon (Vial, 2019), a great number of studies on DT has been developed by

academia (Vial, 2019; Markus and Rowe, 2021), practitioners (McKinsey, 2016), and policymakers (World Economic Forum, 2020).

Indeed, digital transformation is a multilevel, multidimensional and polysemic concept, bringing complexity to its conceptualization and application in different contexts (Vial, 2019; Wessel et al., 2021). Although some efforts have been made by scholars to define digital transformation (Reis et al., 2018; Vial, 2019), currently, there is no commonly accepted definition for this construct (Markus and Rowe, 2021). In order to propose a definition consistent with the related concept of digitalization, including individual, organizational, and societal context, Vial (2019, p. 118) built the following definition for DT: “a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies”. Also, most of research on digital transformation has been focusing on organization-level analysis in both private and public sectors (Mergel et al., 2019). Despite the large number of topics and discussions involving DT, such a viewpoint focusing on the organizational level within the private and public sectors does not grasp the implications of DT at a societal level (Riasanow et al., 2018). Therefore, future research might consider alternative angles to review the current body of knowledge associated with DT.

In short, digital transformation has become an important phenomenon and it is paramount to recalibrate the discussions around the interplay between digital technology and its value propositions to individuals, organizations, and society. While digital transformation activities leverage digital technologies in defining their value propositions, they should also involve the emergence or enhancement of organizational and social identities (Wessel et al., 2021). In a recent guest editorial article about "The Theories of Digital Transformation: A Progress Report", Markus and Rowe (2021, p.275) highlight that "clarification of the digital transformation concept could take the form of identifying digital properties that may make a difference (Benbya et al., 2020) or discussing whether digital properties are modifiable during interactions with humans". Therefore, additional understanding of digital transformation definition and theoretical contributions compatible with interpretive theoretical arguments are needed (Markus and Rowe, 2021).

Harris (2016) asserts that studies on ICT4D have been willing to influence both practice and policy and should engage broadly with users to communicate their findings and have a real impact. In such a context, Walsham (2012) provokes a debate towards the impact of ICT in developing countries questioning if "we are making a better world where people from less advantaged backgrounds can be enabled to enhance their capabilities and increase their participation in matters which affect their lives" (Walsham, 2017, p. 37). Heeks (2019) mapped out elements of the changing relationship between ICTs and development, which evolved along the years and today conceptualizes ICT not as one tool among many that enable particular aspects of development but as the digital platform that increasingly mediates development. This new paradigm focuses on transformation, inclusion and sustainability elements, raised from the Sustainable Development Goals - SDG (Heeks, 2019). In this regard, a new technological base (e.g., industry 4.0, social media, digital platforms, etc.) is digitizing development, leading to datafication and digitalization of development processes (Walsham, 2017). This new mindset has implications not just for development efficiency and effectiveness but also for issues related to social justice, inequality, to name but a few (Kleine, 2009; Gigler, 2015; Harris, 2016)

Although some issues remain the same, such as the view of the poorest and the innovation models (Heeks, 2019), new concerns emerged, namely the important role of digital platforms, the main objectives of the SDGs, and the nature and importance of people's engagement with technology (Walsham, 2012; Heeks, 2019; Viale Pereira et al., 2020). This new century is thus marked by a paradigm shift in the relationship between technology and development, reinforcing the important role of digital technology for development (Zheng et al., 2018). Therefore, the emerging 'digital for development' paradigm aims to balance intervention and collaboration through adaptation to promote development, sustainability, inclusion, and growth (Bon, 2019).

Based on such evidence, the present study intends to address that paradigm shift and make a valuable contribution to the field by investigating the role and value of digital transformation in enabling and supporting development. Considering the Covid-19 pandemic context and the acceleration of digital transformation initiatives worldwide (Soto-Acosta, 2020), studies comparing the pre- vs. post-Covid-19 pandemic environment are vital to providing a critical contextual understanding - including potential boundary conditions - of established theories

(Venkatesh, 2020). That way, the extant literature on digital transformation has failed to address important concerns for developing countries. Infrastructure, business environment, institutional, political, and cultural issues can influence digital transformation at a country level. Thereby, it is necessary to consider seriously context when thinking about digital transformation in developing countries (Avgerou, 2010; Heeks, 2010; Avgerou and Walsham, 2000). In line with this, this study proposes a dialogue between theory and practice, establishes connections between the different actors and ascertains how technology initiatives implemented in developing countries have impacted the challenges imposed by the digital age.

CHALLENGES FOR DIGITAL TRANSFORMATION

One of the main challenges faced by scholars and practitioners about the digital transformation phenomenon is the level of abstraction applied to the concept (Riasanow et al., 2018). Whether at the organizational level or industry level, some academics interpret DT as a set of separate transformation initiatives (Matt et al., 2015). Furthermore, the current debate often confuses the digitization, digitalization and digital transformation concepts (Haffke et al., 2016), using them often interchangeably, mostly in the healthcare sector, where "DT is often simply understood as the process of digitization, i.e., transforming analog to digital" (Riasanow et al., 2018, p. 12).

The great number of DT definitions and classifications prevent researchers from blueprinting an overview of the existing body of knowledge and understanding the drivers of digital transformation (Verhoef et al., 2021). In this regard, South American science experts (Viale Pereira et al., 2020) assert that besides the need of conceptualizing and understanding the DT phenomenon, it is also paramount to put a lens on the drivers, challenges, and vulnerabilities of digital transformation in developing countries. In such a context, one can set potential actions for transdisciplinary processes, understanding mechanisms and paths in which side effects of digital transformation may become the subject of overarching research on development, society and individuals (Joia, 2016; Santos and Joia, 2017; Tarafdar et al., 2015). To promote sustainable digital environments, 15 major concerns have been raised by South American experts, which are adapted and presented in Table 1. Evidence suggests that the mainstream literature on digital transformation seems to be more focused on business, strategy, and organizational change. On the other hand, Viale Pereira et al. (2020) unveil broader concerns about DT, such as ethical

dilemmas, literacy, inequality, legal systems, among others, all of them with potential to impact society at large.

Cluster	Major Concerns
Societal Impacts	Rebounds of smart cities and spatial transfer
	Global companies versus local industries and small and medium enterprises
	Legal systems
	Mitigating corruption
	Digital Literacy/ Inequality
	Data as the new currency
Specific capabilities and ways for coping with digital technologies	Global digital divide
	Digital readiness
Informed Opinion in a digital world	Bias on data-driven decision making
	Acceptance of autonomous decision-making
Ethical Dilemmas	Trust in unknown virtual sources of information
	Ethical dilemmas
	Social media has the power to jeopardize democracy
	Identifying vulnerable groups
Governmental Capacity	Lack of government capacity

Table 1. Digital Transformation Major Concerns
Adapted from Viale Pereira et al. (2020)

As a result of that broader view, this study grouped the 15 concerns presented in Table 1 into three levels of approach that comprise: (1) Economic, Political, Ethical, and Legal Issues; (2) Infrastructure, Access, and Education Issues; (3) Sustainability, Inclusion, Freedom, and Societal Issues. These three levels of approaches were analyzed vis-à-vis three degrees of concern, namely, (i) social impacts, (ii) ability to deal with digital technologies, (iii) ethical dilemmas and government capacity. These 15 main concerns reflect the undesirable effects of the digital transformation in the Global South, portraying a transdisciplinary and critical view of the main

challenges facing developing countries in achieving sustainable development. Below, a brief description of each level of approach is provided.

Economic, Political, Ethical, and Legal Issues

The first level of approach encompasses economic, political, ethical, and legal aspects, whose premises address the use of digital technologies by the community based on political agreements, legal arrangements (e.g., GDPR), digital government platforms flexible and adapted to citizens, mainly to the vulnerable groups (e.g., women, black, migrants), efficient and integrated public-private partnerships, social media, algorithms audit and fake news control. Additionally, this first level approach considers the role of dissemination of standards and values in the digital network through open government, transparency and e-participation, which enables an online dialogue based on digital literacy that empowers people through reliable democratic processes (Viale Pereira et al., 2020). To do that, it is necessary to enable employment generation, attract technology-intensive enterprises and create technology centers to name but a few (Joia, 2010).

Infrastructure, Access, and Education Issues

The second level of approach considers processes and capabilities related to infrastructure, skills, and education. Communities can take advantage of digital technologies via structures and systems, namely, operating systems, types of networks, types of internet access, and transparent algorithms. These structures combined with computers access, digital devices and maintenance contracts create telecenters and labs. Such an environment enables collaboration with startups, venture capitals, and companies that have the power to boost inclusive and frugal innovation. Furthermore, it is fundamental to develop mechanisms and incentives for educating and retraining people to acquire new skills, and to use ICT as a tool for administrative and pedagogical support of education (Teles and Joia, 2010). This dimension also refers to the reform of primary and secondary education, in particular for children relying on public education (Viale Pereira et al., 2020), as well as training of citizens to understand e-government systems, social apps, portals, lives, and social media applied to the local population. In addition, pedagogical models should be adapted to local and vulnerable groups to disseminate information properly (Teles and Joia, 2010; Gigler, 2015).

Sustainability, Inclusiveness, Freedom, and Societal Issues

The third level of approach considers sustainability, inclusiveness and freedom aspects based on societal premises to empower human capacity through tangible benefits, emancipated use of digital technologies, and, thus, well-being. As an example of this dimension, smart cities initiatives should take into consideration the risk of gentrification, the city dynamics in developing countries cities, and the development of legal systems in place to balance the asymmetrical power relationship between citizens and internet giants. Other examples to address sustainability, development and growth are the mitigation of corruption through the implementation of transparency protocols and accountability towards digital government initiatives, as well as the identification of the readiness of the community to develop specific projects considering local contexts. Also, SME and informal sectors, which are extremely important in emerging markets, should be protected by national and regulatory frameworks against global companies to foster inclusive innovation. Likewise, developing countries should adjust their legal frameworks to specify what is allowed and forbidden regarding the use of new technologies (Viale Pereira et al., 2020). Finally, data protection to avoid data leakage is a major concern to be addressed through awareness, education, and development of new business models in different sectors, e.g., health, tourism, trade, and culture (Joia et al., 2011; Díaz Andrade and Urquhart 2012; Gigler, 2015).

That way, the debate is complex as it is required extensive knowledge and reflection to build bridges and answer relevant questions that matter to society mainly in developing countries. Given the large scope and variety of emerging dark side phenomena associated with ICT use (Tarafdar et al., 2015), some scholars have examined theories to explain the potential negative impacts related to digital transformation initiatives. As an example, Viale Pereira et al. (2020) addressed three main aspects: the unintended effects of ICT initiatives in developing countries, the role of social media in the emergence of popular movements, and the effects of smartphone use on mental health.

Despite the potential negative consequences arising from digital transformation initiatives in developing countries, the question is no longer whether these initiatives should be carried out in developing countries, but rather "which ICT efforts should be chosen to contribute to

development of the country" (Viale Pereira et al., 2020, p. 718). ICT has potentially the capacity of contributing to the improvement of various aspects of life - from the reduction of poverty to the strengthening of democracy (Avgerou, 2010). Nevertheless, the impact of ICT in development has not always been successful (Avgerou and Walsham, 2000), which requires an investigation via analysis of actors, discourses and technologies to better understand the concept of development in a digital society. Therefore, one must analyze what 'development' means (Sen, 2001; Zheng et al., 2017), its differences among developed and developing countries, and more importantly, if digital transformation efforts strengthen or attenuates socio-economic gaps that are already spread across developing countries. As such, the next section analyzes the literature on ICT4D through the lens of the three-level dimensions accrued from the aforementioned theoretical reduction.

THEORIZING ICT4D: UNDERSTANDING ICT FOR DEVELOPMENT

Theorizing ICT4D has been challenging and research has increasingly focused attention on conceptualizing ICT4D, linking the concepts to studies on development (Heeks, 2006). Consequently, most ICT4D research has been based on descriptions rather than analytic stances. Moreover, according to Heeks (2008, 2019), the next phase of ICT4D encompasses new technologies, new approaches to innovation, new intellectual integration, and a new view of the poor, raising the following question: "why should we give priority to ICT application for the poor in developing countries?" (Heeks, 2008, p. 26). Regarding this question, the first debate is moral - much of the innovation and technology developed so far have focused on the needs of the world's wealthier corporations and individuals due to a large number of investments. Nevertheless, the biggest problems such as violence, poverty and climate change are impacting the poor the most. The second debate is associated with self-interested awareness - due to globalization, the problems of the poor have become the problems of the rich through terrorism, migration, and diseases (Heeks, 2008), such as the Covid-19 pandemic.

Furthermore, the concept of development encompasses economic, political and social life improvements, which in today's world are increasingly digital. Thus, people without digital access will not be benefited by these improvements (Walsham, 2012). According to Avgerou (2010), there are four main discourses that impact development, namely: ICTs as technology and

knowledge transfer, a process of socially embedded action, a disruptive transformation, and a transformative intervention. The four discourses on ICT4D are a combination of two perspectives regarding the nature of the ICT innovation process and the nature of the development transformation process, giving rise to distinctive discourses about ICT and development. One further challenge proposed by Avgerou (2010) is to bring together the theories on contextualist ICT innovation and the theories on ICT-enabled development. While the contextualist socially embedded theory is a powerful analytical device for micro-level processes, the political economy of development deals with macro-level processes involving aggregates of individuals' actions, collective actors, and institutions (Avgerou, 2010). Indeed, Davison and Martisons (2016) emphasize the role of context in ICT4D research and Walsham (2012) sheds light on the dramatic change that occurred over the last 35 years in the information system (IS) field where ICTs became ubiquitous in many areas of human activity and in all countries of the world. This paradigm shift highlights the need to focus on a broader foundation including different areas of research and considering "ethical goals, increased use of critical approaches welcoming other disciplines with open arms, widening our field of study to many non-traditional settings and rejecting a dominant methodological paradigm" (Walsham, 2012, p. 87).

In this regard, Avgerou (2017), Walsham (2017) and Sein et al. (2019) developed each one a holistic and multidisciplinary perspective on the theoretical foundations for ICT4D research, combining theories from multiple theoretical strands along with middle-range theories. Avgerou (2017) focused on the foundational theories on technology, context and socio-economic development, shedding light on specific topics of ICT-related phenomena in the context of a developing world. Besides, Walsham (2017) discussed the role of theory in ICT4D, questioning which theories should be selected for particular topics and what they might offer to ICT4D research, focusing on three widely used ones, namely Actor-Network Theory (ANT), Institutional Theory, and the Sustainable Livelihoods Framework. These theoretical approaches reflect different disciplinary bases and tackle the notion of development in diverse directions. Finally, Sein et al. (2019) aimed at constructing a coherent narrative to understand how ICT fosters development in underdeveloped communities. The authors outlined the core areas that, according to their research, define the field, namely: ICT, development, and the transformative processes that link ICT and development. Other scholars contributed to the field focusing solely

on the development perspective (Zheng, 2009; Kleine, 2009; Díaz and Urquhart, 2012; Gigler, 2015), on the multidisciplinary approach (Harris, 2016; Walsham, 2017; Berdou, 2017; Heeks and Ospina, 2019), and on critics towards theory building advocating for more interdisciplinary research to make a better world with ICT (Qureshi, 2015; Avgerou, 2010; Heeks, 2019; Joia et al., 2011). Likewise, Qureshi (2015) emphasizes the need to make empirical contributions to current literature understanding the role of ICT and people in the context of development. Indeed, Avgerou (2008) asserts that under the globalization phenomena such research offers contributions in IS beyond “organizational and national boundaries and support global economic and political activities” (p. 134).

Against this backdrop and by applying a hermeneutical circle (Klein and Myers, 1999; Sein et al., 2019), the present study proposes three groups of theories based on the aforementioned research, aiming at theorizing ICT through the lens of its conceptualization. Figure 1 briefly presents each group, namely: theories on development, theories on transformative processes, and theories on context. Although this study does not intend to present an extensive list of theories, three important theoretical approaches and their respective articulations are herein emphasized, in order to build a coherent narrative that helps to “understand and explain the development process that emerges specifically from ICT interventions” (Sein et al., 2019, p.8). Thus, the aim of this research is to offer a holistic perspective of the theoretical foundations of technology for development (Thapa and Saebø, 2014; Zheng et al., 2018).

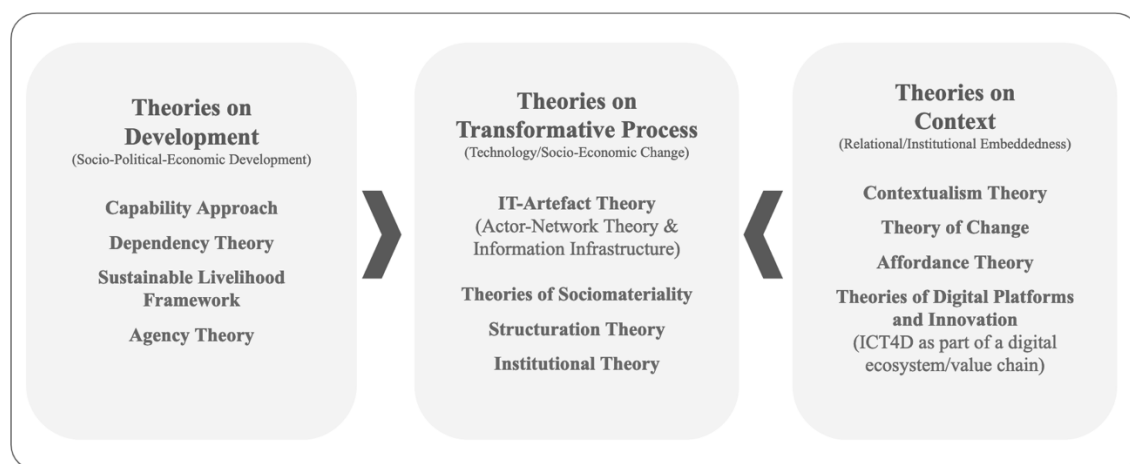


Figure 1. The three groups of ICT4D research theories (Developed by the authors inspired by Sein et al., 2019)

In sum, theorizing ICT4D encompasses engagement with development discourses but also with a broader theoretical literature that addresses transformation processes and contexts in different human activities. According to Avgerou (2017), such engagement comprises the aggregation of approaches from multiple theoretical perspectives, as well as theories that offer models and analyses that allow identifying the potentially transforming role of ICTs. Considering the three groups of ICT4D research theories, one intends to contribute to the literature by categorizing a selection of 34 articles on ICT4D accrued from the dataset of papers used to develop the present study. The categorization was developed considering the theoretical lens, discourses and level of analysis of each paper. Table 2 presents the summary of the findings.

ICT4D Theories	Description	Authors
Theories on Development	Theories on Socio-Political and Economic Development	Heeks (2006); Heeks (2008); Zheng (2009); Kleine (2009); Heeks (2010); Joia et al. (2011); Díaz Andrade and Urquhart (2012); Walsham (2012); Kleine (2013); Miscione et al. (2013); Thapa and Saebø (2014); Gigler (2015); Qureshi (2015); Heeks (2016); Harris (2016); Avgerou (2017); Berdou (2017); Walsham (2017); Zheng et al. (2018); Sein et al. (2019); Perez (2019); Masiero and Das (2019); Heeks and Ospina (2019); Heeks (2020); Masiero and Bailur (2021);
Theories on Transformative Process	Theories on Technology and Socio-Technical Change	Walsham and Sahay (1999); Hayes, Whitley, and Introna (2006); Joia (2004); Joia and Teles (2010); Walsham (2012); Díaz Andrade and Urquhart (2012); Hayes and Westrup (2012); Steyn et al. (2013); Walsham (2017); Avgerou (2017); Zheng et al. (2018); Sein et al. (2019);
Theories on Context	Theories on Relational and Institutional Embeddedness	Avgerou and Walsham (2000); Avgerou (2010); Heeks (2010); Hayes and Westrup (2012); Avgerou et al. (2016); Avgerou (2017); Zheng et al. (2018); Sein et al. (2019); Heeks (2020);

Table 2. Categorization of ICT4D articles

DT4D: TOWARDS A MULTILEVEL CONCEPTUAL FRAMEWORK

As stated by Avgerou (2010), a primary motivation for digital transformation in developing countries is the potential of ICT innovation to contribute to the improvement of human condition (Kleine, 2009; Harris, 2016; Avgerou, 2017; Walsham, 2017). In this regard, digital technologies are transforming the socio-economic and political arenas, having provided groundbreaking beneficial innovations to the world while presenting challenges and major concerns to foster sustainable and inclusive digital environments (Viale Pereira et al., 2020). So far, evidence suggests that the mainstream literature on digital transformation has been focusing on the development and implementation of digital technologies on business, strategy, and organizational change.

Bringing together the abovementioned three groups of theories, namely theories on development (Sen, 2001; Kleine, 2009; Gigler, 2015, Avgerou, 2017; Zheng et al., 2018), theories on transformative processes (Joia, 2004; Sein et al. 2019; Walsham, 2017; Díaz Andrade and Urquhart, 2009), and theories on contextualist ICT innovation (Avgerou, 2010; Avgerou and Walsham, 2000), one developed and present below an empirical framework combining these three levels of analysis: context, transformative processes, and development.

Framework Dimensions

One proposes a multilevel and pluralistic model called Digital Transformation for Development (DT4D), which could be seen as an evolution of Gigler's (2015) evaluation framework for the impact of ICTs on people's well-being and Joia's (2004; 2010) heuristic digital inclusion model (2iD). The DT4D model is a holistic, systemic, and dynamic approach to study digital transformation. The model has been developed to advance the understanding on the dynamics of digital transformation for development and was based on lessons learned from the study of unintended side effects of digital transformation proposed by Viale Pereira et al. (2020). That way, it addresses a list of major concerns impacting developing countries, such as ethical dilemmas, literacy, inequality, legal systems, among others. Figure 2 consolidates those concerns via a three-level structure, as explained below.

Fundamentally, the DT4D model incorporates conceptual constructs that come from the literature on ICT4D, linking the IS, Development and Management fields. The process of

building the multilevel framework improved the understanding of the categories of negotiation that consider the different interests, commitments, plans, perspectives and positions of the network of social groups interacting with the technology, as well as how they will influence the process and outcomes of technologies-in-practice and the emergent social structures (Walsham, 2017; Avgerou, 2017). In fact, evidence from the literature on DT shows the need to incorporate elements that impact DT value creation, seeking to achieve sustainability and growth for society.

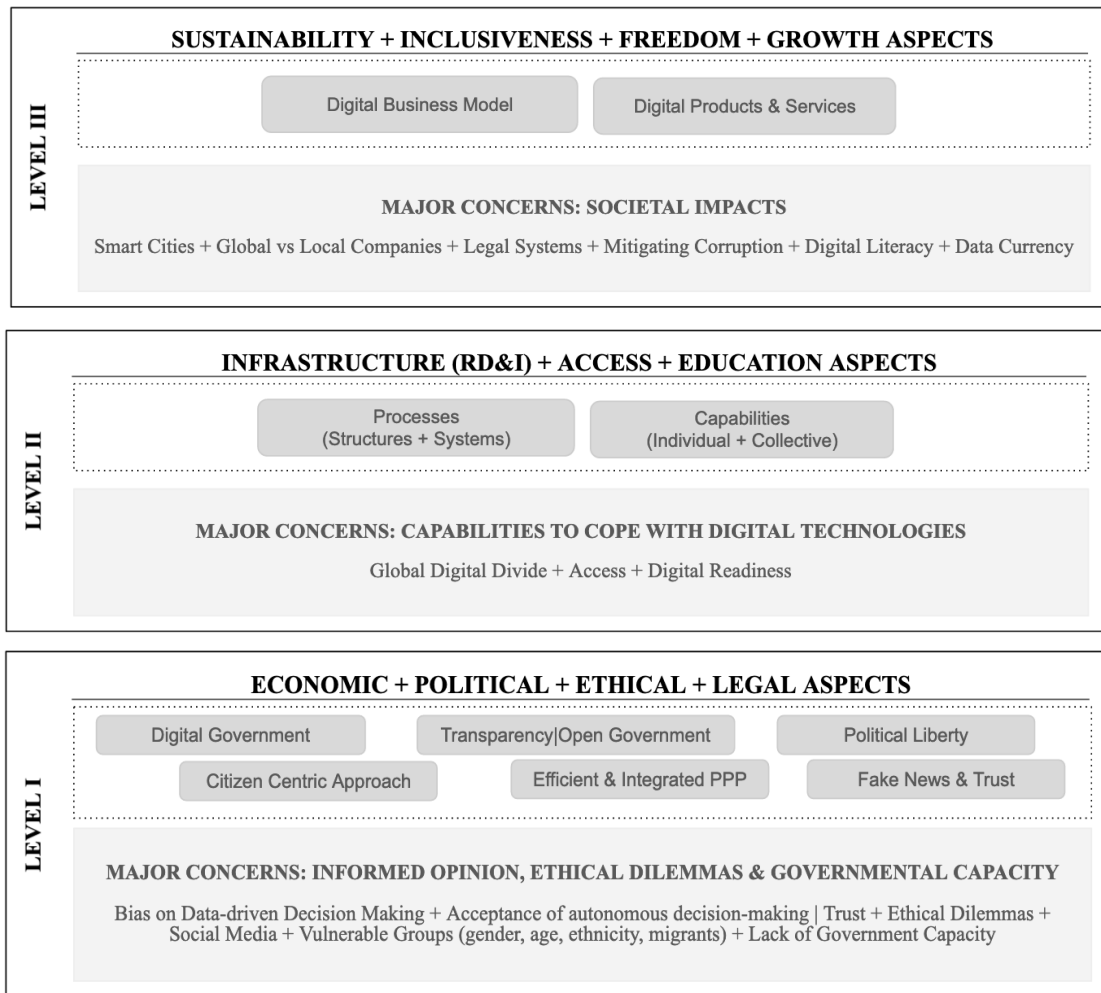


Figure 2. The Multilevel Model of Digital Transformation for Development (DT4D)

As indicated by some academics (Viale Pereira et al., 2020), unintended effects accrued from DT initiatives must be addressed to develop adaptive governance strategies to achieve the Sustainable Development Goals (SDGs). The digital divide affects most countries facing digital business exclusion, challenges for restructuring SME and lack of education systems to provide e-

learning opportunities for remote citizens. These issues are intrinsically related to specific effects, namely "lack of governmental structure, challenging geographical structures, or the digital readiness of society" (p. 718). As a consequence of this broader view, this study proposes the analysis of digital transformation strategies to provide development through:

(i) three-level dimensions: (1) Economic, Political, Ethical, and Legal; (2) Infrastructure, Access, and Education; (3) Sustainability, Inclusiveness, Freedom, and Societal;

(ii) three types of ICT4D theories: (1) Theories on Development; (2) Theories on Transformative Processes; (3) Theories on Context;

(iii) the main outcomes derived from the evaluation of the impact of digital technologies on each level of analysis, considering the major concerns along with the human, social, cultural, political, and economic capabilities.

Figure 3 consolidates those ideas and presents the Multilevel Model of Digital Transformation for Development (DT4D).

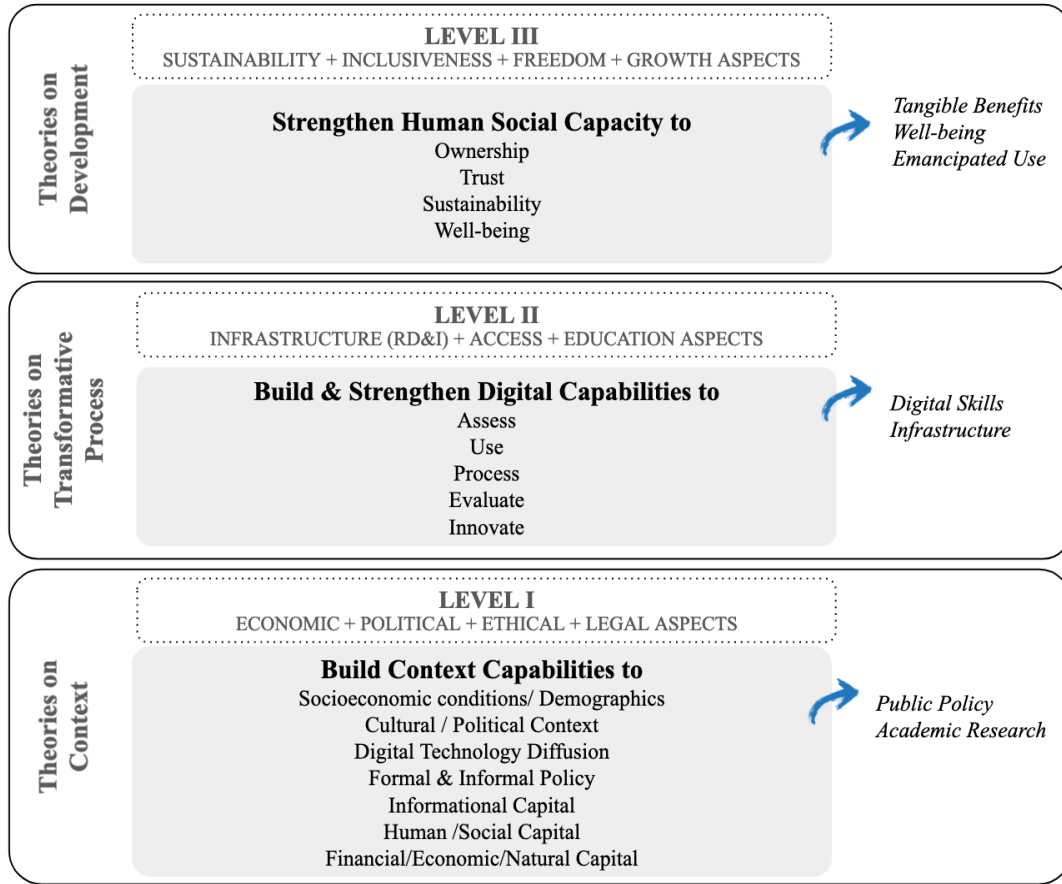


Figure 3. Digital Transformation for Development Model (DT4D) Outcomes

The proposed DT4D model provides evidence to explain the impact of digital transformation initiatives that, as already mentioned, have intended and unintended side effects. Therefore, via an integrative approach, it is possible to analyze the positive, negative and unforeseen outcomes accrued from digital transformation initiatives in developing countries, unveiling potential challenges and opportunities for technology in a digital age in such nations. As a matter of fact, many countries face complex scenarios with large adoption of social media and smartphones (Pozzebon and Diniz, 2012), financial inclusion (Diniz et al., 2009), digital inclusion (Joia and Teles, 2010) and e-democracy (Cunha and Pozzebon, 2009), while facing digital divide in health (Walsham, 2017), education (Hayes et al., 2006) and digital identity (Masiero and Savita, 2021), to name but a few. Gigler (2015) asserts that "measuring ICTs in terms of capabilities reveals that there is no linear relationship between having access to ICTs and using them — having Internet access is a necessary, but insufficient, condition for its use" (p.16).

Thus, the present study intends to explore the interplay between digital technologies, contexts, and development, providing a free flow of valuable information (Zheng, 2009) to strengthen human social capacity to achieve freedom, sustainability, inclusiveness and economic growth via tangible benefits, ownership, trust, emancipated use of digital platforms and well-being. Likewise, infrastructure and digital literacy are key to strengthening digital skills enabling the access, use, evaluation and innovation of digital platforms to achieve social capacity. Finally, economic, political, cultural and ethical aspects inform the understanding of the existing capacity in developing countries to disseminate digital technologies and foster social/informational capital, allowing the creation of formal and informal policies and the development of academic research on DT4D. In this way, it is possible to clearly portray the context of developing countries to assess the potential of DT4D initiatives to transform societies in these nations.

THE WAY FORWARD: A RESEARCH AGENDA

A methodological contribution of the DT4D model proposed is the development of a set of constructs to assess the deployment of digital transformation programs at community and country levels. Hence, the model provides a basis for structuring the knowledge accrued from DT activities for identifying gaps and for developing propositions to guide future research on this realm.

However, measuring and assessing digital technologies' needs of a community before or while implementing a solution is challenging (Gigler, 2015). To measure its use, the purpose of use and conditions under which effective use can enhance informational capabilities to improve human and social life, it is required the understanding of the interaction between actors, technologies and discourses (Avgerou, 2010; Pozzebon and Diniz, 2012). The social constructivist approach allows the understanding of the acceleration of digital transformation, addressing conceptual relationships such as technology/society, agency/structure, and technical reasoning/institutional dynamics (Avgerou, 2010). That way, technology is considered as part of a broader social context, where categories of technologies and social actors' clusters are formed and shaped, leading to specific socioeconomic outcomes (Walsham and Sahay, 1999). As such, social groups combined with technologies and discourses associated with each scenario provide a viewpoint in which categories can be articulated to establish a theoretical relationship between the success and

failure of digital transformation initiatives (Pettigrew, 1990; Pozzebon and Diniz, 2012). Indeed, actors, technologies and discourses help articulate, categorize, and better understand the positive, negative and unforeseen outcomes derived from digital transformation (Pozzebon and Diniz, 2012). Based on that, Table 3 presents the three main dimensions to articulate the Digital Transformation for Development Model (DT4D) proposed.

Components	Dimensions	Concepts
Actors	Context	Social Groups
Digital Technologies	Content	Technology-in-practice
Discourses	Process	Mechanisms of negotiation

Table 3. Components of the DT4D Framework

Considering the contextualism lens, Pettigrew (1990) emphasizes three dimensions used in the framework – ‘Context’, ‘Content’, and ‘Process’ - and claims that these three dimensions are equally important and should be considered altogether. Thus, this study adapted these three dimensions in order to investigate the digital transformation changes at the community level.

Regarding the components of the framework, 'Actors' address the social setting where the ICT artifact is being implemented and used. It helps defining the boundaries of the investigation and includes the identification of different relevant social groups. 'Digital Technologies' refer to the socio-technical characteristics of the ICT artifact being implemented, as used by specific actors at a given level of analysis (individual, social groups, society). 'Discourses' is related to the understanding of how social groups influence the negotiation process taking place around the implementation and use of a given ICT artifact.

Concerning the concepts used in the framework, ‘Social groups’ refer to a group of people who share a common geographical space, social class, professional occupation, to name a few. It also includes the identification of interpretive frames for each social group, allowing the recognition of shared and conflicting perceptions, expectations and interests that characterize the community context (Sahay and Robey, 1996; Bartis and Mitev, 2008; Pozzebon and Diniz, 2012). ‘Technology-in-practice’ centers on the enactment of technology and its boundary conditions on

how actors define properties and applications of a technology before/after its implementation, and the emergence of new social structures. This process of negotiation is both intended and unintended, and their choice emerges from the literature on digital transformation (Barrett and Walsham, 1999; Walsham, 2002). Finally, the ‘Mechanisms of negotiation’ encompass technology content but also “the different interests, commitments, perspectives and positions of the network of social groups interacting with the technology” (Pozzebon and Diniz, 2012, p. 295). The implementation of ICT in a community or region can be seen as an opportunity to change information flow, resource allocation and responsibility attributions (Walsham, 2002; Hayes and Westrup, 2012).

That way, using the Multilevel DT4D model as a lens to examine digital transformation programs to promote development, one can formulate five research propositions:

P1. Digital technologies in developing countries have the potential to impact inclusive economic development by increasing productive capacity, redesigning government, and delivering public services adopted by social groups via important discourses such as sustainability, inclusion, and human development (Gigler, 2015; Avgerou, 2007; Zheng et al., 2018; Joia and Teles, 2010; Kleine, 2009).

P2. The lack of adequate technological infrastructure, access and digital readiness to support local actors in developing countries not just increase the extant digital divide but also generate a long-lasting effect that may have implications for the future of an entire generation (Gigler, 2015; Díaz Andrade and Urquhart, 2009; Thapa et al., 2012; Viale Pereira et al., 2020; Joia, 2004).

P3. Social Networks' transparency and data protection in developing countries are fundamental in the aggregation and convergence of common interests from the government to citizens, fostering informational and social capital to achieve fundamental rights such as privacy, freedom of expression and free choice. (Zheng et al., 2018; Heeks, 2019; Viale Pereira et al., 2020).

P4. Digital platforms in developing countries should converge to enable the application of collaboration in public policymaking to achieve online transparency, accountability, inclusion, social justice, and participation (Heeks, 2019; Bon, 2019; Viale Pereira et al., 2020).

P5. The lack of articulation between government and several actors from civil society to provide adequate digital platforms to foster inclusive and adaptive governance capacity not only cause political crisis and institutional weakness but also result in a divide on how to manage and mitigate unforeseen effects accrued from digital transformation in developing countries (Bass et al., 2013; Bon, 2019; Viale Pereira et al., 2020).

CONCLUSIONS

Essentially, Heeks (2008) asserts that economic, social, and political aspects in this century will be increasingly digital and those without digital technologies will be excluded from society, without access to government, health, and social services, to name a few. Therefore, the present study addressed major concerns for developing countries to understand and evaluate which digital technologies endeavors should be chosen to contribute to development. Mostly, one intends to recognize if such initiatives enhance or reduce social, political, cultural, and economic capabilities.

Above all, the study wishes to acknowledge if such initiatives strengthen the participation, empowerment and emancipation of vulnerable groups to foster sustainability, inclusion and growth. This topic is complex and requires a lens on context (Avgerou, 2010), transformation processes (Walsham, 2017; Sein et al., 2019) and development issues (Gigler, 2015), such as ethical dilemmas, literacy, and legal systems, along with the interplay between actors, technologies and discourses to define the boundaries of the investigation. Yet, a first viewpoint towards a more integrated and articulated multilevel model is herein offered, to advance the understanding of the dynamics of digital transformation for development.

Finally, the present study also provides a blueprint to guide further research and facilitate knowledge accumulation and creation concerning digital transformation initiatives for development. In this regard, the future steps of this research include further elaboration and

validation of the proposed model through selection of multiple longitudinal case studies. This can provide an in-depth and unique research opportunity to understand the important phenomenon of DT through the lens of real-life cases in the context of developing countries.

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