Leveraging Government Digital Platforms in Resource-Constrained Countries: Micro-foundations of Woredas in Ethiopia

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Abstract. The purpose of this paper is to identify the micro-foundations of Woredas in Ethiopia that digitally innovate on the existing government digital platform. The study used a qualitative interpretive case study strategy with three government administrative regions in Ethiopia (called Woredas) that innovate digitally using the government digital platform. To collect data, a structured interview protocol was used. From each of the Woredas (districts), five respondents were chosen to represent users, ICT staff, and management, making a total of 15 respondents. The findings show that the digital platform governance model plays the most important role in digital government innovation. Woredas demonstrate sensing capabilities by learning from the affordances provided by the digital platform. Furthermore, despite the joint nature of their seizing capabilities, no clear organizational structures exist to manifest these capabilities. The governance model, which is centralized in one ICT unit, limits the reconfiguring capabilities.

Keywords: Government digital platforms · Digital platforms · Micro-foundations

1 Introduction

Digital platforms play a significant role in facilitating social networking and creating economic values [1, 2]. Many citizen-government collaboration activities such as voting and participatory policymaking are encouraged by digital platforms [3–6]. The majority of digital platforms share several key features [7]. First, they are technologically mediated. Second, they allow users to communicate with one another. Third, users of digital platforms can perform specific activities. As such, the services provided by digital platforms allow interaction among service consumers and producers [1, 7]. Many low-income countries' digital platforms have lately been enhanced [8].

Improvements in digital platforms that use digital innovation have been shown to notably improve the socio-economic activities of low-income countries [9–11]. Digital innovation in a low-income country may be deemed commonplace in a high-income

country. Nonetheless, the fundamental thesis of digital innovation remains the development of new products, services, or organizational models through the use of digital platforms [12–14]. In this study, digital innovation refers to the use of the government's digital platform to improve government service delivery. The government of Ethiopia uses the digital platform to provide civil servants with access to government-restricted information and access to content available on the Internet in different sectors such as education, health, agriculture, and governance.

Despite the improvement of digital platforms in resource-constrained countries, the digital development index remains stumpy mainly in Africa [15–18]. The existence of a well-defined digital platform does not ensure its utilization or innovation [19, 20]. Unreliable Internet access, digital illiteracy, a digital divide among users, and the use of the platform by individuals with impairments have all been mentioned as barriers to digital adoption [4, 6, 19–21].

Government digital platform is expected to enhance government performance by lowering costs, increasing revenue, and lowering transaction costs [18, 22]. It is considered a way to improve government and public administration performance, as well as a requirement for economic and social growth, particularly for resource-constrained countries. Social and economic growth are particularly crucial in low-income countries like Ethiopia, where governmental administration is defined by incompetence, limited capacity, and inadequately trained personnel [23, 24]. For instance, Digital platforms based on the local context, such as m-pesa, have been found to have a higher rate of acceptance in resource-constrained countries than platforms taken from other settings [25].

The focus of this study is to understand how Woredas in Ethiopia are using existing digital platforms innovatively. Ethiopia's government created a digital platform that allows various government agencies to integrate data transfers and receive government services. Ethiopia established the government digital platform in 2007. This digital platform is a transaction platform [26] that was designed for the exchange of digital data among government organizations and was mainly created to provide government services to the lowest administrative regions called Woredas. "Woreda" is an Amharic term that refers to an administrative region consisting of about 100,000 people. It's meaning is similar to that of a district. Ethiopia is Africa's second-largest country, with 112,078,730 people [27] and Africa's tenth-largest country with 1,104,300 km². 976 (93%) of the 1,050 Woredas have access to the government digital platform. Despite significant investments, only a few Woredas are using the digital platform to innovate government services [28].

The micro-foundations of dynamic capacities (DCs) include cognitive abilities to scan opportunities or uncover prospects, grab chances and/or minimize risks, and restructure or reshuffle the internal resources of government agencies [29]. When government organizations constantly sense and seize opportunities, and reallocate or realign their internal resource to adapt to the agile environment, they generate DCs [30]. The repetitive action of sensing, seizing, and reconfiguring capabilities enable government organizations to transform their business model to be efficient and effective in their routine activities.

Although dynamic capabilities framework (DCF) initially emerged from the perspective of strategic management to make private organizations more competitive, government organizations have also begun to consider the framework as a means to create new government services driven by digital technology. This is because both government and private organizations have similar organizational features such as resources, routines, and capabilities but with different purposes [31–33]. The following are some of the rationale why dynamic capability theory was selected for this research: first, dynamic capability theory considers digital platforms as a central constituent of innovative use of resources, and second, dynamic capability theory switches the focus from resource holdings to resource creativity, which is critical in resource-strapped low-income countries. Additionally, the dynamic capability theory has also been adopted to make sense of resource-constrained countries' digital innovation [34–36]. However, little research has been carried out on the micro-foundations of dynamic capabilities that support digital platforms in resource-constrained countries [37].

The study's goal was to learn about the micro-foundations of local government administrative areas, known as Woredas in Ethiopia, and how these Woredas innovate using the existing government digital platform. Therefore, this research work thought answer the following research question: *How can micro-foundations of dynamic capabilities of government organizations that can leverage the usage of government digital platforms be identified?*

The following is how the rest of the paper is structured: A review of the literature on digital platforms and micro-foundations of dynamic capabilities is provided in the next section. Following this, a description of the government digital platform, and materials and method section are explained. The data analysis and results are then provided, accompanied by a discussion of the findings. Finally, the conclusion, limitations, and future research directions are discussed.

2 Literature Review

2.1 Digital Platforms

The concept of digital platforms is continuously growing, and it's often described in terms of context [1, 38]. Digital platforms are socio-technical frameworks that integrate data, services, technologies, and users to impact community interests [39, 40].

The most significant variations among digital platforms are their market capitalization, sector of operation, and governance methods [7]. The governance technique identifies who is in charge of making platform decisions. The sector in which the platform is created has an impact on the platform's design and administration. Market capitalization is influenced by the ownership structure in which the platform should aim for profit or welfare maximization.

Digital platforms are useful since they lower expenses such as distribution, searching, contracting, and monitoring [4, 40, 41]. Aggregation platforms, such as TripAdvisor and Expedia, compile travel data from a variety of sources into a single platform, reducing the cost of finding information. Online platforms also offer a technical development environment [42–44].

Another quality of digital platforms is their ability to generate innovative ideas [44, 45] and also cross-side network effects [46, 47]. Generativity refers to a platform's potential to produce novel outcomes as a result of big and diversified users [48, 49]. By harnessing the contributions of a large group of people, crowd sourcing, for example, leads to the creation of innovative approaches to solving complex problems. Cross-side network effects show how a user's worth rises as the number of users on the opposite side rises. For instance, when there are more buyers on the other side of eBay or Amazon transactions, the usefulness of the digital platform for the seller grows, and conversely.

However, to implement digital platforms in low-income countries, organizational, cultural, and administrative factors must be taken into account [50]. Due to differences in administrative and cultural aspects, a mere transfer of digital platform ideas does not work in low-income countries[51]. This is because there is a possibility that the solutions would be abused by bureaucratic elites. This could result in corruption, centralism, and inefficiency. To put it another way, a context-based strategy is a more practical method for implementing digital platforms in low-income nations[25, 52].

In addition to being addressed as products, digital platforms are also regarded as ecosystems. Digital platforms, according to the product-oriented approach, are physical goods developed via the engineering of architectural designs, in which economies of scale and scope can be realized through the reuse of components [44, 53–55]. From an ecosystem viewpoint, platforms are considered as a system of business centers that manage and organize interactions across enterprises [42, 44, 56]. This study considers an ecosystem approach, where a government digital platform is used to provide government services and enable an exchange of data and information among government organizations.

2.2   Micro-foundations of Organization's Dynamic Capabilities

Dynamic capabilities are an organization's ability to reconfigure and recombine its internal resources to improve organizational performance [56–59]. In unexpected and dynamic situations, the DCF emphasizes the effective and strategic use of available organizational resources, both physical and nonphysical, to achieve an organizational purpose [59, 60].

Dynamic capabilities enable an organization to implement plans and strategies in novel ways that improve its effectiveness and efficiency [61, 62]. The primary concern in dynamic capability theory is the utilization of existing and available internal resources rather than the acquisition of additional resources [63, 64]. Dynamic capabilities aid in the investigation of not only the non-infrastructural resources required, but also how internal resources are constantly restructured and reused for organizational effectiveness and efficiency [59, 60, 65]. Dynamic capabilities are characterized by the ability to adapt to changing external environments and reinvent existing routines [59, 66, 67]. Dynamic capabilities can lead to greater social and economic progress in low-income countries by allowing them to make better use of their limited resources [68, 69].

Micro-foundations are associated with tacit knowledge and are inbuilt organizational intangible elements. These intangible aspects such as processes, procedures, managerial cognition, and knowledge are known as the micro-foundations of dynamic capabilities [70]. Organizational structures, distinctive competences, decision rules, and disciplines

are also micro-foundations of dynamic capabilities, and these micro-foundations can be divided into three interconnected concepts: sensing, seizing and reconfiguring [70]. The micro-foundations of an organization are facilitators of dynamic capabilities and are discussed in the following section.

2.2.1 Sensing

Sensing activity is the primary and fundamental activity to which organizations should pay close attention to discover new opportunities and be aware of unexpected threats. Sensing activity can be defined as scanning the condition or tendency of the environment in search of information from stakeholders and customers. Sensing is accomplished by learning or interpreting available information and new data [71]. This activity allows not only to discover existing opportunities but also to create new ones. Organizations need to implement this opportunity systematically. According to the literature, it is the management body's responsibility to carry out this activity by filtering the important and relevant information [72].

SQ1: How do Woredas that digitally innovate using government digital platform manifest their sensing capabilities?

2.2.2 Seizing

The seizing activity follows the sensing activity. Developing a business model, recognizing resource needs, making proper decisions about technology and resource investments, and lastly guiding and leading people to implement the required changes are all part of seizing activities. Making a significant change in decision making, as well as formulating and designing a new business model, are examples of seizing activity. According to research works, organizational decision-making is a complex process that requires several steps to be functional [72]. This is owing to the fact that numerous functional areas are involved in decision-making. To make decision-making easier, these cross-functional areas should be emphasized [58].

SQ2: How do Woredas that digitally innovate using government digital platform manifest their seizing capabilities?

2.2.3 Reconfiguring

After seizing an opportunity, an organization's resources should be constantly reconfigured. The reconfiguring activity entails rearranging, reallocating, and realigning resources to increase the organization's value. The reconfiguring activity enables the organization to respond to changing circumstances. To complete this activity, it is essential to change the structure of an organization, manage strategy fit, and ensure incentive alignments. To put it another way, organizations should have a loosely coupled structure to foster innovation. A strategic fit necessitates the allocation of assets and other resources to increase or improve the organization's value. Incentives should be set up in such a way that the organization's performance or improvement is guaranteed.

Managerial and organizational processes can both benefit from restructuring activity. Reconfiguring the managerial process entails activities such as improving communication between managers, whereas reconfiguring the organizational process entails activities such as reallocating resources to maintain effectiveness and efficiency.

SQ3: How do Woredas that digitally innovate using government digital platform manifest their reconfiguring capabilities?

3 The Government Digital Platform in Ethiopia

As any of digital platforms it is essential to describe the purpose, governance arrangement and geographical location of the government digital platform in Ethiopia [7]. Regarding its purpose, the government digital platform is an Ethiopian district-based government digital platform. Broadband, terrestrial, and satellite networks connect the lowest levels of government [73–75]. Federal, regional, and Woreda-level government entities across the country use the government digital platform to access government services including video conferencing, directory services, mail services, and Internet connectivity [74, 76].

On the other hand, the digital platform is governed by the former Ethiopian ICT Development Agency (EICTDA), now known as the Ministry of Science and Technology (MST). MST is responsible for developing rules and regulations governing how Woredas use the government digital platform. The government digital platform consists of three-tier architecture, namely, the national data centre, regional data centres, and Woreda data centres. The national data centre (NDC) is in charge of centrally managing the government's digital platform, as well as controlling and maintaining infrastructure, organizing the activities of regional and Woreda data centers, and providing support and training. The regional data centers are in charge of managing and controlling services given to government entities in their respective regions, in addition to serving Woreda centers inside their regions. At the most basic level, each Woreda has Woreda centers that provide direct services to Woreda government offices. Each Woreda centre has at least two ICT Staff who are assigned to manage services and provide ICT training to Woreda-level government offices.

Regarding the geographical location of the platform, the National Data Centre (NDC) is in Addis Ababa, Ethiopia's capital, while regional data centers are in each regional state's capital cities; Woreda centers are in each Woreda's main towns. VSAT connects the majority of Woreda's data centers to the national data center. The NDC is the hub of the government's digital platform, which provides all the services.

4 Materials and Method

This study used a qualitative-interpretive research paradigm, which allowed the researchers to investigate digital innovation based on the government digital platform in its natural environment [36, 77, 78]. Qualitative-interpretivism allows for more freedom in conducting in-depth investigations into patterns [79], using inductive reasoning to pay close attention to process, context, interpretation, meaning, or understanding [80]. This

method captures the effects of respondents' actions and experiences on a phenomenon of interest without the use of standardized and predetermined response categories [80, 81].

4.1 Data Collection

The data was acquired utilizing a structured interview instrument and a case study research technique.

4.1.1 Interview Selection

Three process owners (those in government agencies who oversee similar processes), one from each government agency, one from ICT support, and a district administrator (or a representative) from each of the three Woredas were selected. There were 15 respondents in total.

4.1.2 Interview Design

The interview questions were developed based on studies on eliciting sensing, seizing, and reconfiguring capabilities [65]. To analyze Woredas' micro-foundations of dynamic capabilities, theoretical notions such as micro-foundations of dynamic capability theory were operationalized into interview questions. Appendix A contains the interview protocol.

4.1.3 Reliability and Validity

Qualitative research's trustworthiness, rigor, and quality are used to describe its reliability and validity [36, 82]. Qualitative research's quality is determined by its credibility, dependability, confirmability, transferability, and authenticity [83]. Credibility refers to the belief in the study's truth and, as a result, the study's findings. The researcher performed in-depth interviews with open-ended inquiries to establish trustworthiness. This method of interviewing enables researchers to gain a deeper grasp of respondents' real-life experiences. The interview protocol was maintained uniformly for all interviews in similar situations. Dependability refers to the data's consistency across the course of the study. The researcher collected data under similar conditions for all interviews. Audio recordings of the interviews were made, and field notes were gathered throughout the procedure. Confirmability refers to the degree to which the results are consistent. The recorded interviews were transcribed into text and returned back to the respondents to confirm that the transcription reflected what they said. Atlas.ti8 was used to collect extensive notes during the analysis. Transferability describes the degree to which findings can be used in different contexts. The research was conducted in three Woredas with similar socio-economic and political environments. Authenticity refers to how accurately and completely researchers depict a variety of various realities and appropriate study participants. The appropriate government entity in the Amhara Regional State selected the sample Woredas. Furthermore, the respondents included a diverse group of civil workers from various levels of management, as well as users and ICT professionals.

4.2   Case Design

Ethiopia has 1,050 Woredas, 976 of which (93%) have access to the government digital platform. Six Woredas were chosen for the study: three that digitally innovate with the government digital platform (the Amhara Regional State, Dangila town, and Woreta town) and three that do not (Bahir Dar town, Bahir Dar Zuria district and Farta). The Amhara Regional State Science, Technology, and Information Communication Commission's ICT management chose the Woredas (STICC). Due to length constraints, this paper examines only the micro-foundations of dynamic capabilities of the three Woredas that digitally innovate with the government digital platform.

Three ICT sample systems of the government digital platform supporting three different government agencies were chosen from each of the Woredas understudies: the judiciary system, human resources (HR) system, and the finance system.

4.2.1   Judiciary (Court) System

Computer-based information and database technologies enhance the court process. At the federal, regional, and Woreda levels, this system hosts court activities such as cases, records, sessions, charges, verdicts, and penalties. Online court services are provided using video conferencing technology. This technology is important primarily in geographically remote districts or locations where citizens with court cases may find it difficult to travel to the judge's residence.

4.2.2   Human Resource Management System

Video conferencing technology is used in the human resource management process to provide employees with timely information and training, particularly in remote areas. This technology saves time that would otherwise be spent traveling from the workplace to the training facility and vice versa. This also lowers training-related travel and administrative expenses.

4.2.3   Finance Management System

The finance management system uses the government digital platform infrastructure to allocate and distribute and process budgets for government organizations at various levels such as federal, regional, and district. For recording, processing, and reporting financial data, the process employs the Integrated Budget and Expenditure (IBEX) system.

5   Data Analysis and Results

Thematic content analysis methods were used in Atlas. ti8 to analyze the interview data.

5.1   Content Analysis Strategy

Thematic analysis is a method of recognizing themes in qualitative data. A sequence of steps is taken into account in the thematic analysis of unstructured data [84]. To elicit the

codes and generate categories (themes) from the data content, an inductive approach was used (see Appendices B-D and Appendices E–G). Process coding was chosen because it corresponds to the study's interpretive nature. Because words that end in "ing" frequently indicate actions in data, process coding enabled the identification of action statements in those words. Furthermore, process coding aided in identifying continuous actions or interactions engaged in response to problems [85, 86].

5.2   Results

This section summarizes the findings of the analysis based on the research questions:

5.2.1   Sensing Capabilities

11 unique codes were elicited with a total count of 59. Four themes were further elicited from codes (Table 1).

Table 1. Sensing capabilities of Woredas (from fieldwork)

Sensing capability themes	Sensing capability codes	Frequency
Using email and messaging services (22)	Using multicast video conferencing	4
	Using messaging services	7
	Using email services	11
Using customer online report and customer feedback (18)	Using customer online report	6
	Using feedback of reports	9
	Understanding customer needs	3
Using telephone and fax (14)	Using telephone	8
	Using fax	2
	Using dedicated call centre	4
Using web site and compliant management system (5)	Using complaint management system	1
	Using web site	4
Total		59

According to the themes, Woredas obtain new information from customers and stakeholders via email and messaging services, followed by customer online reports and customer feedback. The use of a website and a compliant management system is less preferred. Several quotes from the interviews show how some Woredas use their sensing capabilities.

> "We usually identify threats and opportunities after we collect feedbacks from our customers using our website."(Male, Court service process owner)

> "We use email to collect new information from our customers and identify opportunities." (Male, ICT support)

"We are always searching for opportunities while we communicate with our customers via video conferencing."(Male, Human resource management process owner)

5.2.2 Seizing Capabilities

10 Unique codes were elicited with a total count of 28. Four themes were further elicited from codes (Table 2).

Table 2. Seizing capabilities of Woredas (from fieldwork)

Seizing capability themes	Seizing capability codes	Frequency
Learning from experience sharing and research works (12)	Attending online free tutorials	3
	Looking through research works of others	3
	Sharing experience	6
Conducting panel discussion (7)	Inviting external experts	2
	Discussing on new technologies	5
Analysing customer needs and encouraging employees with new ideas (6)	Analysing customer entire business processes	1
	Using feedback of reports	3
	Encouraging employees with new ideas	2
Analysing the appropriateness of technologies(3)	Evaluating the specification of new technologies	2
	Checking the appropriateness of technologies	1
Total		28

Concerning seizing capabilities, the themes suggest that Woredas shape and interpret new information by learning from experience sharing and looking through research works, closely followed by a panel discussion of new technologies, analyzing customer needs, and encouraging employees to come up with new ideas. This procedure is carried out by enlisting the assistance of external experts from companies and universities. The quotations below illustrate the interviewees' seizing capability codes and themes:

"We use online training to interpret and understand new information obtained from stakeholders and customers."(Male, Court service process owner)

"We use the Internet to make decisions on the specifications of new technologies to invest in them." (Female, Finance process owner)

"We use video conferencing to help our branch offices implement new ideas as fast as possible to seize opportunities." (Male, Human resource management process owner)

"We analyze threats associated with new opportunities after we collect information using compliant management system." (Male, ICT support)

5.2.3 Reconfiguring Capabilities

Nine unique codes were elicited with a total count of 38. Five themes were further elicited from codes (Table 3).

Table 3. Reconfiguring capability of Woredas (from fieldwork)

Reconfiguring capability categories	Reconfiguring capability codes	Frequency
Providing incentives (21)	Providing short term training	7
	Applying better salary package	14
Ensuring appropriate use of technologies (6)	Upgrading service bandwidth	4
	Ensuring alignment of technologies	2
Using better performance technologies (6)	Using better performance hard wares	2
	Using latest version soft wares	4
Using intranet communication(3)	Using intranet communication	3
Improving infrastructure and managing external factors (2)	Improving infrastructure	1
	Managing external factors	1
Total		38

The themes reveal that providing incentives to IT skills in the form of short-term training and a better salary package is critical to retaining IT experts in their work. Ensuring appropriate technology use, as well as using higher-performance technologies, increases the value of the government digital platform services significantly. The interview excerpts below describe how Woredas that digitally innovate using the government digital platform practice reconfiguring capabilities:

"We provide short term training and special salary package for IT experts to sustain the effectiveness of the government digital platform in our Woreda."(Male, Woreda administrator)

"In our organization, effective voice communication and file exchange among the top management body is undertaken by using IP messenger." (Female, Finance process owner)

"We improve the value of our services to our customers by upgrading the service bandwidth of the court case management system." (Male, Court service process owner)

6 Discussion of Findings

The findings indicate that Woredas have sensing capabilities via the government digital platform. The Woredas understand changes in their agile environment to identify and mitigate any threats. Similarly, Owoseni and Twinomurinzi [36] discovered that small and medium enterprises (SMEs) in Lagos, Nigeria use capabilities such as feedback, social media, and Internet-based technologies, among other things, to identify emerging market opportunities in their research. The comparison holds because organizational elements such as resources, routines, and capabilities that enable improved performance can be found in both government and private organizations using the same logic [31–33].

The attempt to translate and exploit these opportunities (the seizing capability) is primarily driven by self-motivated efforts such as learning from experience sharing and looking through research works, analyzing customer needs, and encouraging employees with new ideas. Furthermore, the seizing capabilities of Woredas (Table 2) were related to learning from others' innovations. This could show that learning from the innovation of others rather than investing in innovation is regarded as important for deploying the micro-foundations of Woredas as it is cost-effective [32, 33, 87]. However, there are no apparent Woreda structures in place that outline how to take advantage of identified opportunities. Self-driven efforts that are not part of an organizational structure, such as those in government, tend to be frustrating in large organizational structures. This has resulted from path dependencies that are built up in the past [88]. Other organizations demonstrate their seizing capabilities through organizational learning, in which individual agents in the organization use the organization's structure to gain knowledge from the environment and then communicate among members and subunits to incorporate the shared knowledge into the organization's working procedures [89, 90].

The same capability codes overlap between different capabilities with different contexts, as shown in Tables 1 and 2 of the results section. Government organizations in the Woredas, for example, use feedback of reports as both sensing and seizing capabilities. They use these capabilities in a variety of contexts. They use these sensing capabilities to examine the environment for opportunities and manage threats. However, as seizing capabilities, they also use the same capabilities to shape new information or ideas based on knowledge obtained from feedback report. This exhibits that the micro-foundations are conceptually different but correlated [65].

In terms of the ability to rearrange, reallocate, and realign resources to increase the value of the existing digital platform by capitalizing on identified opportunities (the reconfiguring capabilities), Woredas rely primarily on technical ICT that depends on an external competence that may not be readily available in the Woredas. Moreover, the traditional or centralized (not being decentralized) governance model of the government digital platform contributed to restraining the development of reconfiguring capabilities that could be made by government organizations.

While the role of the government digital platform is to create opportunities for Woredas to provide government services effectively and efficiently, Woredas that perform the repetitive activities of micro-foundations (sensing, seizing, and reconfiguring capabilities) are found to modify their business models that enable them to make sense of digital innovation.

6.1 Implications for Research, Practice, and Policy

The findings have practical and policy implications, particularly for resource-constrained countries like Ethiopia, where the micro-foundations of the dynamic capabilities framework are concerned with making the best use of limited resources already available. In practice, policymakers and practitioners can use the micro-foundations of dynamic capabilities to better understand crucial factors when creating government digital platforms to encourage digital innovation in a quickly changing environment. The micro-foundations uncovered can subsequently be taught to other Woredas who aren't already using the platform. Furthermore, the findings have research implications and can be used as a foundation for researchers to further investigate the design and implementation of government digital platforms in low-income countries from the service innovation perspective of micro-foundations.

The findings are also consistent with the governance model of the government digital platform, which is overseen by a centralized ICT unit. The central unit creates the rules and regulations that govern how Woredas interact with the government digital platform. Local digital innovation is hampered by such a governance model. Many other organizations are increasingly decentralizing digital innovation from a traditional central ICT department to within each department by utilizing more ICT-savvy business users rather than ICT technical experts [12, 91]. Constrained generativity and cross-side effects are also reflected in the governance model. The following section concludes with a reflection on the preceding findings as well as policy and practice recommendations.

7   Conclusion

The study's goal was to identify, using qualitative-interpretive methods, the micro-foundations of Woredas that digitally innovate using Ethiopia's existing government digital platform.

The Woredas demonstrated sensing capabilities by leveraging the digital platform to understand their environment and identify opportunities, but the organizational structures to translate those opportunities into potential digital innovations were lacking.

The governance structures surrounding digital platforms continue to be traditional and centralized to an ICT unit. This governance framework holds back digital innovation.

The preference for self-learning and collaborative partnerships with external experts as a means of capitalizing on identified opportunities and integrating them into new learnings from the external environment is a strength. However, the reliance on an external reconfiguring capability limits the potential digital innovations.

As a result, the research suggests that policy regarding the governance model of government digital platforms be reconsidered to allow for a more distributed model that emphasizes greater collaboration with non-technical personnel supported by technical ICT. The study recommends that sensible efforts be made to incentivize the self-learning and collaborative approach in practice.

7.1 Limitations and Future Research

The study's focus on Woredas of Amhara Regional States was one of its limitations. Future research should look into increasing the number of the Regional States and stakeholders across Woredas.

Appendices

See Table 4, Figs. 1, 2, 3, 4, 5 and 6.

Table 4. Appendix A: Interview schedulef

Sub-research question	Interview questions		
	Process owner	ICT Support	District administrator (or representative)
SRQ1: How do Woredas that digitally innovate using government digital platform manifest their sensing capabilities?	1. From your experience, how do you use the government digital platform to systematically capture new information from stakeholders and customers?	1. From your experience, how do you use ICT to support admin processes to systematically capture new information from stakeholders and customers in your Woreda/zone?	1. From your experience, how is the government digital platform used to help public agencies systematically capture new information from stakeholders and customers?

(*continued*)

Table 4. (*continued*)

Sub-research question	Interview questions		
	Process owner	ICT Support	District administrator (or representative)
SRQ2: How do Woredas that digitally innovate using government digital platform manifest their seizing capabilities?	1. From your experience, how do you use the government digital platform to shape or interpret the new information obtained from customers? 2. From your experience, how do you use the government digital platform to manage new ways of doing things? 3. From your experience, how do you use the government digital platform to make decisions to invest on technologies and resources?	1. From your experience, how do you use ICT to support admin processes to shape or interpret the new information obtained from customers in your Woreda/zone? 2. From your experience, how do you use the government digital platform to upgrade your skills to shape new techniques in your Woreda/zone? 3. From your experience, how do you use ICT to adopt new technologies on the government digital platform?	1. From your experience, how is the government digital platform used to help public agencies shape or interpret the new information obtained from customers and stakeholders? 2. From your experience, how is the government digital platform used to support public agencies to identify new ways of doing things? 3. From your experience, how do you use the government digital platform to help public agencies make decisions to invest on technologies?
SRQ3: How do Woredas that digitally innovate using government digital platform manifest their reconfiguring capabilities?	1. From your experience, how do you use the government digital platform to rearrange or reallocate or realign resources? 2. From your experience, how do you manage incentive alignments to sustain the effectiveness of the government digital platform in your Woreda? 3. From your experience, how do you use the government digital platform to communicate between top-level management bodies?	1. From your experience, how do you use ICT to improve the value of the government digital platform in your Woreda/zone? 2. From your experience, what form of incentive is best to sustain the effectiveness of the government digital platform in your Woreda? 3. From your experience, how do you use ICT to communicate to admin processes so that the government digital platform will assist better?	1. From your experience, how is the government digital platform used to support public agencies to improve the value of their services? 2. From your experience, how do you perform incentive alignments to sustain the effectiveness of the government digital platform in your Woreda? 3. From your experience, how do you use the government digital platform to communicate between top-level management bodies?

Fig. 1. Appendix B: Sensing capability coding regime

Fig. 2. Appendix C: Seizing capability coding regime

Fig. 3. Appendix D: Reconfiguring capability coding regime
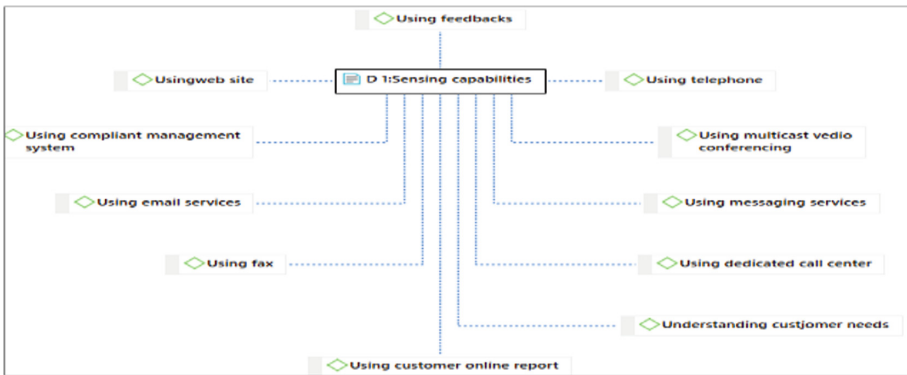

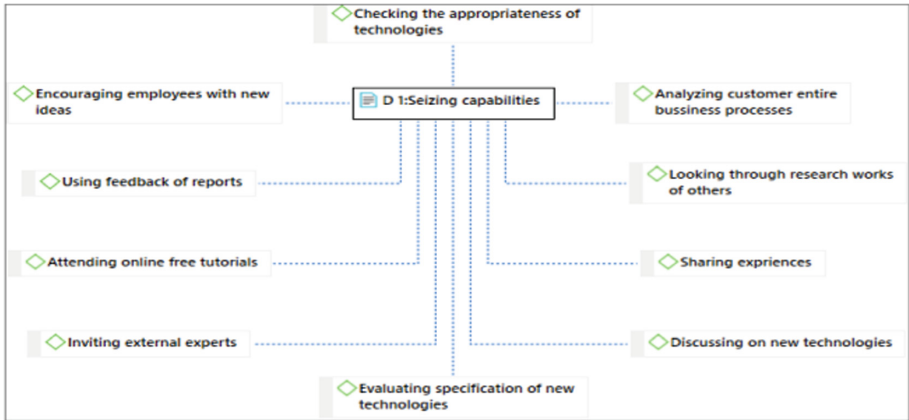**Fig. 4.** Appendix E: Network diagram for sensing capabilities

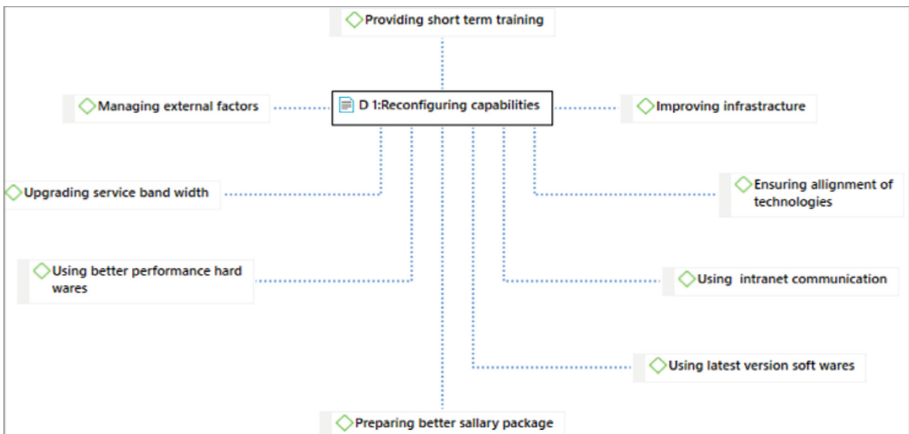**Fig. 5.** Appendix F: Network diagram for seizing capabilities

Fig. 6. Appendix G: Network diagram for reconfiguring capabilities

References

1. Constantinides, P., Henfridsson, O., Parker, G.G.: Introduction-platforms and infrastructures in the digital age. Inf. Syst. Res. **29**, 381–400 (2018)
2. Gertjan van Stam, M.: Access to digital platforms: Can mobile networks coverage reports be relied upon? Observations from rural Zambia. In: Proceedings of the 1st Virtual Conference on Implications of Information and Digital Technologies for Development, pp. 177–185 (2021).
3. Nugroho, R.P., Zuiderwijk, A., Janssen, M., de Jong, M.: A comparison of national open data policies: Lessons learned. Transforming Gov.: People, Process Policy **9**(3), 286–308 (2015). https://doi.org/10.1108/TG-03-2014-0008
4. Waller, L., Genius, A.: Barriers to transforming government in Jamaica: Challenges to implementing initiatives to enhance the efficiency, effectiveness and service delivery of government through ICTs (e-Government). Transforming Gov.: People, Process Policy **9**(4), 480–497 (2015). https://doi.org/10.1108/TG-12-2014-0067

5. Albiman, M.M., Sulong, Z.: The role of ICT use to the economic growth in Sub Saharan African region (SSA). J. Sci. Technol. Policy Manag. **7**, 306–332 (2016)
6. Naranjo-zolotov, M., Oliveira, T., Casteleyn, S., Irani, Z.: Continuous usage of e-participation: the role of the sense of virtual community. Gov. Inf. Q. **36**, 536–545 (2019)
7. Koskinen, K., Bonina, C., Eaton, B.: Digital platforms in the Global South: Foundations and research agenda. In: DIODE Working Paper (2018)
8. Katz, R., Callorda, F.: The economic contribution of broadband, digitization and ICT regulation (2018)
9. Esselaar, S., Stork, C., Ndiwalana, A., Deen-Swarray, M.: ICT usage and its impact on profitability of SMEs in 13 African countries. Inf. Technol. Int. Dev. **4**, 87–100 (2007)
10. Aron, J., Muellbauer, J.: The Economics of Mobile Money: harnessing the transformative power of technology to benefit the global poor, England (2019)
11. Ejemeyovwi, J.O., Osabuohien, E.S., Johnson, O.D., Bowale, E.I.K.: Internet usage, innovation and human development nexus in Africa: the case of ECOWAS. J. Econ. Struct. **8**, 1–16 (2019)
12. Nambisan, S., Lyytinen, K., Majchrzak, A., Song, M.: Digital innovation management: reinventing innovation management research in a digital world. MIS Q. **41**, 223–238 (2017)
13. Hinings, B., Gegenhuber, T., Greenwood, R.: Digital innovation and transformation: an institutional perspective. Inf. Organ. **28**, 52–61 (2018)
14. Susanty, A.I., Yuningsih, Y., Anggadwita, G.: Knowledge management practices and innovation performance: a study at Indonesian Government apparatus research and training center. J. Sci. Technol. Policy Manag. **10**, 301–318 (2018)
15. Stier, S.: Political determinants of e-government performance revisited: comparing democracies and autocracies. Gov. Inf. Q. **32**, 270–278 (2015)
16. Das, A., Singh, H., Joseph, D.: Information & management a longitudinal study of e-government maturity. Inf. Manag. **54**, 415–426 (2017)
17. Zhenmin, L.: United Nations e-grovernment survey 2018 (2018)
18. Mensah, R., Cater-Steel, A., Toleman, M.: Factors affecting e-government adoption in Liberia: a practitioner perspective. Electron. J. Inf. Syst. Dev. Ctries. **87**, e12161 (2020)
19. Roengtam, S., Nurmandi, A., Almarez, D.N.: Anwar Kholid: Does social media transform city government? a case study of three ASEAN cities. Transform. Gov. People, Process Policy. **11**, 343–376 (2017)
20. Toots, M.: Why E-participation systems fail: the case of Estonia's Osale.ee. Gov. Inform. Quart. **36**(3), 546–559 (2019). https://doi.org/10.1016/j.giq.2019.02.002
21. Danneels, L., Viaene, S., Van den Bergh, J.: Open data platforms: discussing alternative knowledge epistemologies. Gov. Inf. Q. **34**, 365–378 (2017)
22. Mawela, T., Twinomurinzi, H., Ochara, N.M.: Exploring public sector planning for transformational government. J. Sci. Technol. Policy Manag. **8**, 352–374 (2017)
23. Abu-Shanab, E., Shehabat, I.: The influence of knowledge management practices on e-government success: a proposed framework tested. Transform. Gov.: People, Process Policy **12**(3/4), 286–308 (2018). https://doi.org/10.1108/TG-02-2018-0016
24. Twizeyimana, J.D., Andersson, A.: The public value of E-Government–a literature review. Gov. Inf. Q. **36**, 167–178 (2019)
25. Senshaw, D., Twinomurinzi, H.: Designing for digital government innovation in resource constrained countries : the case of Woredas in Ethiopia. In: 15th International Conference on Design Science Research in Information Systems and Technology. Springer, Kristiansand, Norway (2020).
26. Koskinen, K., Bonina, C., Eaton, B.: Digital Platforms in the Global South : Foundations and Research Agenda. Springer International Publishing (2019).
27. Mettler, T.: World Countries by GDP -TOBI 2020 underserve regions (2019).

28. Miruts, G., Asfaw, M.: The implementation of civil service reforms in Ethiopia: the WoredaNet as a sole promoter to implement civil service reform of Tigray national regional state. Civ. Environ. Res. **4**, 95–102 (2014)
29. Teece, D.J., Pisano, G., Shuen, A.: Dynamic capabilities and strategic management. Strateg. Manag. J. **18**, 509–533 (1997)
30. Cristina, C., Oliveira, F., Junior, W., Clarissa, A., Kunzel, E.: The extended dynamic capabilities model: a meta-analysis. Eur. Manag. J. **38**, 108–120 (2019)
31. Klein, P.G., Mahoney, J.T., Mcgahan, A.M., Pitelis, C.N.: Capabilities and strategic entrepreneurship in public organizations. Strateg. Entrep. J. **7**, 70–91 (2013)
32. Pablo, A.L., Reay, T., Dewald, J.R., Casebeer, A.L.: Identifying, enabling and managing dynamic capabilities in the public sector. J. Manag. Stud. **44**, 687–708 (2007)
33. De Vries, H., Bekkers, V., Tummers, L.: Innovation in the public sector: a systematic review and future research agenda. Public Adm. **94**, 146–166 (2016)
34. Xiao, L., Dasgupta, S.: Dynamic IT capability: an instrument development study. In: Amcis (2009)
35. Sharma, R., Shanks, G.: The role of dynamic capabilities in creating business value from IS assets. In: AISeL, pp. 1–7 (2011).
36. Owoseni, A., Twinomurinzi, H.: Mobile apps usage and dynamic capabilities: a structural equation model of SMEs in Lagos, Nigeria. Telemat. Informatics. **35**, 2067–2081 (2018)
37. Senshaw, D., Twinomurinzi, H.: Reflecting on the role of dynamic capabilities in digital government with a focus on developing countries. In: Proceedings of the 11th Annual Pre-ICIS SIG GlobDev Workshop. AIS eLibrary, San Francisco, USA (2018)
38. Pereira, G.V., Parycek, P., Falco, E., Kleinhans, R.: Smart governance in the context of smart cities: a literature review. Inf. Polity **23**(2), 143–162 (2018). https://doi.org/10.3233/IP-170067
39. Berto, J., Estevez, E., Janowski, T.: Universal and contextualized public services: digital public service innovation framework. Gov. Inf. Q. **33**, 211–222 (2016)
40. Gawer, A.: Digital platforms' boundaries: The interplay of firm scope, platform sides, and digital interfaces. Long Range Plann. **54**, 102045 (2020)
41. Ariana, S., Azim, C., Antoni, D.: Clustering of ICT human resources capacity in the implementation of E-government in expansion area: a case study from pali regency. Cogent Bus. Manag. **7**, 1754103 (2020)
42. Parker, G., Van Alstyne, M.W., Jiang, X.: Platform Ecosystems: How Developers Invert the Firm. MIS Q. 41 (2016)
43. Salge, T.: Don't get caught on the wrong foot: a resource-based perspective on imitation threats in innovation partnerships. Int. J. Innov. Manag. **21**, 1750023 (2017)
44. Reuver, M., Sørensen, C., Basole, R.C.: The digital platform: a research agenda. J. Inf. Technol. **33**, 124–135 (2018)
45. Sedera, D., Lokuge, S., Grover, V., Sarker, S., Sarker, S.: Innovating with enterprise systems and digital platforms: a contingent resource-based theory view. Inf. Manag. **53**, 366–379 (2016)
46. Janowski, T.: Digital government evolution: from transformation to contextualization. Gov. Inf. Q. **32**, 221–236 (2015)
47. Kenney, M., Rouvinen, P., Seppälä, T., Zysman, J.: Platforms and industrial change. Ind. Innov. **26**, 871–879 (2019)
48. Fielt, E., Gregor, S.: What's new about digital innovation? In: 9th Information Systems Foundations Workshop (ISF 2016). pp. 1–14. Canberra, Australia (2016)
49. Hein, A., et al.: Digital platform ecosystems. Electron. Mark. **30**, 87–98 (2019)
50. Gil-Garcia, J.R., Flores-Zúñiga, M.: Towards a comprehensive understanding of digital government success: integrating implementation and adoption factors. Gov. Inf. Q. **37**, 1010518 (2020)

51. Seshaw, D., Twinomurinzi, H.: The moderating effect of gender on adopting digital government innovations in Ethiopia. In: Proceedings of the 1st Virtual Conference on Implications of Information and Digital Technologies for Development, 2021, pp. 325–341 (2021)
52. Senshaw, D., Twinomurinzi, H.: Innovating with government digital platforms in low-income countries: the dynamic capabilities of Woredas in Ethiopia. J. Sci. Technol. Policy Manag. (2021)
53. Zahra, S.A., Nambisan, S.: Entrepreneurship in global innovation ecosystems. Acad. Mark. Sci. Rev. **1**, 4–17 (2011)
54. Wareham, J., Fox, P.B., Ginner, J.L.C.: Technology ecosystem governance. Organ. Sci. **25**, 1195–1215 (2014)
55. Skog, D., Wimelius, H., Sandberg, J.: Digital Service Platform Evolution: How Spotify Leveraged Boundary Resources to Become a Global Leader in Music Streaming. In: Proceedings of the 51st Hawaii International Conference on System Sciences. pp. 4564–4573, Hawaii (2018).
56. Ghazawneh, A., Henfridsson, O.: Balancing platform control and external contribution in third-party development: the boundary resources model. Inf. Syst. J. **23**, 173–192 (2013)
57. Collis, D.J.: Research note: how valuable are organizational capabilities? Strateg. Manag. J. **15**, 143–152 (1994)
58. Hristov, K.: Internet plus policy: A study on how China can achieve economic growth through the internet of things. J. Sci. Technol. Policy Manag. **8**, 375–386 (2017)
59. Augier, M., Teece, D.J. (eds.): The Palgrave Encyclopedia of Strategic Management. Palgrave Macmillan UK, London (2018). https://doi.org/10.1057/978-1-137-00772-8
60. Chong, M., Habib, A., Evangelopoulos, N., Woo, H.: Dynamic capabilities of a smart city: An innovative approach to discovering urban problems and solutions. Gov. Inf. Q. **35**, 682–692 (2018)
61. Kankanhalli, A., Charalabidis, Y., Mellouli, S.: IoT and ai for smart government: a research agenda. Gov. Inf. Q. **36**, 304–309 (2019)
62. Kankanhalli, A., Zuiderwijk, A., Tayi, G.K.: Open innovation in the public sector: A research agenda. Gov. Inform. Quart. **34**(1), 84–89 (2017). https://doi.org/10.1016/j.giq.2016.12.002
63. Nason, R.S., Wiklund, J.: An assessment of resource-based theorizing on firm growth and suggestions for the future. J. Manage. **44**, 32–60 (2018)
64. Lawson, B., Samson, D.A.: Developing innovation capability in organisations: a dynamic capabilities approach. Int. J. Innov. Manag. **5**, 377–400 (2001)
65. Hossan Chowdhury, M.M., Quaddus, M.A.: Supply chain sustainability practices and governance for mitigating sustainability risk and improving market performance: a dynamic capability perspective. J. Clean. Prod. **278**, 123521 (2021)
66. Wang, C.L., Ahmed, P.K.: Dynamic capabilities: a review and research agenda. Int. J. Manag. Rev. **9**, 31–51 (2007)
67. Hu, G., Shi, J., Pan, W., Wang, J.: A hierarchical model of e-government service capability: an empirical analysis. Gov. Inf. Q. **29**, 564–572 (2012)
68. Janssen, M., van der Voort, H.: Adaptive governance: towards a stable, accountable and responsive government. Gov. Inform. Quart. **33**, 1–5 (2016). https://doi.org/10.1016/j.giq.2016.02.003
69. Mohammed, M.A., et al.: E-government and its challenges in developing countries: case study Iraqi e-government. Soc. Sci. **11**, 4310–4319 (2016)
70. Irani, Z., Kamal, M.: Editorial. Transform. Gov. People, Process Policy **10**, 354–358 (2016)
71. Foss, N.J., Lindenberg, S.: Micro-foundations for strategy: a goal-framing perspective on the drivers of value creation. Acad. Manag. J. **27**, 85–102 (2013)
72. Wilden, R., Gudergan, S.P.: The impact of dynamic capabilities on operational marketing and technological capabilities: investigating the role of environmental turbulence. J. Acad. Mark. Sci. **43**, 181–199 (2015)

73. Hambrick, D.C., Crossland, C.: A strategy for behavioral strategy: appraisal of small, midsize, and large tentconceptions of this embryonic community. Behav. Strateg. Perspect. **39**, 23–39 (2018)
74. Hare, H.: Survey of ICT and education in Africa: Ethiopia Country Report (2007)
75. Lessa, L., Belachew, M., Anteneh, S.: Sustainability of e-government project success: Cases from Ethiopia. In: 17th Americas Conference on Information Systems. Detroit, Michigan, 4th–7th Aug 2011
76. Lessa, L., Anteneh, S., Klischewski, R., Belachew, M.: Towards a conceptual framework for pledging sustainable e-government success: the case of G2G in Ethiopia. In: Africon 2015 (2015)
77. Madebo, A.N.: Technology and politics in the horn of africa. Int. J. Commun. **13**(2019), 3042–3048 (2019)
78. Dubé, L., Paré, G.: Rigor in information systems positivist case research: current practices, trends and recommendations. MIS Q. **27**, 597 (2003)
79. Yin, R.K.: Case Study Reseach: Design and Methods, 4th edn. Sage Publications, California, USA (2009)
80. Thanh, N.C., Than, T.T.: The interconnection between interpretivist paradigm and qualitative methods in education. Am. J. Educ. Sci. **1**, 24–27 (2015)
81. Eyisi, D.: The usefulness of qualitative and quantitative approaches and methods in researching problem-solving ability in science education curriculum. J. Educ. Pract. **7**, 91–100 (2016)
82. Yilmaz, K.: Comparison of quantitative and qualitative research traditions: epistemological, theoretical and methodological differences. Eur. J. Educ. **48**, 311–325 (2013)
83. Golafshani, N.: Understanding reliability and validity in qualitative research. Qual. Rep. **8**, 597–607 (2003)
84. Connelly, L.M.: Trustworthiness in qualitative research. MEDSURG Nurs. **25**, 435–436 (2016)
85. Braun, V., Clarke, V.: Thematic analysis. In: APA handbooks in psychology®. APA handbook of research methods in psychology, vol. 2. Research designs: Quantitative, qualitative, neuropsychological, and biological, pp. 57–71. American Psychological Association, Washington, DC (2012)
86. Cooper, R.: Decoding coding via the coding manual for qualitative researchers by Johnny Saldaña. The Qual. Rep. **14**, 245–248 (2009)
87. Stuckey, H.L.: Methodological issues in social health and diabetes research. The second step in data analysis: coding qualitative research data. J. Soc. Heal. Diabetes. **3**, 7–10 (2015)
88. Moussa, M., McMurray, A., Muenjohn, N.: A conceptual framework of the factors influencing innovation in public sector organizations. The J. Developing Areas **52**(3), 231–240 (2018). https://doi.org/10.1353/jda.2018.0048
89. Teece, D.: Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. Strateg. Manag. J. **28**, 1319–1350 (2007)
90. Roberts, N., Galluch, P.S., Dinger, M., Grover, V.: Absorptive capacity and information systems research: review, synthesis, and directions for future research. MIS Q. **36**, 625–648 (2012)
91. Sharma, J.K., Singh, A.K.: Absorptive capability and competitive advantage: some insights from indian pharmaceutical industry. Int. J. Manag. Bus. Res. **2**, 175–192 (2012)
92. Gomez, G., Manser, M., Webster, J., Sanchez, J.: Top 5 Challenges of Digital Transformation (2018)