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GOVERNMENT ROLES AND DYNAMIC CAPABILITIES IN DIGITAL TRANSFORMATION PROJECTS

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Completed Research Paper

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Abstract

Digital transformation initiatives have been strategically deployed by governments to enhance efficiency, increase digital competitiveness, and gain leverage internationally. While previous studies have examined government roles in IT transformation initiatives, they often focus on specific settings due to the challenge of obtaining comprehensive data across multiple initiatives. This study advances the literature by using a dynamic capabilities and government roles perspective to analyze three digital transformation initiatives over a 20-year period in the healthcare sector. The findings propose a 2x2 framework that generalizes government roles in digital transformation initiatives. Depending on the clarity of the problem and solution, three roles are identified: champion, corrector, and monitor. We also demonstrate how dynamic capabilities manifest differently for each role through three interrelated processes: digital infrastructure, digital competence, and digital governance transformation.

Keywords: Government Roles, Digital Transformation, Dynamic Capabilities, Case Study

1 Introduction

In recent years, organizations have leveraged cloud computing, social media, virtual reality, machine learning, and artificial intelligence (AI) to transform their operations and enhance their competitiveness (Chasin et al., 2022). This phenomenon is referred to as digital transformation (DT) (Ologeanu-Taddei et al., 2025). Within the public sector, digital transformation is defined as "changes introduced by the implementation of digital technologies in the public sector" (Afzal & Panagiotopoulos, 2024, p. 1). DT initiatives have also been launched by numerous countries to bring governments closer to citizens and businesses (OECD, 2023). For example, Spain, Japan, and the UK have implemented data-sharing initiatives (e.g., Spain's National Data Intermediation Platform, Japan's Co-operation Network System for Personal Information, The UK's National Data Library) to enhance service quality and promote innovation through data-driven insights, as well as to foster partnerships between public and private sectors (OECD, 2024). These examples illustrate that countries are investing in DT initiatives not only to provide more accessible and meaningful services to their customers but also to enhance their strategic leverage (ECDC, 2021).

Despite the strategic value of DT initiatives, the topic has been little studied in the e-government context (Danielsen et al., 2022), particularly regarding government involvement (Gil-Garcia et al., 2021). DT initiatives are inherently disruptive and require significant strategic involvement from the government (Carter et al., 2024). This most likely necessitates a combination of different government roles when it advances DT. Yet, the literature has largely been silent on these roles and their evolution, as most studies focus only on specific contexts and initiatives, and at a given moment of time. For example, governments

can adopt a top-down approach, imposing initiatives (e.g., UK digital identify initiative) (OECD, 2024), or a bottom-up approach, reaching consensus with the population (e.g., Vietnam enterprise architecture initiative) (Dang & Pekkola, 2023). The government can be active, anticipating future problems (e.g., climate change policy), or reactive, responding when problems reach a critical level (e.g., Covid-19 lockdown in China) (Li, 2021).

Existing studies primarily focus on either the relationship between the government and other actors in the policymaking process (a problem dimension), or the government's approach to solving societal problems (solution dimension) (Richardson, 2013). How government roles fluctuate across these two dimensions has not been studied. For example, it is not known how governments adapt different approaches or aggregate them to overcome challenges such as the digital illiteracy of the population or lack of digital competence among leaders (ECDC, 2021). Furthermore, recent studies have suggested the importance of dynamic capabilities in successful DT initiatives (Chatfield & Reddick, 2019; Soluk & Kammerlander, 2021; van Noordt & Tangi, 2023; Yeow et al., 2018). Building on these developments, this paper addresses the research gap. We examine the evolution of government roles and dynamic capabilities in national DT initiatives to uncover how governments overcome the challenges associated with new DT initiatives, aiming to improve service delivery and digital competitiveness. We thus answer the following questions: (1) *What roles do governments play in national DT initiatives?* And (2) *How are dynamic capabilities manifested under different governmental roles?*

To address these research questions, we employed an embedded single case study approach, utilizing the roles of government and dynamic capabilities as our theoretical lenses. In particular, through embedded cases of three national electronic health (eHealth) initiatives over 20 years in Vietnam, we illustrated an evolution of Vietnamese government roles from monitoring the DT initiatives to being a corrector and eventually a champion. Throughout this process, the dynamic capabilities of the government and organizational-level health facilities manifested differently. Furthermore, there are three interrelated transformation processes unfolded in each government role: the transformation of the digital infrastructure (that exemplifies the digital divide of developing countries), of the stakeholders' digital competence, and of the digital governance of the government regarding DT initiatives. The interplay of these three transformation processes impacts how the government roles evolve over time.

2 Theoretical Background

2.1 Digital Transformation Stages in the Public Sector

DT initiatives are widely recognized as lengthy and challenging endeavours, with only approximately 15 percent of such projects deemed successful (Adelakun et al., 2025). Despite these challenges, governments worldwide are increasingly harnessing digital technologies to revolutionize service delivery and enhance citizen engagement (Mergel et al., 2019). Consequently, numerous DT initiatives have been implemented globally (OECD, 2021). These initiatives not only enhance governmental services but also strengthen strategic positions and digital competitiveness. In the public sector, the literature indicates a paucity of research on digital transformation within this context (Danielsen et al., 2022). The literature further delineates three stages of digital transformation: digitization, digitalization, and digital transformation (Adelakun et al., 2025; Verhoef et al., 2021). These stages coexist and are defined as follows: digitization refers to the conversion of analog information into digital format; digitalization signifies the process and sociotechnical changes that alter existing business models; and digital transformation denotes radical and significant changes at organizational, strategic, and societal levels (Adelakun et al., 2025; Danielsen et al., 2022). This study examines the digital transformation process in the healthcare sector, encompassing the three stages within an embedded single case study that comprises the implementation of three nationwide eHealth initiatives.

2.2 Digital Transformation and Dynamic Capabilities

Prior studies have employed the dynamic capabilities theory to understand how organizations create and maintain digital competitiveness through digital transformation (Soluk & Kammerlander, 2021; Yeow

et al., 2018). Within the public sector, researchers have increasingly scrutinized the link between digital capabilities and government service performance. For instance, Chatfield and Reddick (2019) found that Internet-of-Things-enabled dynamic capabilities can lead to better smart government performance. van Noordt and Tangi (2023) showed that e-government capabilities are crucial to developing AI capability for public administrations. While useful, the number of these studies remains modest, and there is no clear understanding yet of how such dynamic capabilities developed over time, and what are the government roles during the process. Thus, in this study, we employ dynamic capabilities theory to understand how government roles and dynamic capabilities evolve for digital transformation in the public sector.

Dynamic capabilities theory posits that to create sustainable performance, an organization needs to build its dynamic capabilities through three main activities: *sensing* new opportunities and threats, *seizing* opportunities by taking action, and *transforming* its structures and processes to remain relevant (Teece, 2007). Prior studies have shown that sensing, seizing, and transforming are important activities to build digital capabilities in DT initiatives (Soluk & Kammerlander, 2021). Furthermore, successful initiatives also requires three interrelated transformations: the transformation of *digital infrastructure* surrounding the initiative (OECD, 2024), the transformation of *digital competency* of the involved stakeholders (Eden et al., 2019), and the transformation of *digital governance* of the organization (Chatfield & Reddick, 2019). These transformations form a triangle of constraints that guide how governments and organizations should approach the DT initiatives. Three transformations also guide the governments to manage the DT challenges and balance between maintaining current operations and pursuing a comprehensive transformation of the organization (Poláková - Kersten et al., 2023).

First, DT requires an evolution and a *transformation of digital infrastructure* surrounding the initiative. Digital infrastructure refers to "the basic information technologies and organizational structures, along with the related services and facilities necessary for an enterprise or industry to function" (Tilson et al., 2017, p. 748). Digital infrastructure is considered one of the most critical challenges in the implementation of DT initiatives in developing countries (Bélanger & Carter, 2009). This was evident with the Covid-19 pandemic: many countries were struggling to transform their public services to online (Ndou et al., 2023). *Second*, DT requires a *transformation of the stakeholders' digital competences*. Digital competence is understood as a set of fundamental knowledge, skills, and abilities required for the effective use of ICT and digital technologies in performing professional duties (Oberländer et al., 2020; Ochoa Pacheco & Coello-Montecel, 2023). National DT initiatives necessitate the transformation of the stakeholders' competences (Alrasheedi et al., 2022). For example, policy makers need a visionary digital mindset to leverage technologies (Kane et al., 2019). End-users need support to become digitally literate and adopt new technologies. Increasing digital competence is a critical step for DT initiatives (Gjika & Pano, 2023). *Third*, DT requires a *transformation of digital governance*. Digital governance is defined as "digital technology ingrained in structures or processes of governance and their reciprocal relationships with governance objectives and normative values" (Engvall & Flak, 2022, p. 44). Prior studies have discussed some forms of government for successful DT outcomes, such as the shared governance approach (Eden et al., 2019) or the top-down approach (Kane et al., 2019). Taken together, these studies suggest that government should be aware of different policies in governing the DT initiatives, and be able to evolve its policies to fit the contingencies (Denford et al., 2024).

2.3 Government Roles in National Initiatives

It is self-evident that government plays a critical roles in establishing the dynamic capabilities and success of national DT initiatives (Chatfield & Reddick, 2019; van Noordt & Tangi, 2023). Extant research suggests that government roles in implementing national IT initiatives can be divided into top-down, bottom-up, or hybrid approaches. A top-down approach is centralized, with the central government leading and other agencies participating in an initiative (Long & Franklin, 2004). One such example is Norway's National Joint Solutions initiative, led by the Norwegian Agency for Digital Government in collaboration with other agencies (OECD, 2024). In contrast, a bottom-up approach is decentralized, with the central government negotiating with its stakeholders to identify and implement initiatives. For instance, Vietnam's enterprise architecture initiative involved local governments and

agencies (Dang & Bui, 2023; Dang & Pekkola, 2023). A hybrid approach combines top-level guidance with bottom-level expertise (Goggin et al., 1990; Long & Franklin, 2004). An example is the U.S. ARPANET, involving multiple government levels, academia, the military, and businesses (Aldrich et al., 2002). In addition, action-level roles have been identified, such as monitoring growth, developing frameworks, and managing growth processes (Li, 2021), or governments can also act as innovators or sponsors if highly interested in the innovation (Moon & Bretschneider, 1997).

Richardson (2013) summarized government approaches and actions using two dimensions. On the relational dimension, governments can take a top-down (imposing) or bottom-up (consensus) approach to policymaking. A top-down approach involves the government determining and imposing policy details, while a bottom-up approach involves working with the population to reach consensus. On the problem-solving dimension, governments can be proactive or reactive. A proactive stance involves leading initiatives in anticipation of future problems (e.g., climate change policy), while a reactive stance involves responding to problems only when they become critical (e.g., COVID-19 lockdown in China). These dimensions define government styles based on the relationship between the government and other actors in policymaking, and the government's approach to solving societal problems (Richardson, 2013).

3 Methodology

3.1 Research Settings and Case Background

We used an embedded single case study approach (Yin, 2009) to document the digital transformation journey of the Vietnamese healthcare sector over two decades. In our data, the unit of analysis in the single case is the digital transformation process in the Vietnamese healthcare sector, and the unit of analysis in the subunits is the implementation of three nationwide eHealth initiatives (e.g., digitalized healthcare systems) in different times and contexts. The selection of the case was motivated by the unique opportunity for "unusual research access" (Eisenhardt & Graebner, 2007, p. 27) to access a rich and long set of case study data through personal connections of one of the authors. Additionally, Vietnam was considered one of the most aggressively digitalized countries in Southeast Asia (ECDC, 2021), thus representing a theoretically interesting case that can unveil how the role of the government unfolded in the digital transformation process.

The World Health Organization (WHO, n.d.) defines eHealth as "the cost-effective and secure use of information and communications technologies in support of health and health-related fields, including health-care services, health surveillance, health literature, and health education, knowledge and research". National eHealth initiatives refer to a large-scale eHealth project or plan at the national level that may contain several sub-projects or sub-plans (Warth & Dyb, 2019). We chose Vietnam using purposeful sampling reasons: (a) DT is in a strategic focus of the Vietnamese government, and (b) we had an opportunity to observe three different eHealth initiatives, constituting comprehensive transformations of the healthcare sector. Three initiatives are the National Telehealth Initiative (NTI), National Admin Health Information Technology (NHIT) Initiative, and National Clinical HIT (NCHIT). These were chosen because they offer insights into the impact of DT on a wide range of stakeholders, ranging from users to government to society. This thus helped us to understand and unlock the governance style of DT. In terms of DT stages, the NTI is more of a digitization of healthcare communication, while the next two initiatives are digitalization of administrative and clinical healthcare functions.

DT in Vietnam has undergone three distinct periods. *In the first period*, which we calls Exploration (2001-2007), Vietnam initiated "Project 112" to informatize public services and establish national databases (Gov. 112, 2001). This initiative was managed in a top-down manner with strong political support but ultimately failed to meet its objectives, leading to its abrupt halt in 2007. *In the second period*, Exploration and Experiment (2008-2017), the government cautiously launched new DT initiatives, due to the failure of Project 112. During this time, a bottom-up approach was adopted, with local authorities managing projects and a National Steering Committee providing advice. This period saw smaller, short-term projects in the first half and larger, long-term projects in the latter half. *The third*

period, Acceleration (2018-present), has seen Vietnam, under the leadership of the Ministry of Information and Communications (MIC), accelerating towards a genuinely digital nation. This period is characterized by flexible management styles, including top-down, bottom-up, or hybrid, depending on the DT initiative.

The public healthcare sector in Vietnam is organized into four levels. Level 1 includes hospitals and other HFs that are supervised by the Ministry of Health (MoH), level 2 by the Department of Health, level 3 by the District Health Bureau, and level 4 by the commune health center. The government operates hierarchically, with shared responsibilities across levels. DT in the Vietnamese healthcare sector followed in lockstep with the national-level initiatives. No DT initiatives were observed in the healthcare sector during the first period (Exploration 2001-2007). However, the subsequent period saw the MoH introducing initiatives to promote IT applications (2008-2010) and digitization (2011-2017). Building on this, the MoH introduced an IT-wide architecture in the third period to accelerate DT in the health sector.

3.2 Data Collection

Our data include interviews, secondary data, and observations (Table 1). Different sources help us to triangulate the sources and further assure the validity of the study (Creswell & Miller, 2000). We adopted an opportunistic approach to data collection as one of the authors had worked with people involved in the eHealth initiatives and therefore was able to interview them and to access internal documents. After the first round of interviews, we used a snowball technique in which we asked the interviewees to point to other people who had appropriate knowledge of the initiatives. Altogether we conducted 45 semi-structured interviews with the MoH, the MIC, eHealth initiatives partners (e.g., vendors/developers, services providers, advisers), and eHealth initiatives users (e.g., health facilities - HFs, patients). Our interviews took place between January 2020 and January 2021. Conducted in Vietnamese, these lasted between 26 and 113 minutes, with an average length of 39.6 minutes. Follow-up questions were asked via telecom software, email, and through informal dialogue during the data analysis process. We also collected secondary data: internal documents, project documents, meeting memos, press releases, conference materials, and online materials, related to the initiatives. In total, we collected more than 125 documents comprising about 10,000 pages.

Types	**Data sources**
Semi-structured interviews	MoH: 6 Interviewees MIC: 8 Interviewees eHealth initiative partners: 12 Interviewees eHealth initiative users: 19 Interviewees
Secondary data	Policies, memos, project documents: 125 documents (10,000+ pages)
Observations	Debrief meeting and online workshop: 2 sessions (4 hours 15 minutes)
Follow-up interviews	MoH and MIC: 2 Interviews (40 minutes)

Table 1. Data types and data sources of the study.

We also conducted two observation sessions to capture the development process of the initiatives (see also Orlikowski, 2007). The first 75-minute session in January 2019 consisted of two government officers in charge of managing IT applications in state agencies, three developers representing three initiatives, one service provider, two users, and two researchers. An officer briefed us on the initiative status and summarized the key activities. The second session, a three-hour online workshop in December 2020, focused on national eHealth initiatives with six government officials, three CIOs, 10 Health Facility (HF) representatives, and two users. The aim was to review the development of NHIT and plan for the future. In both sessions, extensive field notes and photographs, when permitted, were taken.

3.3 Data Analysis

We followed Eisenhardt's (1989) guidelines for the data analysis. First, we constructed a within-case study write-up to gain an overview of the timeline and refine the data collection process. The key events from the interviews and secondary documents were summarized. This reduced the number of pages to manageable amounts and helped us to identify key points. Two authors discussed the cases weekly until we reached a saturation point in the case understanding. This provided us in-depth understanding of the cases and their main events. We also ensured the consistency and reliability of data analysis by discussing the meaning of data among researchers. The interviews and secondary data were handled by at least two authors. Key quotations, events, and timelines were documented in a file so that they were checked by at least two researchers.

In the second phase, we followed a theory-driven coding approach (Yin, 2009) to analyze each case by the analytical framework, constructed from the theoretical background above. In particular, the interviews and secondary data were imported in NVivo software. The two coders discussed and looked for evidence in interviews that explained each case on the different theoretical dimensions. Secondary data were also used when necessary to corroborate evidence from interviews. Specifically, for each case, we traced and identified the following: (a) Government activities: we identified what happened in each case using the seizing, sensing, and transforming categories from the dynamic capabilities theory; (b) Dynamic capability settings of the DT initiatives which can be characterized by three dimensions: the status of the digital infrastructure, the usage of data standards, and the utilization of the initiatives among the stakeholders; and (c) Government roles: we classified the government roles in each eHealth initiative. The government roles were characterized by two dimensions: relational dimension (top-down vs. bottom-up) or problem-solving dimension (active vs. reactive).

Finally, we synthesized the findings across the three cases for theory-building purposes (Yin, 2009). This was an iterative process in which the researchers engaged in weekly discussions over the case write-up and synthesized the findings and connected them to the literature. It is important to note that this was a cross-case synthesis, not a cross-case comparison in which researchers look for patterns and similarities (Eisenhardt, 1989). Instead, the cross-case synthesis focuses on the evolution of different case elements over time and generalizes them to theory.

4 Findings

4.1 National Telehealth Initiative (NTI)

Starting from 2006, the NTI commenced to establish a telehealth platform in Vietnam, covering three governmental levels in the healthcare sector (levels 1-3). Its development can be divided into two periods (Table 2). In the first period (2006-2016), the goal (*sensing*) was to enhance medical capacity in lower-level hospitals, reducing the burden on national-level hospitals. The motivations were explained below: "*Telehealth was established at our hospital to connect with six level 2 hospitals in the Red River Delta and Northern Midlands of Vietnam. The goal was to enhance medical capacity, improve the quality and expertise of local doctors, and ensure patients receive high-quality treatment locally*" (Director, VD Hospital). National hospitals *seized* the opportunity to work with lower-level hospitals and IT vendors to *transform* their operations. IT vendors fully operated the telehealth system, providing networks, devices, and support.

However, during this period, *digital infrastructure* was poor, with less than 30% of the population having internet access and less than 10% with high-speed broadband. This made setting up telehealth systems costly and cumbersome. The director of VD Hospital, the leading hospital in the initiative, commented: "*Preparing for a telehealth surgery session took about two weeks and required over 100 technicians and staff to ensure smooth operation"* (Director, VD Hospital). The lack of *digital governance* made it difficult to ensure consistent quality across telehealth centers. One physician commented: "*During this period, telehealth centers were established mainly by purchasing equipment and software, but there was a lack of government policies and operating mechanisms*" (Physician – BS DTH, N Hospital). Lack of digital competence was evident, as noted by the Vice Director of the

Electronic Health Administration (EHA): "'*It's the first step that counts.' It was a "learning by doing" approach. We implemented telehealth, learned from it, improved, expanded, and addressed challenges as they arose*" (Vice Director, EHA). Thus, we can classify the government role during this period as minimal. Due to these characteristics, few telehealth centers were established. By 2016, only 23 out of over 1,500 hospitals had joined the initiative, with 600 telehealth sessions conducted.

In the second period (2017-current), the government *sensed* the significant advantages of DT in healthcare and *seized* the opportunity with a strong push. They launched a National DT Program in 2020 (Gov. 749, 2020). The MoH *transformed* this initiative, advancing remote medical examination and treatment (MoH 2628, 2020). The COVID-19 pandemic further drove this transformation, as lockdowns created a pressing need for telehealth. One vendor director stated: "*We had to reallocate all company resources to respond to the COVID-19 emergency, the way of doing things must be different [...] Setting up telehealth at DHY hospital and satellite hospitals took just one week, compared to the usual two years*" (Director, Vendor's Solution Department).

The *digital infrastructure* witnessed a drastic change. From 2006 to 2016, the Internet subscribers in Vietnam tripled from 17.25% to 53%, with nearly half the population gaining high-speed access. This means the population is more comfortable with using IT to access health services. During this period, hospitals also adopted AI, data analytics, and IoT, enhancing security and migrating services to the cloud. Regarding *digital governance*, the government issued standards and regulations for telehealth, such as criteria for IT applications in HFs and regulations on telemedicine activities, such as principles of telehealth operation, technical requirements for telehealth activities, general expertise requirements for telehealth, and telehealth operations fees (MoH 49, 2017; MoH 54, 2017). These activities rapidly expanded the NTI. One physician commented: "*Vietnam currently has favourable conditions for developing telehealth services. Our telecommunications are among the best in Southeast Asia. We have regulations and initiatives for telehealth. We have tested and confirmed the effectiveness of telehealth services*" (Physician, E Hospital). In terms of *digital competence*, telehealth adoption was slowly changing the habits of citizens and physicians, from traditional to online consultation. The interviewer commented: "*The biggest challenge in implementing telehealth is not the technology, but changing the habits of patients and doctors from face-to-face to online consultations*" (Director, Vendor 2's Solutions Department). During the period, the *government's role* was to issue policies and legitimize practices. By the end of 2021, NTI connected all HFs (levels 1 to 3). Telehealth sessions became routine for consultations, medical examinations, treatment, and training. In 2022 alone, there were 3,000 consultations, over 1,100 medical examinations, and 32,000 sessions.

Element	**First period: 2006-2016**	**Second period: 2017-current**
Sensing	To improve medical capacity in lower-level hospitals.	To take advantage of DT in healthcare.
Seizing	Hospitals worked with vendors to implement their initiative.	Government pushed for DT initiatives in the healthcare sector. The Covid-19 pandemic accelerated the adoption of telehealth.
Transforming	IT vendors supplied equipment and set up infrastructure.	Telecommunication with high-speed Internet access with significant improvements.
Digital infrastructure	Capability of the hospitals is limited. Internet was underdeveloped making the connection quality unreliable. unreliable.	Capability of the hospitals is improved. Internet was improved; high-speed Internet is more accessible. Telehealth services are consolidated and migrated to cloud servers.
Digital governance	There were no policies, operating mechanisms, and standards for telehealth.	Various policies on DT and telehealth: The 2020 National Digital Transformation Program (Gov. 749, 2020), set of criteria for IT applications in HFs (MoH 54, 2017) and regulation on telehealth activities (MoH 49, 2017).

Digital competence	Lack of IT skills and training opportunities.	Changing the habits of users and health providers to use telehealth.
Government Roles	None.	Issued policies to legitimize the practices.

Table 2. Development of the national telehealth initiative.

4.2 National Admin HIT Initiative (NHIT)

Started in 2017, the NHIT aimed to establish a platform of about 12,000 HFs at the commune level. NHIT development can be divided into two periods (Table 3). In the first period (2017-2019), the government *sensed* that these health stations play a vital role in delivering public healthcare services. The MoH *seized* this opportunity by focusing on *digital governance*, such as guidelines for HFs' back-office systems, and set criteria for IT applications (MoH 54, 2017; MoH 6110, 2017). The guidelines mandated a minimum of 20 functions for HIT, including infrastructure, security, and resource requirements. This *transformed* HFs' admin HITs, allowing them to develop their own HITs as long as they met the MoH's requirements. This led to a proliferation of admin HIT systems due to different IT vendors and a lack of data sharing (*digital competence*), as voiced by an interviewee: "*We have about 12,000 level 4 HFs. All activities were paper-based years ago. Despite IT improvements from 2017-2019, the ISs were not interconnected, making management difficult*" (Chief of Office of MoH). In terms of *digital infrastructure*, the ISs adopted either a standalone or a client-server architecture but lacked data-sharing standards. This lack of interoperability caused management issues. A physician said: "*The health station implemented admin HITs. They improved efficiency. The problem was that there were many HIT systems that were not connected with each other*" (Physician S4, P1 Health Station, T District, H province). By 2019, the HFs had an average of 11 distinct HIT systems, each handling specific tasks.

In the second period (2020-current), the government *sensed* the need to address interoperability issues. They *seized* this by issuing a decision (MoH 3532, 2020), mandating admin HITs to share data across all levels (Level 4 to Level 1). The EHA agency ensured HIT interoperability, and the MoH issued a data format standard for data exchange (MoH 198, 2021) (*digital governance*). They *transformed* by developing V20, a national admin HIT platform for all HFs, consolidating real-time patient data for quicker decisions and data flow from commune to national levels. In terms of *digital infrastructure*, the V20 platform used cloud-based technologies, making deployment easy. It integrated with other databases and systems, such as the MoH Data Portal and banking payment systems, offering versatility for HFs. An interviewee commented: "*Previously, using multiple admin HIT systems was inconvenient and time-consuming. The V20 platform benefits healthcare staff, state agencies, and patients. It connects everything automatically, linking all levels from the commune to the MoH. It also saves patients time and offers convenience by connecting with systems like health insurance and health records*" (Nurse, DL, NB province). During this period, the government role was mostly focusing on issuing data format standards to increase interoperability across all admin HIT systems. By 2021, around 10,600 of 12,000 HFs were connected via V20. However, challenges like incomplete module deployment, inability to connect to other platforms (e.g., national immunization databases or WHO-supported platforms), and varying IT skills among staff persisted (*digital competence*).

Element	**First period: 2017–2019**	**Second period: 2020–present**
Sensing	Government identifies DT in HFs is the backbone of national healthcare reform.	Lack of interoperability among admin HIT systems.
Seizing	Government pushed for the digitalization of administrative tasks in HFs.	Government addressed the lack of interoperability among admin HIT systems.
Transforming	Each health station implemented its own admin HIT system which used either a standalone or a client-server architecture.	A national admin HIT platform named V20 was developed using digital technologies (cloud-based).

Digital infrastructure	A standalone or a client-server architecture, but lacked data-sharing standards	Digital technologies were used (cloud architecture).
Digital governance	Guidelines and criteria in the development of admin HIT systems (MoH 6110, 2017; MoH 54, 2017).	The EHA of MoH led the development of an admin HIT system. New guidelines that regulate the interoperability of admin HIT systems in HFs (MoH 3532, 2020).
Digital competence	Proliferation of admin HIT systems developed by HFs that lack interoperability. I.e., by 2019, on average, each health facility had 11 different admin HIT systems.	Incomplete deployment of all modules of the platform, inability to connect to other platforms, unequal IT skills among staff or outdated computers at the HFs lead to incomplete data and poor usage.
Government Roles	Admin HIT requirements and functions were guided by MoH. No specific standard for the platform interoperability.	MoH standardized data formats in order to connect any admin HIT to only one platform.

Table 3. Development of national admin HIT initiative.

4.3 National Clinical HIT Initiative (NCHIT)

In 2018, the NCHIT started to digitize patient health records in level 1 to 3 hospitals. The government *sensed* NCHIT as a way to enhance digital competitiveness and streamline healthcare management with digital technologies. The government *seized* this opportunity by issuing a circular outlining the scope, legalities, principles, and standards for electronic medical records, digital signatures, and privacy/security standards (MoH 46, 2018). They also defined the government's role in establishing the NCHIT and set data format and exchange standards, acknowledging international health data standards (MoH 3926, 2017; MoH 7713, 2007). The 2018 Circular mandated compliance with these standards, enabling different clinical HIT platforms to share data. However, only subsets of health records can be shared for reuse or research (*digital governance*). In that sense, the government played a hybrid role, pushing incentives and strategic drivers while leaving development to HFs. Unlike the admin HIT initiative, a council certifies local clinical HIT compliance with government guidelines, comprising officials and healthcare professionals from all healthcare levels. The process is described by an interviewee: "*Our Electronic Medical Record system was evaluated in February 2020 by the Professional Council, led by the Department of Health in QN Province. Based on MoH policies, our EMR met 5 out of 7 criteria, making us one of the first level 3 hospitals in the province to replace paper medical records*" (Vice Director, HH District Health Center, QN, level 3 hospital). Regarding the *digital infrastructure*, the government now owns only the data, outsourcing digital infrastructure to IT vendors who have improved their HIT platform capabilities. Vendors set up cloud-based infrastructure and developed algorithm-based decision support systems. AI synthesizes medical records for regimens and prognosis suggestions, and scanned images to train AI models for disease suggestions like pneumonia. These applications have enhanced platform attractiveness. In terms of *digital competence,* the lack of commitment from health facility leaders persists. Others include staff behaviour change, IT staff qualifications, and uneven infrastructure development, all affecting clinical HIT implementations: "*Implementing NCHIT changes working habits, requiring strong leadership and staff participation. HFs are confused about necessary investments and upgrades due to asynchronous digital infrastructure*" (MoH Report, 2020). To improve digital competence, stakeholders such as the government, the MoH, IT vendors, and healthcare facilities (HFs) were involved. For instance, the MoH and the Department of Health have organized symposiums to assist HFs: "*Assigning responsibilities, particularly to leaders, aids DT acceleration and system use. The 'Small rain lays great dust' approach suggests that users are convinced by the benefits of clinical HIT over time*" (Vice Director General K3, K Hospital).

Element	**2018–present**
Sensing	Enhance digital competitiveness and streamline healthcare management.

Seizing	Government pushed for the use of electronic medical records in the healthcare sector.
Transforming	The government transitions to "owning data" while leaving the specifics of digital infrastructure of the platforms to IT vendors. The government issued regulations and standards, while the HFs have the flexibility to develop and implement their own system. However, a professional council will assess whether the clinical HIT platforms meet government requirements.
Digital infrastructure	Digital technologies and software-as-a-service models were adopted. Advanced technologies such as algorithm-based decision support systems were integrated to improve the decision-making process.
Digital governance	MoH outlined the scope, legalities, principles, and standards for electronic medical records, picture archiving and communication systems, digital signatures, and privacy/security standards, as well as indicated the role of the government (e.g., agencies under the MoH) in establishing the NCHIT. Recognized and adopted international standards (e.g., HL7, DICOM) (MoH 3926, 2017; MoH 7713, 2007).
Digital competence	Lack of commitment from healthcare facility leaders. Challenge to changing working habits of the healthcare staff. Lack of IT skills in healthcare facilities to implement and support clinical HIT platforms.
Government Roles	MoH issued guidelines, and independent institutions checked compliance.

Table 4. Development of national clinical HIT initiative.

5 Discussion

5.1 Government Roles in Digital Transformation Initiatives

We synthesize our three cases to understand the evolution of government roles and changes in each case. In terms of the government roles, the government style in the telehealth initiative can be described as "*government as a monitor*" in which the government adopted a reactive problem-solving approach with a consensus relationship with hospitals. Specifically, the government was not involved, leaving telehealth platform development to the hospitals. The government then changed its role and accelerated the implementation of telehealth by issuing guidelines, but hospitals still controlled development and implementation. Throughout, the government monitored and intervened only when necessary. On the other hand, for the admin HIT initiative, the government style can be described as "*government as a corrector*". First the government let the HFs develop their own platforms but then it stepped in with revised standards and a government-supported platform to address their proliferation and their lack of interoperability. In the clinical HIT initiative, a "*government as a champion*" style was adopted when the government took the lead right away. It was still a hybrid approach where the government only defined the functional requirements, data standards, and guidelines for development while the HFs had flexibility to develop and implement their own platforms (Goggin et al., 1990; Long and Franklin, 2004).

What (Problem) / **How (Solution)**	Problem clear	Problem not clear
Solution clear	Government as champion	Not empirically observed
Solution not clear	Government as corrector (Sandbox Approach)	Government as monitor (Wicked Problem)

Figure 1. The government roles in DT initiatives.

Our synthesis findings show how the government roles evolved within and across the cases. We propose a 2x2 framework capturing these roles, the dimensions being societal problem clarity (the "What": what is the problem we are going to solve) and solution clarity (the "How": how will we solve the problem using DT solutions). Three cells are apparent in our cases, with one cell unobserved. However, it can be

questioned whether a solution there can ever be observed: knowing a solution to an unknown problem might not be epistemologically right (Figure 1).

First, if both the problem and the solution are clear, the government can act as a champion of DT initiatives. This was the case of the NCHIT initiative. The need for the clinical HIT platforms was clearly understood as part of the national DT initiative. Based on the lessons learned from the previous pilot program and from the NHIT initiative, the government also understood how the platform should be built, and whether the necessary foundations for the platform existed (e.g., digital infrastructure was in good shape, the stakeholders' digital competence was high, and the government leaders were committed to the initiative). The government consequently issued functional requirements, data standards, and step-by-step guidelines to develop the platform. To avoid an extensive number of platforms as happened with the NHIT initiative, the government set tight governance practices and data standards for data format and data exchange and focused on owning data. The HFs were free to develop and implement their own clinical HIT platforms as long as they followed the government guidelines.

Second, if the problem is clear but the solution is not clear, the government can adopt a sandbox approach and act as a corrector of DT initiatives. The sandbox approach refers to an environment in which the government permits limited actions in developing DT solutions with relaxed regulatory constraints and limited customers (tests-trails), and minimizes the risk of restricting policies and enforcement action (Allen, 2019). This resembles the "let a hundred flowers bloom" philosophy (Nadkarni & Prügl, 2021). With the sandbox environment, if any unintended issues emerge, the government can step in as a corrector and regulate the DT solutions. This happened with the NHIT initiative. The government was setting up regulations on the functional requirements of the NHIT so that the HFs can implement their own admin HITs accordingly. The problem of extensive proliferation of individual platforms without interoperability abilities emerged. There were no standards for data exchange in the regulations. The government had to act as a corrector, interfere with a top-down approach, and consolidate all admin HITs to one platform (i.e., V20 platform).

Third, if neither the problem nor the solution is clear, the government can only monitor the DT initiatives. We refer to this as a "wicked problem": the DT initiative problem is ill-defined, but lacks an authoritative set of rules, criteria, or methods (Coyne, 2005), or has unclear definitions, causal complexity, or conflicting goals (Denford et al., 2024). In this situation, the government can rely only on the consensus to make sense of and organize the solution. The NTI initiative is an example of this style. At the beginning, the government was inactive in problem solving but sought consensus with the stakeholders to leave the development to hospitals. The government chose this approach because the digital infrastructure was underdeveloped, there was a lack of digital competences across the population, and the government officials were not competent in regulating the DT initiatives. Only after those reasons were acknowledged, the government was able to issue policies that helped to accelerate the telehealth adoption.

Our 2x2 framework conceptualizes the roles for the government under different circumstances. This contributes to DT initiative studies often just describing the government involvement rather than focusing on why certain governance styles take place (King et al., 1994; Li, 2021; Moon & Bretschneider, 1997; Richardson, 2013). We also note that it is possible that the government takes different roles within the same initiative or changes their roles over time. We thus invite future studies on this topic.

5.2 Dynamic Capabilities and Government Roles

We further conducted a cross-case synthesis of three cases to understand how dynamic capabilities manifested in different government roles, particularly regarding digital governance, digital infrastructure, and digital competence (Table 5). Each government role has unique conditions of DT elements and the manifestation of dynamic capabilities. We contribute to studies on dynamic capabilities by illustrating how the manifestation of dynamic capabilities in DT initiatives is characterized by the three interrelated transformation processes of digital governance, digital infrastructure, and digital competence.

Element	Government as a monitor (NTI)	Government as a corrector (NHIT)	Government as a champion (NCHIT)
Dynamic capabilities Manifestation	*Organizational-led transformation* Starts at the organizational level with sensing and seizing, followed by transformation at both government and organizational levels.	*Government-initiated, organizational-driven transformation* Begins with government sensing and seizing at the organizational level, and transformation at both levels.	*Government-led transformation* Government initiates sensing, seizing, and transforming. Health facilities simply follow the government's lead at the organizational level.
Digital governance	*From limited involvement to guideline-based governance:* The government initially had limited involvement but later issued guidelines to accelerate telehealth adoption.	*From guideline-based governance to reactive policy governance* The government initially set functional requirements without data exchange standards, leading to a proliferation of administrative HIT platforms. Later, policies were introduced to address this issue.	*Starting by proactive policy governance* The government set functional and data standards, allowing HFs flexibility in platform development.
Digital infrastructure	*From lagging behind in IT to advancing digital technologies infrastructure:* The digital infrastructure upgraded from lagging behind IT and low- to high-speed Internet with digital technologies, supporting telehealth through consolidated, cloud-based services.	*From standalone to digital advanced technologies:* Most admin HIT systems were standalone or client-server based, lacking interoperability. Later, the NHIT platform, being cloud-based, allowed easy deployment and maintenance.	*Starting with digital advanced technologies:* The government shifted to owning only data, while vendors developed advanced platforms with advanced digital technologies.
Digital competence	*From technical skill deficiencies to socio-technical skill gaps:* Early implementation lacked digital skills, relying on vendors' IT and infrastructure. Later, there were struggles in changing user and health provider habits to use telehealth.	*From socio-technical skill gaps to leadership and skill challenges:* There was a persistent lack of IT skills among staff in HFs, as well as struggles in changing habits.	*Leadership and skill challenges:* Healthcare leaders lacked commitment, staff struggled to change habits, and IT skills were insufficient.

Table 5. Synthesis of government roles in connection of DT elements and dynamic capabilities.

First, when the government acts as a *monitor* in DT initiatives, the dynamic capabilities process is characterized as *organizational-led transformation.* This process is initiated at the organizational level as the health facilities sensed and seized the opportunity to start the NTI. Then, the process was followed by transformation at both the government and organizational levels when they work together to embrace cloud solutions to NTI. In this instance, DT initiatives also trigger several transformations of dynamic capabilities (Chasin et al., 2022). Specifically, digital governance evolves from limited involvement to

guideline-based governance. Digital technology progresses from lagging behind in IT to advancing digital technologies infrastructure. Also, digital competence shifts from technical skill deficiencies to socio-technical skill gaps. In that sense, digital infrastructure and digital competences, that were initially underdeveloped, necessitated significant roles for digital governance.

Second, when the government acts as a corrector in DT initiatives, the dynamic-capabilities process is characterized as *government-initiated, organizational-driven transformation*. This process begins with government sensing the need for a NHIT, health facilities seizing the opportunity to implement new admin HIT systems at the organizational level, and transformation of structures and processes at both levels. Three transformations happened: Digital governance evolves from guideline-based to reactive policy governance. Digital infrastructure transitions from standalone systems to advanced digital technologies. Meanwhile, digital competence shifts from socio-technical skill gaps to leadership and skill challenges.

Third, when the government acts as a champion in DT initiatives, the dynamic-capabilities process is characterized as g*overnment-led transformation*. This process begins with the government initiating sensing, seizing, and transforming. Health faculties simply follow the government's lead at the organizational levels. Unlike other cases, the three transformation processes are unfolding without the endings. Digital governance remains a proactive policy governance. Digital infrastructure begins with advanced digital technologies, while leadership and skill challenges persist with digital competence. Nevertheless, these transformation processes have taken the lessons learned from the other two cases to improve the dynamic capabilities of the government in guiding DT initiatives.

5.3 Practical Implications

This study has several practical implications. First, our framework provides a guideline for governments to choose the right management approach for their DT initiatives. Literature has discussed the tensions between a 'let a hundred flowers bloom' philosophy versus a 'launch, learn, pivot' philosophy in DT initiatives (Nadkarni & Prügl, 2020). Our framework adds clarity to that discussion by showing that there is a right context for each and every approach. In other words, our framework provides the configuration of DT in the context of the governments. Second, we shed light on the relationship between government roles, DT constraints, and dynamic capabilities' operationalizations that provide a tool to identify, prioritize, and strategize the DT initiatives actions. If the population is not digitally literate, the government can launch an initiative to address the issue. For example, Vietnam has established community DT teams since 2021. This was considered a breakthrough and unique approach to improve the citizens' digital competences. A community DT team was established in each village, with the core being the youth, to guide every citizen, especially elders, rural inhabitants, and ethnic minorities, to use the digital platforms. By August 2022, there were more than 45,500 teams with approximately 220,000 members in Vietnam.

5.4 Limitations and Future Research

The study is not without limitations. First, we adopted an interpretive research approach. This can be subjective. We have coped with this by giving illustrative examples and by using several approaches to triangulate the data. Second, we employed an embedded case study encompassing three eHealth initiatives within a single country, which may constrain the generalizability of our findings to the specific study context. For instance, the results of this study can be applied to other governmental initiatives in Vietnam, such as smart city initiatives (Dang, 2025), telecentre initiatives (Do et al., 2023; Thai et al., 2022), and various other governmental programs. Nevertheless, it is important to note that our findings are more appropriately generalized to theoretical frameworks (Yin 2009) rather than taking them to other contexts. This limitation opens opportunities for future research. Finally, healthcare was not to make direct economic profit in this study but to enhance medical capacity and access for vulnerable inhabitants. Consequently, economic factors have not appeared in our research.

6 Conclusion

DT has been on the forefront of a new wave of governance for governments across the world. However, public sector DT is still in its infant stage. There is a lack of comprehensive understanding of strategies needed in the policy, management, and infrastructure to successfully implement DT initiatives. In this study, we examined three DT initiatives transforming the healthcare sector in Vietnam. We uncovered how the Vietnamese government coped with several challenges with its initiatives when improving service delivery and digital competitiveness. Our findings provide insights into strategically choosing the right approach for a given DT initiative. The findings thus are valuable for countries and their governments seeking approaches to implement their DT initiatives.

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