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## Government Workspace Digitalization and Socioeconomic Development Outcomes in Ghana

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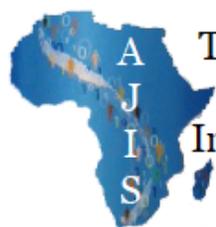


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## Government Workspace Digitalization and Socioeconomic Development Outcomes in Ghana

### Cover Page Footnote

This study acknowledges all participants who spent time and effort to provide diverse views on government workspace digitalization in Ghana and the effects thereof. The authors also acknowledge editors and reviewers of The African Journal of Information Systems for their constructive criticism of the work.



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# Government Workspace Digitalization and Socioeconomic Development Outcomes in Ghana

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## ABSTRACT

The study sought to understand how the structural environment shapes socioeconomic outcomes of government workspace digitalization in Ghana based on a qualitative, interpretive case study and the structural model of technology as a theoretical lens. The findings show how the availability of electronic transactions law, government borrowing, and extendable system design can positively influence socioeconomic outcomes of government workspace digitalization. However, use of multiple system development environments, bureaucracy, a within-country digital divide, and a persistent physical signature and letterhead culture can negatively influence the socioeconomic development goals of government workspace digitalization.

## Keywords

Digitalization, e-government, e-workspace, socioeconomic goals, structural model of technology, Ghana.

## INTRODUCTION

This study seeks to understand how the structural environment shapes socioeconomic outcomes of government workspace digitalization in the developing economy of Ghana. The structural environment refers to rules, norms, and resources within a social system (Orlikowski, 1992). Socioeconomic development goals relate to expected improvements in the social and economic conditions of individuals, institutions, or nations (Roztocki & Weistroffer, 2016). Over the years, some governments have accepted digitalization as an e-government innovation to promote socioeconomic

development (Tambouris et al., 2013; Zhao et al., 2015). As a concept, digitalization is the practice of migrating processes, contents, and objects that used to be physical or analog onto electronic platforms (Fichman et al., 2014). Government workspace digitalization, therefore, involves migrating public-sector work from physical offices onto electronic platforms such as web portals. The traditional workspace for government employees has been in buildings and with physical materials and tools such as pens, pencils, papers, files, folders, cabinets, and paper trails (Larkotey et al., 2017). Related human interactions have also been face-to-face. Such conditions of work, however, promote undue bureaucracy and delays as well as time and space constraints. In recent years, some governments have initiated projects to digitalize their physical workspace to promote electronic workflows and interactions.

Government workspace digitalization is a form of e-government innovation. Studies on e-government have generally focused on broad themes such as e-democracy (Bwalya & Mutula, 2016), e-services (Nygren et al., 2014; Sorn-in et al., 2015) and e-tax (Haider et al., 2015). Therefore, there is less concentration on government workspace digitalization. As a result, not much is known about workspace digitalization. Such initiatives are also subject to structural effects. There is, therefore, the need to study how structural environments can shape socioeconomic outcomes of government workspace digitalization, particularly within a developing economy context where such innovation is emergent. In line with this research motivation, the research question for this study is: *How does the structural environment shape the socioeconomic development outcomes of workspace digitalization in a developing economy?* To address this question, the study employs a qualitative, interpretive case study methodology (Myers, 2013; Walsham, 2006) and the structural model of technology (Orlikowski, 1992) to investigate this phenomenon.

The rest of this manuscript is structured as follows. The next section reviews the relevant literature on e-government and digitalization activities, followed by the theoretical foundation and the methodology. The subsequent sections present the case description, analysis, discussion, research contribution, and finally, the conclusion.

## **GOVERNMENT SERVICES DIGITALIZATION AND SOCIOECONOMIC OUTCOMES**

Government services digitalization initiatives are considered unpredictable due to high levels of complexities between stakeholders (McLeod & Doolin, 2012). These complexities arise from the requirement for a high level of coordination and sharing (Choi et al., 2014), resistance to change in the mindset of users and the significant process re-engineering (Bigdelia et al., 2013; Waller & Genius, 2015). There is also a lack of a collaboration and communication framework among various divisions of government (Sun & Li, 2014).

Digital innovations promote government initiatives, which lead to improvement of the socioeconomic conditions of stakeholders (Palvia et al., 2018). Information and communication technology (ICT), of which e-government is part, influences individual income levels, education, quality of life, and standard of living. Institutionally, ICT influences quality of human resources, global competitiveness, and institutional income. At the national level, ICT influences democracy, increased national product and wealth, improved labor market, and increased international acceptance (Roztocki & Weistroffer, 2016).

Government services digitalization is enabled through the provision of clear legislation (Elsheikh et al., 2008; Špaček, 2020), concise guidelines for implementation (Weerakkody et al., 2011) and available human resources and collaboration between all stakeholders (Muhaya et al., 2015). Effective leadership skills and well-planned change management processes promote e-government initiatives (Nkohkwo & Islam, 2013). Aside from gaining access to expertise and reducing cost (Gantman, 2011), information

technology (IT) outsourcing might be used to promote a specific political agenda (Gordon & Walsh, 1997).

Developing economy e-government initiatives are constrained through the unavailability of funds (Domínguez et al., 2011). In other instances, over-dependence on central government's internally generated sources (Ebrahim & Irani, 2005; Elsheikh et al., 2008), which may not be regularly and readily available, makes it challenging to plan and sustain such e-government initiatives (Heeks, 1999). Also, lack of user participation (Alcaide-Muñoz & Bolívar, 2015; Nkohkwo & Islam, 2013) constrains e-government initiatives. The lack of Internet, ICT infrastructural facilities and power (Ndou, 2004; Elsheikh et al., 2008) as well as network, telecommunications, hardware and sometimes, software issues (Nkohkwo & Islam, 2013) also make it more difficult for governments to connect to grassroots. Furthermore, bureaucracy (Schwester, 2009) and the apparent lack of change of organization bureaucracy to new business models provided by e-government initiatives (Ertl et al., 2014; Nurdin et al., 2012) constrain e-government project goals. Political interference (Irani et al., 2007), the size of the government, the procedure for change, and apparent restrictions from the employees (Anthopoulos et al., 2016) also constrain e-government initiatives.

Literature on e-government in Ghana indicates that some factors enable or constrain e-government initiatives. For example, factors that will allow e-government initiatives are prudent management of interactions (Larkotey et al., 2017), involvement of intermediary consultants (Larkotey et al., 2017), and influence from the international community. Conversely, outdated laws, a culture of paper document flow, non-use of integrated systems implementation, and inadequate and unreliable online access for participating units (Effah & Nuhu, 2017) constrain e-government initiatives. In addition, cultural and behavioral attributes, such as socialization, limit driver licensing digitalization. Cognitive political institutions also constrain national biometric identification implementations (Owusu-Oware et al., 2017).

There have been many studies discussing the socioeconomic influences of ICTs in general (Dunne et al., 2004). The reason is that developed countries have similar social, political, and economic features (Ngwenyama & Morawczynski, 2009); therefore, findings from one developed country can easily be generalized to other developed countries (Samoilenko & Osei-Bryson, 2016). However, developing countries are faced with significant differences (Roztock & Weistroffer, 2008), which prevent generalization of practical studies from one context to the other. Hence there is a need for context-based (Walsham & Sahay, 2006) studies that seek to elucidate the context-specific characteristics that enable or constrain the socioeconomic goals of e-government initiatives.

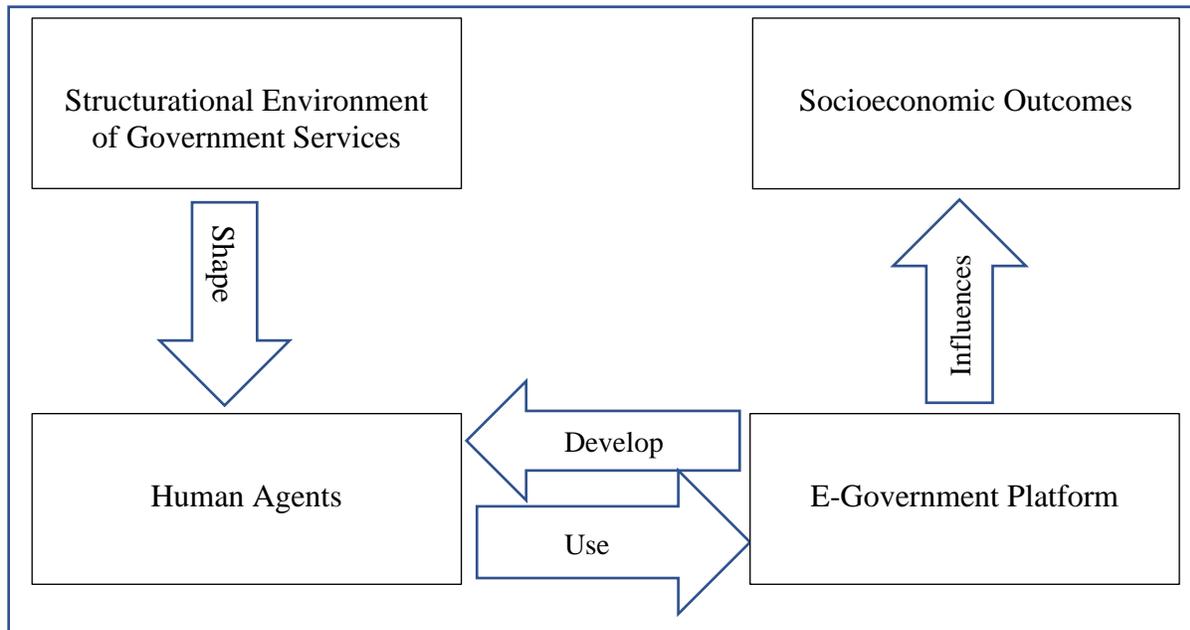
## **THEORETICAL FOUNDATION**

This study draws on the structurational model of technology (Orlikowski, 1992) as a theoretical lens (Klein & Myers, 1999) to explain the phenomenon under study. The structurational model of technology was derived from structuration theory (Giddens, 1984, 1986), which views the relationship between social structures and human agency as a form of duality (Jones & Karsten, 2008). However, because Giddens' original structural theory did not account for technology, Orlikowski (1992) developed the structurational model of technology as an information systems theory to account for such a deficiency.

Although Orlikowski's (1992) structurational model of technology focusses on development and use, the level of analysis is at the institutional (mesa) level. The structurational model of technology has been criticized for analyzing data at the institutional level only. The theory does not take into consideration the broader institutional factors that influence the development and use of government services (Grgecic & Rosenkranz, 2010; Jones et al., 2004). However, based on the purpose of the study and the research question, the study introduces a fourth component called the socioeconomic outcomes. Therefore, the

socioeconomic outcomes component promotes analysis at the macro level to generate a new framework, as shown in Figure 1.

**Figure 1**  
*Structurational Model of Technology*



*Note.* Adapted from Orlikowski, 1992 and De Waal, 2013.

Hence, the structurational model of technology seeks to explain the duality of relationship between the structurational environment of government system, human agencies, e-government development and use and socioeconomic outcomes. First, this study defines the structurational environment as the broad institutional factors such as political, economic, legal, social, and technical (Jones et al., 2004) that influence development and use of digitalized government services in a given social system (Orlikowski, 1992). Second, human agents include people and groups involved in the development and use of the e-government system. Third, the e-government platform refers to the digital environment where government work takes place. Finally, socioeconomic outcomes is the social and economic benefits derived by individuals, institutions, or a nation from e-government platforms (Roztocki & Weistroffer, 2016).

The main principle of the theory is duality of technology, which involves the co-shaping relationship between the structurational environment of government system, human agents, and e-government platforms and their socioeconomic outcomes. The "develop," "use," "influences," and "shape" elements shown in Figure 1 are the relationships underlying the principle of duality. First, the develop relationship shows that an e-government platform is a product of human agents shaped by the structurational environment of government systems. Second, the use relationship explains how human agents use e-government platforms. However, the development and use shape each other through duality of

relationships. Finally, the influence relationship shows how development and use of e-government platforms influence socioeconomic development.

Given the nature of this study, theories such as the structuration model (Giddens, 1984, 1986), the adaptive structuration model (DeSanctis & Poole, 1994), which analyze the structural environment, could have been used. However, Giddens' structuration theory barely mentions technology (Walsham, 2002). In addition, DeSantis' adaptive structuration theory does not align with the interpretive tradition, given its deterministic nature (Pinsonneault & Pozzebon, 2001). Hence, the structural model of technology with its duality of relationships makes it appropriate for the study. Therefore, from the interpretive research perspective, this study draws on the structural model of technology as a sensitizing device (Klein & Myers, 1999) to understand the research phenomenon and not for testing purposes.

## RESEARCH METHODOLOGY

We used a qualitative, interpretive case study to understand the phenomenon under study. The research, therefore, focuses on qualitative socioeconomic outcomes of the workspace digitalization. Rather than studying the outcomes and effects of processes, interpretive studies focus on how such processes emerge (Kaplan & Maxwell, 1994) as well as assess the meanings participants assign to a phenomenon (Orlikowski & Baroudi, 1991). Thus, studies conducted interpretively aim to understand the context and its relationship with the phenomenon (Walsham, 1995). Following the interpretive tradition (Walsham, 2006) and for internal validation (Poba-Nzaou & Raymond, 2013), data collection was from multiple sources between August 2015 and October 2020. Sources of data were through semi-structured interviews, document and artifact analysis, participant observation, and informal discussions. Key informants were selected through purposeful sampling and snowballing (Patton, 2002).

The total number of interview participants was 40 public-sector officials, which includes two directors from the Ministries, Departments, and Agencies (MDA) and one director from the National Information Technology Agency (NITA), a government agency in charge of national ICT project implementation. Others are eight employees who are unit heads from the public service, five local MDA IT heads, 14 citizens who transact with MDAs, three lead developers, three lead testing officials, and four members of the steering committee. Participants from all levels were selected based on their participation or in-depth knowledge of the development and/or use of the platform. On average, interviews lasted for about 47 minutes for each participant. Interviews were conducted until saturation was achieved in each of the participating groups when those following did not provide additional information or provide facts that led to further insights in the case (Lincoln & Guba, 1985).

Additional data was gathered through document and artifact analysis. This collection was done by requesting physical reports such as minutes of meetings, project development, user feedback, technical documents, user manuals, flyers, legal documents, policies, and brochures. The Electronic Transactions Act served as the legal document. Policy documents such as the Public-Sector Working Policy, Public-Sector Structure Policy, and Employee Handbook were analyzed. Other reports and strategy documents analyzed were project meeting reports, project reports, "as is" reports, "would be" reports, testing reports, and implementation reports. Electronically, more data was gathered from the websites of the institutions involved and through Internet searches.

Further data was gathered through participant observation. With time, researchers gained the trust of participants and therefore engaged in informal discussions. Once over, data from such discussions were quickly written down and sent to participants to review before being added and used for analysis. Data

gathered through these means were compared to that of the interviews and participant observation to determine similarities and differences.

Data collection and analysis were done concurrently (Myers, 2013). Following Davidson and Chismar (2007), this study used the hermeneutic circle (Gadamer, 1976; Klein & Myers, 1999) as the mode of analysis. The hermeneutic circle provided the basis for understanding the meaning of the text. With the hermeneutic circle, a full understanding of the structural environments and how they shaped government workspace digitalization only became more evident when the individual parts of the empirical data were understood and vice versa. Hence, from the interpretive perspective, an understanding of the structural environment was achieved by understanding the various components of the digitalization process and how they influenced the socioeconomic outcomes of the government workspace digitalization. Therefore, an analysis of the concepts such as the structural environments of government systems, human agents, e-government platform, and socioeconomic outcomes shaped the analysis interpretively. The researchers met periodically to discuss and develop consensus on the emerging findings. Our initial understanding guided our reading and re-reading (Swatman, 2015), leading to new knowledge, which further guided our further reading of the data (Hirschheim & Lyytinen, 1995). Follow-up interviews were organized in instances where clarification was required, and feedback from these sessions was analyzed further to improve the quality of the study.

## **CASE STUDY DESCRIPTION**

The case under study is the government workspace in Ghana. In recent years, Ghana has joined the league of developing countries introducing digital services. Ghana is a lower-middle-income developing economy with about 29,600,000 citizens and situated on the west coast of Africa. For the past 15 years, there has been a steady rise in the use of the Internet. This information is found in the International Telecommunication Unions' (ITU; 2015) report showing that the percentage of individuals using the Internet grew from 0.15 in the early 2000s to 23.48% by 2015.

Regarding technology infrastructure, Ghana has, according to the International Telecommunication Union (2015) report, 4.0 fixed telephone subscriptions, 87.1 mobile-cellular telephone subscriptions, 2.4 fixed broadband subscriptions (all per 100 people), with 17% and 18.3% of households with a computer and Internet access, respectively. Ghana's public sector is structured into MDAs. Per the public-sector structure policy document, ministries constitute the policy-making institutions of the government. Departments are the policy-implementing units reporting to the ministries. The government agencies are lower-level administrative units, which report to the departments or directly to the ministries. An example is the NITA, which reports to the Ministry of Communication (MoC). The government workspace, therefore, constitutes the relationships within and between the MDAs, the central government, parliament, and the judiciary.

Over the years, the government work environment within and among agencies and offices has been inundated with paper-based processes and workflows. According to a director, employees have depended on physical processes to collaborate, share information, process documents, and serve the public. An employee said that "documents are printed and kept in files or folders and file cabinets congesting space and sometimes difficult to find. As a result, documents often get missing between and within offices." "We were faced with undue bureaucracy leading to delays in document processing and increasing intermediaries," another employee narrated. Announcements were posted on notice boards, that workers rarely read. There was a duplication of work between employees and offices. "Inter-office meetings are held in physical locations, and some workers have to travel long distances from their office to designated office locations in different cities leading to lateness," a director narrated. According to a

steering committee member, the physical workspace was also bewildered with inefficiencies, lack of transparency, perceived corruption, and high budgetary cost. "For a long time, government officers were not prepared to work with electronic documents, a situation which frustrated government, citizens, and private organizations that interact with the public sector," a NITA director narrated.

In 2008, the parliament of Ghana passed the Electronic Transactions Act (Act 772) to legalize and legitimize the use of electronic documents and processes in Ghana. NITA took that opportunity to initiate a proposal for digitalization of the physical government workspace. According to a NITA director, "the goals of the project were to curb corruption, reduce the cost of operations, promote efficient, effective government communication and operations, streamline document processing, and ensure monitoring and evaluation."

### **Project Initiation and Planning**

A change in government and subsequent realignment of priorities by the new government delayed the project commencement. "Finally, the project initiation and planning began in January 2014 through the joint effort of the MoC and NITA", an MDA director said. The Minister of Communications commissioned a 25-member steering committee with representatives from NITA, MDAs, and private ICT experts to oversee the project. "The platform was expected to electronically connect public-sector offices and employees by migrating existing physical activities onto a digital work environment through e-meeting, e-document management, e-notice board, and e-correspondence components," a steering committee member narrated. The steering committee and NITA costed the project and it was approved by MoC. In March 2014, the MoC sought external funding from the World and China Exim Banks to resource the project. At a press briefing a director of the MoC reported that "We have enough money to see us through the whole project. We will, therefore, use this money judiciously to complete the entire project."

The project was awarded to a local IT firm, called WebTech (pseudonym). Subsequently, the minister inaugurated the platform development team comprising members of the steering committee, NITA, and WebTech to the MDA directors at a separate meeting.

### **Platform Development**

WebTech gathered requirements for a year by observing public-sector work processes, and interviewing citizens and employees of private firms that transact with the MDAs. WebTech also read source documents on procedures received from the various MDAs and the Electronic Transactions Act. After analysis, the development team recommended three components for the intended e-workspace portal; (1) Portal Content Management with sub-components for Meeting Management System, Document Management System, and the Intranet Portal; (2) Correspondence Management System and (3) Unified Communications System. Table 1 below presents the web components, sub-components, and functionalities.

Considering the project size, WebTech decided to outsource the Portal Content Management and Correspondence Management sub-components to two other offshore companies in Romania and India, respectively (pseudonym PCMTech and CMSTech). Therefore, the project team expanded from one to three companies. One major feature decided was the introduction of electronic signatures, stamps, and seals.

At a progress meeting, a steering committee member spoke about their displeasure with electronic signatures, stamps, and seals and said that, "Electronic signatures are not safe based on our experiences.

An example is when someone used a minister's electronic signature without his knowledge. Protecting such signatures is difficult given the porous nature of our network.”

On the other hand, WebTech believed that electronic signatures were crucial to the whole digitalization process. As narrated by one WebTech director, “We believed we could not digitalize the work processes without electronic signatures, mainly since the Electronic Transactions ACT supported it.”

**Table 1**

*Web Components, Sub-Components, and Functionality*

Web Component	Sub-Components	Functionality
Portal Content Management	Document Management System (e-Document)	<ul style="list-style-type: none"> <li>• Create, share and approve documents</li> <li>• Electronic signatures, seals and stamps</li> <li>• Store, back-up and archive</li> </ul>
	Meeting Management System (e-Meeting)	<ul style="list-style-type: none"> <li>• Virtual meeting</li> <li>• Meeting scheduling</li> <li>• Online invitations</li> <li>• Tasks assignment reminder</li> <li>• Previous minutes sharing</li> </ul>
	Intranet Portal	<ul style="list-style-type: none"> <li>• Government-wide network</li> </ul>
Correspondence Management System	E-Notice Boards	<ul style="list-style-type: none"> <li>• Announcements</li> </ul>
	E-Correspondence	<ul style="list-style-type: none"> <li>• Letters, memos &amp; circulars</li> <li>• Email</li> </ul>
Unified Communications System	Instant Messenger	<ul style="list-style-type: none"> <li>• Video &amp; audio calls</li> <li>• Inter and intra-agency employee chat</li> <li>• Inter and intra agency file transfer</li> <li>• Employee contact search</li> </ul>

Later, the agreement was to print out confidential documents, sign, and seal and then scan back into the e-workspace. Actual platform development began in May 2015 and ended in January 2016. WebTech, PCMTech, and CMSTech each used different tools for development. Table 2 presents the web components, development firm, and development tools used.

By January 2016, the e-workspace with three sup-portals was ready. To capture documents into the document management system, two high-definition scanners for each of the MDAs were purchased in April 2016.

**Table 2**  
*Web Components, Development Firm, and Development Tool*

Web Component	Firm	Sub-Components	Development Tools
Portal Content Management	PCMTech	E-Documents	<ul style="list-style-type: none"> <li>● Documentum (Enterprise)</li> <li>● Captiva Software</li> </ul>
	PCMTech	E-Meeting	<ul style="list-style-type: none"> <li>● Microsoft 2013 SharePoint</li> <li>● MSSQL</li> </ul>
		Intranet Portal	<ul style="list-style-type: none"> <li>● PhP and MySQL</li> </ul>
Correspondence Management System	CMSTech	E-Notice Boards	<ul style="list-style-type: none"> <li>● Microsoft 2013 SharePoint</li> <li>● MSSQL</li> </ul>
	CMSTech	E-Correspondence	<ul style="list-style-type: none"> <li>● Microsoft 2013 SharePoint</li> <li>● MSSQL</li> </ul>
Unified Communications System	WebTech	Instant Messenger	<ul style="list-style-type: none"> <li>● Microsoft 2013 SharePoint</li> <li>● MSSQL</li> </ul>

*Note.* PCM = Portal Content Management; CSM = Correspondence Management System; MSSQL = Microsoft Structured Query Language; PhP = Hypertext Preprocessor; MySQL = My Structured Query Language.

## Implementation and Use

The e-workspace was implemented and hosted on an existing national network and database housed in the country's data center that had been developed by NITA. Public Relations and Archives Administration Department (PRAAD) did quality assurance testing. Stress and security testing were conducted by a local IT auditing firm (pseudonym: AUDTech).

A “trainer of trainees” workshop was organized for all local MDA IT officers and their directors by NITA. Local MDA IT officers were empowered to add MDA specific functionalities when needed and solve all technical issues of the e-workspace. An official of NITA was appointed as a designated back-end officer to resolve the problems beyond local IT officers. The platform went live for use within the broader public-sector traditional work environment in May 2016 amid continuous modifications by local MDA IT officers. For those MDAs using the digitalized workspace, meetings have become shorter, with many results achieved. Notices are sent to the individual mails of workers. Therefore, citizens and other stakeholders attest to the fact that their documents are processed much faster than they used to be. A citizen narrated that “I was quickly able to pay my taxes through the GRA portal. It makes my life easier.” Another director said, “We cut down our stationery by 35%. This decision has saved us more money. Now, I can approve, sign, and seal documents once I request a dedicated network anywhere in the world.”

MDA directors discovered their earlier decision to print, manually sign, seal, stamp, and scan back documents into the document management system for dispatch was tedious. A director narrated that, “We realized that it was more challenging to print, sign, seal, stamp, and scan back into the e-workspace. We decided to have these processes digitalized.”

At a crunch meeting, a decision was made to introduce an electronic signature, seal, and stamp functionality.

One other major challenge was the lack of interoperability among the sub-components. Therefore, MDAs use the same access credentials to login differently for each sub-component. Personalization of the government e-workspace is on the increase as MDAs add specific functionalities to their e-workspace. For example, the Registrar General and Ghana Revenue Authority have added business registration and online tax payment functionalities, respectively.

One major setback is that regional and district government offices are still using the manual work and paper-based processes. According to a director, they have limited Internet facilities, power, and lower bandwidths. Therefore, district officers work on their part of documents, then send them to the regional offices by road for onward processing and to the national offices for scanning final processing with the e-workspace. Most meetings are still held physically at all levels. Announcements continue to be mostly physical and posted on notice boards which employees rarely read. Finally, although the loan provided by the banks was enough for the development, "the MoC is now struggling to raise funds for the maintenance of the e-workspace," a director said.

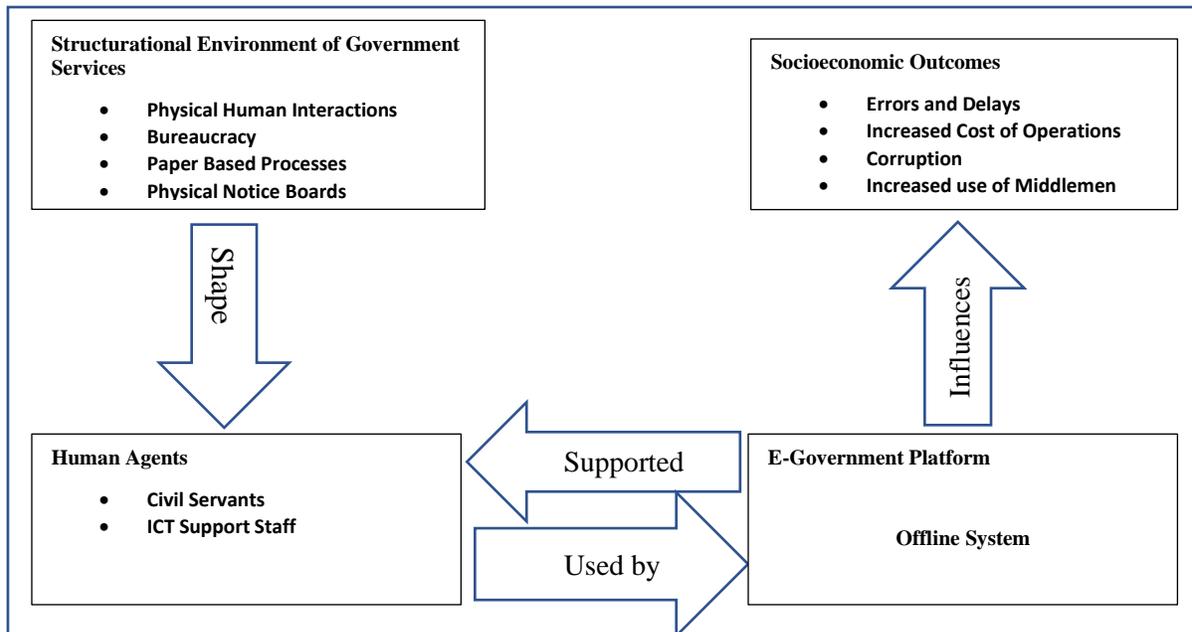
## **ANALYSIS OF FINDINGS**

The analysis of the empirical data is done through the lens of the structural model of technology using the hermeneutic circle as a mode of analysis. The analysis focuses on three sections; the structural environment of the traditional government workspace and associated socioeconomic outcomes, the digitalization itself, and the socioeconomic outcomes of the digitalized workspace.

### **The Structural Environment of the Traditional Workspace and Socioeconomic Outcomes**

The structural environment of the existing government workspace comprised the physical workspace as the structural component, civil servants, and ICT support staff in the MDAs as human agents and offline information systems as the e-government technology component. The primary structural environments of the physical workspace were physical human interactions, bureaucracy, paper-based processes, and use of physical notice boards. Figure 2 summarizes the pre-government digital workspace and socioeconomic outcomes before digitalization.

Physical meetings and person-to-person contacts portrayed human interactions. The paper-based culture involved the use of letterheads, physical signatures, seals, stamp, and physical storage in files, folders, and cabinets. The excessive bureaucracy involved excessive use of duplicated procedures and multiple copies of paper in government service delivery. For example, clients of these government agencies had to provide multiple copies of documents to all facets involved in providing the service needed, and there were no shortages of instances where the documents were still not "received" due to the physical workflows and long delays. The use of notice boards for announcements and notices was also an ineffective structural feature.

**Figure 2***Pre-Government Digital Workspace and Socioeconomic Outcomes before Digitalization*

Note. ICT = Information and communication technology.

The human agents were civil servants and local ICT staff in the various MDAs. The ICT support team was mainly low-level professionals who provided minimal technical support for the existing offline systems. The civil servants constitute the public-sector workers who relied on the offline system for their paper-based work processes. The offline system was a collection of unintegrated systems within and between the various offices with a structurational environment that limited and tied service delivery to paper-based activities involving printing, scanning, and distribution of papers. This offline system led to a lack of seamless integration due to the disparate systems with different databases. Table 3 presents the initial activities and their socioeconomic development outcomes.

The main outcome of the above structurational environment of government on civil servants was the need to be physically present at one's office desk to work. The socioeconomic development outcome before digitalization is grouped under the individual, institutional, and national levels. At the individual level, consequences such as errors and delays in documentations increased cost because of the use of intermediaries, and lack of document tracking were the outcomes of the physical structures and offline system. The institutional level experienced lack of transparency and perceived corrupt practices, which led to the loss of government funds, inefficient work processes leading to delays in transactions, inconvenient meetings, information asymmetry leading to unpreparedness on the part of employees and lack of monitoring and evaluation of work processes as the socioeconomic outcomes. The national level suffered from less government productivity leading to a loss of goodwill from the public and other stakeholders and increased budgetary allocations.

**Table 3***Activities and their Socioeconomic Outcomes on Government Workspace before Digitalization*

<b>Structural Component</b>	<b>Structurational Environment</b>	<b>Socioeconomic Outcomes</b>
Physical Workspace	Physical Documents	<ul style="list-style-type: none"> <li>● Manual signatures, seals, and stamps</li> <li>● Physical storage of files and folders</li> <li>● Difficult to search and retrieve old documents</li> <li>● Misplacement of documents</li> </ul>
	Physical Meetings	<ul style="list-style-type: none"> <li>● Late meeting invitations</li> <li>● Non-tracking of tasks assigned</li> <li>● Spending much time on previous minutes causing delays</li> </ul>
	Physical Interactions	<ul style="list-style-type: none"> <li>● Employees spend hours in traffic for intra MDA interactions</li> <li>● Employees find it difficult to have contacts of other officers</li> <li>● More paper was spent printing and typing letters.</li> </ul>
	Physical Notice Boards	<ul style="list-style-type: none"> <li>● Employees were not abreast with MDA announcements.</li> </ul>
Offline Systems	Offline and Paper-based processes	<ul style="list-style-type: none"> <li>● Delays in processing documents</li> <li>● Lack of monitoring and evaluation</li> <li>● Bureaucracy</li> <li>● Corruption</li> <li>● Increased use of middlemen</li> <li>● Increased cost of operations</li> </ul>
	Standalone Systems	<ul style="list-style-type: none"> <li>● Manual signatures, seals and stamps</li> <li>● Physical storage of files and folders</li> <li>● Difficult to search and retrieve old documents</li> <li>● Misplacement of documents</li> </ul>

*Note.* MDA = Ministries, departments, and agencies.

### **Digitalization of Offline Workspace**

The problems with the structurational environment of the existing government workspace triggered the need for digitalization. The development team designed a government e-workspace to improve socioeconomic outcomes of government work. The e-workspace platform development went through project initiation and planning, analysis, design, and implementation to shape the design outcomes. Human activities, which had key effects on the digitalization, were the enactment of the Electronic Transactions Act, international loan-financing, flexible design, and use of multiple development platforms.

The commissioning and subsequent empowering of the steering committee provided the basis for a group of individuals to ensure the success of the project. In addition, costing and budgeting of the project by the development team and approval from MoC officials provided the financial basis for donors to support the project. Financial resources sought were meant for platform development and implementation without any plans for system maintenance and post-development activities.

Requirements gathering and analysis were constrained by bureaucratic norms of the public sector, resistance to change by some civil servants as well as difficulty in gaining access to information. Introduction of the Electronic Transactions Act provided a firm foundation for the acceptance of electronic work processes especially, regarding electronic signatures, stamps, and seals.

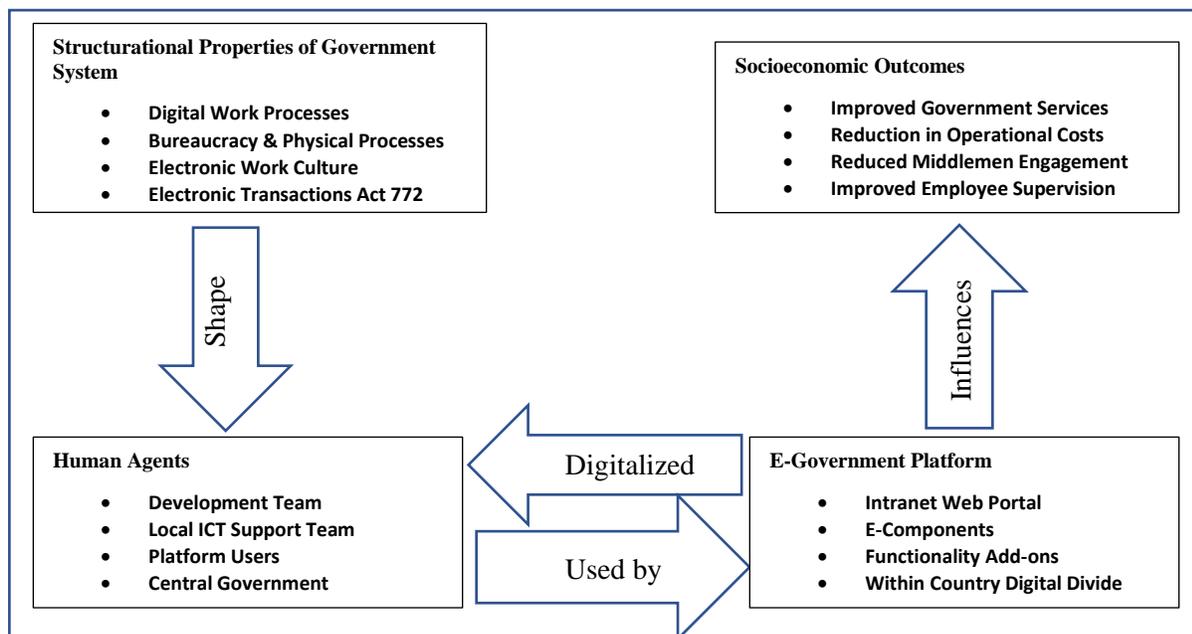
Lack of communication among the three development teams created a situation where multiple development tools were used, resulting in a government e-workspace with three components using the same login credentials but different logins.

### The Structural Environment and Socioeconomic Outcomes of the Digitalized Workspace

Government e-workspace assumed a new structural environment after digitalization. Figure 3 presents the post-government digital workspace and socioeconomic outcomes after digitalization.

**Figure 3**

*Post-Government Digital Workspace and Socioeconomic Outcomes after Digitalization*



Note. ICT = Information and communication technology.

Initially, the traditional workspace consisted of a partly digitalized structuration environment. Paper-based processes, physical meetings, notice boards, and interactions were transformed into e-documents, e-meetings, e-notice boards, and e-correspondence, respectively. However, civil servants and

government officials continued to use physical signatures, stamps, and seals in place of the provisioned electronic functionalities.

The structural environment of the e-government technology was transformed from offline paper-based processes and stand-alone systems to a platform with e-components and functionality add-ons, which operate on the intranet web portal. However, the use of multiple development tools has created a platform devoid of a completely seamless connection. This includes a “within-country” digital divide due to slow Internet connections, low bandwidth, and power issues that prevent lower-level government agencies from using the platform. The current structural environment of the government is one that is operating in the more extensive traditional workspace where transactions are still physical. Therefore, bureaucracy, paper-based processes, physical signatures, stamps, and seals are still being used concurrently with the electronic work environment making socioeconomic goals only partially achieved.

For human agents, local ICT officers in MDAs have been empowered to solve problems associated with the government e-workspace as well as extend the system to meet the needs of local offices. The appointment of a back-end officer at NITA promotes prompt responses to issues beyond the local MDA IT officials. Platform users are civil servants who use the platform to provide services to citizens and other stakeholders. The central government offers limited financial support for maintenance of the platform. Table 4 presents the structural environment and its socioeconomic outcomes after digitalization.

First, citizens and businesses can electronically submit and track their document requests. Also, employees who use the platform create, share, approve, and process documents through the e-document system. Furthermore, some employees use the e-meeting system on the platform to create and send e-notifications, hold virtual meetings, assign tasks, and set meeting reminders as well as share previous minutes to participants before the next meeting. Other platform components in use include e-announcements, e-notice boards, and memos. Letters and circulars are sent via e-correspondence. Finally, some civil servants can make video and audio calls, online chat, file transfer, and document searches without face-to-face contact.

Nonetheless, some civil servants and government officials are not using the platform. For those in rural communities, a within-country digital divide is a major constraint. The digital divide is attributed to a lack of constant power, limited access to the Internet, and/or low bandwidth in the rural areas. Bureaucracy is on the ascendancy because the district and regional offices still continually use the traditional and paper-based system, implying that documents are scanned into the e-workspace and printed out for dispatch after processing. Collaboration, announcements, and meetings are still physical, all of which create a system where the lower government offices are mostly traditional and higher levels electronic, leading to increased bureaucracy. Regarding work location, only directors are allowed to use the intranet portal remotely. All other workers must be present in the office to access the government's e-workspace, constraining ubiquitous work on the part of the broader workforce.

Although the current platform is used in the more extensive traditional public sector setup, some socioeconomic development outcomes are being realized at the individual, institutional, and country levels. At the individual level, the platform has led to a reduction in processing cost due to the elimination of intermediaries, an increase in self-service, tracking of processes, and increased trust in the public sector. On the part of the public sector institution, there are improved services, increased monitoring and evaluation, improved information flow, reduction in delays, and working ubiquitously on the part of directors. At the national level, there is a reduction in budgetary and operational cost due to a decrease in paper-based processes; therefore, channeling monies for other social interventions and

an improvement in the public sector's goodwill. However, these socioeconomic development outcomes are not manifested at the district and regional levels.

**Table 4**

*The Structural Environment and Their Socioeconomic Outcomes after Digitalization*

<b>Structural Component</b>	<b>Structural Environment</b>	<b>Socioeconomic Outcomes</b>
Digital Structure	Digital work processes	<ul style="list-style-type: none"> <li>● Improved government services</li> <li>● Minimal reduction in operational cost</li> <li>● Reduced middlemen engagement</li> <li>● Improved employee supervision</li> </ul>
	Bureaucracy	<ul style="list-style-type: none"> <li>● Bureaucracy at the lower levels of government leading to increased bureaucracy at the national levels.</li> </ul>
	Electronic Work Culture	<ul style="list-style-type: none"> <li>● E-Documents               <ul style="list-style-type: none"> <li>○ Faster document processing</li> <li>○ Ubiquitous work for some directors</li> </ul> </li> <li>● E-Meetings               <ul style="list-style-type: none"> <li>○ Effective meeting management</li> <li>○ Increased participation in meetings through technology.</li> <li>○ Improved decision making at meetings.</li> </ul> </li> <li>● E-Correspondence               <ul style="list-style-type: none"> <li>○ Improved corresponded within and between MDAs.</li> </ul> </li> <li>● E-Notice Boards               <ul style="list-style-type: none"> <li>○ Improved Information flow</li> </ul> </li> </ul>
E-Workspace	Intranet Portal	<ul style="list-style-type: none"> <li>● Secured government communication</li> </ul>
	E-Components	<ul style="list-style-type: none"> <li>● Databases and web development tools</li> </ul>
	Flexible Add-ons	<ul style="list-style-type: none"> <li>● Local MDA IT officers can modify interfaces as well as add MDA-specific functionalities leading to e-workspace localization.</li> </ul>
	Within-Country Digital Divide	<ul style="list-style-type: none"> <li>● Slow Internet and low bandwidth at the lower levels of government has constrained use of platform.</li> </ul>

*Note.* MDA= Ministries, departments and agencies; IT= Information technology.

Since the study sought to understand government digitalization from various perspectives, the analysis was divided into three sections to look at the socioeconomic development outcomes of specific structural environments. Consequently, the sections give a clear understanding of which socioeconomic intentions were achieved and not.

## DISCUSSION

Following the research question, this section discusses the findings on how the structural environment shapes socioeconomic outcomes of government workspace digitalization in a developing economy. The findings show that there were critical structural environments that enabled or constrained the intended socioeconomic outcomes.

### **Structurational Environment Properties that Enable Socioeconomic Development Outcomes**

The findings from the study show that the availability of the Electronic Transactions Act, funding through government borrowing, and extendable design are critical structural environments that enable workspace digitalization to achieve some intended socioeconomic outcomes. First, the availability and enforcement of established laws promote digitalization and legitimizes the use of government e-workspace. In this study, the enactment of the Electronic Transactions Act served as the motivation for NITA and the government to formulate plans of digitalization and promote use. Within the developing-economy literature, the significance of clear legislation (Elsheikh et al., 2008; Špaček, 2020) and guidelines for implementation (Weerakkody et al., 2011) for acceptance and use of e-government innovation has been highlighted. Findings from the current study affirm such importance of appropriate laws to promote a government e-workspace. Beyond the introduction of clear legislation, positive stakeholder perception, which ultimately leads to trust in that particular legislation, determines the level of acceptance. In this study, stakeholders initially did not believe in the privacy of their signature. However, the Electronic Transactions Act provided the basis for protecting and accepting electronic signatures, stamps, and seals until their perceptions changed.

Second, the availability of funds through government borrowing helps to provide the necessary resources for the successful implementation of e-workspace platforms leading to intended socioeconomic outcomes. As the findings show, funding did not become an issue due to loans received from the World and China Exim banks. Yet, within the developing-economy e-government literature, unsustainable funding sources (Domínguez et al., 2011; Ebrahim & Irani, 2005; Elsheikh et al., 2008; Weerakkody et al., 2011) have been discussed as a critical structural environment that constrains national ICT projects. The experience of Ghana from the current study suggests that using international loan agreements rather than direct government funding through national budgets may be sustainable for massive e-government projects. Thus, loan financing from a foreign bank can offer sustainable funding for such large-scale ICT projects without interruptions. Nonetheless, the experience from this study shows that when loan financing is used, there will still be the need for direct government funding for system maintenance, without which the project may succeed at the digitalization phase but collapse during the use phase.

Third, the extendable design of e-workspace promotes scalability, extendibility, and customization by other government institutions to encourage specific functionalities at the local ministry, department, and agency levels. As the current study shows, MDAs were able to extend functionalities of the e-workspace platform to suit their local needs, thereby promoting successful use at local levels. In addition, the extendable design that was adopted for the e-workspace empowered ICT professionals at the local institutions to not only address local problems but also extend the usability of the system to promote local socioeconomic outcomes. From the case study, Ghana Revenue Authority, which is a government agency for generating internal funds to support development, has added functionality of returning taxes electronically. Within the developing economy literature, such flexible design for extendibility at the ministry, department, and agency-level has not been discussed. The findings from the current study,

therefore, offer new insight on how extendable rather than standardized design of e-government web platforms can promote design extendibility resulting in localization and ultimately achieving intended socioeconomic outcomes.

### **Structurational Environment Properties that Constrain Socioeconomic Development Outcomes**

Conversely, the structurational environments that constrain workspace digitalization and prevent achievement of intended socioeconomic outcomes are the use of multiple development environments, a within-country digital divide, bureaucracy as well as the unchanged culture of physical signature and letterheads usage. First, multiple development tools lead to non-seamless integration among the e-workplace sub-components. From the case study, political interference resulted in selecting an organization which did not have the full capacity to handle the project. Hence, WebTech, PCMTech, and CMSTech used different development environments leading to sub-components that could not be easily integrated. The experience from this study shows that political agendas (Owusu-Oware et al., 2017) and interference (Gordon & Walsh, 1997) should not outweigh technical and professional advice during e-workspace development. The findings suggest that in getting outsourced companies to develop e-government platforms, it is essential to deal with one firm and insist on using the same development environment to avoid creating a system that lacks seamless integration.

Second, a within-country digital divide prevents e-government projects from achieving related intended socioeconomic outcomes. From the case, the uneven distribution and access to ICT infrastructure, especially the Internet, at the district and regional levels constrained the use of the e-workplace. Developing-economy literature shows how over-concentration of Internet facilities in cities and lack of access in rural areas (Alcaide-Muñoz & Bolívar, 2015; Nkohkwo & Islam, 2013), poor network infrastructure (Ebrahim & Irani, 2005) and lack of power (Ndou, 2004) constrain e-government project goals. The digital divide (Elsheikh et al., 2008) makes the distribution of ICT infrastructure for e-government implementation difficult (Ndou, 2004). Therefore, while the intended socioeconomic outcomes of the project was partially achieved at the national level, the same cannot be said for the lower levels of government.

Third, the deeply established bureaucracy (Schwester, 2009) within the public sectors of developing countries is a public-sector constraint on the achievement of the intended socioeconomic outcomes of government e-workspace. In Ghana's case, bureaucracy in approving and acquiring the required hardware and software for the project was saddled with bureaucratic processes, which delayed the project. Furthermore, bureaucracy still exists at all levels of government after digitalization because the e-workspace is being used within the more extensive traditional work setting, and the district and regional levels of government are not using the platform. Developing economy literature suggests that lack of transformation of bureaucracy (Ertl et al., 2014) to new business models afforded by technology (Nurdin et al., 2012) constrain ICT goals. Suggestions from this study indicate that the introduction of technology alone is not enough to curb bureaucracy. There is a need to re-organize business processes and modify work structures to reduce bureaucracy. Also, a combination of the traditional and digital workspace worsens bureaucracy.

Fourth, unchanged physical paper and signature culture constrains the use of government e-workspace frustrating intended socioeconomic outcomes. In the case of Ghana, public-sector workers wanted to see physical signatures and letterheads, although the Electronic Transactions Act sanctioned electronic signatures and letterheads. Developing-economy e-government literature suggests a culture of paper document flows (Effah & Nuhu, 2017), resistance to change in the mindset of users and the significant

process of re-engineering (Bigdelia et al., 2013; Waller & Genius, 2015) constrain the intended socioeconomic outcomes of government e-workspace. In the end, the intended socioeconomic outcomes of enhancing inter-agency communication and collaboration, streamlining workflow for efficiency, curbing bureaucracy and delays, improving correspondence, reducing corruption and operational cost, and promoting ubiquitous work was not fully achieved.

Since the study was conducted in Ghana, it is limited in terms of its single-country focus. Yet, from the interpretive research perspective, the expectation is not to seek statistical generalization but offer theoretical and transferable knowledge to areas that share similar contexts with the case study country. Thus, the findings are considered useful for countries with a similar government workspace environment.

## CONTRIBUTIONS

The core contribution of this study is the application of the structurational model of technology to socioeconomic outcomes of government workspace digitalization. This was achieved by introducing the socioeconomic outcomes component to study how a structurational environment shaped socioeconomic outcomes of government workspace digitalization in the developing economy context of Ghana. By this extension and application, other studies can use this model to study the socioeconomic outcomes of the structurational environment on other e-government areas such as e-services, e-tax, e-payment, e-passport e-procurement, e-parliament, and e-immigration.

Developing-economy governments are advised to use international funding for massive e-government projects since such loans can guarantee completion. Governments can use their internally generated funds for post-development phases. Ideally, one resourceful development team should handle projects. In cases where there is an urgent need for more than one development team, governments should facilitate communication and agreement among the multiple groups on which development platform(s) to use. Finally, governments should take practical steps to minimize the within-country digital divide.

Managers of digitalized government platforms should be familiar with legal instruments and use as convincing tools to manage resistance to digitalization and to ensure the use of such platforms. In addition, platform managers should provide quick solutions to government e-workspace errors by training and empowering local IT officers. In the absence of such quick solutions, users will lose confidence in using the platform.

Policymakers are advised to ensure that appropriate laws are put in place to legitimize transition from physical workspaces to a digital work environment. In the absence of such laws, there will be resistance from public officials, which may lead to non-achievement of intended socioeconomic outcomes. In addition, policymakers should promote laws that encourage extendable designs of government e-workspace platforms to promote personalization and confidence among agency-specific users of achieving intended socioeconomic outcomes. Policymakers should promote device-connection laws that encourage the use of mobile devices to access government e-workspace platforms ubiquitously as this will allow lower agencies without physical ICT infrastructure to connect through their mobile devices. Since the telecommunication companies already have network infrastructure in these communities, government can create device-connection policies that will allow public officers to use the communication network to connect to the e-workspace while having all the security measures in place.

Therefore, findings from this study, as well as contributions, can serve as guidelines for developing economy government digitalization initiatives and for those seeking to digitalize their government workspace to achieve socioeconomic development.

## CONCLUSION

This study explored how structural environments shape socioeconomic outcomes of government workspace digitalization in a developing economy based on existing literature and the structural model of technology. We presented the idea of government workspace digitalization as one crucial concept that influences a complex system such as e-government. The study revealed that structural environments could enable or constrain socioeconomic outcomes of e-workspace digitalization. The findings show that availability of an electronic transactions act, government loan financing, and extendable design enable socioeconomic outcomes of government workspace digitalization. On the other hand, the use of different development tools, a within-country digital divide, and an unchanged culture of bureaucracy, physical paper, and signature negatively constrain the socioeconomic outcomes of government workspace digitalization.

The research presented insights into how the structural environment shaped the intended socioeconomic outcomes of government workspace digitalization in Ghana. These insights were related to the developing economy context by identifying key structural elements that influence government workspace digitalization initiatives. Consequently, through the adoption of healthy structural environments, developing-economy public sector can position itself in a way that leads to achieving intended socioeconomic outcomes. Therefore, the authors have achieved the purpose of the study by producing contributions useful for countries with similar government workspace environments. The study is limited because it looked at socioeconomic outcomes of government workspace digitalization from a qualitative perspective. Therefore, future studies can look at socioeconomic outcomes of government workspace digitalization from a quantitative perspective. In addition, future studies can compare the structural environments of developed and developing countries and their socioeconomic outcomes on digitalization.

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