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Virtual Platforms for Government Services in COVID-19 and Beyond: A Sociomaterial Case Study of Passport Service in Ghana

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Abstract: In the COVID-19 era, the use of virtual platforms to meet social and physical distancing requirements has become more important across the world. Before COVID-19, information systems research on virtual platforms had focused on born-digital organizations and virtual platformization of pre-digital organizations in the private sector. Not much research therefore exists on virtual platformization of government services, especially from the developing world. This study therefore investigates a virtual platformization initiative for passport service in Ghana and its performance under the COVID-19 lockdown and beyond. The findings show that the service could not be fully platformized to meet physical distancing requirements due to activities related to physical materials such as signature, stamps, and documents as well as non-platformized systems of collaborating institutions. The paper discusses these constraints and how they can be addressed to enable end-to-end virtual platformization of government services in COVID-19 and beyond.

Keywords: virtual platform, platformization, sociomateriality, case study, government service, Ghana.

1. Introduction

The COVID-19 era has made virtual platforms important for online interactions in place of physical, face-to-face contacts [1–3]. Virtual or digital platforms are ICT infrastructure that enables online interactions between different actor groups [4, 5]. In terms of architecture, a virtual platform comprises a core module, standardized interfaces, and complementary applications [6, 7]. The standardized interfaces such as APIs and web services are boundary resources that connect the core module to various web client and mobile complementary applications [8, 9].

Virtual platforms contrast physical platforms that require co-located spaces such as traditional offices in buildings for direct and face-to-face contacts [10]. Over the years, virtual platforms have been used by born-digital organizations such as Amazon, Airbnb,

and eBay to create values for their customers. In recent years, pre-digital or traditional organizations without virtual platforms have begun to adopt them for digital services. The process by which pre-digital organizations migrate their activities from physical or offline onto online platforms is termed virtual platformization [11–13]. Generally, virtual platformization seeks to replace face-to-face, physical contacts with digital interactions [14].

The use of virtual platforms has become important for pre-digital organizations during and after the COVID-19 lockdowns, as social and physical distancing have become a requirement rather than a choice [2, 15]. As a result, virtual platforms for service delivery in some sectors, including education, shopping, and healthcare have begun to attract information systems (IS) research [e.g. 3, 16, 17]. However not much is known about government services involving physical materials such as passports, especially in a developing country context where digital infrastructure remains limited.

Following this gap, this study seeks to explain how virtual platformization of government services in a developing country context can enable online interactions to meet physical distancing requirements during and after COVID-19. The accompanying research question is: *how can government services involving physical materials be virtually platformized for COVID-19 and beyond*. To address the question, this study employs qualitative interpretive case study methodology [18] and sociomateriality theory [19] to investigate Ghana's passport service platformization before and during the COVID-19 pandemic.

The rest of this paper is organized as follows. Section 2 reviews literature on virtual platformization and COVID-19. Section 3 presents sociomateriality as the theoretical foundation. Section 4 presents the methodology. Section 5 reports on the empirical findings. Section 6 provides sociomaterial analysis of the empirical findings. Section 7 discusses the research findings, while Section 8 concludes the paper with its contribution.

2. Virtual Platformization and COVID-19

The term platformization generates platform as a hub for interactions among people and objects [20]. Platformization becomes virtual when the process involves digital technologies. Generally, the term platform refers to any space or location that enables interactions among different actors [10]. While a physical platform brings people into co-located environments for face-to-face interactions [10], a virtual platform brings them together for online interactions [6, 7, 21]. Thus virtual platforms function as hubs for online services without the need for physical contacts [12].

Over the years, born-digital organizations have been using virtual platforms for service delivery [22] while pre-digital organizations have been operating from physical locations such as buildings and office spaces. Thus, virtual platformization offers them the opportunity to migrate onto virtual platforms. Doing so enables them to integrate their silo systems and replace physical face-to-face contacts with virtual interactions for improved service delivery [23, 24].

As virtual platforms are mostly enabled by the Internet and mobile technologies [25, 26], they offer benefits such as customer self-service instead of employee service [26]. They also promote mobile connectivity for anywhere anytime transactions including online and mobile payments. Virtual platforms also support working from home without the need for a dedicated physical office [16].

Although virtual platformization was increasingly becoming the norm for pre-digital organizations seeking to migrate online, COVID-19 has made it more of a need than a choice for such organizations [15, 27]. Thus pre-digital organizations are expected to promote working from home to sustain service provision to customers [16]. While material objects such as food and drinks could not be virtualized during the lockdown, their online purchase and home delivery became important for organizations and their customers [3]. Generally, information objects such as books and educational services can be digitalized for online delivery. Yet, physical materials such as passport booklets cannot be easily virtualized and delivered online due to legal and international requirements. Hence, the need exists for a study into digital platformization of government services involving such materials during and after the COVID-19 lockdown.

3. Theoretical Foundation: Sociomateriality

The theoretical foundation for this study is the relational perspective of sociomateriality [19], which was developed to explain entanglement between social and material entities in practice. The core concepts are social, material, and sociomaterial practice. The term social refers to interactions between people as shaped by social structures, including rules, norms, and traditions; material refers to “stuff” the world is made up of [28 p. 86], see also [29, 30]. Moreover, a material can be physical (e.g., hardware) or digital (e.g., software and online data) [30, 31]. Sociomaterial practices are activities that are performed by entangled social and material components [19].

From the relational perspective, the key principles of sociomateriality are entanglement, relationality, and performativity [19, 32]. First, entanglement refers to inextricable constitution of the social and material in action [19]. Barad [32] refers to actions taking place within entanglement as intra-action rather than interactions. Second, relationality is ontological and refers to how an entity’s existence or function is related to other entities. This shows that no entity (social, material, or practice) is independent in action. Therefore, sociomaterial analysis does not look for dependent and independent variables. Finally, performativity, which is also ontological, is the notion that sociomaterial practices produce outcomes or bring realities (social, material, or their combination) into being [32].`

In recent years, sociomateriality has increasingly become a paradigm in IS research with its own ontology, epistemology, and methodology [33]. However, its application in the digital or virtual platform literature remains limited. Given that virtual platform development and use involve people, social structures, and material objects, sociomateriality can be a useful theoretical lens for studying such a phenomenon. Therefore, this study seeks to use it to analyze the virtual platformization phenomenon.

4. Methodological approach

The setting for the study is Ghana, a developing country in Africa. The case phenomenon is the national passport service in Ghana and related activities from the perspective of both service providers and consumers. This study follows a qualitative methodology with case study as the research method [18]. Qualitative case study was chosen to enable detailed analysis of activities and processes of the research phenomenon within its real-life context. The underlying research paradigm is sociomaterial ontology and epistemology [19], which together view the social and the material as entangled, relational, and performative. In recent years, the sociomaterial paradigm has recently emerged in IS research as an alternative to positivism and interpretivism [33].

Qualitative data collection for the study occurred over one-year from June 2019 to June 2020 and came from multiple sources, namely interviews, participant observations, and documents. In line with the relational view of sociomateriality [19], data collection focused on tracing activities of relational practices and their changes over time [29, 34]. The intention was to track entanglements, relationality, and performativity of the phenomenon.

Participants for the study included employees of the Passport Office, their collaborating institutions, citizens who had been applicants and/or witnesses. The researcher also drew on his own observation and experience of going through the process as an applicant. Additional data came from online and offline documents on the case.

Data analysis was based on sociomateriality analysis involving mapping the concepts of entanglement, relationality, and performativity as practiced in the research phenomenon. This was followed by breaking the practice into specific activities (intra-actions) and their sociomaterial components. The output of the sociomaterial analysis is presented in Section 6.

5. Empirical Findings

In Ghana, the Passport Office is the agency of the Ministry of Foreign Affairs responsible for issuing national passports to citizens. The passport service activities include form filling, witnessing, submission and vetting, background checks as well as printing and issuing. Before 2016, these activities were physical. However, from 2014, a digitalization process was initiated to platformize them.

5.1 Activities before platformization

Before the platformization initiative, the physical and paper-based activities were as follows:

Form filling: involved acquiring and completing a physical form from any post-office. Filling involved using a pen to inscribe personal details onto the form and signing or thumbprinting the relevant portions.

Witnessing: involved getting a person with high status to endorse contents of the completed form and passport pictures of the applicant with stamps and signatures. Possible witnesses included: the clergy, army and police officers, heads of institutions, and qualified professionals such as doctors, lawyers, and accountants.

Submission and vetting: involved physical submission of witnessed application forms with original identity documents, namely birth certificate for fresh passport application, previous passport for renewal, and police report for a replacement of missing passports. Vetting at the passport office involved checking the documents for accuracy and completeness. Applicant's biometric data and passport pictures were then captured and added to the application dossier. The details were subsequently keyed into a passport processing software.

Background checks: involving given copies of the application dossier to officers from collaborating agencies such as the Birth and Death Registry (BDR) to check and verify the birth certificate and government security agencies to check criminal records on the applicant, if any. If all went well, the dossier was sent to management for approval.

Printing and Issuing: involved sending relevant details of the applicant to a printing company to print the passport booklet and return it to the passport office for issuing to the applicant.

The physical process before the platformization was fraught with some challenges. One applicant complained as follows:

...passport process is full of bureaucracy, document losses, delays and corruption. We know some officers team up with illegal intermediaries called "Goro Boys" to collect bribes to speed up the process for some applications.

An officer at the passport office also commented on data entry errors:

sometimes data entry clerks introduce errors when keying application details into the processing software.

5.2 Platformizing the service

In 2014, the Ministry of Foreign Affairs engaged the National Information Technology Agency (NITA) to help digitalize and platformize the passport service. The main goals were to (1) streamline the constituent activities for an efficient process, (2) promote collaboration among the BDR and collaborating security agencies for criminal and background checking (3) reduce actual and perceived corruption, and (4) remove data entry errors.

NITA subsequently analyzed the existing system and developed a requirement specifications document for the virtual platform project. The ministry accepted the specifications and worked with NITA to engage a software company, which re-developed the existing application into a core platform module as well as interfaced and online complementary applications for applicants and the printing organization.

Core Platform: The core platform was set up as an intranet for processing and connected to computers at the physical passport office. Therefore, employees of the passport office can only use the platform from their physical offices. They are unable to access from home or outside the office. The core platform enabled online vetting and prompting of applicants for any corrections. It also had functionalities for capturing biometrics data and pictures of applicants during submission.

Complementary Applications: The applicant facing software was internet-based and therefore accessible online via PCs and smartphones. Its functionalities included online form filling, document uploads, and printing of physical documents for witnessing and physical submission. It also had functionalities for mobile and online payments. The printing company's interfaced online application enables remote printing of passport booklets after management approval. However, no supplementary applications were developed for the BDR and the security agencies for criminal background checking. On this, an immigration officer complained as follows:

The core platform is not connected to our system. It is very frustrating for us to use printed documents and travel between our officers and the passport office. If they integrate the various systems, we can do work from our offices without the need to physically come here.

5.3 After the platformization (before and during COVID-19)

From 2016, the passport service platform came into use with both online and offline activities as follows:

Form filling: the platform enabled online form filling, uploading of supporting documents, and paying for the service through online banking and mobile money platforms. It also enabled online submission of completed forms to the passport office for processing.

Witnessing: In the absence of an online complementary application, witnessing continued to be physical with stamps and signatures. The process remained as offline interaction between the applicant and the witness.

Submission: two types of submission emerged. Virtual submission through the online platform and physical submission of the printed and witnessed copy. In addition to uploading copies of supporting documents, applicants were still required to submit original physical copies to the passport office for background checks.

Vetting and Processing. vetting and processing occurred in the passport office as combined digital and physical activities. The core platform was used to vet the online documents while the printed form and supported documents were vetted and process offline. In addition, applicants need to be physically present for their biometrics and picture capturing.

Background checking: In the absence of an online complementary application, background checking continued to be physical from the passport office. Birth registry and

security personnel need to be physically present and use physical documents for the background checks.

Printing and collection: With the online printing company application, an applicant's data for passport booklet are electronically submitted for printing. However, in line with international conventions, passport booklets need to be physically printed and issued. After printing, applicants are informed through the online platform for collection. Although applicants could opt for home delivery through courier services, the high costs and lack of trust for postal services discourage them. Therefore, most applicants go to the office physically to collect their passport booklet.

During Covid-19: From March 2020, the Government of Ghana announced a lockdown to restrict movement of people to reduce the spread of the disease. Notwithstanding the virtual platformization effort made by the passport office, the organization closed down and stopped providing services to citizens. Even when the lockdown was lifted in April 2020, the passport office continues to operate under the same combined online and physical interactions as before the lockdown.

One question that some applicants and IT professionals in the country keep asking is why the passport office has not migrated online during and after the lockdown. The next section provides a sociomaterial analysis of the situation.

6. Sociomaterial Analysis

This section employs sociomateriality principles as an analytical lens for the passport service platformization and outcome. The analysis focuses on activities of the service in relation to sociomaterial entanglement, relationality, and performativity as shown in Table 1.

Online form filling, payment, and submission. Before the platformization, form filling, payment, and submission were purely physical and paper-based. With the virtual platform, these activities have become digital. As shown in Table 1, the sociomaterial entanglement within which the virtual activities occur as intra-actions comprise the applicant, officers, application data and documents, virtual platform, guidelines, scanners, and payment platform. The relationalities of elements within the entanglement include the use of guidelines for form filling, scanner for digitizing documents for upload, payment platform for online and mobile payments. The performative outcome is the completed and online submitted form.

Witnessing and physical submission: Previously, form witnessing was physical. After the platformization, it remains physical. The sociomaterial entanglement comprises the applicant, the witness, the printed form, rubber stamp, pens, and signature. For relationality, the printed form is for the applicant, pens, and rubber stamps are for witnessing while witness's signature and stamps are for endorsing the documents. The performative output is the witnessed form ready for physical submission to the passport office.

Table 1. Sociomaterial analysis of the passport service platform performance

Activities	Entanglement	Relationality	Performativity
Online form filling, payment, and online submission	applicant, officers, application data and documents, virtual platform, guidelines, scanner, and payment platform.	form is for applicant's data, guidelines for form filling; scanner for digitizing documents for upload; payment platform for online and mobile payments.	completed and submitted online application form
Witnessing and physical submission	Applicant, witness, printed form, stamp signature	Applicant's printed form for witness' stamp and signature	witnessed form ready for physical submission
Vetting and processing	Applicant, passport officers, online form, printed form, original copies of supporting documents, platform, biometric devices and digital camera, office location	Applicant's printed form and supporting documents are for vetting and processing by officers; applicant provides biometric data and takes a picture; officers access online forms for vetting and processing	digital and physical application document processing
background checking	Collaborating agents, printed documents, document stands, background records	Printed documents, quality standards, applicant's background records are for confirming citizenship and critical records (if any) of applicants	application dossier cleared for approval and printing
Approval, printing, and issuing	Director, passed application, applicant, passport, printing organization, international convention, applicants	Passed application is for management approval and booklet printing. Printed booklets are for issuing and collection	Printed passport booklet ready for collection

Vetting and processing: Before the platformization, vetting and processing were also physical. Following the platformization, vetting and processing have become partly digital and partly physical. The digital part involves accessing and checking applicant's details and documents on the virtual platform. The physical part involves checking and processing printed and witnessed documents for signature and stamps. The physical part also includes e-capturing of applicant's biometric and picture while the digital part is uploading them onto the core platform. The performative outcome is combined digital and physical application document processing.

Background checking: Before the platformization, background checking was physical and remained so after. The entanglement and relationalities include birth registry and security officers, applicant details, passport office location and silo systems of the collaborating agencies. The performative outcome constitutes application dossier cleared for approval and printing.

Approval, printing, and Issuing: Following the platformization, approval for printing and issuing have also become partly digital and partly physical. Management depends on both online content and physical trails of documents from processing and background

checks to approve application documents for printing. Through the extranet system, the printing organization accesses applicant details to print passport booklet, after which applicants are electronically informed through the platform to for collection. Thus, the performativity is the printed passport booklet ready for collection.

7. Discussion

This study's research question focused on how government services involving physical materials and activities can be virtually platformized for physical distancing under COVID-19 and beyond. Overall the findings show how Ghana's passport service platformization was partial and therefore could not be delivered online during and after COVID lockdown. Thus, the service could not meet the necessary physical distancing requirements under COVID-19 [2, 15]. Among the reasons are the nature of the virtual platform's sociomaterial entanglement, continuation of physical practices, silo systems operations and unreliable postal services.

First, the virtual platform's sociomaterial entanglement was partly digital in nature. The digital part includes the online application. The physical materiality includes signatures and stamps as well as printed passport booklets. As a result, practices such as witnessing, vetting, and background checks could not be online but required physical interaction in the passport office space. Since these activities form significant part of the passport process, the service could not be completely virtualized during and after the lockdown. Given that digitization is a requirement for virtual process and service platformization [35]. Thus, to enable fully virtual platformization, it is important to consider not only data content but also digitization of physical objects such as stamps and signature and how to use their digital equivalent to avoid the need for physical contact.

Also, the infrastructure and the necessary preparations had not been made for working from home. Per the working culture, employees work with physical applications with signature and stamps by witnesses. Despite the attempt to virtually platformize the passport process, the focus had been on just the applicant's part while other participants were ignored. As a result, the form filling part could be completed from home but other activities including witnessing, vetting and background checks could not be done without physical contact. This finding calls for relationality in virtual platformization to ensure that all participants can have online interactions. Thus, in line with the relationality principle of sociomateriality, form filling should be related to witnessing, vetting, and background checks. Hence, platformizing some activities and leaving others does not provide the needed maximum benefits.

Another reason for the partial platformization was the failure to connect the core platform to the information systems of collaborating institutions involved in the background checks, including the birth registry and the security agencies. Consequently, their officers had to be physically present at the passport office to check original documents. Since silo systems should be the starting point for digital platformization [13], it is important that the passport office platformize the collaborating institutions to avoid face-to-face contacts.

Another factor that required physical presence of applicants was the need to collect the printed passport. In line with international convention, the office needed to print the booklet as a physical product and issue it as such. To avoid physical contact, the need exists to post the booklets. Again, this calls for trusted postal and reliable home addresses.

8. Conclusion

This study began with the aim of explaining how government services involving physical materials can be virtually platformized to meet physical distancing requirements in COVID-19 and beyond. The findings show that the virtual platformization of Ghana's passport services was not able to migrate all activities online to meet the social and physical distancing requirements during and after the lockdown. The failure was due to lack of telecommuting infrastructure, non-platformization of collaborating agencies, and unreliable postal systems. The discussion section offers implications for how such constraints can be addressed.

The study contributes to research, theory, and practice. For research, it extends the extant literature on virtual (digital) platformization into government service domain involving physical materials. It demonstrates how sociomaterial entanglements of virtual platforms can shape physical and digital activities for online and offline service provision for lockdowns and physical distancing requirements during pandemics.

The paper also contributes to sociomateriality theory by using entanglement, relationality, and performativity for activity analysis as intra-actions [32] of practices. By this, the study shows how sociomaterial practices can be broken down into constituent activities for more detailed analysis. Given that specific guidelines for sociomaterial methodology and analysis are still emergent [29], the approach used here can serve as a framework for analysis between practice and activity levels.

For practice, the findings provide an insight into how a particular configuration of virtual platform can enable or constrain virtualization of services from offline to online environment to avoid physical interactions. Thus, the findings can serve as a framework for IS and service practitioners on how to configure virtual platforms to support online service delivery during and after COVID-19.

The paper's limitation stems from its focus on a single case within a developing country context and use of evolving methodological and theoretical approaches that are yet to be stabilized. Future research can evaluate the novel approaches used in this study.

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