Received 4 October 2021
Revised 15 December 2021
18 January 2022
Accepted 21 January 2022

Performance of open government data in a developing economy: a multi-stakeholder case analysis of Ghana

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Abstract

Purpose – This study uses the technology fit–viability theory to study the performance of one of the early pioneers of open government data (OGD) in Africa. The study aims to investigate the task and technology fit, as well as the economic, IT infrastructure and organisational viability as performance measures for the Ghana Open Government Data (GOGD) initiative.

Design/methodology/approach – The study adopted a qualitative approach by interviewing key actors within the GOGD ecosystem, namely, the OGD implementing body, data suppliers and data users. The results were compared with established OGD best practices and standards around the world.

Findings – The results suggest that Ghana's OGD architecture appears far from meeting its fit and viability goals because of lacklustre performance attributed to the following factors: a complete lack of synergy among various stakeholder groups and actors in the GOGD ecosystem, a lack of sustainable financial support for the implementing body, a shortage of qualified staff for the GOGD project and partial neglect of GOGD as a consequence of the implementation of a new project called eTransform.

Research limitations/implications – This research is limited to Ghana's OGD initiative. Perhaps, a comparative study on the performance of other OGD initiatives in Africa and other developed countries will present another view of how OGD initiatives are performing across the globe. Again, the number of interviewees in the study may not be sufficient to generalise the results.

Practical implications – The study guides developing economies on how to examine national and international legal frameworks that have consequences on the usage of OGD at the national and sub-national levels. Besides, the study results will help implementing agencies and by extension government to be wary of the consequences of neglecting relevant stakeholders in the implementation process. The study also emphasizes on the need for developing economies to have sustainable funding and technical support for OGD implementation.

Social implications – The study helps shape citizens' understanding of what the government is doing pursuant to making data readily available for them. Because OGD spurs innovations, citizens' continuous involvement is key in the process of realising government drive to be open and accountable to citizens through data.

Transforming Government:
People, Process and Policy
Vol. 16 No. 3, 2022
pp. 318-333

1750-6166
DOI 10.1108/TG-10-2021-0158

The authors acknowledge helpful comments from the reviewers and the editor of TG:PPP. This research was not supported by any external funding.

Originality/value – This research is the first, to the best of the authors' knowledge, to present a retrospective and prospective view of a country's OGD implementation to ascertain the country's fit and viability. More uniquely, this study will be the first, to the best of the authors' knowledge, in assessing the performance of OGD setup in Africa.

Keywords Open government data (OGD), Developing economy, Fit–viability theory, Multi-stakeholder analysis, Open government partnership (OGP)

Paper type Research paper

1. Introduction

President Obama's directive on open government in 2009 ushered in a re-defined and more appealing, contemporary, world-wide initiative known as open government data (OGD) (Tauberer, 2014). The initiative resulted in the creation of the open government partnership (OGP), a body responsible for promoting OGD among governments around the world. Anchored on the principles of transparency, participation and collaboration, the focus of the President's directive was to harness modern information technologies to strengthen governance, promote transparency, fight corruption and empower citizens (Ubaldi, 2013). To achieve these, citizens were to be empowered within their rights to access government-controlled data for effective public oversight. Consequently, governments around the world were encouraged to make freely available online data held within public agencies, units and departments for citizens' use, reuse and distribution. This creates a win-win situation for government on one side and citizens on another. That is, as governments use data to launch innovative citizen-centric services, citizens, on the other hand, also make use of the data to scrutinise government policies and activities while also empowering themselves economically (Virkar and Pereira, 2018; Bvuma and Joseph, 2019).

In the light of the above and due in part to the emergence of the data revolution and its affordances, a renaissance of government-led open data initiatives emerged across the globe spearheaded by the OGP group. This led to the development and a launch of open government data initiatives (OGDI) at national and local levels of governance in most jurisdictions (Kubler *et al.*, 2018). In Africa, five countries pioneered the OGD movement, namely, South Africa, Ghana, Kenya, Tanzania and Liberia in 2011. Following this, several other African countries have also joined the movement through the support of the OGP. As of 2018, there were 14 African countries on the OGP programme, implementing various commitments and action plans with conflicting accounts of successes and failures. Again, the OGP's independent reporting mechanism, which tracks the progress of member countries, reports of startling progress among member countries, particularly in Africa, because of implementation challenges, defunct or inactivity on most OGD Web portals, non-conformity to data-publishing standards and a general lack of up-to-date data sets on Web portals (Ibrahim *et al.*, 2016; Afful-Dadzie and Afful-Dadzie, 2017). In effect, the general assessment of the performance of OGD across Africa is lacking, particularly among critical success factors (Krishnamurthy and Awazu, 2016; Chatfield and Reddick, 2017). Chatfield and Reddick (2017), for instance, bemoans a lack of multi-stakeholder perspective in OGD assessment and why this skews the narration on true progress made. While the one-sided assessment of OGD has prevailed in recent studies, researchers have not adequately discussed the task and environmental requirements together with economic and infrastructural viability (Krishnan *et al.*, 2017; Zhao and Fan, 2018; Abubakar, 2019; Magalhaes and Roseira, 2020).

In addition, resource and innovation theories as well as technology organisation and environment theories have dominated OGD research (Zhao and Fan, 2018; Krishnan *et al.*, 2017). These theories, on the other hand, have been criticised for overlooking factors such as the OGD's socio-technical fit (Dawes *et al.*, 2016), technical infrastructure (Afful-Dadzie and

Afful-Dadzie, 2017) and economic viability (Ahmadi Zeleti *et al.*, 2016), paving the way for a multi-stakeholder research on OGD's fit and viability. The fit–viability theory (FVT) has been proposed as a longitudinal measure to close the above gap by properly assessing how task and technology fit requirements, as well as economic, IT infrastructure and organisational viability, impact the performance of the OGD initiative.

The current study aims to empirically examine the performance of the Ghana open data initiative (GODI) to ascertain its fit and viability to achieve its set targets and goals. Thus, we seek answers to the following questions:

Q1. How fit for purpose is Ghana's open data initiative?

Q2. To what extent has the current Ghana open data initiative been viable?

Q3. How has the Ghana open data initiative performed over time?

To do this, we identified three key players in the GODI ecosystem, namely, the implementer, data suppliers and key data users. Note that, while several empirical OGD country assessments have been reported in the literature such as in Spain (Carrasco and Sobrepere, 2015), Brazil (Corrêa *et al.*, 2017), Saudi Arabia (Saxena, 2019) and China (Wang *et al.*, 2018), this study is uniquely different and makes several contributions on many fronts: firstly, several of the above-mentioned OGD assessments focused on Web portal content and functionality. This study examines the GODI's implementing body, data suppliers and data users from a multi-stakeholder perspective. We believe this holistic approach offers a fair assessment of a country's OGD performance. Secondly, the approach used in this study is the first attempt, to the best of the authors' knowledge, at conducting both a retrospective and prospective view of a country's OGD implementation to ascertain its fit and viability. Thirdly, this study will be the first, to the best of the authors' knowledge, in assessing the performance of OGD setup in Africa. Furthermore, the study provides an understanding of the nuances of OGD implementation and its sustainability particularly when literature on the actual performance of OGD initiative across Africa across is lacking. Guided by the FVT, the study contributes to the task, technology fit, organisation, infrastructure, economic and environmental viability of OGD in developing countries. This study also contributes to deepening the understanding of legal, technical, economic and organisational dimensions as critical to the survival of OGD initiatives. While prior research has indicated the mundane technical and organisational challenges besetting in the viability of OGD (Afful-Dadzie and Afful-Dadzie, 2017; Ahmadi Zeleti *et al.*, 2016), we extend this domain experience by providing a thoughtful view of the performance of OGD in a developing economy setting. The remainder of the paper is organised as follows: the FVT, the methodology, the findings, the discussion and the study's conclusions are presented in the following sections.

2. Theoretical foundation: the fit–viability theory

The FVT, originally by Tjan (2001), extended the task-technology fit theory by Goodhue and Thompson (1995) to aid organisational assessments of internet-based projects. To align the theory with emerging technologies, the FVT was later revised by Liang and Wei (2004), Liang *et al.* (2007) and O'Donnell and Jackson (2007). While the fit measures the extent to which technology competence matches with the performance of the tasks, viability measures the cost, benefits and readiness to adopt and use the technology within the organisational environment (Liang *et al.*, 2007). The combination of technology and task, according to Liang and Wei (2004), has become a critical factor in increasing organisational productivity and profitability. Extant studies have demonstrated how FVT aid in accessing the performance of adopted information technologies. For instance, Larosiliere and Carter (2016) applied the FVT to determine how a country's level of

technology development positively influenced the maturation of electronic government services. Liang *et al.* (2021) extended the FVT to examine critical factors that lead to managers' willingness to adopt blockchain technology. Tripathi and Nasina (2017), on the other hand, assessed the success and failures of organisation's cloud computing adoption using the FVT. Given the significance of the aforementioned factors, we draw on the FVT because the performance of an organisation can best be assessed whether it is fit for purpose and viable (Larosiliere and Carter, 2016). While some prior studies have done assessment of OGD in some jurisdictions as mentioned earlier, we argue that proper empirical introspective assessment of a national OGD has yet to be done. In view of this, the FVT is useful in providing an in-depth evaluation of GODI.

In this study, the *fit* dimension has two constructs, *task* and *technology*, which are used to assess organisations' infrastructure readiness towards information technology adoption. In the *viability* dimension, *economic*, *IT infrastructure* and *organisational* factors are used to assess the value-added in the form of new applications, technical and human resource as well as financial capabilities to a given organisation. Given the general lack of assessment of OGD in Africa, an introspective view is eminent (Krishnamurthy and Awazu, 2016). Thus, FVT is a good fit for tracking the performance and sustainability of organisations such as GODI (Liang *et al.*, 2021). We empirically leveraged the FVT as the guiding theory because its constructs of fit and viability were considered suitable for evaluating the performance of GODI; the 10-year period of GODI implementation is a reasonable period for its performance to be tracked; and Information technology was central to the GODI and therefore FVT was deemed appropriate.

Vicente and Novo (2014) affirmed that the FVT is particularly useful when examining technology fit and its consequential value in relation to its implementation and performance, taking into account environmental factors. Meanwhile, the FVT helps to investigate the technical, organisational and environmental factors that affect the implementation and challenges of OGDI (Zuiderwijk *et al.*, 2012) . In OGD implementation, several key critical success metrics have been identified in the literature. We synthesised several of these metrics using the FVT to track the performance of Ghana's decade open data implementation. Modelled on the original FVT constructs (Tjan, 2001), Figure 1 presents an extended FVT framework proposed to guide the research.

2.1 Legal–technology–environmental fit dimension

The OGD fit dimension is expressed on three pillars, namely, legal, technology and environmental. Note that, originally the fit construct in the FVT proposed task and

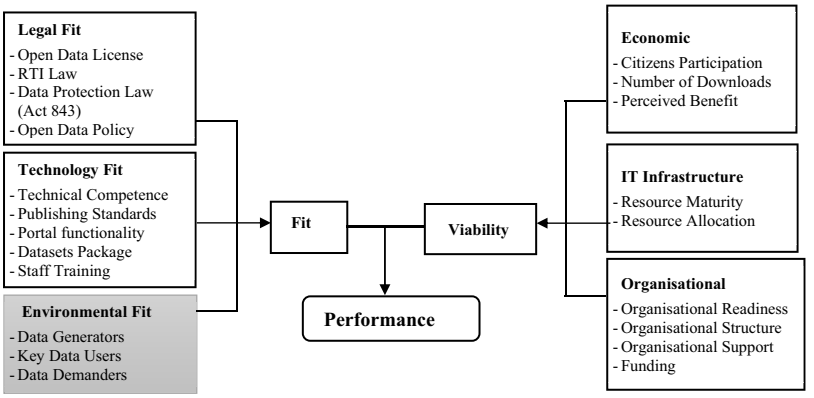

Figure 1.
Research framework

technology requirements (Liang *et al.*, 2007). Porumbescu (2016) and Dietrich *et al.* (2012) established that a degree of convergence between the task, technology and environmental characteristics of OGD initiative helps implementers to get the most out of a technology. Again, the task–technology dimension must meet key requirements, including legally and technically open (Ubaldi, 2013). In this study, the "task" dimension is replaced with "legal" to align with OGD standard implementation requirements (Ubaldi, 2013). Additionally, the study added an environmental-fit construct to serve as a moderating factor on the assumption that key stakeholders in the OGD ecosystem have influence on the success of the implementation. The addition of the "environmental" fit requirements supports the position espoused by Liang and Wei (2004) that the adoption of FVT must respond and address the environment in which the technology is implemented. The legal fit assesses statutory requirements such as Open Government License, Ghana's Data Protection Act (Act 843) and the National Open Government Data Policy. The technology-fit, on the other hand, assesses technical requirements such as IT competencies of OGD personnel, training acquired over the period of implementation and publishing standards. The environmental-fit assesses stakeholder engagements (i.e. data generators and key data users) as well as citizen participation (Herzog, 2014; Murotua *et al.*, 2020). The proposed legal–technology–environmental (LTE) requirements in this study are in line with OGD objectives of enforcing a broader, non-discriminatory, free public access to government data (Gascó-Hernández *et al.*, 2018).

2.2 Viability dimension

The viability dimension of the FVT as used in this study determines the feasibility of a country's economic, IT infrastructure and organisational resources towards the sustainability of OGD initiatives (Larosiliere and Carter, 2016). The organisational viability, on the other hand, assesses a country's overall readiness, management structures as well as political support by government towards OGD implementation. Prior OGD studies (Krishnan *et al.*, 2017; Larosiliere and Carter, 2016) maintain that the maturity of a country's level of technological development influences the maturation of electronic government tools and services. In essence, the availability of quality human resources, technological infrastructure and wealth were all significant factors that positively impacted OGDI (Afful-Dadzie and Afful-Dadzie, 2017). Again, given the significant involvement of citizens, Murotua *et al.* (2020) confirmed that, participation in OGD initiatives spurs innovations among digital entrepreneurs. Following this requirement, roles and responsibility of management towards ensuring the sustainability of the OGD initiatives were assessed. Similarly, the viability of the IT infrastructure reviews and evaluates the entire information and communication technology infrastructure of the country as a backbone to the implementation of OGD as outlined by the World Bank open data toolkit (Herzog, 2014).

3. Methodology

To determine how fit and viable Ghana's open data initiative has been, an exploratory case study method was used. We adopted a qualitative approach to interview key stakeholders (i.e. the implementing body, data suppliers and data users) in the GODI. The qualitative research design was aimed at gaining rich and detailed understanding of OGD implementation (Flick, 2018). This approach allows researchers to find answers to the "*why* and *how*" of a phenomenon under study (Mohajan, 2018). Additionally, the approach affords the analyses of individual experiences, interactions, documents and communication among entities to be examined (Mohajan, 2018). In line with this, eight relevant documents, including the World Bank's OGD Toolkit, Ghana's Data Protection Act 2012 (Act 843), GODI reports, policy documents and the data Web portal were

analysed. The OGD toolkit, for instance, is intended to guide OGD implementers in understanding the fundamentals of open data, as well as directing member countries on how to avoid potential pitfalls in implementation. The data triangulation (OGD archival records and documents) approach was to help ascertain the fit and viability of the GODI and to map it with findings from the interviews. Given that the focus was on key stakeholders, a purposive sampling technique was deemed appropriate to determine their role in the GODI ecosystem (Creswell, 2013). Sample selection across the three main actors was based on the participants' expertise, role and understanding of the GODI.

Three sets of semi-structured interview guide with different questions were developed to elicit information from each of the three GODI actors, namely, the National Information Technology Agency (NITA) representing the implementing agency, key public sector institutions in Ghana representing data suppliers and participants from two software development firms representing data users or demanders. The questions were structured based on the roles each actor played in the GODI implementation processes. For instance, because NITA is responsible for the GODI Web portal development and maintenance as well as the implementation processes, we sought to ascertain from management whether the initiative had been fit for purpose and viable in cognisance with international OGD best practices. The generation and distribution of data supplies was the responsibility of public sector institutions. Therefore, we sought to understand their involvement in the project's implementation process. Finally, for software developers, the interview sought to ascertain the viability of GODI by mapping their active involvement with the quality, availability and adequacy of data published on the Web data portal. Four interviewees were sampled within each of the three GODI actors. In all, 12 sets of open-ended interviews were conducted from July 2018 to March 2019. The FVT theory provided an effective approach for collecting, analysing and confirming the findings.

3.1 Data analysis technique

The results were analysed using the Miles *et al.* (1994) transcendental realism technique, which highlights interview transcripts into themes of *data condensation, data display and verification of conclusions*. Data condensation organises interview data into themes through "coding and memoing" (Boateng, 2016). While coding labels and segments the transcribed interview data into the themes, memos assist in generating ideas to establish a relationship between the literature and relevant theories (Boateng, 2016). This involved simplifying, selecting, abstracting and transforming the data that appear in full corpus of the interview data (Miles *et al.*, 1994). Data display, on the other hand, compresses the data in a way to allow for conclusions to be drawn. Reducing data, according to Miles *et al.* (1994), helps in drawing meaningful conclusions. These processes aided in developing a clear nexus among concepts and themes from the interview. In this study, themes that emerged upon applying Miles *et al.* (1994) processes included legal, technology, environment, economic, organisation, resources and funding, impact, challenges, cost and performance as presented in Figure 1.

4. Key findings

4.1 Ghana open data initiative implementation strategy

NITA's role is to deliver a functioning OGD Web portal on behalf of the Government of Ghana (GoG). In 2011, NITA assessed the IT infrastructure in Ghana to ascertain its readiness for the OGD project. Technical capabilities of NITA's staff were assessed; stakeholders, especially data suppliers, were engaged; and a management team and a steering committee were formed to ensure successful development and implementation of

OGD in Ghana. In Figure 2, the processes involved in data publication on the Web portal is shown.

4.1.1 Legal, technology and environmental fit requirements. GODI's fit requirements were evaluated based on the legal, technical and environmental considerations in the implementation. At the time of the GODI implementation, the Web portal had no open data license, the Right to Information bill had not been passed and there was no OGD policy to guide its implementation. This was a clear legal barrier to OGD implementation because the RTI law could compel state agencies to share data sets of public interests. In respect of the legal bottlenecks, a management team member of GODI explained:

> The current Ghana OGD web portal is not open by default. This is because, the government of Ghana is yet to sign the open by default chatter, which would legally ensure that datasets on the web portal can be accessed without restrictions. Though the current portal is functioning, the datasets are not legally covered either with the open data license or the open by default.

A Technical Lead Officer (TLO) from NITA, the OGD implementing agency, added:

> One of the setbacks we faced was that there was no law compelling government agencies to release data to NITA for onward publication on the web portal. This affected our work greatly. Even though we had the President of Ghana's blessing, some agencies refused to provide us with data to publish.

GODI was not open to all Ministries, Departments and Agencies (MDAs) across the country because of financial constraints. There was no public announcement or engagement to sensitise the business community and the citizenry of the project's goal. Clearly, NITA operated GODI in obscurity as most citizens and businesses were not aware of its existence. This affected the level of participation. The project coordinator explained:

> We wanted to have frequent public engagements, but we were constrained financially. Moreover, hosting regular stakeholder fora was financially exhaustive and we could not sustain the meetings in view of the limited financial support.

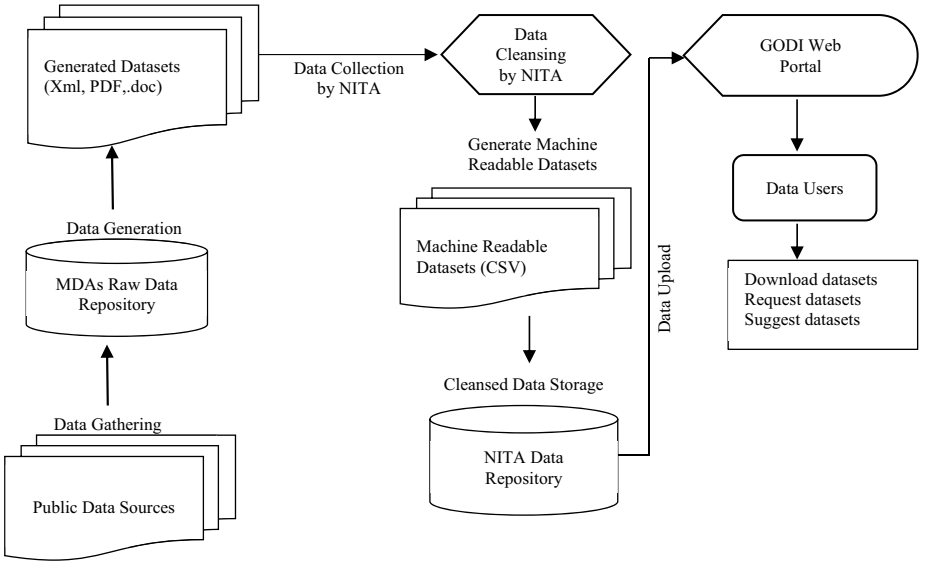

Figure 2.
Flow of events that lead to data being published on the (GODI) Web portal

A Director in-charge of ICT in a public agency explained that challenges besetting GODI were lack of engagement and training of key actors. He added that:

> Technically, some staff responsible for data collection at the various MDAs are unfamiliar with how to generate digital datasets in the required machine-readable format. So clearly, it's a big hurdle in the public sector.

Other technical challenges which have affected implementation have been lack of adherence to OGD publishing standards. For instance, data sets on the OGD portal could not be visualised and CSV was the only data format available as at the time of this publication.

The TLO concedes:

> The GODI implementation was hampered by the absence of a technical guidelines particularly for the data collectors to follow. Again, our inability to provide basic training to the data generators. This resulted in data generators producing data in non-machine-readable formats.

4.1.2 Ghana open data initiative economic, IT infrastructure and organisational viability. The GODI portal saw an overwhelming patronage at the peak of the project in 2014. NITA was recording over 8,000 hits and about 4,000 downloads every month. However, this record dwindled because of NITA's incapacity to raise awareness about the project's importance. The TLO lamented that:

> [. . .] we recorded a phenomenal reduction in the number of hits because of several reasons but largely due to our failure to effectively propagate the objectives of the initiative in the country coupled with our inability to publish more relevant datasets.

NITA's existing IT infrastructure had passed independent assessment of the Web Foundation but GODI was challenged with regard to physical IT infrastructure. Note that, the same infrastructure was being used to provide electronic services to agencies belonging to the state across the country. Thus, NITA's electronic services infrastructure could be described as fit to support the Web portal.

Over the years, successive governments had not committed enough funds for activities such as training of staff, purchase of new IT infrastructure and regular stakeholder engagement. Managers of the project confirmed that:

> NITA was constrained because the project was funded from our limited budgetary allocation from the Ministry of Communications. In addition, supporting all of NITA's initiatives around the country was a difficult undertaking.

NITA could not sustain the consultancy charges of the World Foundation team because funds had dried out barely six months into the project. More critical was their inability to train the data generators in the public institutions.

5. Analysis and discussions

This section discusses the findings of the GODI implementation focusing on its fit, viability and performance. The discussions were guided by the research framework as seen in Figure 1 and the study questions.

5. 1 Ghana open data initiative fit requirement

The GoG being a member of the open government partnership group is enjoined to fulfil a set of requirements in conformity with international OGD practices. In the following section, we discuss whether these requirements have been met through the lens of the FVT.

GODI's legal, technology and environmental fit requirements were used to evaluate the general acceptability, accessibility and usability of the programme. The findings show that GODI's legal requirements were largely not met during the implementation. Except for the data protection law (Act 843), some significant legal frameworks such as the RTI bill, national open data policy and open government data license were not ready at the start of the programme. These statutory frameworks give permissible rights to data users (including private citizens, businesses and even government's own agencies) to access, (re) use and distribute OGD. Given that these were mandatory fit requirements for the implementation and sustenance of GODI, the Ghana OGD portal was "legally-not-opened" because of its nonconformity with accepted OGD legal-fit requirements. This assertion confirms Janssen *et al.*'s (2012) view that the OGD-related legal and regulatory requirements must be satisfied by implementing agencies because they have direct impact on data acquisition, access and reuse. Thus, Ghana's lack of OGD legal requirements at the start of the implementation was a barrier to the accessibility and reusability of published data sets (Korn and Oppenheim, 2011; Morrison, 2017).

Besides the legal fit requirements, the technology-fit requirements were necessary for the effective implementation of GODI. We find in the results that staff of both the implementing body, NITA and government agencies (data generators) were not given the needed training to commence GODI. This resulted in poor data generation, scarcity of data sets on the OGD Web portal and non-adherence to international OGD publishing standards. The findings also suggest a seeming neglect of relevant OGD stakeholders in the GODI implementation. For instance, data suppliers in the Municipal and District Assemblies (MDAs), researchers, media practitioners and software developers who could have assisted with relevant data to generate for the portal were not engaged. As emphasised by Dawes *et al.* (2016) and Shao and Saxena (2019), stakeholder engagement is significant and neglecting them would have negative consequences on OGD implementation.

5. 2 Economic, IT infrastructure and organisational viability of Ghana open data initiative

We evaluated the economic, IT infrastructure and organisational maturity of GODI for its viability. The economic viability requirement of GODI was evaluated in terms of whether the open data initiative spurred innovation among citizens, enhanced citizens' engagements, promoted transparency and generally increased economic prospects among citizens during the decade of GODI implementation. Because the most visible sign of OGD implementation is often the Web portal, the research analysed GODI's economic viability in terms of the level of citizen's participation and the number of data sets, number of visits, data downloads, use, reuse and (re)distribution. Analysis of findings revealed that, visits and the number of downloads from the data portal at the initial stage of the initiative were encouraging. However, the number of visits and downloads reduced drastically later in 2014 because of NITA's failure to publish data sets that are current. As of the time of this research, the Web portal had become redundant with little or no updates to existing data sets. Given that sustained availability of updated data is essential to realising the economic value of GODI, the drop in the number of daily visits and downloads could also be a demonstration of published data sets not meeting the aspirations of users. The phenomenon was not only a breach of best OGD practices (Kučera *et al.*, 2015), but also contradicted accepted OGD publishing criteria such as the relevance and currentness (Afful-Dadzie and Afful-Dadzie, 2017) of the data. Again, apart from the count of number of visits to the OGD Web portal and number of downloads, there was no evidence of GODI tracking how people use and reuse, distribute and redistribute the data as a function of citizens' level of participation and interest.

In terms of infrastructure, the Web Foundation found NITA's existing IT infrastructure not capable of commencing the GODI project. The phenomenon was not different from the MDAs where basic IT infrastructure to support the GODI project was not in place. Giving the inadequacies of GODI's IT infrastructure, it is safe to say that GODI's viability as far as the project was concerned was minimal. The feasibility of the GODI is dependent on NITA's IT infrastructure, which reflects their physical infrastructure capability and preparedness. Furthermore, GODI's organisational structure, maturity (readiness and support) and financial capabilities determined its viability (Ohemeng and Ofosu-Adarkwa, 2015). All these factors hampered the implementation of GODI in several ways. For instance, the poor composition of the GODI's management body affected the project execution. It also emerged from the analysis that, as a consequent to the poorly constituted management board, supervision was ineffective coupled with a limited understanding of the GODI implementation strategy. Again, management was unable to get government of Ghana's cabinet buy-in to support the initiative. In fact, GODI was beset with several challenges because of lack of adequate financial support from central government. As a result, basic but critical tasks such as training and procurement of needed infrastructure were not forthcoming. Given the varied objectives of GODI to both Government and citizens, there is the need for regular support from top management in terms of readiness and funding (Ahmadi Zeleti *et al.*, 2016; Gasco-hernandez and Gil-garcia, 2018). In this regard, we posit that NITA failed in making the initiative economically viable on behalf of government, citizens and businesses. The analysis then suggests that GODI's organisational structure, as an indicator of preparedness and support, had a significant impact on its viability.

5.3 Performance of Ghana open data initiative in its implementation

Assessing the performance of an information technology is often premised on metrics such as system capabilities, information effectiveness and service qualities (Chang and King, 2005). However, Zuiderwijk and Janssen (2014), Ibrahim *et al.* (2016), Gascó-Hernández *et al.* (2018) and Zuiderwijk *et al.* (2018) maintained that the performance of a national OGD should be measured by system capabilities, data quality and user satisfaction. Our assessment of the performance of GODI over the period was guided by the literature in line with the research framework. Consistent with Ibrahim *et al.* (2016) and in line with the objectives of the FVT, we used a scorecard (Table 1) to judge the performance of the GODI based on our findings.

Overall, the study concludes that GODI performed abysmally over the period of implementation. In respect of the objectives of promoting transparency and accountability, fighting corruption, citizens' participation and accountability and championing technology and innovation through OGD, very little was achieved. Liang and Wei (2004) maintained that in order for an artefact to succeed in its implementation, one must not only focus on its fit but must also evaluate the organisational and infrastructural viability.

6. Conclusion and recommendations

The number of African countries implementing OGD is increasing by the day. However, the implementation processes and subsequent performance of OGD on the continent have not been studied. We addressed the study objectives by leveraging the FVT as the theoretical guide. The research looked at how task, technological and environmental fit criteria, as well as economic, IT infrastructure and organisational viability, influenced GODI's overall success. Primarily, the research examined the role and interactions of the three main players in the GODI ecosystem, namely, the implementing agency (NITA), data providers (i.e. government agencies and units) and key data users (demanders). The conceptualisation of

Table 1.
Summary scorecard for GODI's performance assessment

Fit and viability assessment of GODI	Guided literature	Yes	No
1. Was the initiative appropriately fit for the intended purpose?	Goodhue and Thompson (1995); Larosiliere and Carter (2016); Liang and Wei (2004); Liang *et al.* (2007)	√	
2. Was the initiative in tandem with users' expectations?	Gascó-Hernández *et al.* (2018); Afful-Dadzie and Afful-Dadzie (2017), Dawes *et al.* (2016)		√
3. Was there a positive response to the initiative from major data users?	Gascó-Hernández *et al.* (2018); Chatfield and Reddick (2017), Ohemeng and Ofosu-Adarkwa (2015)		√
4. Did the data sets on the online portal meet the demands of the data users?	Porumbescu (2016); Kučera *et al.* (2015); Reiche and Hofig (2013)		√
5. Was GODI fit on its legal, technology and environmental readiness requirements?	Morrison (2017), Korn and Oppenheim (2011)		√
6. Is the current GODI structure viable for success?	Chatwin and Arku (2018); Ibrahim *et al.* (2016), Dawes *et al.* (2016)		√

the FVT (Figure 1) extends the understanding of the antecedent of OGD by probing into external factors which inhibit implementation and sustainability of OGD especially in developing economies where little attention has been given to the concept. In particular, the use of the FVT inspires researchers to pay more attention to the task and viability aspects of OGD in relation to performance and sustainability. The use of the FVT theory also demonstrates how OGD implementation can be evaluated in terms of performance.

Overall, the study findings offer valuable insights into the GODI implementation. First, though GODI's initial structures to implement the programme could be described as fit for the purpose, several of the fit requirements especially of legal and task were not sufficiently met. Secondly, given the shortcomings in GODI's fit criteria, it was not surprising to say that GODI was largely not viable, especially considering that there were few economic and organisational gains in the OGD implementation. However, GODI's information technology viability, as measured on the FVT, could be said to have been satisfactorily accomplished. Weighing on both the fit and viability criteria, we can conclude that GODI's overall performance in the decade review was not satisfactory. We suggest the following strategies to improve GODI's overall outcomes in the coming years.

First, a national OGD policy must be designed and implemented in clear and attainable manner. The proposed national OGD policy must be aligned with the broader e-governance policy of the country. Secondly, the capacity of key OGD staff must be enhanced by regularly organising training sessions for relevant stakeholders in the Ghana OGD ecosystem. Thirdly, there must be efforts to adhere to licenses for open data. The proportion of machine-readable open data on the GODI Web portal must be improved to attract data users. Finally, regular stakeholder involvement is also required, as is executive buy-in from national and local government officials.

The GODI performance evaluation in this study has broader implications for the African region where the relevance of OGD as a panacea to revolutionising economies, fighting corruption, spurring innovations and empowering citizens has not been fully embraced (Ubaldi, 2013; Virkar and Pereira, 2018; Bvuma and Joseph, 2019). The percentage of African citizens who know and understand OGD is arguably low in spite of its potential to empower and amplify the voices of Africans in economic, political and social dimensions on the continent (Murotua *et al.*, 2020; Ibrahim *et al.*, 2016). Even though the study's context is Ghana, similar challenges pertain in other African countries as documented by Murotua *et al.* (2020), Shao and Saxena (2019), Ibrahim *et al.* (2016) and Afful-Dadzie and Afful-Dadzie (2017). As reinforced in this study, there is a clear lack of synergy between the OGD-implementing agency, data generators and users. We submit that the unsatisfactory performance of Ghana's OGD implementation, and to an extent the continent, is the result of the following:

- lack of appreciation of the economic, social and political benefits of OGD activities; and
- lack of sustainable funding for African countries in spite of the euphoria to join OGP.

It appears that most African countries do not have sustainable self-financing sources for OGD activities and therefore rely on donor agencies for support. The implication is that, where donor funds for OGD activities dry up, the programme automatically stalls.

This paper offers other implications for policy and practice. For instance, the study emphasises the importance of governments investing in training and development of human resources, as well as technical infrastructure, to strengthen institutional capacity and competencies, not only for the OGD implementing agency but also for all key actors in the OGD ecosystem.

In terms of implication for policy, developing economies must thoroughly examine national and international legal frameworks that have consequences for the usage of OGD. As pointed out in this study, in spite of the enthusiasm by the government of Ghana to implement OGD, the lack of appropriate legal frameworks to guide the implementation resulted in several bottlenecks for the implementing agency. Countries, especially in developing economies, need to be aware of legislations that impact OGD implementation and to strive towards ensuring that the laws do not become undue hindrance to achieving the goals of OGD. Similarly, countries interested in implementing OGD must be aware of the various licensing regimes and data formats that are part of prerequisites for implementing OGD.

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