



An Evaluation Framework for the Impact of Digitalization on the Quality of Governance: Evidence From Indonesia

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ABSTRACT

The goal is to develop an evaluation framework for the quality of governance (QoG) and to evaluate the impact of government digitalization on the QoG for Indonesia. The study develops an evaluation framework to determine the impact of digitalization on the QoG. Data were collected to test the framework in practice by interviewing 10 state apparati and organizing small-group discussions. The manual process of the state government officers' selection in Indonesia is considered very poor and vulnerable to corruption, collusion, and nepotism. The interviewees agreed that digitalization resulted in improved transparency and QoG. Overall, information digitalization has a dual impact as it led to improving service quality, transparency, and government accountability, but it did not result in less corruption, collusion, and nepotism. The findings suggest that digitalizing needs to be complemented by introducing checks and controls to reduce these problems. An evaluation framework offers important insights for digitalization and helps to identify opportunities to improve the QoG further.

KEYWORDS

Control of Corruption, Indonesia, Information Digitalization, Quality of Governance, Transparency

1. INTRODUCTION

Information digitalization is expected to help the government to combat corruption and improve its governance. Technology can control corruption and deliver public goods like education, health care, social security, and transportation more efficiently and effectively (Saxena et al., 2022). Several countries, such as India (Nyathikala et al., 2023) and Indonesia (Darusalam et al., 2021a), actively use technology to improve the *Quality of Governance* (QoG). The term "Quality of Governance"

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or “QoG” was introduced and propagated by the Quality of Government Institute at the University of Gothenburg, Sweden. In essence, QoG refers to a list of individual and aggregated datasets that measure how well a country manages specific governance datasets such as “accountability,” “political stability,” “rule of law,” “government effectiveness”, and other related variables. Prior research argues that Information digitalization can enhance the country’s QoG (Singh and Sahu, 2008). Information digitalization can improve government effectiveness, efficiency, transparency, and accountability (Theworldbank, 2006). Yet, there does not exist a comprehensive evaluation framework for evaluating the QoG in public administration.

Evaluation of information systems (IS) needs to take the content, context, and process of an IS into account (Symons, 1991). Digitalization is challenging to evaluate both from a conceptual and measurement point of view. The work of Smithson and Hirschheim (1998) confirmed the study by Symons (1991). Smithson and Hirschheim (1998) argued that Information systems evaluation is a complex problem. The environment that keeps getting more complicated makes it harder for stakeholders (managers) to evaluate new IS before and after they are put in place (McNaughton et al., 2010, Loukis et al., 2010, Chu and Tseng, 2018, Lee-Geiller and Lee, 2019, Aikins, 2019). Evaluation frameworks are needed to evaluate the effect of Digitalization. Yet, such a framework does not exist for information digitalization effect on QoG.

There exist no frameworks for evaluating the impact of information digitalization. The purpose of this explorative study is to develop an evaluation framework. The framework is derived from the literature. To test the evaluation framework on the quality of governance (QoG) a case study was conducted. This paper is structured as follows. First, this paper explores the literature on information technology as a mechanism to enhance the quality of governance. After that, the research method is presented. Then the case study background and an overview of stakeholders are presented, followed by an evaluation of information technology for quality of governance. The findings and discussion are discussed in part four. Finally, this paper concludes and discusses future work.

2. LITERATURE BACKGROUND

The literature review discusses government digitalization and the main challenges of using Digitalization as a means to tackle corruption. All too often a simplistic view on digitalisation is taken. For example, everything completely digitized creates more transparency and is easily accessible to the public (Antara.com, 2021). Yet, in reality no transparency needs to be created. This section explicitly examines the literature related to these two factors: information technology on the quality of governance.

2.1 Quality of Governance Concepts and Theory

The term “Quality of Governance” or QoG” was introduced and propagated by an international research centre, Quality of Government Institute, University of Gothenburg, Sweden (Howell, 2013). Computed as an index, the QoG measures the quality of a country’s governance. A high QoG score indicates good governance, and a low QoG score implicates poor governance. Due to its more comprehensive coverage, QoG has been endorsed and widely accepted by reputable global organizations such as the World Bank, Organization for Economic Cooperation and Development (OECD) and the International Country Risk Guide Group (ICRG). In essence, QoG, which is computed as an index, refers to a list of the individual and aggregated datasets that measure how well a country manages certain governance datasets such as “accountability,” “political stability,” “rule of law,” “government effectiveness” and other related variables. In addition, The World Bank then defines and assesses the quality of governance in three categories using the following criteria (Kaufmann et al., 2011, p. 223, Linhartova, 2022). Methods for choosing, managing, and switching governments: – Voice and Accountability is crucial when it comes to how citizens participate in the choice of government, as well as for freedom of expression, freedom of association, and the state

of the free media. – Political Stability and Absence of Violence/Terrorism is a criterion related to the likelihood that a government will be destabilised or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. Governmental power to effectively formulate and implement appropriate government policies – Government Effectiveness is a criterion indicating the quality of public services, the quality of civil service performance and the degree of its independence from political pressures, the quality of the formulation and implementation of public policies, and the credibility of the government's commitment to such policies. – Regulatory Quality is a criterion related to the government's ability to choose appropriate policies and implement legislation that enables and supports private sector development. 3) Respect of citizens and the state for institutions that regulate social and economic relations between them.

2.2 Quality of Governance and Digitalization

Prior research argues information digitalization through e-government can enhance the country's QoG (Singh and Sahu, 2008). Government digitalization can improve government effectiveness, efficiency, transparency, and accountability (Theworldbank, 2006). E-government can enhance governance quality by reducing costs, improving services, and bringing transparency, and accountability to the government. For example, the mobile phone is one of the tools for the diffusion of information for better governance in Sub-Sahara Africa (Asongu and Nwachukwu, 2016). In a study by Singh and Sahu (2008) supported by Popelyshyn et al. (2019), information digitalization through Open Government Data (OGD) can improve institutional quality by promoting transparency, citizen engagement, innovation, evidence-based decision-making, and efficiency in government operations. This study presents a Ukrainian case study's findings. OGD's potential to fight corruption is its most essential benefit in Ukraine. Corruption affects Ukraine's progress in many aspects of public life. Low government and industry readiness and a lack of crucial datasets affect OGD in Ukraine. Accountability, citizen involvement, and advanced service offering are still unfulfilled OGD aims. According to Popelyshyn et al. (2019), Open Government Data has the opportunities to enable more effective government bodies, improve public service quality and enhance policy formulation. Open Government Data contributes to sustainable development and strengthens good governance (Bhatnagar, 2003a).

In studies by Janssen and Zuiderwijk (2012) and Janssen et al. (2020), government digitalization can improve the country's QoG. The authors posit that data sharing through open data platforms can improve the government delivery system's accuracy, speed, and transparency in their studies. The implementation of such an initiative was expected to positively impact a country's economic growth, social well-being, and environment, thereby improving the country's competitiveness in its digital transformation.

The Ukrainian government's use of Digitalization through open data initiatives improved the country's accountability from 62 to 44 in 2016 (Popelyshyn et al., 2019). The successful open data initiative in Ukraine is called Prozorro¹. The world-renowned e-procurement uses an open data system to ensure the openness and accountability of Ukraine's public tenders. It was established in 2016 as a hybrid system of centralized public and decentralized private markets. Prozorro saves about 10% of public and private expenditures due to improved transparency and competition. It strengthens procurement, increases transparency, and triggers equal competition between companies. The same study by Popelyshyn et al. (2019) also highlighted the success stories of using open data technologies such as OpenBudget² and Rada4you³, which resulted in a better Quality of Governance in the country.

Alryalat et al (2017) found that transparency and corruption are major research themes in social media. The study shows how important social media and citizen-centered e-government services are for promoting citizen involvement, transparency, and collaboration in government operations. It also shows how much more theory-based research is needed in this area (Alryalat et al., 2017). In addition, Bertot et al. (2010) found that social media applications and information digitalization such as Facebook, Twitter, Youtube, and Instagram can encourage openness, transparency, and

accountability among users, leading to significant changes in implementing the rule of law by the government and its citizens. A research report published by the governance and social development resource centre (GSDRC) supports these findings⁴. The report suggests that social media has much potential for governance purposes but has not been capitalized on in most contexts. For example, many governments use e-government strategies to disseminate information online but have not solicited citizen feedback. The report further noted the use of mobile phones to support e-governance. Mobile phones are increasingly used to access the internet, which has increased the usage of social media sites.

A study by Ameen and Ahmad (2017) in Malaysia identified some good government factors that lead to good governance and anti-corruption policies in the Financial IS . The strategies include adopting the internet application, e-government improvement, and social media for a better financial technology system. In another study in India, Bhatnagar (2000) found a close relationship between government digitalization and the Quality of Governance. Digitalization provided decision support to public administrators for improving the planning and monitoring of development programs. Information digitalization also enhanced services to citizens, brought transparency, and empowered citizens through access to information and knowledge. Information digitalization was also utilized to develop a geographical information system (GIS) used mainly in rural facilities' locations to identify the disaster-prone area.

Sousa (2016) argues that some conditions should be in places like the training of public officials and institutional arrangements. It is necessary for the ability to further analyze or take interventions after spotting possible corruption. Since corruption is rooted in culture, information digitalization alone is insufficient to reduce corruption. They should collaborate with public governance, institution, media, and society (Sousa, 2016). Several works of literature on government digitalization commented on implementing the digitalization approach to reducing corruption. Shim and Eom (2008) argue that information digitalization can enhance the QoG. Information digitalization can promote good governance, strengthen reform-oriented initiatives, minimize the potential for corrupt actions, improve the connection between citizens and public employees, permit citizens to follow their activities, and monitor and control public employees' actions. Also, Bhatnagar (2003b) stated that information digitalization could provide disclosure information. As a result, societies, NGOs, researchers, and politicians can track the decisions and actions that government employees lead.

A study by Verma and Gupta (2015) examined several challenges of implementing digital information to improve QoG. The principal component factor analysis was used to identify the obstacles. The findings were classified into five categories: governance, resource constraints, capacity building, technology, and lack of awareness. The lack of sufficient and appropriate resources to implement digital information makes it difficult to generate high-quality data consistently. It is critical to institutionalize digital information in government. Appropriate governance instruments must establish proper responsibility allocation and accountability mechanisms. Lack of understanding about digital information and its potential applications also challenges nodal officers driving the digital information initiative in their departments. Capacity building for government officials is critical for identifying high-value datasets and publishing them in the public domain.

As shown above, implementing digital information can have advantages and disadvantages. The institutional measures can influence whether the benefits are accomplished. As such more insight is needed in which aspects can influence the benefits. Therefore a systematic literature review is conducted and the elements used in the literature.

3. RESEARCH METHODOLOGY

Our research goal is to develop a framework for evaluating the impact of information digitalization.

We take an approach to develop a framework based on literature and interviews. For example, Eisenhardt (1989) argue that, the used of literature review to build research strategy based on cases particularly from some cases. The literature review is based on PRISMA protocol (Moher et al., 2009).

3.1 Systematic Literature Review

The aim of the systematic literature review is to identify elements for inclusion in the evaluation framework. It begins with developing and validating the review protocol. The protocol's goal is to ensure that the review is methodical, follows the procedure, is transparent, and can be replicated. In this study, followed the guidelines for conducting SLR as proposed by Moher et al. (2009), as seen in Figure 1.

RQ: What are the impact of information digitalization on the quality of governance among public and private sector in Worldwide context?

TO answer this research questions we searched the literature using keyword. “Information Digitalization” and “Quality of Governance” as the two most important keywords from the research question during the identification phase. Keyword enrichment is necessary to make the search process rigorous and effective. Gazendam et al. (2010) suggest using an online thesaurus to enrich keyword results with more synonyms. This resulted in the addition of the keywords such as “Information digital”, “digital transformation”, “governance”, and “quality” as shown in Table 1.

After enhancing the keywords, the researcher created a complete search string utilising the Boolean operator, phrase searching, truncation, wildcard, and field code functions for two databases: Scopus and Web of Sciences. There is a requirement to search multiple databases in order to avoid publication bias, compensate for the weaknesses of one database with another, and promote transparency in this protocol (Briner and Denyer, 2012, Kraus et al., 2020, Xiao and Watson, 2019). This study review two database which is SCOPUS and Web of Science

Figure 1. PRISMA flow diagram adapted from Moher et al. (2009)

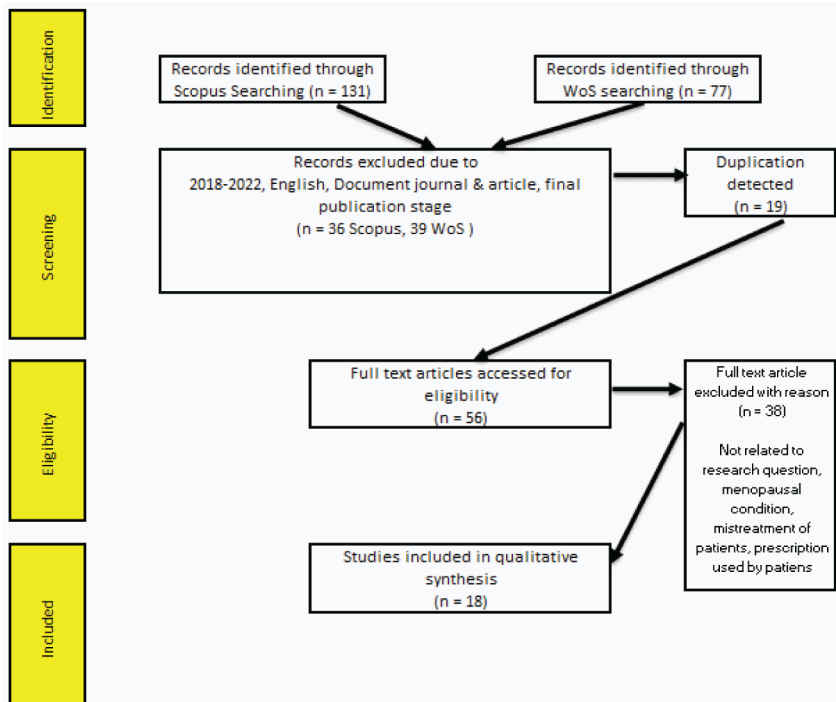


Table 1. The search string

Database	Search String
SCOPUS	(TITLE-ABS-KEY (“information digital*” OR “digital transformation”) AND TITLE-ABS-KEY (“governance” AND “quality”))
Web of Sciences	(TS=(“information digital*” OR “digital transformation”) AND TS=(“governance” AND “quality”))

databases (the full list is available in Appendix 1). Table 1 demonstrates how the researchers constructed search queries for Scopus and Web of Sciences. The search for field codes is based on the title, abstract, and key term. Scopus consequently identified 131 articles, while Web of Science identified 77. The next protocol is screening.

3.2 Screening

Screening is the second step of the PRISMA protocol in this study. This screening procedure requires the researchers to decide whether to include or exclude the articles to be reviewed. Using a filtering system, the database facilitates this procedure automatically. The advantage of the screening procedure is that it ensures that the selection criteria from the database are adequate, neither too limited nor too broad (Kraus et al., 2020).

The researcher eliminated the duplicate article with recordings in both the Scopus and Web of Sciences databases. This procedure is necessary to avoid double review, resulting in the detection of 19 instances of duplication. The researchers then excluded articles based on the study’s timeframe (2018 to 2022), article language (English), document type (journal or article), and publication stage (final). Consequently, 38 articles must be excluded because they did not meet the intended criteria.

3.3 Eligibility

Eligibility is the third procedure in the PRISMA protocol. Apart from identification and screening, this process is difficult because it is manual (Mohamed Shaffril et al., 2021). As a result, the researchers go through a lengthy process. For the eligibility procedure, there are 56 articles available. The researcher followed the advice of Kraus et al. (2020) and began reading the publications with the title and abstract. The researchers can then determine whether the paper is eligible and answers the research topic in this study. As a result, 38 publications are disqualified since they do not answer the research question. Following the eligibility phase, the researchers can proceed to the inclusion process.

3.4 Inclusion and Data Extraction

Following the completion of the qualifying process, the researchers agreed to review 18 articles. The researchers then extracted data by creating an extraction sheet at the start. As a result, data extraction assists researchers in answering the research question. Furthermore, the matrix table is a useful support tool for increasing transparency and illuminating the ongoing synthesis process (Kraus et al., 2020, Mohamed Shaffril et al., 2021).

3.5 Analysis

The data in this study was evaluated by the researchers using data synthesis. By spreading the information from the matrix table among the 18 articles to be reviewed, the synthesis is crucial in completing analysis. As a result, the synthesis result will be examined and presented using the qualitative method - thematic analysis. Thematic analysis is used to identify, assess, and interpret

meanings (themes) in qualitative data (Braun and Clarke, 2014). The researcher found various topics in this study based on the important results of the selected paper, which will be presented in the next part.

4. RESULTS OF BACKGROUND ON THE SELECTED ARTICLES

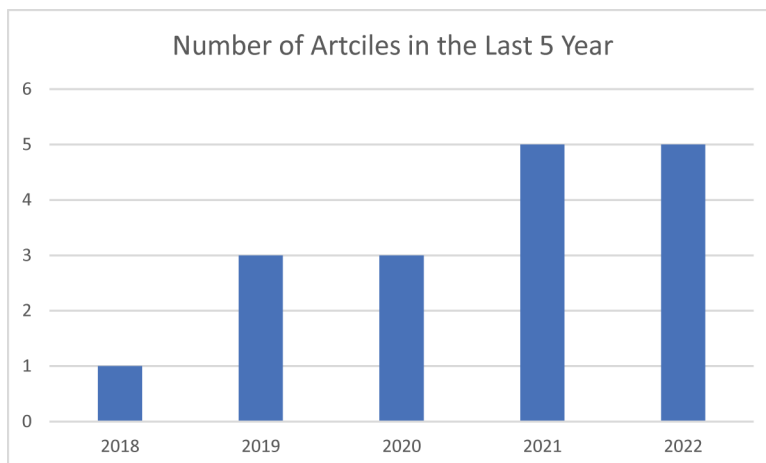
The researcher found and chose 18 articles to review. Five articles were published in the year 2022, Five articles were published in 2021, Three articles were released in each of 2020 and 2019, and one article was published in each of 2018. In terms of the region, one article focused on on the combination of more than one country. China, Australia and India has the most single country papers with two studies, followed by Bangladesh with two research. Each country contributed one article: Vietnam, Negeria, Russia, Indonesia, Malaysia and Russia. The research design has a varied amount of publications, with quantitative, qualitative articles, and mixed-method articles.

4.1 Refinement and Testing Case Study

The study develops an evaluation framework for evaluating the QoG and refined and tested the framework in practice. For the the case of the use of the Computer Assisted Test (CAT) system in reducing the corruption practice of recruitment of state apparatus in Indonesia was used. This case study captures many aspects of QoG.

The evaluation is based on case study research. Using a case study allows for the investigation of a real issue within a defined context by utilizing various data sources (Yin, 1994). A case study “investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not evident (Yin, 1994 p.13)”. Eisenhardt and Graebner (2007) In a case study, various data sources are used to examine an actual problem within a defined context (Yin, 1994). Using empirically supported case studies to generate theoretical constructs, propositions, or midrange theories is a common research method (Eisenhardt, 1989). A case study is an empirical description of a phenomenon based on various data sources (Yin, 1994). In addition, the case study is a comprehensive method that incorporates specific data collection and analysis approaches into the logic of the research strategy’s design. In this study, the case study serves as a comprehensive research strategy to evalaute the framework in practice. A case study was conducted in Indonesia to examine the use of the Computer Assisted Test (CAT) system on the quality of governance.

Figure 2. The distribution of the reviewed articles per year



The methodology for this study involves conducting qualitative interviews with 8 civil servants in February 2022 who work for the government, especially the lecturer of the State Islam University of Raden Fatah Palembang, Indonesia. This study's qualitative methodology entails collecting information from the interviewer's viewpoint concerning the respondents. The study's primary focus is on 8 lecturers between the ages of 32 and 34 who were interviewed. These lecturers are from the Science and Technology faculty and specialise in information systems at UIN Raden Fatah Palembang. On April 11, 2022, the interviews took place. According to Kallio et al. (2016) Semi-structured interviews are a qualitative research approach that incorporates aspects of both structured and unstructured interviews. The interviewer follows a prepared set of questions or subjects in a semi-structured interview, but has the flexibility to ask extra follow-up questions and explore new areas based on the participant's responses. This enables for a more open-ended and conversational approach while still preserving some structure and consistency. Semi-structured interviews were used to gain insight into the framework and allow them to extend or comment on the framework. To ensure the ethical considerations are met, the researcher obtained informed consent from the participants, maintained confidentiality and anonymity, and ensured that the research did not cause harm or distress to the participants.

Some questions were asked during the interviews: i) Compared to conventional procedures, how does using the Computer Assistant Test (CAT) for civil servant recruitment help prevent corruption?. ii) What characteristics of the Computer Assistant Test (CAT) make it useful for reducing corruption throughout the hiring process for civil servants? iii) How does the Computer Assistant Test (CAT) ensure fairness and transparency in hiring civil officials, thereby lowering the risk of corruption?. iv) Could you give instances or case studies where the Computer Assistant Test (CAT) has effectively thwarted corruption in hiring civil servants? iv) How can the Computer Assistant Test (CAT), which helps mitigate corruption issues, improve the general credibility and integrity of the hiring process for federal servants?.

A focus group or "small talk" was held at UIN Raden Fatah Palembang, Indonesia, on February 11, 2022 from 10 am to 12 pm Indonesian time to examine the efficacy of computer aid in eliminating corruption in civil servant recruitment. Eight UIN Raden Fatah Palembang Lecturers were chosen to participate in this conversation. The focus group discussed the elements of the framework. The small talk was carefully organised to guarantee that everybody participated actively. A designated person was responsible for documenting or taking notes throughout the discussions, which was important for analysing the ideas and suggestions generated during the meeting.

Koschmann et al. (1996) interpreted the importance of small group discussion. Small group discussions, for example, can positively impact cognitive function by requiring participants to reflect deeply on their ideas (Lee and Ertmer, 2006). Also, the cognitive processes involved in asking questions, providing explanations, and elaborating upon ideas to give these answers all play a role in the learning process (Cohen, 1994, Slavin, 1996, Parong and Mayer, 2021). Collaborative dialogue between interviewers and interviewees in a community of inquiry enabled them to share knowledge and co-create new understandings, as described by (Cochran-Smith and Lytle, 1999, Lykes, 2020). Collaboration in multimedia-based problem-solving environments is critical, according to Albion and Gibson (2000) and Riyadi and Ferianto (2021), who argue that group discussions are essential to the success of problem-based learning.

5. LITERATURE REVIEW OF EVALUATION FRAMEWORKS FOR THE QUALITY OF GOVERNANCE

Several evaluation frameworks related to information digitalization have been suggested and implemented to enhance the QoG. This literature review assessed their suitability as QoG tools. Table 1 presents the evaluation frameworks of how government digitalization can improve the QoG. The frameworks are analysed for its main elements that are used for evaluating. From the Systematic

Literature Review methods, we found that the frameworks employ a diversity of data collection methods. Some examples from prior studies is presented related to how evaluation frameworks on information digitalization on enhancing the quality of governance in some countries.

A study by Lee-Geiller and Lee (2019) aims to investigate the multidimensional factors that enable government websites to reach their full potential. To accomplish this, the authors developed the Democratic E-Government Website Evaluation paradigm, an integrative paradigm. They conducted a qualitative meta-analysis by investigating literature in information systems, business, public administration, and democratic theory. This study contributes to the existing literature by expanding the scope of e-government website analysis beyond citizens' acceptance and concentrating on their engagement. It depicts citizens as active agents in governance and offers a comprehensive model for public authorities to improve their websites. These enhancements can result in more effective public outcomes by facilitating democratic e-governance. Other studies supported study by (Lee-Geiller and Lee, 2019), they argue that Information Digitalization enhances governance by increasing transparency, efficiency, and innovation, decreasing corruption, and enhancing government efficiency and regulatory quality (Dhaoui, 2022, Lněnička et al., 2021, Ayakwah et al., 2021).

For example, Ayakwah et al. (2021) examine government digitalization initiatives and accompanying difficulties in Africa, especially in Ghana. The study explores the development and operation of digitalization programmes in important areas such ports, national health insurance, utility bill payments, financial services, and digital addressing systems by analysing numerous sources, including vast literature. According to the research, digitization improves creativity, efficiency, transparency, and other factors in both the public and private sectors. The quick spread of digital technologies creates both many opportunities and challenges for regional sustainable development. However, obstacles prevent the benefits from being completely realised. These obstacles include restricted infrastructure, a lack of human resources, insufficient stakeholder involvement, and a lack of user education and training. The authors provide several options, such as building the required infrastructure, providing service providers and customers with ongoing digital education and training, and establishing cybersecurity expertise. African governments should establish regulatory frameworks to encourage the use of digital platforms by businesses and public institutions.

The Role of E-Government in the Evaluation of the Quality of Governance in the Countries of the European Union examined by Linhartova (2022). This paper investigates the effect of e-government maturity on a country's governance quality, with a particular concentration on European Union member states between 2003 and 2020. The study uses correlation and regression analysis and bag plots for graphical interpretation. The findings indicate a correlation between e-government utilisation and governance quality. It has been demonstrated that the implementation of information and communication technologies positively impacts the evaluation of governance quality in the country under study. It is marked by the enhanced quality of public services and level of involvement of numerous stakeholders, including people. Citizens become co-creators of public value and strong influencers of the quality of public administration using methods such as participatory budgeting or co-creation of public service.

The frameworks in table 2 are diverse and cover different aspects. Some frameworks look at the process, whereas others look at the results or the long-term societal impact. Operational measures like data and system quality can be looked at, but also to political and social values. There is no single dominating approach for evaluating QoG. Some gaps are identified such as lack of a unified framework for analysing e-government. This makes comparing different e-government programmes and identifying best practices challenging. Secondly, the current frameworks are focus on the process rather than outcomes.

Many e-government evaluations concentrate on the implementation process rather than the initiative's outcomes. This can lead to an emphasis on short-term objectives rather than long-term impact. Thirdly, lack of stakeholder involvement. Key stakeholders such as citizens, corporations, and civil society organisations are frequently excluded from e-government programmes. As a result,

Table 2. Overview of evaluation frameworks for the quality of governance

Author	Title	Brief Overview	Research Method	Elements of Evaluation
(Ward et al., 1996)	Evaluation and realization of IS/IT benefits: an empirical study of current practice	This paper shows the main results of a 1994 survey of how the UK business world evaluates and realizes the benefits of IS/IT (called “benefits management”).	Survey	A new benefits management process model was utilized to develop a questionnaire to assess how well firms manage benefits across the investment lifecycle.
McNaughton et al. (2010)	Designing an evaluation framework for IT service management	This study presents a design of a holistic evaluation framework for IT Service Management (ITSM) enhancement with a specific focus on the IT Infrastructure Library (ITIL)	Design research approached	Management, Technology, IT Users, and IT Employees
Loukis et al. (2010)	An evaluation framework for e-participation in Parliaments	This paper talks about a framework that has been made to evaluate several e-participation pilots in the way that parliaments make laws.	Information Systems Approach	It looks at the process, the system, and the results. Each of these is broken down into several evaluation criteria.
Seyal et al. (2016)	A preliminary evaluation of ICT centers performance using COBIT framework: Evidence from institutions of higher learning in Brunei Darussalam	This study is being done on four higher education institutions (HEIs) in Brunei Darussalam’s Information and Communication Technology Centers (ICTCs) to evaluate and highlight their performance in achieving IT Governance using a performance measuring COBIT framework.	COBIT Approach	The COBIT also looks at the indicators for the maturity level, which can be anywhere from 0 to 5. The results of this preliminary study show that not all of the items used to measure the five domains of COBIT can be used to measure these ICTs. The average maturity level of all these ICTs ranges from 1.40 to 1.72.
Chu and Tseng (2018)	Open data in support of E-governance evaluation: A public value framework	In this paper, the authors first make a public value e-governance evaluation framework and discuss whether open government data, which makes public administration institutions more open, accountable, and effective, can help with e-governance evaluation.	Interview	Operational Values Political Values Social Values

continued on following page

Table 2. Continued

Author	Title	Brief Overview	Research Method	Elements of Evaluation
Lee-Geiller and Lee (2019)	Using government websites to enhance democratic E-governance: A conceptual model for evaluation	This study investigates the multidimensional characteristics that enable government websites to deliver on their promises.	a qualitative meta-analysis	information systems, business, public administration, and democratic theory
Darmawan et al. (2020)	Exploring Factors Influencing Smart Sustainable City Adoption using E-Government Services Effectiveness Evaluation Framework (E-GEEF)	This paper looks at the main things that affect the development of Indonesia is adopting smart cities.	Questionnaire	The method chosen uses the E-Government Services Effectiveness Evaluation Framework (E-GEEF), which is a very complete model for measuring how well technology is used.
Koniyo (2021)	Identification of components for evaluation e-government governance framework according to regional government characteristics	The goal of this study is to find out what parts can be changed to make a new framework that can be used to evaluate e-government governance in regional governments in the future. A study will help by giving a new way to evaluate e-government by taking into account parts that are important to the way regional governments work.	systematic literature	System Quality, Information Quality, Service Quality on Net Benefits
Tyagi and Goyal (2021)	Contextualizing Electronic Governance, Smart City Governance, and Sustainable Infrastructure in India: A Study and Framework	The study illustrates the research gap about the numerous E-governance systems developed and implemented in India as part of the Indian government's digital India strategy. using information and communication technologies (ICT).	Survey	Modifications should be made to the interactive user interface and user experience, documentation, incorporation of local language, performance monitoring, feedback form, and digital service standard factors outlined by the Government of India's open source technology-based development and information technology act.
Quijano et al. (2022)	Towards sustainable and smart cities: Replicable and KPI-driven evaluation framework	A KPI-driven evaluation framework has been designed to encompass the numerous pillars of a smart and sustainable city for the mySMARTLife project (GA#731297).	A case Study	Environment, energy, mobility, ICT, citizens, economy, governance

efforts that are not aligned with the demands of these stakeholders may be implemented. Finally, lack of resources. E-government efforts frequently lack the resources required for success. Delays, cost overruns, and poor quality can all result from this.

The literature shows that a broad range of aspects can be affected by information digitization. Apart from efficiency and effectively, service quality, transparency, and government accountability, but o aspects are related to corruption, like fraud, collusion, and nepotism, can all be affected by information digitalization. There are five benefits of digital transformation (Căpu neanu et al., 2021). Firstly, Information digitalization improves the quality of government by lowering costs, improving services, and making the government more open, transparent, and accountable. Secondly, digital information promotes long-term development and improves governance. Thirdly, Implementing such an initiative was expected to positively impact a country's economic growth, social well-being, and environment, enhancing its competitiveness in its digital transformation. Based on these arguments and to achieve the study's objective, the first objective is to assess the influence of digitization of information on the quality of Governance (QoG), while the second objective is to build an evaluation framework.

In conclusions, there are a large variety of criteria that needs to be taken into account. Furthermore accomplishing the benefits might require transformation of QoG. In particular controls are needed. In addition, for a comprehensive framework of information digitalization for the quality of governance should be include in the framework are check and control, efficiency and effectiveness of the system. As result it will create better service quality, transparent and government accountability.

6. TOWARDS A COMPREHENSIVE EVALUATION FRAMEWORK

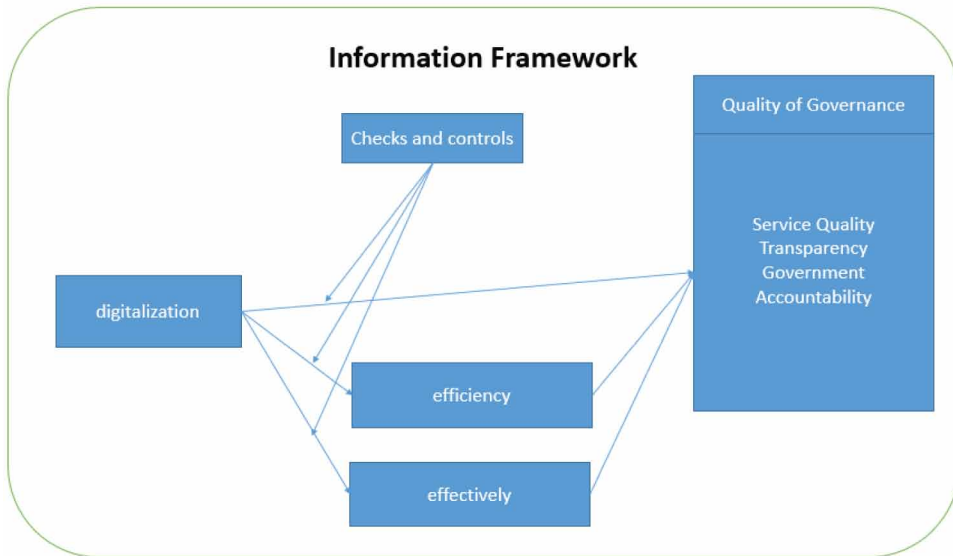
An evaluation framework should contain the main concepts that might be influenced and the measure to be able to evaluate the impact (Tyagi and Goyal, 2021, Quijano et al., 2022, Duhamel and Sandoval-Almazán, 2021). Based on Table 1, we propose an evaluation framework for how Digitalization can improve the quality of governance, efficiency, and effectiveness and the moderation of Checks and Controls.

Although our focus is on the QoG, digitalization might also affect efficiency and effectiveness (Bertot et al., 2010, Wandaogo, 2022, De Marco, 2021). The latter will in turn, influence the QoG. Therefore we measure efficiency and effectiveness as first-order effects and QoG as secondary effects. Therefore we include these in our evaluation framework.

Governance is dependent on the openness to create transparency and accountability (Soverchia, 2015, Aikins, 2019, Darusalam et al., 2021b) and also on the introduction of check of controls to ensure that administrative processes are executed as required and to avoid a single person would be able to conduct fraud (preventive controls) and to ensure that possible fraud and corruption can be detected (detective controls) (Del Sordo et al., 2015, Verhoef, 2007, Harasheh and Provasi, 2023). Indeed there are corrective controls to undo fraud and punish the guilty. The check and controls should minimize the risks of fraud and corruption.

Digitalization can play a crucial role in improving the quality of governance, efficiency, and effectiveness, as well as the moderation of checks and controls. There are some methods in which Digitalization can help achieve these goals. Firstly, Digitalization can give citizens easy access to government information and services. Secondly, Digitalization can automate and streamline government processes, reducing the time and resources required to complete tasks. Thirdly, Digitalization can help government agencies collect and analyze large amounts of data, allowing them to make more informed decisions and policies. Fourthly, Digitalization can improve the security of government systems and data, helping to prevent fraud, cyber-attacks, and other security breaches. Finally, Digitalization can help to improve checks and controls by providing real-time monitoring and analysis of government systems and processes. This can help identify potential problems or irregularities, allowing quick intervention and remediation.

Figure 3. The framework for the impact of digitalization on the quality of governance



Fraud Corruption can measure qoG (Chen et al., 2006), Transparency (Kosack and Fung, 2014) and Accountability (Almquist et al., 2013). In the context of QoG, fraud can manifest in various forms, such as embezzlement, bribery, nepotism, or favouritism. It is critical to monitor the prevalence and severity of fraudulent actions in the government or public institutions in order to assess the quality of governance. Secondly, corruption is another critical factor that can significantly impact the quality of governance (Amagoh, 2009). It refers to the misuse of public power or resources for personal gain, often involving the exchange of money, favours, or gifts. Corruption can undermine public trust in the government, damage the economy, and impede the delivery of essential services to citizens (Del Sordo et al., 2015). Thirdly, transparency is the degree to which government or public institutions' actions, decisions, and processes are open, accessible, and accountable to the public (Soverchia, 2015). Transparency is essential to ensure that citizens have access to information and can hold the government accountable for its actions. Fourthly, accountability refers to the responsibility of government officials and institutions to answer for their actions and decisions. It involves establishing clear lines of responsibility, ensuring that decision-makers are held responsible for their actions, and providing mechanisms for citizens to hold the government accountable (Chatfield and AlAnazi, 2015). Thus, factors such as the rule of law, human rights protection, and public participation can also contribute to a comprehensive assessment of the quality of governance (Chu et al., 2022).

7. FINDINGS: EVALUATING THE FRAMEWORK IN PRACTICE

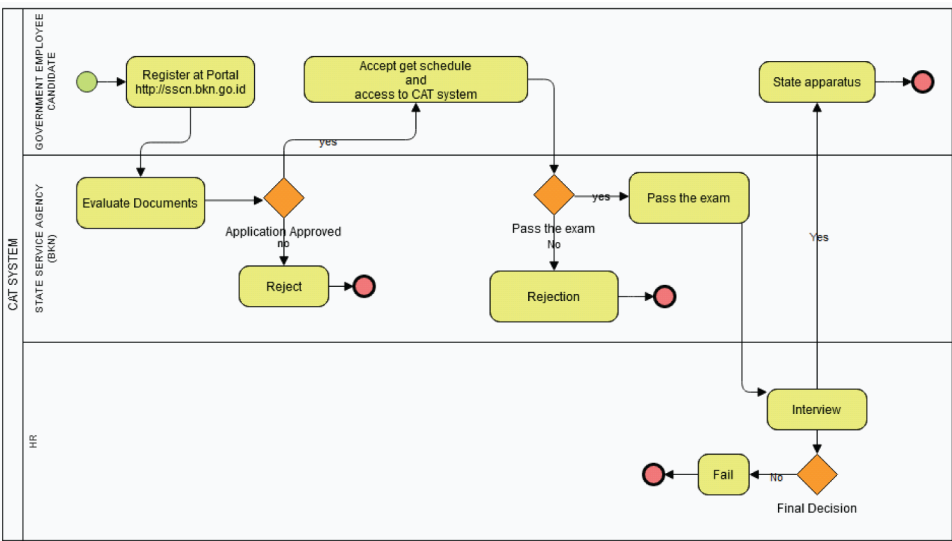
The Indonesian government introduced a new system to recruit state apparatus (state government officers), the Computer Assisted Test (CAT) system, in 2009 (Buana and Wirakusuma, 2015). Computer Assistant Test (CAT) is a prospective state apparatus computer-based selection test. With the CAT system, the public can see the exam results directly when they have finished working on the exam (Triandini and Yusri, 2017, Zainuddin, 2020). The CAT system has five functions (Atmojo, 2021). Firstly, to speed up the examination process and report test results. Secondly, creating standardization of test results nationally. Thirdly, the CAT has provided three types of questions, namely National Insight (TWK), General Intelligence Test (TIU), and Personal Character Test (TKP). Fourthly, the

assessment of the results of the SKD exam is carried out in an objective, transparent, and accountable manner. Finally, candidates for state government officers can easily access the achievement of results. With the Computer Assisted Test (CAT) system, the Indonesian government seeks to create professional and competent Civil Servants (PNS).

Figure 4 demonstrates how a potential candidate registers for an exam using the Computer Assisted Test (CAT) system. Firstly, the applicant register and creates the account at <https://sscasn.bkn.go.id>. Once the account is created, they can log in and fill in their data. Secondly, a candidate uploads all the required documents as test-takers—for example, ID cards, curriculum vitae, degree certificates, etc. The state service agency (BKN) will select the best candidates who fulfill all the stipulated requirements. The applicant will get the examinee number if the conditions are fulfilled. All participants will be scheduled for an exam using the CAT system. The exam will be held simultaneously in the designated building with all terms and conditions. Thirdly, Exams will be held simultaneously for approximately two hours. After the exam is completed, the examinees will immediately get the results, whether they pass or not. Only passed candidates will proceed to the next stage. Successful candidates will next take the field competency selection exam, and they will also undergo an interview process.

The first research hypothesis of the study was to examine the relationship between information digitalization and Quality of governance. During the small group discussion, all interviewees were asked whether Information digitalization could enhance the quality of governance in Indonesia. Interviewees agreed that the CAT system had improved transparency and good governance regarding the recruitment of state apparatus in Indonesia. CAT aims to increase transparency, objectivity, accountability, and efficiency. Theoretically, the purpose of public service is to satisfy the public. To achieve this satisfaction requires excellent service quality, one of which is reflected in transparency. By having access to various types of information, the public and stakeholders can assess the extent to which the government is partial to their interests and take the right attitude in responding to the policies taken by the government. With the concept of information transparency promoted by the selection of CPNS admissions through the CAT method, it is hoped that it can create a positive opinion of the government in terms of organizing the selection of state apparatus admissions.

Figure 4. Overview of the CAT process



The study's second research hypothesis examined the relationship between the Information Digitalization Framework on reducing corruption in Indonesia. The relationship indicated that accessibility and usage of information digitalization contributed significantly towards better Control of Corruption. In other words, Information Digitalization Framework enhanced transparency and accountability in the public sector, especially in recruiting state apparatus in Indonesia. The respondents noted that the CAT platform itself is fairly objective. Candidates answer all the questions digitally without much human intervention from fellow examinees or the examiners. However, it was noted that behavioral-related questions were missing in the digital CAT exam that tested examinees' integrity and their perceptions on good governance and control of corruption at workplaces. Further, the second stage of the state civil apparatus selection involves a field competency selection exam and a face-to-face interview. The respondents perceived that at this second stage of selection, the importance of integrity, good governance, and effective control of corruption was not adequately stressed, despite the fact that CAT was to enhance transparency and mitigate corruption in the government sector. The respondents also further noted that one obvious loophole in the second stage of state civil apparatus is the likelihood of nepotism practice taking place. For example, examinees can lobby and bribe interviewers to give them good grades and be recommended as prospective state employees. All in all, it was concluded that the selection of newly recruited state civil apparatus was not purely based on the CAT platform alone. In the second stage of selection involving interviews and competency test, manipulation of results could happen, hence jeopardizing the government's effort to propagate transparency and good governance. The CAT platform could be extended to include other measures that tested examinees' integrity and ethical behavior at workplaces.

8. DISCUSSION

The Discussion section is an integral part of this study. This section presents the research findings and provides a thorough analysis and interpretation. The author discusses the findings' implications, limitations, and significance concerning existing literature and theories in this section.

According to the small group discussion, the civil servants (PNS) selection process in Indonesia is still considered very poor and creates vulnerability to corruption, collusion, and nepotism. The complicated registration process plus the conventional selection shows that from an early age, the Civil Servant Candidate (CPNS) has been conditioned in a bureaucratic, "superficial" work situation and is not based on expertise. In addition, the interviewees also mention that almost every year, indications of irregularities in the acceptance of Civil Servant Candidates involving unscrupulous officials of the Ministry of State Apparatus Empowerment and Bureaucratic Reform, mafia, intermediaries, regents/mayors to the selection committee.

On the other hand, all interviewees were asked whether the CAT system could improve the quality of governance in Indonesia. Interviewees and parties agreed that the system positively impacted the quality of governance in terms of transparency and accountability of the CAT system. They said that The selection of prospective civil servants in Indonesia from 2017 to 2021 uses a new method, the Computer Assisted Test (CAT) method. The CAT is an exam method with computer aids to obtain a minimum standard of basic competence and competency standards for personnel. The CAT aims to speed up the examination process and report test results, create standardisation of national exam results, set value standards, and increase transparency, objectivity, accountability, and efficiency.

The finding suggests that the Digitalization of information enhances governance by enhancing socioeconomic development, political institutions, and transparency, eventually reducing corruption. The finding supported by some researchers such as Nwozor et al. (2022). They argue that digital transformation has become a major area of attention for public sector governance internationally due to the increased adoption of information, communication, and technology (ICT) in various spheres of life. Digitalization has been welcomed by governments all around the world, including Nigeria, to increase productivity and fight corruption. In order to evaluate the nature, procedures, and obstacles

in the fight against corruption, this article investigates the digital transformation of Nigeria's public sector. The study examines factors aiding or impeding digitization and its possible effects on fostering transparency and eradicating corruption through the analysis of primary and secondary data. The results indicate that digitization can increase openness in public sector activities, which is why it is advised to digitise procedures and strengthen organisations in charge of preventing corruption.

The Proposed Evaluation Framework of Information Digitalization on Reducing Corruption was also tested by using Computer Assistant Test (CAT) System. The finding also confirmed that, the Framework will improve the quality of governance by increasing transparency, reducing corruption, and positively affecting evaluations. A study by Kysh (2022) examined how information digitalization specifically e-government improve the transparency and accountability. This study investigates the scientific perspectives on the development of e-government in the context of Digitalization. It argues that e-government is increasingly incorporated into people's lives and plays a crucial role in the operations of modern states. By analysing various theoretical perspectives on the term "e-government," this study concludes that it is a form of public administration that improves the transparency, efficiency, and openness of both public and local authorities through the use of information and telecommunication technologies. The study also highlights the importance of Digitalization as an innovation management catalyst. The analysis concludes that e-government, in conjunction with Digitalization, presents an opportunity to transform the character of public authorities, thereby fostering greater transparency and public participation. The study proposes a number of measures to facilitate this transformation by fostering the growth of e-government within the domain of Digitalization. Thus, according to our findings, digitization, encompassing e-government and information and communication technology, improves governance quality by improving openness, reducing corruption, and positively affecting evaluations.

9. CONCLUSION

In our case, one of the most important aspects of QoG is openness to information. Reforming the bureaucracy is one way to bring about the implementation of Good governance. A system selection or the CAT method implements bureaucratic reform in sourcing quality and reliable civil servant resources. Government agencies use computer aids to improve the quality of employees in the selection process for the acceptance of prospective civil servants to overcome the weaknesses of the conventional system, which is full of fraud. When assessing candidates for government jobs, CPNS's computer-based CAT model uses a computerized approach, which means that the results of an assessment can be seen at the time of the test's administration. The CAT method used in selecting prospective civil servants at the Regional Personnel Agency has led to an increase in quality that changed the opinions of CPNS selection participants, which previously had mostly negative views but turned to positive ones.

This study demonstrated that the CAT system partially enhances the quality of governance in terms of recruiting state civil apparatus in Indonesia. Technological sophistication is important for changes in the selection of CPNS. CAT system offers some benefits, such as all registrations being done digitally and exam results being available immediately. All questions entered into the computer, the objective rating level, and access to each obtained score will be simple to understand. Questions related to the measurement of integrity and ethical behavior can be added to make the CAT platform more comprehensive and balanced. On the other hand, the field competency test and face-to-face interviews that are "non-digital" processes are still vulnerable to nepotism and corruption. Hence, such competency tests could be added to the CAT to ensure the platform is complete and comprehensive.

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ENDNOTES

- ¹ <https://prozorro.gov.ua/>
- ² <https://mof.gov.ua/en/spending-gov>
- ³ <https://rada4you.org/>
- ⁴ Governance, Social Development, Humanitarian and Conflict online Portal www.gsdr.org

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