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# Public administration digitalization effects on corruption: Lesson learned from Indonesia

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The digitalization of public administrations can reduce corruption, but many efforts fail. Although the relationship between digitalization and corruption has been investigated, how corruption can be reduced in practice is given hardly any attention. Therefore, we take a different approach by investigating an in-depth case study using documents and interviewing civil servants and citizens. This study found technical and organizational issues blocking the reduction of corruption. Despite encountering technical challenges, most informants agreed that automating administrative processes and making each process step transparent resulted in less corruption. Separating concerns by having different officers conduct each process reduced corruption on the condition that direct communication between immigration officers and passport applicants was blocked. The present study concludes that organizational and technological changes should go hand in hand to reduce corruption. Specifically, the separation of concerns at the organizational and system levels is needed to prevent persons from collaborating and misusing the system. Also, regulatory modifications and suitable governance structures are necessary.

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CCS Concepts: • **Information systems** → **Information systems applications**; **Mobile information processing systems**; **Decision support systems**; **Data analytics**;

Additional Key Words and Phrases: Information digitalization, transformation, e-government, digital services, human interaction, corruption, identity management

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## 1 Introduction

Prior studies argue that Information digitalization positively impacts corruption [Adam and Fazekas 2021; Darusalam et al. 2019; Fanea-Ivanovici et al. 2019; Sohag et al. 2021]. Governments worldwide are faced with the challenge of digital transformation [Fang 2002]. The concept of information digitalization, sometimes viewed as digital transformation, encompasses converting analog information, data, or processes into a digital format [Forbes 2019; Khan et al. 2015; Weforum 2023]. The process of transformation entails major organizational and institutional changes to take advantage of new digital technology [Tangi et al. 2021; Verhoef et al. 2021]. In contrast, digitalization has a narrower view and often refers to the automation of services, such as the services to control corruption [Arayankalam et al. 2021].

Corruption is commonly understood as “the act of those in positions of responsibility or authority misusing or exploiting their entrusted power for personal or private gain” [Shleifer and Vishny 1993, p. 3]. Frequently, it encompasses unethical or illicit behaviors that contradict the fundamental tenets of equity, honesty, and responsibility within organizational or governmental entities. The abuse of power manifests in diverse manners, including but not limited to bribery, embezzlement, nepotism, and favoritism [Gardiner 2017; Theobald 1999]. Such actions erode the faith and confidence of the general populace in both public and private domains. In addition, Corruption comprises a range of manifestations, such as bribery, which entails the exchange of expensive objects in return for exerting influence; embezzlement, which involves the theft of entrusted assets; and nepotism, whereby decision-making is influenced by favoritism toward relatives or friends. Corrupt practices undermine confidence, fairness, and accountability within both the public and commercial sectors. The prevention and mitigation of corruption necessitates the implementation of strong measures, a culture of transparency, and a steadfast dedication to upholding ethical principles in government.

Digital public services can enhance transparency by promoting good governance and strengthening reform-oriented actors [Bairavasundaram et al. 2008; Gans-Morse et al. 2018; Hubert 2020; Von Haldenwang 2004]. According to Shim and Eom [2008], information digitalization offers a higher quality of government service by reducing time and cost. Furthermore, digital services can improve transparency, accountability, and corruption [Addo and Avgerou 2021; Kanyam et al. 2017]. Information digitalization is seen as a way to change public sector employees’ performance in parallel with the evolution of current technology. Some countries such as South Korea, India, Russia, Argentina, South Sahara Africa, Ghana, and Chile have adopted digitalization to successfully improve their public services [Bhatnagar 2003a; Chawla and Bhatnagar 2004; Im 2003; Kang 2001; Kanyam et al. 2017; Srivastava et al. 2016].

Many countries have embraced digitalization. For example, Chile, Pakistan, and the Philippines have used digitalization as an anti-corruption mechanism. As Heeks [2005] narrated, Chile analyzed the e-procurement system to allow government officials and citizens to compare the government’s bids. The government added a system to mitigate corrupt practices to prevent price-fixing or “inflationary costs” by corrupt officials and contractors. In addition to reducing corruption, the E-procurement system expanded the number of small businesses

that could participate in the government bidding process, reducing monopoly by large firms [Elsayed 2023]. In Pakistan, the entire tax system and the department were restructured to reduce direct contact between citizens and tax officials and requests for bribes [Andersen 2009; Sadok 2023]. The Philippines Department of Budget and Management established an e-procurement system for government agencies to allow public bidding on government contracts, prevent price-fixing, and allow public accountability [Andersen 2009]. Yet, many of the digitalization efforts have not resulted in an actual reduction of corruption. Furthermore, digitalization might only have reinforced current practices instead of changing them [Malik and Froese 2022]. There are even doubts that emerging technology can help reduce corruption at all [Adam and Fazekas 2021]. Therefore, there is a need to understand better the mechanisms that will contribute to reducing corruption.

The main objective of this research is to understand how the digitalization-enabled mechanism can reduce corruption and the effect of the mechanisms. Although there is much work at the macro level analyzing the relationship between digitalization and corruption, there is a need for an in-depth understanding of the mechanisms behind reducing corruption. Therefore, this research aims at understanding the mechanisms that influence corruption. A case study of the digitalization process of issuing passports in Indonesia is investigated for this. The results obtained from this inquiry can offer significant knowledge for policymakers and stakeholders interested in utilizing digitalization to address corruption within administrative procedures.

This article is structured as follows: First, this article explores the literature on information digitalization as a mechanism to fight against corruption. After that, the research method is presented in Section 3. Then, in Section 4, the case study background of the Indonesian country and an overview of stakeholders are presented, followed by an evaluation of information digitalization for fighting corruption and a discussion in section four. Finally, conclusions are drawn and future work directions are presented.

## 2 Literature Review

Digitalization of applications refers to actions that connect information through other electronic technologies such as the internet, wireless networks, cell phones, and other communication mediums [Collins 2003; Dictionaries 2009]. Some prior studies argue that Information Digitalization has a positive relationship with fighting corruption and improving the quality of governance [Elbahnasawy 2014]. The study by Bertot, Jaeger, and Grimes [2010] explores the potential impact of information and communication technologies on cultural attitudes about transparency, specifically e-government and social media. In addition, Kim [2014] uses institutional theory to evaluate the development of the anti-corruption system to improve transparency and combat corruption. The study examines institutionalization's regulatory, cognitive, and normative dimensions and four anti-corruption strategies embedded in the system. Another study uses national-level data to explore the impact of e-government on reducing corruption, along with traditional anti-corruption factors like bureaucratic professionalism, bureaucratic quality, and law enforcement [Shim and Eom 2009]. The study shows that digital government effectively reduces corruption by promoting good governance and strengthening reform-oriented actors externally through citizen engagement and internally through effective monitoring and control of employee behaviors. Their statistical analysis indicates that e-government has a consistently positive impact on reducing corruption, along with the traditional factors proposed by the public administration.

**Information and Communication Technologies (ICT)** allow countries to create transparency and promote anti-corruption [Relly and Sabharwal 2009]. Sousa [2016] argues that there are five major ways in which Information Digitalization can help reduce corruption risks: (1) Raising awareness of specific governance problems (types of corruption); (2) Providing low-cost online platforms to monitor and promote more inclusive transactions and accountable decision-making. As a result, it can reduce the cost of distribution, accessing and collecting government information [J. C. Bertot et al. 2010]; (3) Reduce the incentives for corruption by reducing the direct contact and familiarity between end-users and decision-makers; (4) Enable the more effective control of financial transactions that may put the integrity of politically exposed agents (individual or collective) at stake, and (5) Speeding up public awareness for anti-corruption campaigns.

Many governments have implemented various strategies to reduce and combat corruption-related issues, particularly to reduce brokers and middlemen who tend to engage in unethical behavior when dealing with government agencies [Dombrowski et al. 2014; Mkude; Wang 2020; Witsoe 2012]. The government must control corruption to avoid future problems. The principles of anti-corruption initiatives embody the following elements: law and legislation, transparency, accountability, and integrity [Teachout 2008]. De Sousa [2010] has also affirmed that these principles are essential in designing anti-corruption strategies or applications. However, digitalization has shown mixed results, and efforts did not always contribute to less corruption [Adomako et al. 2021; Androniceanu et al. 2022]. Thus, anti-corruption initiatives are critical for promoting fair and transparent governance, economic development, and social stability. By establishing clear laws and regulations, promoting transparency, holding individuals and institutions accountable for corrupt practices, and promoting integrity, these initiatives can help to prevent corruption and ensure that public resources are used for the benefit of all citizens. The success of these initiatives depends on a range of factors, including political will, effective implementation, and public support, and ongoing efforts are needed to combat corruption at all levels of society.

There are multiple reasons why digitalization might not reduce corruption [Cappelli et al. 2024; Halai et al. 2021]. The implementation might fail or just digitalize current practices, including the potential for conducting corruption, without changing the system [Janssen and Ubacht 2018]. Another reason is the lack of transparency in the public service provision [Ball 2009; Peisakhin and Pinto 2010] and no mechanisms for accountability [Aiyar and Samji 2009; Brusca et al. 2018]. Lord [2007] states that some countries produce more information or are more transparent. Efforts to promote transparency or openness to fighting corruption are strongly shaped by the countries' cultural, economic, and political characteristics [Ettlinger and Bosco 2004]. Brusca et al. [2018] found that transparency is positively associated with the perception of corruption. In addition, the public government must improve the expansion and disclose budgeting information to enhance public governance and reduce corruption perception. Another key strategy for fighting corruption is accountability [Vian 2020]. Accountability ensures that a person or organization's performance or behavior will be reviewed [Heinrich and Brown 2017]. Thus, digitalization can enhance transparency and accountability if the public government, NGOs, Media, and society work together [Darusalam et al. 2019; Hulstijn et al. 2017; Rehse and Tremöhlen 2022].

Many studies have found that digitalization could reduce corruption. Backus [2001] found that information digitalization plays a vital role in the country's socio-economic development by reducing corruption and strengthening democracy. According to Ma et al. [2023] and Bhatnagar [2003b], they have concluded that building an online delivery system requires that rules and procedures be standardized through computer coding [Bhatnagar 2003b; Ma et al. 2023]. Characteristics of the countries, such as cultural, economic, and political, can make it challenging to use digitalization to fight corruption [Cuéllar and Stephenson 2022; Hubert et al. 2020]. Institutional changes are needed to reduce corruption when digitalization [Berente and Seidel 2022; Holmlund et al. 2017]. There is often a need to transform current applications and consider the context to reduce corruption. Yet, the understanding of digitalization and its impact on corruption is limited. There is a need for a more thorough investigation of how corruption is impacted by. It necessitates a deeper analysis of digitalization to understand what mechanisms can contribute to reducing corruption.

In summary, studies also emphasize the potential of digitalization for reducing corruption, investigating relationships at the macro level, and emphasizing how crucial it is to comprehend the cultural, economic, and political. Many articles focus on investigating high-level relationships, but specific cases of digitalization and understanding its mechanisms and effects at the organizational level are missing. Measures on how corruption can be reduced in practice and the organizational implications are less known. The need for a more thorough investigation of how digitization impacts corruption is the area of research that must be filled.

### 3 Research Method

The main objective of this research is to gain insight into the mechanisms of how digitalization can reduce corruption. This study uses a qualitative research approach to explore how implementing M-PASPOR in Indonesia

improves public service delivery and reduces corruption. This study was selected as several changes were made during the implementation to reduce corruption, and technical and governance aspects were addressed. The research method used in this study is a single case study via face-to-face interview and observation with the immigration officer and passport applicants. A case study allows for the investigation of a real issue within a defined context by utilizing a variety of 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].

Additionally, Eisenhardt and Graebner [2007] stated that various data sources are used in a case study 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 find the best answer to a specific question rather than just collecting data about the topic.

The research object is the immigration officers and users of the M-PASPOR application at Palembang, South Sumatera, Indonesia. Four immigration officers and 20 e-passport applicants who have been using the system since it was implemented were interviewed. This allowed to capture both the public servants and the citizens’ perspectives. The interviews were semi-structured interviews [Adeoye-Olatunde and Olenik 2021; Magaldi and Berler 2020] to ensure that all elements related to digitalization, mechanisms, technology and governance and corruption were covered, while at the same time, the researcher could explore more depth and new elements if needed. The citizens were asked about their experience using the M-PASPOR application, and to reflect on the possibility of corruption compared to their previous experiences with the manual process.

## 4 Findings and Discussion

This section contains the findings and discussion from the in-depth case study. First, the application process, as it has been followed in the past, is discussed. Next, the new M-PASPOR is presented. By investigating the previous and new processes, the differences between them were identified, and their effect on corruption was analyzed. Thereafter, the effect of not needing brokers and cash transactions is discussed, then the mechanisms for increased transparency and accountability are presented.

### 4.1 The Previous Application Process

In the past, the application process was primarily a manual process involving various stakeholders. Figure 1 shows the manual passport application process in Indonesia. The manual passport process involved applicants, immigration officers, and the bank. This is not a straightforward process, and there are many transfer points that provide the opportunity for corruption. Furthermore, migration officers could handle the whole process, which puts all decision-power within a single person.

Indonesia, one of the world’s largest countries, is moving from traditional to information digitalization. In January 2022, the government introduced a new public digital service, M-PASPOR. This new innovative service is to substitute the manual service passport application among citizens to the online passport application system to improve service delivery and reduce the involvement of third parties who charge additional fees to expedite the process. M-PASPOR application is a new form of the online Passport Queue Registration Application (APAO) implemented to make passport services more transparent, accountable, and fast ([www.imigrasi.go.id](http://www.imigrasi.go.id), 2022). In addition, through M-PASPOR, applicants can apply for a passport by uploading scanned files to the application. However, passport applicants must come to the immigration office for interviews and data verification. M-PASPOR’s features include online payment for applications, checking the passport application status, ID validation, rescheduling arrival schedules, and integrating Indonesian travel documents. Before the



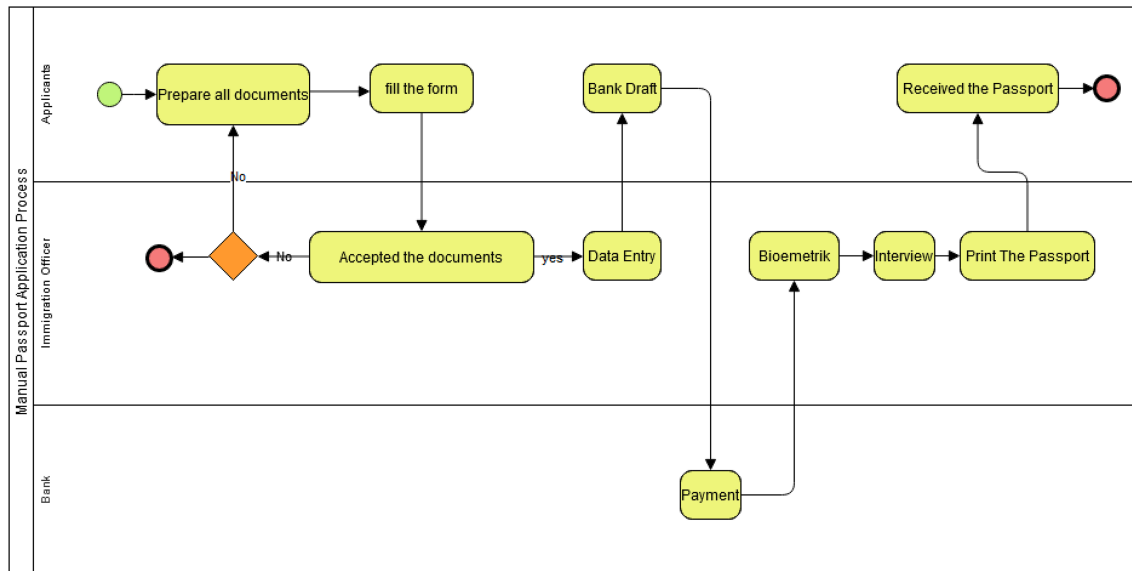


Fig. 1. The manual passport application process.

introduction of M-PASPOR, applicants were expected to visit the immigration office, fill in documents, make payments, and collect their passports once these are ready. The process takes an average of eight hours to a few days if all documents and information are completed. This resulted in the involvement of a third party to assist in the application with extra charges over and above the standard fees and introduced a weak link vulnerable to corruption. The sound provisioning of passports is crucial for reducing corruption. Figure 1 shows that the manual passport application process is not straightforward and has many transfer points.

First, applicants should prepare all the documents required to apply for a passport. The documents are ID cards (original and copy), birth certificates (original and copy), family members (original and copy), prepare stamps, and degree certificates (original and copy). Then, the applicants must fill out the form (2 pages form). The second step is to submit all documents to the immigration office. If all the documents requirements are completed, then process to the next stages, but if the documents are not complete, the applicants should go back to the first process (prepare all documents). The third step is data entry by immigration officers, which will generate a bill for the applicant to pay to the bank. The immigration will call by phone to make an interview and photo section (it should be a maximum of 1 week after the payment is received). Additionally, once the applicants make the payment, they must go to the immigration office to give evidence of the payment. The applicants are to wait until 3 days after the payment and wait for the immigration center in Jakarta to approve all the data and verification. Then, the passport is printed, and the immigration will return back to the passport collection counter. Thus, the manual passport process took a minimum of 2 weeks for the applicants to get their passports.

Many brokers are involved in the immigration office, especially for manual passport applications. For example, because of the crowded and long queues coupled with the complicated bureaucratic process for making passports, passport applicants use the services of brokers to help them. As a result, people who take care of themselves will lose to those who use brokers' services. Many passport applicants choose to have the assistance of brokers when making their passports. Even if they use brokers' services, there is an additional price of five hundred thousand Rupiahs (Rp.500,000 or ₺34) to one million five hundred thousand Rupiahs (Rp. 1.500.000 or ₺101), excluding the cost of making the passport itself, depending on how many days the passport-making process takes. The price for the broker's services includes filling out forms and lobbying immigration people. There is a huge difference

Table 1. Cost of Manual Passport in 2009

No	Passport Type	Price Fee (Rupiah/\$)
1	48-page ordinary passport for Indonesian citizens	Rp. 300.000/\$20.20
2	Ordinary passport 48 pages replacement lost and still valid	Rp. 600.000/\$40.40
3	ordinary passport 48 pages replacement lost damaged and still valid	Rp. 300,000/\$20.20
4	Ordinary passport 48 pages replacement lost/damaged and still valid due to natural disasters and crew members whose ships sank	Rp. 300,000/\$20.20
5	24-page Ordinary Passport for Indonesian Citizens	Rp. 100.000/\$6.74
6	Ordinary Passport 24 pages lost and still valid	Rp. 200.000/\$13,48
7	Ordinary Passport 24 pages damaged and still valid	Rp. 100.000/\$6.74
8	Ordinary passport 24 pages replacement lost/damaged and still valid due to natural disasters and crew members whose ships sank	Rp. 100.000/\$6.74
9	services for using Biometric-Based Immigration Document Issuance System Technology	Rp. 55.000/\$3.71

Source: <https://kanimpalembang.kemenkumham.go.id>

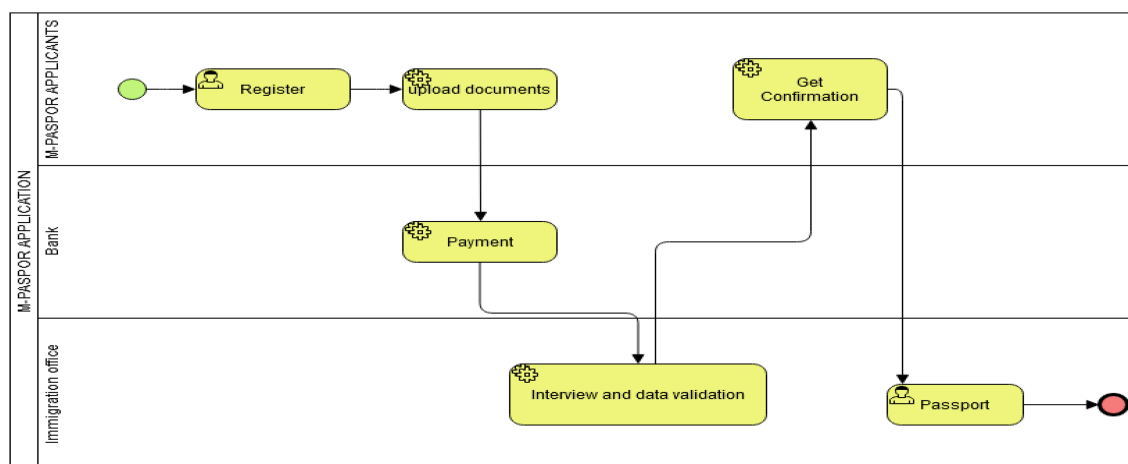


Fig. 2. M-PASPOR process.

in costs between using the services of a broker and taking care of by themselves. Please note that the original fees for various services at the immigration office in Indonesia correspond to those on the immigration office website. Table 1 shows the cost of making a passport in 2009.

## 4.2 M-PASPOR Application Process

M-PASPOR was launched on 26 January, 2022, and is a pre-processing procedure for passports at Indonesia's 126 Immigration Offices. The public can apply for a new passport and register for a passport online using the M-PASPOR application. In order to speed up the passport application process, this application allows applicants to input their personal information and upload necessary documents online at any time. All Indonesian Immigration Offices can use this application.

Figure 2 describes how citizens can apply for a new passport or renew their passport using the M-PASPOR application. Firstly, applicants download the M-PASPOR from the Play Store on their mobile devices. The M-PASPOR is available on Android only. Secondly, the M-PASPOR applicants upload all documents required.



After that, the applicants choose the available date on the M-PASPOR application and then make a payment to the bank. The next step is for the applicants is to have the interview and data validated by the immigration office. Once the interview finishes, the applicants will get confirmation; the normal process will take three working days. After three days, the applicants get their passports. The process required very minimum interaction between users and officers. Passport applicants agree that this process reduces the potential for corruption.

The processes involved in the M-PASPOR application were observed and reviewed during the study. In addition, the applicants and immigration officials were also asked whether the M-PASPOR provides efficient, timely responses and diminishes the broker's involvement. The latter transforms the governance structures as citizens interact directly with the government in the new situation. Both parties agree that the completion time for making passports is by the stipulated time. The settlement time is stated to be completed within three working days after registration at M-PASPOR. However, the process can take longer if there are obstacles, such as incomplete documents or no payment. If there is a problem with the M-PASPOR application, more information will be provided on the website, and appropriate measures will be taken. This can include invitations by the immigration office to come directly to the nearest immigration office. They will be assisted in their services with a walk-in queue.

#### 4.3 No Cash Transaction and Brokers

The M-Passport application is the latest innovation issued by the Directorate General of Immigration (Directorate General of Immigration) of the Ministry of Law and Human Rights, based on the Regulation of the Minister of Law and Human Rights of the Republic of Indonesia number 8 of 2014 concerning Ordinary Passports and Travel Letters Like Passports. All of the circular procedures have been implemented in Immigration's M-PASPOR application, which incorporates elements of openness and accountability. This prevents corruption in a public institution such as the immigration office. In addition, it also reduces the involvement of brokers in the process of making a passport. Under the M-PASPOR application, transactions are conducted directly between the passport applicants and the M-PASPOR application, and there is no communication involved outside the application.

All interviewees were asked whether the passport applicants of brokers' involvement could be reduced when the M-PASPOR application was implemented. Interviewees and parties agreed that the system had reduced human intervention, especially among brokers in the Immigration office. For example, there is no cash transaction, and all the passport applicants must pay for their services by transferring the fee to some banks directly, and there is no face-to-face transaction. Previously, the traditional system was exposed to the involvement of brokers lobbying for some travel agents. They could bribe the officer by giving an "*express fee*" to complete the process and cut the queue to apply for a passport. In addition, all the passport applicants had to queue for almost the whole day, and they tried to bribe the immigration officers to speed up the process of making their passports.

#### 4.4 Transparency

Transparency is often viewed as a condition for reducing corruption [J. C. Bertot et al. 2010]. During the interviews, all the processes involved in the M-PASPOR application were observed and reviewed during this study. Transparency was enhanced by making information, processes, and actions available to the public. According to the users, the M-PASPOR reduces the involvement of brokers in the immigration office because all the processes are automated and transparent. It would make it harder for immigration officials to abuse their power and less likely for them to be corrupt in small ways. In addition, it made the officers more accountable for their work in the passport process.

In the meantime, the following is another response from the M-PASPOR applicants: "the processes in the M-PASPOR are transparent, and all the information provided can also be accessed through the application. For example, we can make payments directly from banks, ATM machines, or online banking. We also get a notification by email once the payment is successful. As a result, when we do not have an opportunity to bribe or utilize the brokers. The schedule for the interview is also adequately reasonable for us to find the best time for the

interview.” As a result, it was found that the system offered M-PASPOR applicants clarity, simplicity, and a reasonable timeline. It also indicated that the M-PASPOR applicants agreed and were satisfied with the M-PASPOR Application. The immigration officer also monitors the process flow accordingly. Hence, more transparency in the M-PASPOR application would help immigration officers provide better social services.

#### 4.5 Accountability

Accountability is the second tenet of anti-corruption [Ishak and Said 2015; Vian 2020]. Accountability aims at ensuring that people, like officials and applicants, do their jobs and tasks correctly in their area of responsibility. This principle must be used in the M-PASPOR application to ensure that officials do their jobs when processing passports and reduce the number of brokers involved.

The responses from several immigration officers on the accountability in making passports by using the M-PASPOR application indicated that Immigration officers had been provided training related to the use of the M-PASPOR application. The exercise aims at ensuring that the immigration officers understand how things work and can do their jobs accordingly. Other than that, the officers’ selection in using the M-PASPOR application was based on their experience in managing and conducting a passport. During the interview, four M-PASPOR officers said that immigration officers had set up training to learn how the system works and how to run it. Most of the training sessions were conducted in-house by the immigration office. An officer said: “We went through the immigration office’s online training several times. This training aims at carrying out the assigned tasks and build accountability in passport management through the M-PASPOR application”. Immigration officers and passport applicants could benefit from training to improve transparency and accountability. As a result, using M-PASPOR can lessen the likelihood of brokers becoming involved in processes when they do their jobs properly.

Finally, accountability was improved by reducing the handover points and separating concerns by having different officers conduct each process, which reduced corruption. Both the technical system should support the separation of concerns, and the allocation of responsibilities should reinforce the separation. The interviewees indicated that a condition for achieving this is that direct communication between immigration officers and passport applicants should be blocked. In short, the separation of concerns at the governance and the system level is needed to prevent persons from collaborating and misuse the system.

#### 4.6 Integrity

Integrity can be described as a set of moral principles applied by an individual in such a way as to prevent their actions and conduct from being corrupted [Ishak and Said 2015; Regier 2020]. Fraudulent activities were uncovered when the manual system was in place [Kinasih and Sujianto 2022]. For example, in the immigration office at Pekanbaru, Riau, Indonesia, the manual system’s lack of performance hindered integrity, as data might differ and be inconsistent. Therefore, promoting integrity among officers was needed to ensure transparency and efficiency in e-passport services. This integrity would eliminate undesired attitudes among the officers, reduce brokers’ intervention, and lower petty corruption. The new system ensures integrity by its nature and makes it easier to comply with regulations and more difficult to conduct fraud by the immigration officers.

The passport application process uses the principle of integrity to ensure that the system complies with the relevant laws and regulations. Moreover, if all procedures and rules are followed, passport officers will hardly have any freedom to make decisions independently. Corruption is possible only if they collaborate with others, but the system might detect it. During the interviews, four immigration officers stated that there was no way for them to disobey the rules while using the M-PASPOR application. The officers emphasized that they perform their duties with integrity, ensuring that the public can rely on their decisions. In the M-PASPOR application, a different officer handles each stage of the passport-making procedure, which began on 27 January, 2022. This separation of duties among the officers demonstrates accountability and promotes integrity within the M-PASPOR application services. The design of the service aims to be transparent and to foster integrity among the officers involved in issuing electronic passports.

Furthermore, the M-PASPOR application removes the involvement of brokers in passport application processes. This prevents brokers from trying to game the passport application process bribe public servants, and nepotisms. Furthermore, as a result of removing brokers in the process, there is no price and quality difference between those who use and those who do not. This increases integrity by preventing possible actions and conduct from being corrupted.

## 5 Conclusion and Future Work

The main objective of this research is to understand the mechanisms of how digitalization can reduce corruption. For this, we investigated an in-depth case study of the passport service provisioning process and compared the situation with and without digitalization. A process should not merely be digitalized, but extensive transformations are needed. Our study found that the mechanisms that removed the need for having a broker, reduced the number of transfer points, opened information about processes and actions, and separated responsibilities so that no single person can commit corruption without others knowing improved transparency and accountability and resulted in less corruption. Although the advantages are clear for reducing petty corruption, there were also some technical drawbacks to online passport services, such as the server being down, not being able to register, and the M-PASPOR application only being available on Android phones. This might prevent inclusiveness as non-digital savvy and lower-educated persons might experience access and usage issues. Some drawbacks might be easily overcome and originate partly due to the immaturity of the services. We recommend improving this as soon as possible and highlighting inclusiveness in further research.

The study's findings indicate that the principles of anti-corruption initiatives comprising law and regulation, transparency, accountability, and integrity in the M-PASPOR application can reduce the broker's involvement in the M-PASPOR application. Transparency, accountability, and integrity were found to be necessary for developing strategies to curb issues related to corruption. By making information, processes, and actions readily available to the public, there is an increase in both transparency and accountability. Furthermore, integrity is improved by preventing corrupt actions and conduct. Because the M-PASPOR application was developed in an automated and transparent manner, this resulted in a system with lower corruption.

The theoretical contribution originates from understanding the in-depth mechanisms that help to reduce corruption. Furthermore, our study shows that regulation needs to be changed, the right governance needs to be in place, organizational changes are needed, and systems need to be designed in a proper way to reduce corruption. Automation alone is insufficient, and the organization must also be transformed. For accountability, the organization's transformation by separation of concerns and preventing communication between public servants is key. Most literature has remained at a high level of abstraction and has not investigated those mechanisms. Likely, there are more and other mechanisms, and we recommend more case studies to find what works to reduce corruption.

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