

Managing Digital Innovation as Public Sector Transformation Strategy: A Case Study in Office of Population and Civil Registration Klaten Regency

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Abstract. Public sector organizations in Indonesia especially the Office of Population and Civil Registration (OPCR) are deploying digital innovation as part of their transformation strategy. Prior research has predominantly focused on SME's digital transformation, implementation of digital application at the financial agency, improving the quality of OPCR service by utilizing ICT, the development of a typology of OPCR service innovation, and innovation of civil administration in Indonesia during the Covid-19 outbreak. Whereas, this paper discusses the practical implications of OPCR innovation in the frame of digital transformation which is rather limited in Indonesia. Drawing on a case study approach, this research is using data from primary sources obtained through the interview process and supported with data from observation, regulation, and other secondary sources. We adopt Cooper and Zmud's Six-Stage Technology Diffusion Model to help us analyze and explain the data in terms of the practical implementation process and the outcomes/implication from every stage.

Findings of this study are harmonization between technology and civil administration service increase establishment of OPCR strategic plan, resources integration enhances the transformation of OPCR through digital innovation, OPCR commitment, and stakeholder trust integration establish institutionalization of digital innovation.

Keywords: Digital Innovation · Six Stage Technology Diffusion Model · Digital Transformation · Civil Administration

1 Introduction

Innovation has the meaning of ideas or thought, practices, or objects that are perceived as new things either by individuals or certain organizational groups that adopt these new things [1]. In addition, innovation can be in the form of discovery results or inventions that aim to solve certain problems [2]. In the last five years, technology is an innovative medium that is highly sought after by various countries around the world. Leaders of countries in the world through the 2017 High-Level Political Forum, warned of the

importance of using cutting-edge technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and Advanced Robotics to be able to transform following the times that are fast-paced and unpredictable in scale [3].

For the government, the use of digital technology is the solution chosen as a problem solver in the public service sector. The implementation of this digital technology often leads to high-level policies that aim to provide benefits to the community or reduce or even eliminate the costs incurred in each service [4]. The innovations in the form of digital products above have an impact on changing the way the government provides services to its people. Digitizing services also means reducing direct public contact with the bureaucracy which has an impact on service transparency. The more transparent and accountable a digital innovation is, the higher the public's trust in the government, thereby increasing the success of the transformation strategy. At the same time, we need to understand that the successful transformation of stakeholders involved in the process of implementing digital innovation.

Generally, the implementation of digital innovation has always remained challenges to the government. Most often, the majority of existing studies have examined egovernment innovation at the national level. It's also important to examine at the lower level especially for an archipelagic country such as Indonesia with different challenges in every province. Among the many digital innovations, the Office of Population and Civil Registration (OPCR) Klaten Regency was considered as a successful OPCR at the local government level to implement its digital service innovation called Online Service System of Office of Population and Civil Registration Klaten Regency (*Sistem Pelayanan Online Dinas Kependudukan dan Pencatatan Sipil Kabupaten Klaten*) "Sipon Keduten". In early 2020, Sipon Keduten was firstly designed and publicly used to transform how people take care of birth, death, change of address, and any other certificate of civil administration digitally. This way, radically change the process and cost-time savings for both government and citizens.

The case of Sipon Keduten was analyzed to understand the intended OPCR transformation during the implementation process and how the actor, stakeholder, third party organization, and regulation facilitate the process. This study aims to provide some insight and consideration to researchers and other OPCR officers in the field of digital innovation in the public sector that could be applied for future transformation. The remainder of this paper is organized as follows: we present past review on managing digital innovation, public sector transformation, and e-government implementation. The next section explains the research approach adopted in driving this study, followed by findings and discussion of The Sipon Keduten case. The final section presented the implication of our study by suggesting future research.

2 Literature Review

2.1 Background

Talking about transformation in the public service sector, it cannot be separated from the role of the use of information technology. Among researchers, there are different terms regarding the use of this technology such as DEST [5], digital platformisation [4], and

digital-led transformation [6]. The phenomenon of using digital technology is basically trying to transform the public sector from a conventional bureaucracy into a more effective and efficient public service. Not infrequently, the public service sector switches to using the website and the internet as the first step in the context of transforming and digitizing their services [7].

A similar incident was also experienced by Indonesia where many public service sectors, especially the government, implemented web and applications as vehicles for transformation. While the main focus is the use of technology to improve operational activities and deliver the web, there is criticism from researchers that the proposed transformation is actually still not following the main goal of a transformation [5]. Therefore, the next level is not only increasing the effectiveness, efficiency, and transparency of public services but also involving various other stakeholders in the transformation framework.

In 2020, Indonesia has experienced an increase in the number of uses of digital technology in the e-government framework to 0.6612 percent [8]. This increasing momentum of e-government must be utilized as well as possible, one of which is by examining the key to the success of the transformation by the use of e-government. Previous research has focused more on transformation in the SME's sector [9], improving public services in the agrarian sector [10], implementation of digital application at the financial agency [11], improving the quality of OPCR service by utilizing ICT [12], the development of a typology of OPCR service innovation [13], and innovation of civil administration in Indonesia during the Covid-19 outbreak [14]. Meanwhile, there are far fewer studies that study the implementation process of digital innovation within the framework of transformation at the local government level. Furthermore, most of those studies don't involve multiple stakeholders in their e-government implementation. As such, the lack of research on the implementation process is important to get more attention. It is the objective of this research to bridge this gap in the public sector transformation strategy in Indonesia.

2.2 Cooper and Zmud's (1990) Six Stage Technology Diffusion Model as an Analytical Method

To ensure a structured and systematic approach, the authors use data analysis methods relevant to the implementation of technology as a transformation agent. Coopser and Zmud's (1990) method is commonly known as the Six-Stage Technology Diffusion Model. This method identifies six stages of organizational transformation: initiation, adoption, adaptation, acceptance, routinization, and infusion. The selection of this model is believed by the authors to provide relevance and understanding to our study because we believe that this method can describe the process of using technology as an organizational transformation vehicle in general or specifically, namely public service organizations/agencies.

Table 1 describes the model based on the characteristics of each stage and the outcomes obtained in the implementation process.

Stage	Process	Product
Initiation	Active or passive identification of problems/opportunities and solutions in the form of information technology (IT) for the problems raised.	Found a match between technology as a solution with its application in the agency.
Adoption	There were rational and political negotiations to get support from agencies in the context of applying the technology.	A decision is reached to invest the necessary resources to accommodate the implementation effort.
Adaptation	Information technology development, installation, and maintenance. Organizational procedures are undergoing revision and development. Providing intelligence and training to members in agencies related to IT procedures and applications.	IT applications are provided for use by agencies.
Acceptance	Agency members are forced to commit to the use of IT Applications.	IT applications are used in completing work in agencies.
Routinization	Encourage the use of IT Applications as a normal activity.	The government system of the agency is arranged in such a way to familiarize the use of IT applications, which has been considered as something normal.
Infusion	Increasing the effectiveness of the use of IT applications with more comprehensive and integrated methods to support higher levels of work in the agency.	IT applications are used within agencies to their fullest potential.

Table 1. Six Stage Technology Diffusion Model

3 Research Methods

The focus of this paper is to study the implementation process of digital innovation as a transformation strategy in the OPCR Klaten Regency. We employed an empirical method to get insights, generate lessons to be learned from a selected case of digital innovation (the Sipon Keduten). The approach chosen by the author is a case study approach, which is a research approach that is carried out specifically on certain cases in a company/institution or research location with a narrow scope. This approach is carried out intensively, in detail, and in-depth towards a particular organization, institution, or phenomenon [15]. Based on its scope, this type of approach does cover a narrow subject and area. However, it can produce more in-depth and specific research on the object under study.

Our main data was obtained through semi-structured interviews conducted with informants consisting of the Head of Klaten Regency OPCR, Head of Population and Registration Division, Head of Civil Registration Division, Head of SIAK Division as The Project Manager of Sipon Keduten. The interview focused on the role of each resource person in the effort to implement the Sipon Keduten process. Secondary data sources are also added such as observation and regulation. The results of the interviews are presented in a case description which contains a summary of the overall implementation process.

Data analysis was carried out by summarizing and identifying the main points from the interviews. The points obtained were analyzed using Cooper and Zmud's (1990) method. The reason we use this method is that it is suitable for analyzing the complexities that occur in a technology implementation process in the government public service sector and the dynamics experienced during the transformation process (i.e., H.J. Kim, 2007).

4 Case Description

4.1 Case Background

The Population and Civil Registration Office of Klaten Regency has started its first digital transformation since the release of the web and mobile application-based Sipon Keduten innovation. Sipon Keduten was released in March 2020 and emerged on a joint initiative as a solution for administrative services during the new normal so that people can take care of administrative documents without the need to come directly to the service. The legal framework for the Sipon Keduten innovation has been shaded by Ministry of Home Affairs Regulation Number 7 of 2019 concerning Online Population Administration Services which is part of the instructions of the Directorate General of Civil Registration so that there are no obstacles about regulations at the central government level. Based on the Ministry of Home Affairs Regulation of the Klaten Regency without exception.

The person in charge of designing the Sipon Keduten application coordinates with the Office of Community Empowerment, Village and Population and Civil Registration (Dispermadesdukcapil) of Central Java Province. This phenomenon is unique, especially Dispermadesdukcapil because it provides free online civil administration service application facilitation for all OPCR in Central Java. Thus, the entire OPCR Service in Central Java does not need to order everything independently, such as servers, hosting, to application design. All these requirements have been provided and are ready to be used in the form of a template, the OPCR only needs to request an online application to the Dispermadesdukcapil then within two working days the template is ready and submitted to the relevant OPCR.

After the template is submitted by Dispermadesdukcapil, a configuration is immediately carried out such as application name, icon, feature name, and other requirements so that the application is ready for use. During the configuration process, the Project Manager also coordinates with areas related to services that will be included in the Sipon Keduten, such as services from the field of innovation, population registration, and civil registration. This is important so that the relevant fields can immediately issue the latest regulatory requirements so that they are relevant to the service method using Sipon Keduten. After the application and regulation of the Sipon Keduten policy are ready, the OPCR Service will conduct a trial of the application. This test is not only to familiarize employees with the new system but to maintain the OPCR commitment to one-day service because it is a manifestation of excellent service from the OPCR. Even though Ministry of Home Affairs Regulation Number 7 of 2019, there are still other agencies that have not used these services because the commitment of each OPCR Service in providing online services can vary, judging from the factor of readiness of human resources from officers and the community as users.

4.2 The Changes Established by New System

Unfortunately, the presence of Sipon Keduten alone does not necessarily become a solution for all people to use online civil administration services. For residents who have limited internet access or technology such as smartphones, it is quite difficult to access Sipon Keduten. Based on this problem, the OPCR collaborated with all village governments (401 offices in total) to help provide online administrative services based on Sipon Keduten for residents who have problems as mentioned earlier. So, residents only need to come to their respective domicile village offices to get administrative services.

In the village, some officers functioned as Sipon Keduten operators. They are known as SMARD (Village Administration Management System) Operators, are special officers chosen by the village government and then fostered by the OPCR to become an extension of administrative services at the village level. The SMARD Operator Scheme is contained in the MoU between the OPCR and the entire village government as stakeholders at the lowest level.

The development of Sipon Keduten from time to time is dynamic. The Project Manager conveyed several developments that occurred during Sipon Keduten's creation and implementation until now. First, the administrative service that was first improved was the use of TTE in the soft file of service results sent to the public. Second, permission for SMARD Operators to print the soft file at the request of the applicant who uses the administrative service through the SMARD Operator. According to him, corrections and additions to features and innovations into Sipon Keduten continue to be made to provide services that make it easier for the community. Until finally the latest innovation in Sipon Keduten was realized, namely "Adek Manja". This innovation is the result of a collaboration between the OPCR Service and Ojek Online services as a medium for taking e-KTP and KIA.

Basically, all administrative documents can be printed by the applicant independently using 80-g HVS paper based on Articles 12 and 14 of Ministry of Home Affairs Regulation Number 109 of 2019 concerning Forms and Books Used in Population Administration. However, specifically for e-KTP and KIA are still printed directly by the OPCR Service because they use a special blank which causes the collection to be carried out directly at the OPCR Service. SMARD operators are not facilitated in printing the two documents above due to limited facilities and infrastructure, so SMARD operators must take them directly to the OPCR. Meanwhile, applicants who use Sipon Keduten independently can choose the Adek Manja innovation that has been implanted as a special feature for taking e-KTP so that they don't have to come directly to the OPCR Service. The Project Manager said that Adek Manja service received a positive response from

Stage	Aspect	Related Elements	Interview Quote
Initiation	Evaluate the transformation and come up with solutions that meet the needs of the OPCR Service	 Realize the need for applications to support online civil administration services according to the vision of the Office. Awareness to maintain the quality of administrative services during the pandemic Demands using online services following Ministry of Home Affairs Regulation Number 7 of 2019. 	"Since the pandemic. At that time, the Central Government immediately instructed for the service to be maximized for online services. This online service system existed before, it just wasn't optimal" (1)
	Analyze the needs of the innovation project	 Analyze administrative procedures and existing technology at the OPCR Service. Identify community needs. 	"The objective or target is the entire population of Klaten Regency" (1) "In the village, there is such a thing called SMARD Operator. So that those who cannot use a smartphone can still be served" (2)
Adoption	Evaluation of regulatory issues	1. Head of SIAK Division as the person in charge of designing Sipon Keduten collaborates with the Innovation, Population Registration, and Civil Registration Division to redesign the regulations and procedures.	"Technically, I do observation first. Then I convey the things that are needed in the implementation of the Sipon Keduten to the Division that handle it" (3)

 Table 2.
 Aspects, related elements, and the supporting evidence of the Sipon Keduten implementation process

the community because it made it easier for them to take their e-KTP without having to go to the OPCR Service face-to-face.

Talking about the benefits, the Head of Population and Registration Department explained that the convenience that the community gets from the existence of Sipon Keduten, in general, is that they can take care of administrative documents without having to bother queuing and come directly to the OPCR Service. Because it is carried out online, automatically the public and officers do not meet face to face to minimize the spread of the Covid-19 virus. In addition to the community, the OPCR Service officers also get a lot of practical benefits because they don't need to archive physical files anymore. This is possible because all administrative document requirements are sent via Sipon Keduten in the form of digital files, then officers only need to download the files uploaded by the applicant as archival evidence in digital form. In addition, the collaboration between the OPCR Service and SMARD Operators also accelerates the work process in issuing administrative documents. He emphasized that this service transformation had an impact on internal and external organizations with the existence of Sipon Keduten as an application and collaboration with the village government as stakeholders at the village level.

4.3 Digital Innovation Implementation Process

This section present aspect in every stage of the Six-Stage Technology Diffusion Model, related elements, and interviewee selected quotes about the implementation process of Sipon Keduten. For details, we draw on Table 2.

The following number represents each interviewee in Table 2:

- 1. Head of Office of Population and Civil Registration Klaten Regency.
- 2. Head of Population and Registration Division.
- 3. Head of SIAK Division as The Project Manager of Sipon Keduten.

Stage	Aspect	Related Elements	Interview Quote
	Finalize the innovation project plan	1. Head of SIAK Division get through to Dispermadesdukcapil to get support for designing the Sipon Keduten application	"For the coordination (with the province) it's only for two days, Mas. It's ready, after it's ready I can access it from the admin side" (3)
		2. Head of SIAK Division designs the Sipon Keduten user interface based on a template from Dispermadesdukcapil	"Then I just configured first, for Klaten I configure it first as planned before" (3)

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Stage	Aspect	Related Elements	Interview Quote
Adaptation	Modify the application project with new service regulations	1. Modify the services provided in the Sipon Keduten application according to the new regulations provided by the three divisions.	"For civil registration, of course, birth certificates, KK registers, KTP, certificate of civil migration, this innovation is related to data utilization, data update proposals. Those are things that we coordinate
	Setting up the technical infrastructure	 Installing the Sipon Keduten application which is ready to use. Coordinate with SMARD Operator to use Sipon Keduten. 	before implementation (Sipon Keduten)" (1) "After it is ready (Sipon Keduten) I will prepare the operator, the flow, what kind of policy, it is already running." (3)
	Operational problem management	 Testing the Sipon Keduten application at the OPCR and village offices. Observing the independence of OPCR and SMARD Operators in using Sipon Keduten. 	previous implementation, we independently also had SMARD Operators, we met earlier" (2)
	Management of operational issues	1. Conduct evaluation and coordination between OPCR and SMARD Operators through online platforms such as WhatsApp.	"We already have a group (with SMARD Operator) WA and Telegram are there. Thus, when the operator has a problem, it can be conveyed." (1)
	Informing the use of Sipon Keduten to various stakeholders	 Maximizing social media to inform the public about Sipon Keduten's independent services. Collaborate with every village government to socialize Sipon Keduten services in their authorities. 	"Our duty is to provide guidance. We have made socialization through social media, we have also made it through Youtube" (1) "The term is there, besides that, not all of them take it through ADEK MANJA (a feature to distribute civil administration document with GOJEK services) because of course it can be taken by the family, it can be taken by yourself, it can be taken by the village (SMARD) operator. It's just an option, one alternative" (3) "This is more effective because OPCR officers don't have to physically archive files and all requirements are stored virtually" (2)

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Stage	Aspect	Related Elements	Interview Quote
	Realizing the complexity of Sipon Keduten-based services	 Provide an alternative system for retrieval and delivery of administrative documents resulting from the Sipon Keduten service. Cooperating with third parties in developing several innovations related to Sipon Keduten 	
Acceptance	Impact on the work process in the agency	 Reducing workload. Maintaining service stability amid a pandemic 	
	Public perception	 The community responded positively to the Sipon Keduten service. The Sipon Keduten service in the village makes it easier for people who have difficulty accessing the Sipon Keduten independently. 	"It can be taken by the village (SMARD) operator earlier (the electronic KTP) and those who have arrived have generally good testimonials, they glad of the new feature (taking civil administration document with online motorcycle taxis and village (SMARD) operators) this is good, you don't need to go to the office, you already have it" (2)
Routinization	Routine use of systems and service processes based on Sipon Keduten	 Conduct social media-based socialization to the public whenever there is a new policy for the Sipon Keduten service. Maintaining a commitment to Sipon Keduten online services. 	"This face-to-face application is now open, so it can also be taken face-to-face. Actually, this is a commitment from each OPCR whether they want to maximize online (service) or not In the past, the Central Government instructed that had to be online because it was related to virus prevention, its dynamic, Mas." (1)

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Stage	Aspect	Related Elements	Interview Quote
Infusion	Outcome obtained	 Improve integrated work processes among related stakeholders. More accurate and comprehensive service data because all services are recorded at Sipon Keduten. Make it easier for the community to manage civil administration documents anywhere and anytime. 	"From the village, apart from inputting, the officer can print out the online service" (1) "Online (service), this is meant to cut space and time, right?" (1) "Because you don't have time, because you are busy, we will give you a choice, you can take an online motorbike taxi service" (3)
	Longer continuity of innovation	 Improved administrative services that are more sustainable amid rapid technological developments. Increase the capability of the community and stakeholders by using up-to-date technology. 	"At that time there was no electronic sign (TTE) delivery feature, people were also confused after receiving the notification, how to print it, then TTE was added in Sipon Keduten. It's running, Mas, evaluation is must and always will be added to Sipon Keduten" (2)

5 Findings and Discussion

In order to analyze the data that has been obtained, the authors use the scheme of Cooper and Zmud (1990) namely the Six-Stage Technology Diffusion Model. Table 2 describes the research data in the context of process characteristics and product outcomes at six different stages. The results of the interviews are also presented in the form of quotes to support the data analysis in Table 2. For example, in the initiation stage table, there are terms of key aspects. This aspect can be interpreted as a process carried out by the OPCR Klaten Regency and then conveyed details in related elements, namely the needs of policymakers for the need for a digital platform, awareness to maintain the quality of administrative services during the pandemic, and as a form of implementation of Ministry of Home Affairs Regulation Number 7 of 2019 concerning Online Population Administration Services.

5.1 Harmonisation Between Technology and Civil Administration Service Increase Establishment of OPCR Strategic Plan

The government's public service sector has traditionally been seen as a rigid institution with low service quality and inefficient procedures. Due to increasingly modern technological developments, the government is required to improve public services by rethinking the efforts needed to change the current style of work through new strategic initiatives. Thus, analyzing the service environment and evaluating existing capabilities accurately, can provide an overview for developing strategic steps in the future [16].

At the initiation stage of the Sipon Keduten implementation process (see Table 2), the OPCR realized the need to build an IT application-based infrastructure to provide efficient public services to the community. The new normal period as a result of the Covid-19 virus pandemic resulted in the paralysis of the traditional services of the OPCR Service which were carried out face-to-face. This challenge has triggered the OPCR to immediately transform and implement a new public service strategy.

The OPCR Service captured a new strategy, namely by cooperating with technology and aligning it with existing administrative services to create flexible, unobstructed services that can reach all levels of society in the Klaten Regency without exception. Now, digital technology platformization is the spearhead of various government systems [5]. Likewise with the case of the OPCR, to realize their vision of "Realizing Orderly Population Administration through Information Technology-Based Innovation" and carrying out the mandate of Ministry of Home Affairs Regulation Number 7 of 2019, integrating all administrative services and changing the system to online is an important step that OPCR finally choose in developing new strategies that will be pursued in the future.

This strategy aims to make online civil administration services able to be a solution for people who want to take care of civil administration by upholding equality, flexibility, and quality of service. Integrating technology with existing resources, the OPCR cooperates with SMARD (Village Administration Management System) operators at the village level into their strategic plan. The cooperation framework for SMARD operators and the Sipon Keduten service is a solution for people who do not have independent access to Sipon Keduten because of the lack of facilities such as smartphones or laptops. Thus, the benefits of the Sipon Keduten service can be obtained by all levels of society who incidentally have different access capabilities.

5.2 Resources Integration Enhances Transformation of OPCR Through Digital Innovation

In the adoption, adaptation, and acceptance stages (see Table 2), the OPCR allocates its resources appropriately to ensure that the essential aspects of administrative services are maintained when conducting digital transformation through Sipon Keduten. Evaluation of applicable regulations, coordination with the Department of Village Community Empowerment, Population and Civil Registration (Dispermadesdukcapil) as an online service provider in Central Java (Central Java), socializing new technology to the community using social media, and executing the Sipon Keduten application down to the village level through operators. SMARD is a long and complex step from integrating existing resources as well as a form of commitment from the OPCR to maintain the quality of administrative services within the framework of its transformation.

5.3 OPCR Commitment and Stakeholder Trust Integration Establish Instituzionalization of Digital Innovation

The context of transformation doesn't just stop at having digital innovation as a medium. This is what OPCR Klaten Regency also realizes that there is a need for collaboration with other stakeholders to maximize transformation in the field of population administration. Therefore, an MoU was created between the OPCR and the village government which generally integrates Sipon Keduten services into the village government framework. Thus, almost all types of administrative services that can be served by OPCR Service officers through Sipon Keduten can also be carried out by SMARD Operators. In addition, all electronic data in the form of requirements, service statistics, and administrative service results in each village can be directly accessed by the SMARD operator concerned. This phenomenon raises new value for the village government by integrating valid data, making it easier to obtain population data in the area that can be used to design superior programs from the village.

Departing from the commitment to provide maximum administrative services during the pandemic, the integrated and well-run system leads to the trust of the community (as users) and the village government (as stakeholders at the village level) to continue to utilize Sipon Keduten within the framework of online civil administration services, The integration of the trust given by the community and village government with the existence of Sipon Keduten is what makes the institutionalization of Sipon Keduten even stronger.

6 Conclusion

Penelitian ini berusaha untuk memberikan perspektif transformasi sektor pelayanan publik berbasis inovasi digital dari segi proses implementasi. The Findings from the study and theoretical foundation by Six Stage Technology Diffusion Model led us to explore how digital innovation facilitate transformation in public sector organization.

In this study, our approach goes beyond the relatively simplistic stigma underpinning recent literature on managing digital innovation, which has paid less attention to gaining multiple stakeholders and how they shape during the implementation process. Furthermore, the findings show three transformational outcomes that digital innovation enables in the public sector. To date, there has been limited literature on how managing digital innovation facilitates public sector transformation through the implementation process point of view. Thus, from this work, the study contributes to both managing digital innovation and public sector transformation services.

Our study provides an insightful perspective to enrich the knowledge on public sector transformation strategy from a local government context. However, the research is limited by focusing on one public sector organization in a single regency. This focus also reveals a gap in the knowledge regarding how digital transformation strategy is used in private sector transformation at the local government level. We only use retrospective data, and there is a lack of longitudinal data that examines the other decision or considerations during the implementation process. Future research could perhaps attempt to address that gap to unravel other issues surrounding the implementation process of digital innovation in the public sector.

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