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Development of Public Value Based E-Government Maturity Framework

Titisari Ramadhane[1*], *Luthfi* Ramadani[2], and *Lukman* Abdurrahman[3]

[1]Information System Department, Telkom University, Bandung, Indonesia
[2]Information System Department, Telkom University, Bandung, Indonesia
[3]Information System Department, Telkom University, Bandung, Indonesia

Abstract. The implementation of E-Government in Indonesia is expected to assist the government in providing services and changing relations with citizens, businesses, and other government agencies. To support the implementation of e-Government, one of the things that can be proposed is the determination of public value in public services. Public value can be defined as the value created by the government for citizens through the delivery of public services. In implementing the SPBE performance targets at the Jombang Regency Communication and Informatics Service, problems were found, including, the Regional Apparatus Organization (OPD) was still building its applications without coordinating, there were still many OPD applications that could not be integrated with other applications and it is still difficult to fulfil sectoral data in OPD, thus affecting the public value obtained by the people in Jombang Regency. The case study focus on assessment of the SiRinduNona website of the Department of Investment and Integrated One-Stop Services Jombang Regency based on the development public value-based E-Government maturity framework that has been made by researchers. The results of the maturity stage of The SiRinduNona website for Jombang Regency is included in stage 4, namely collaboration stage with a percentage of 73.14%.

1 Introduction

Indonesia is a country that has focused on the development and implementation of an Electronic-Based Government System (SPBE). Based on survey results, Indonesia will rise 11 places in 2020 [1]. The application of E-Government is expected to assist the government in providing services and changing relations with citizens, businesses, and other government agencies. For the implementation of the SPBE to achieve its goals, it is necessary to carry out periodic evaluations to find out how far the SPBE implementation is progressing in each Central Agency and Regional Government [2]. To support the implementation of the SPBE, one of the things that can be proposed is the determination of public value in public services. Support for public values functions as value created by the government for citizens through the delivery of electronic-based government administration services and electronic-based public services to support SPBE. Obstacles and challenges to implementing E-Government in Indonesia are related to issues of standardization, human resources, infrastructure, community literacy, leadership, and organizational culture [3].

Public value can be defined as the value created by the government for citizens through the delivery of public services [4][5]. Along with the advancement of ICT, many variants of the maturity framework have been put forward by various researchers, almost all of these models agree that the development of E-Government occurs linearly and progressively, where the government reaches maturity at different stages[6]. The E-Government maturity framework guides controlling processes in developing and maintaining E-Government services and how to foster a culture of excellence in delivering and managing these services in a country [7].

Studies on E-Government usually put forward a model of the different stages of E-Government development without providing a solid theoretical foundation, which causes confusion or inconsistency in understanding this model to a certain extent. Most studies propose stages of E-Government development, focusing on technology implementation, operations, or integration of previously reported models without showing other perspectives such as public value [8]. Therefore, there is a need to explore the general framework of the stages of E-Government development from a public value perspective. E-Government is implemented in almost all offices, both city and district governments, in Indonesia. One of the agencies that plays an active role and is closely related to the implementation of e-government, is the Office of Communication and Informatics. Jombang Regency, as one of the districts that are strategic in terms of location and have a strong cultural history, pays special attention to the development of SPBE to provide public services.

In implementing the SPBE performance targets at the Jombang Regency Communication and Informatics Office, problems were found, including, the Regional Apparatus Organization (OPD) was still building its applications without coordinating with the Jombang

* Corresponding author: ramadhane@student.telkomuniversity.ac.id

Kominfo Service, there were still many OPD applications that could not be integrated with other applications from the central or regional levels, there is still a lack of competent human resources for information technology staff in each OPD, and it is still difficult to fulfill sectoral data in OPD, thus affecting the public value obtained by the people in Jombang Regency [9]. Therefore, this research needs to be conducted to develop a public value-based E-Government maturity framework, knowing how public value indicators are added to the E-Government maturity framework, and conducting a public value-based E-Government maturity framework assessment in Jombang Regency.

2 Related Works

2.1 E-Government

E-government is a crucial component in the advancement of any governmental system, facilitating the enhancement of transparency, accountability, and good governance. Its implementation aims to optimize government efficiency while enabling citizens to access government services with enhanced efficiency and effectiveness [10]. The implementation of e-government in administration can enhance the provision of services and information to the public, simplify access for citizens, promote transparency, thereby fostering anti-corruption measures, and optimize resource utilization, including budget and time, to expedite existing bureaucratic procedures.

2.2 SPBE

The Electronic-Based Government System, which is governed by Presidential Regulation of the Republic of Indonesia Number 95 of 2018, offers services to SPBE users through information and communication technology [11]. The governance and management of SPBE provide assistance in implementing SPBE. A framework known as SPBE governance ensures the application of regulation, guidance, and control in the execution of SPBE in a holistic manner.

2.3 Public Value

Public value is a conceptual abstraction as its essence is contingent upon the dynamic and evolving needs of the public [12]. Governments face the challenge of balancing conflicting priorities between cost reduction and responsiveness. Public authorities need to be cognizant of the thresholds where the value generated for specific groups might lead to the detriment of value lost for others [13]. Certain authors argue that the generation of public value through E-Government is perceived as the influence of E-Government on government operations, activities, policies, and services provided to citizens [14][15]. The conceptualization of public value revolves around three macro variables; Quality services delivery, Competence of public organizations, and Achievement of socially required outcomes [16].

2.4 Maturity Model

The E-Government maturity model offers guidelines for managing the processes involved in establishing and sustaining E-Government services. Various maturity models in the literature have been utilized to assess the maturity of E-Government portals [17].

Table 1. Comparation of Maturity Model

Maturity Model
Maturity Stage
SPBE [10]
(1) Information (2) Interaction (3) Transaction (4) Collaboration (5) Optimum
Hiller and Belanger [11]
(1) Information (2) Two-way communication (3) Transaction (4) Integration (5) Participants
Almazan and Gil-Garcia [12]
(1) Presence (2) Information (3) Interaction (4) Transaction (5) Integration (6) Political Participation
Layne and Lee[13]
(1) Cataloguing (2) Transaction (3) Vertical integration (4) Horizontal integration

3 Methodology

3.1 Data Collection Method

In this study, the authors asked for opinions from experts. Experts were asked to carry out and provide assessments and opinions related to the design instrument for the public value-based E-Government Maturity Framework that had been made.

3.1.1 Data Validation

Validation was carried out by giving assessment questionnaires to experts. In this study the authors used content validity with a quantitative approach, namely Content Validity Ratio (CVR) and Content Validity Index (CVI).

No. of Panellists	Minimum Value
5	.99
6	.99
7	.99
8	.75
9	.78
10	.62
11	.59
12	.56
13	.54
14	.51
15	.49
20	.42
25	.37
30	.33
35	.31
40	.29

Fig. 1 CVR Minimum Value

This approach was chosen because content validation was determined based on the type of data, approach objectives, cost, time, and availability of experts. Explains the formula to determine the CVR value is as follows:

$$CVR = \frac{ne - \frac{N}{2}}{\frac{N}{2}} \quad (1)$$

n_e: The number of experts who provide relevant value
N: Number of panel expert

3.1.2 Data Reliability

The level of agreement or dependability between two or more assessors who categorize the same object is measured statistically by researchers using Fleiss' kappa. Fleiss' kappa is a statistical metric utilized to evaluate the reliability of agreement among two or more raters (multi-rater kappa) when categorizing categorical items. It quantifies the level of agreement in classification beyond what would be expected by chance.

3.2 Analysis Method

Data analysis used in this research is content analysis. In the data analysis process, the steps that need to be carried out in Figure 2.

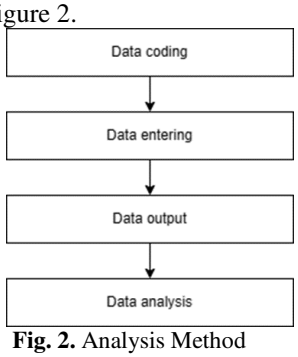

Fig. 2. Analysis Method

4 Result and Discussion

4.1 Public Value based E-Government Maturity Framework

The public value categories, public value indicators, and survey questions are all divided into four maturation phases (information, interaction, transaction, collaboration, and optimum). Best practices for the four development phases are illustrated in Table 2.

- The first is information stage. SPBE services are provided in the form of one-way information. Content, process, scope has not been fulfilled as a whole.
- The second is interaction stage. Information Service Level has been fulfilled. SPBE services are provided in the form of two-way interactions. As an example, there are information search features, uploading planning documents, and downloading documents.
- The third is Interaction stage. Criteria have been fulfilled. SPBE services are provided through a single operational transaction unit using several SPBE resources as examples of transactions to users related to planning government activities, including data validation, analytics, and approval mechanisms.
- The fourth is collaboration stage. Transaction stage criteria have been fulfilled. SPBE services are provided through integration or collaboration with other SPBE services.
- The fifth is optimum stage. Collaboration stage criteria have been fulfilled. SPBE services have been repaired and improved in quality according to changing needs in the internal and external environment.

Table 2. Public Value Maturity Stage

Maturity Stage	
Public Value	**Reference**
Information Stage	
Transparancy	[5], [7], [8], [14]–[21]
Information quality	[5], [7], [15], [18], [20]–[23]
Accessibility	[15], [18], [21]
Responsiveness	[7], [15]–[19], [24]–[26]
Ease to navigation	[7], [15]–[19], [24]–[26]
Interaction Stage	
Interaction within other public organizations	[5], [7], [15], [18], [20]–[23]
User interaction	[5], [7], [15], [18], [20]–[23]
User orientation	[5], [7], [15], [18], [20]–[23]
Transaction Stage	
Efficiency	[5], [7], [21], [8], [14]–[20]
Security	[5], [7], [15], [18], [20]–[23]
Privacy	[15], [18], [21]
Single sign on	[7], [15]–[19], [24]–[26]
Use of standard	[7], [15]–[19], [24]–[26]
Personalization	[5], [7], [15], [18], [20]–[23]
Workflows	[7], [15]–[19], [24]–[26]
Satisfy users' needs	[7], [15]–[19], [24]–[26]
Customer centricity	[5], [7], [15], [18], [20]–[23]
User form	[7], [15]–[19], [24]–[26]
Payment	[7], [15]–[19], [24]–[26]
Modularity	[5], [7], [15], [18], [20]–[23]
Cost reduction	[7], [15]–[19], [24]–[26]
Service quality	[7], [15]–[19], [24]–[26]
Collaboration Stage	
Participation	[5], [7], [15], [18], [20]–[23]
Social network	[7], [15]–[19], [24]–[26]
Consultation	[5], [7], [21], [8], [14]–[20]
Collaboration	[15], [18], [21]
Optimum Stage	
Enhance networks development	[5], [7], [21], [8], [14]–[20]
System quality	[5], [7], [15], [18], [20]–[23]
Increased resilience	[15], [18], [21]
Data integrity and quality	[7], [15]–[19], [24]–[26]
Data immutability	[5], [7], [15], [18], [20]–[23]
Errors reduction	[5], [7], [21], [8], [14]–[20]

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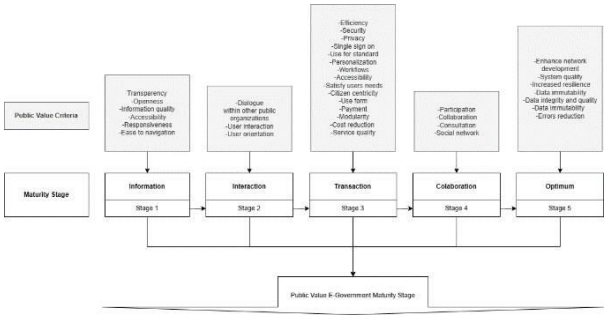

Fig. 3. Public Value based E-Government Maturity Framework

This section explains about the SiRinduNona website (Integrated Non-Business Licensing System) at the Department of Investment and Integrated One-Stop Services in Jombang Regency on which the case study was applied, the methodology and the results of this case.

CVR value with 5 experts was 0.99[22], while the CVR value obtained by the researchers in this study was 1. Based on this, the researchers concluded that the public value maturity stage model designed was valid. The content validity index is used by experts based on a four-point scale:

Table 3. CVI Relevant Scale

CVI	Agreement
1	Very irrelevant
2	Not relevant
3	Relevant
4	Very Relevant

Experts were asked to provide an assessment related to the guidelines that had been made by the author. Experts are selected based on knowledge, experience, or have related publications so that they can assess the process of content validity. Qualifications of experts who assess academic at least Masters or who have professional knowledge and experience in the field of SPBE, governance, system architecture and information system development, and auditors. The number of experts who carry out assessments in validation is 5. The result of this survey was collected:

Table 4. CVI Result

Expert	Agreement	Result
1	3,82	Relevant
2	3,62	Relevant
3	3,70	Relevant
4	3,71	Relevant
5	3,68	Relevant

Researchers use statistical methods that are used to measure the level of agreement or reliability between two or more assessors who classify the same item, namely by using Fleiss' kappa.

Table 5. Interpretation of Kappa

Kappa (κ)	Agreement
<0	Poor
0.01 – 0.20	Slight
0.21 – 0.40	Fair
0.41 – 0.60	Moderate
0.61- 0.80	Substantial
0.81- 1.00	Almost perfect

Table 6. Result

	Overall
Kappa	**0.817**
Asymptotic Standard Error	0.056
Z	14.614
P Value	0.000
Lower 95% Asymptotic CI Bound	0.707
Upper 95% Asymptotic CI Bound	0.926

As a result of this, it can be concluded that the maturity model is both valid and reliable across the sample of participants given that all participants exhibit a high level of agreement throughout the three survey parts.

4.2 SiRinduNona Website

SiRinduNona "perizinan.jombangkab.go.id" is an application system for electronic non-business licensing services at Department of Investment and Integrated One-Stop Services in Jombang Regency, which is intended for managing non-business licenses.

Fig. 4 Screen Shot of The Main Page of The SiRinduNona Website

This website also provides detailed information about services non-business licensing and procedures. Licensing services contained on this website include licensing in the health sector, social sector, education and culture sector, training and research sector, publication sector, public works and urban planning sector, livestock farming sector.

There are several menus that make it easier for website users to carry out the licensing process, such as setting up user accounts, making licensing applications according to the intended sector, viewing a list of permit applications for both previous and ongoing permits, and users can find out the entire permit application process from the submission process to issuance of permits that are transparent at each stage

4.3 Data Analysis Methodology

4.3.1 Analysis Method

a. Data Coding
   Data from an OPD website is processed by converting data (conversion) from data in the form of website appearance to numeric data in accordance with coding requirements. The coding data supplied for this study is a coding sheet where data is entered one at a time and given a code.
b. Data Entering
   Entering data is the process of transferring data that has been converted into a numeric code into

a computer using Microsoft Excel. Furthermore, data that has been coded in the form of numbers is then processed using SPSS.

c. Data Output
The above code is for selecting sub-indicators at each stage; if the sub-indicator is not found on the website being assessed, the number will change to "zero". Each code is processed by using the frequency distribution table to cover the distribution of data that has previously been presented using Excel.

Table 7. Output Code SPSS

Output code SPSS	**Code meaning**
Public value code	Sub variables contained in the website
0	Sub variables that are not found on the website

After using the SPSS frequency distribution, the data appears frequency values according to [33] are qualified based on the following steps:

1. The cumulative value is the total value of each question which is the answer of each respondent. The number of respondents that the researchers took were 1 website from 1 OPD in Jombang Regency
   - Percentage calculation formula:

$$\frac{Item\ cumulative\ value}{Frequency\ value} \times 100\% \quad (1)$$

2. Calculating the largest and smallest cumulative numbers, the number of respondents is 1 website from 1 OPD with the largest measurement scale of 5, and the smallest measurement scale of 1:
   - Biggest cumulative number = 1 x 5 = 5 (Stage 5)
   - Smallest cumulative sum = 1 x 1 = 1 (Stage 1)
3. Calculate the largest and smallest percentage values:
   - The Highest Percentage Value (HPV) = (5:5) x100% = 100%
   - The Lowest Percentage Value (LPV) = (1:5) x 100% = 20%
4. Calculate the range value with the formula:

$$Range\ Value = \frac{(HPV - LPV)}{largest\ number\ of\ scales} \quad (1)$$

$$Range\ Value = \frac{(100\% - 20\%)}{5} = 16\% \quad (2)$$

Based on the results of the calculation of the range values above, a percentage interval value of 16% is obtained so that the score interpretation category is obtained as shown in Table 8 below:

Table 8. Maturity Stage Percentage Category

No	**Percentage**	**Percentage category**
1	20 % - 36 %	*Stage 1* (Information)
2	36 % - 52 %	*Stage 2* (Interaction)
3	52 % - 68 %	*Stage 3* (Transaction)
4	68 % - 74 %	*Stage 4* (Collaboration)
5	74 % - 100 %	*Stage 5* (Optimum)

Analyzing the data is the final stage in the research. In this study the results from the SPSS data tool will be interpreted as data that have been obtained during data collection from each observation on 1 website, the processed data is presented using tables, graphs or pie cart, then the next step is to provide an interpretation or interpretation of the data, interpretation is a process of using data.

4.4 Result

Results of Maturity Stage Analysis Frequency Distribution of Investment Service and One-Stop Services in Jombang Regency (SiRinduNona Website)

Table 9. Information Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	20.0	20.0	20.0
	S1-1	1	20.0	20.0	40.0
	S1-2	1	20.0	20.0	60.0
	S1-3	1	20.0	20.0	80.0
	S1-4	1	20.0	20.0	100.0
	Total	5	100.0	100.0	

Based on Table 9, it can be seen that a total of 5 information stage indicators, the SiRinduNona website (Integrated Non-Business Licensing System) does not fulfill 1 indicator with a percentage of 20% concerning ease of navigation. Then 4 indicators with a percentage of 80% contained in the website, namely information quality, transparency, accessibility, and responsiveness.

Table 10. Interaction Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	S2-1	1	33.3	33.3	33.3
	S2-2	1	33.3	33.3	66.7
	S2-3	1	33.3	33.3	100.0
	Total	3	100.0	100.0	

Based on Table 10, it can be seen that out of a total of 3 indicators of the interaction stage, the Sirindunona website has met 3 indicators, namely interaction within other public organizations, user interaction, and user orientation with a percentage of 100%.

Table 11. Transaction Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	14.3	14.3	14.3
	S3-1	1	7.1	7.1	21.4
	S3-2	1	7.1	7.1	28.6
	S3-3	1	7.1	7.1	35.7
	S3-6	1	7.1	7.1	42.9
	S3-7	1	7.1	7.1	50.0
	S3-8	1	7.1	7.1	57.1
	S3-9	1	7.1	7.1	64.3
	S3-10	1	7.1	7.1	71.4
	S3-11	1	7.1	7.1	78.6
	S3-12	1	7.1	7.1	85.7
	S3-13	1	7.1	7.1	92.9
	S3-14	1	7.1	7.1	100.0
	Total	14	100.0	100.0	

Based on Table 11, it can be seen that out of a total of 14 transaction stage indicators, the SiRinduNona

website does not fulfill 2 indicators with a percentage of 14.3% regarding single sign on and use of standards. Then indicators with a percentage of 85.7% contained on the website, namely, efficiency, security, privacy, personalization, workflows, satisfy users' needs, customer centricity, user forms, payments, modularity, cost reduction, service quality.

Table 12. Collaboration Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	50.0	50.0	50.0
	S4-2	1	25.0	25.0	75.0
	S4-3	1	25.0	25.0	100.0
	Total	4	100.0	100.0	

Based on Table 12, it can be seen that out of a total of 4 collaboration stage indicators, the SiRinduNona website does not fulfill 2 indicators with a percentage of 50% concerning participation and collaboration. Then indicators with a percentage of 50% contained in the website, namely, social network and consultation.

Table 13. Optimum Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	S5-1	1	16.7	16.7	16.7
	S5-2	1	16.7	16.7	33.3
	S5-3	1	16.7	16.7	50.0
	S5-4	1	16.7	16.7	66.7
	S5-5	1	16.7	16.7	83.3
	S5-6	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Based on Table 13, it can be seen that from a total of 6 optimum stage indicators, the SiRinduNona website has fulfilled 6 indicators, namely enhanced networks development, system quality, increased resilience, data integrity and quality, data immutability, errors reduction with a percentage of 100%.

Table 14. Percentage and Average of SiRinduNona Website

Website	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Total	Average
SiRinduNona	80%	66,7%	85,7%	50%	83,3%	365,7%	73,14%

From Table 14 the total for all stages is 365.7%, the total is divided by 5 stages, resulting in an average of 73.14%. Further explained in Fig 6 below:

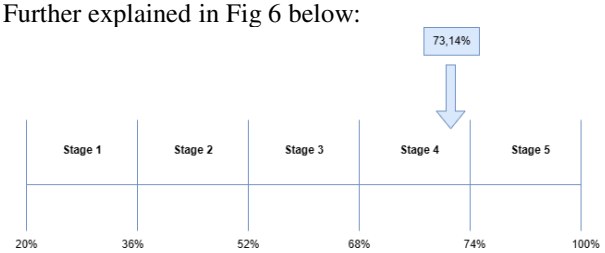

Fig. 5 Continuum Line of SiRinduNona Website

Based on Fig. 5 the SiRinduNona website has an average of 73.14% so it can be concluded that the SiRinduNona website is in stage 4, namely collaboration.

4.5 Improvement Recommendation

This study uses five variables, namely, information, interaction, transaction, collaboration, and optimum. Of the five variables which are stages for assessing the maturity stage on 1 website of the Investment Service and One-Stop Integrated Services of Jombang Regency. In the presentation below, each website has different improvements according to the public value that is not the most densely packed on the website that has been assessed. The following are the results of the analysis that has been carried out:

Table 15. Percentage Stage of SiRinduNona Website

No	Website	Persentase	Stage
1.	SiRinduNona	73,14%	Stage 4 Collaboration
Explanation			
The SiRinduNona website for Jombang Regency is included in stage 4, namely collaboration with a percentage of 73.14%, because there are sub-indicators that are not fulfilled, improvements are needed which can be made as follows:			
Improvement Recommendation:			
1. Department of Investment and Integrated One-Stop Services in Jombang Regency can make improvements by adding a site map on the web to make it easier for users to find menus in tabs. Then on the web, you have to separate images, videos using a search engine on web pages. The web can be maximized by providing image, video and publication features to make it easier for residents and also to give the impression that residents are interested in using the web.			
2. Department of Investment and Integrated One-Stop Services in Jombang Regency can also make improvements to create Single sign-on (SSO) on the SiRinduNona website for a mechanism that allows users to use a set of credentials (username and password) to access various related services or applications provided by the government. With SSO, users only need to authenticate once and can access various services without having to enter their credentials again every time they access a new service through the main web of the Department of Investment and Integrated One-Stop Services in Jombang Regency.			
3. The government's public service website refers to involving the community in the decision-making process, providing feedback, and actively participating in providing public services through the website. It aims to increase community involvement, strengthen transparency, and enable collaboration between government and citizens with the example of Feedback or Community Satisfaction Survey (SKM).			

5 Conclusion

Based on the research results obtained with research that focuses on the development of public value-based E-Government Maturity Framework where the case study focuses on the SiRinduNona Department of Investment and Integrated One-Stop Services in Jombang Regency website, SiRinduNona "perizinan.jombangkab.go.id" is an application system for electronic non-business licensing services at Department of Investment and Integrated One-Stop Services in Jombang Regency, which is intended for managing non-business licenses. The results of the maturity stage of The SiRinduNona website for Jombang Regency is included in stage 4,

namely collaboration (Transaction Level criteria have been fulfilled. SPBE services are provided through integration or collaboration with other SPBE services) with a percentage of 73.14%, because there are sub-indicators that are not fulfilled.

Improvements are needed which can be made as follows, can make improvements by adding a site map on the web to make it easier for users to find menus in tabs. With SSO, users only need to authenticate once and can access various services without having to enter their credentials again every time they access a new service through the main web of the Department of Investment and Integrated One-Stop Services in Jombang Regency. Government's public service website refers to involving the community in the decision-making process, providing feedback, and actively participating in providing public services through the website. It aims to increase community involvement, strengthen transparency, and enable collaboration between government and citizens with the example of Feedback or Community Satisfaction Survey.

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