Assessing the quality and prioritize improvements of e-government using e-govqual and IPA

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Abstract

The Gresik Regency Government in 2020 has made new innovations in the development of E-Government as a form of implementing Presidential Regulation Number 3 of 2003 Regarding National Policy and Strategy for E-Government Development. Through the launch of the Pelayanan Online Pendaftaran Administrasi Kependudukan Gresik (Poedak) managed by the Population and Civil Registration Service. Poedak service aims to make it easier for the people of Gresik Regency to take care of population files. It is necessary to evaluate feedback from the public as end users regarding existing services, to help the government as a service provider to find out the extent of the benefits felt by service users and assist in improving and developing service quality. This study uses the E-GovQual method to measure the extent to which the quality of Poedak services is based on what users perceive, and the IPA method maps attributes according to improvement priorities. This study showed that the average score on the performance level assessment on all E-GovQual variables had a score of 3.13. Then the average score on the importance assessment on all E-GovQual variables was 3.08. So that the value of the gap between performance and importance can be known by 0.05. The results of the conformity analysis between the performance level and the importance level have a conformity value of >100% which is 102%. Thus, the overall performance of the Poedak service is good and meets the expectations or interests of users. There are 4 attributes that are included in quadrant 1 (concentrate here) which means improvement is needed. These four attributes include: adequate response format (FIAA2), providing timely service (RA2), loading speed time on the website (RA5), and ease of understanding information content (CAIA6).

1. Introduction

E-Government is the use of information and communication technology (ICT) by the public sector to build interaction between the government and all stakeholders including the community, business, and also between other government agencies with the aim of providing broad access to information, providing quality public services and opportunities for the public to participate in the process of government administration [1]. E-Government as a forum to facilitate the delivery of services to the community [2]. Smart City can be defined as the application of the concept of a smart city by utilizing technology and communication to integrate information from various sectors and create public spaces for the community [3]. Gerakan Menuju 100 Smart City is the program that created with the aim of guiding and encouraging Regencies/Cities in maximizing the use of technology and communication in compiling the Smart City Masterplan, so that it can solve various problems that occur in each city such as problems of population growth, congestion, poverty, crime, natural disasters and so on [4]. Through the Letter of the Ministry of Communication and Informatics of the Republic of Indonesia dated May 5, 2017 Number 265KOMINFO/DJAI/AI.01.05/05/2017 concerning the Submission of the Results of the Assessment Selection of the Movement Towards 100 Smart Cities, Gresik Regency was declared as one of the Regencies/Cities that are worthy of being a Smart City [5].

To support the implementation of E-Government development, the Gresik Regency Government began to make innovations in developing services in the form of a web-based service called the Pelayanan Online Pendaftaran Administrasi Kependudukan (Poedak) in 2020. The Poedak website is divided into 8 services, including services for submitting birth certificates, death certificates, reprinting or changing family cards, printing Identity Cards (KTP), Child Identity Cards (KIA), moving Indonesian citizens (WNI), broken packages / splitting family cards, and non-Muslim marriages or divorces. Identity management carried out by Dispendukcapil is carried out from birth to death with the aim of ensuring the legality of the population throughout Indonesia, ensuring protection for the entire community so that people can live safely and comfortably. Identity management carried out by Dispendukcapil is carried out from birth to death with the aim of ensuring the legality of the population throughout Indonesia, ensuring protection for the entire

community so that people can live safely and comfortably [6]. Through the Poedak which is a website-based application aimed at making it easier for the people of Gresik Regency to take care of population files [7].

Based on the results of the researcher's interview on December 6, 2021 to Mr. Khusaini as the Head of the Population and Civil Registration Service (Dispendukcapil) of Gresik Regency, it is known that the background of the Poedak website itself is to make it easier for people to apply for services, especially for the people of Gresik Regency who live far from the city center. It is necessary to evaluate feedback from the public as end users regarding existing services, to help the government as a service provider to find out the extent of the benefits felt by service users and assist in improving and developing service quality [8]. This research in measuring the quality of E-Government services uses the E-GovQual method, a method commonly used to measure the quality of information system services that focuses on measuring the quality of government services with a bound dimension between government and society [9]. The IPA method is a combination of importance and performance factors in a two-dimensional graph that makes it easier to convey data and proposals to the object under study where there are 3 analyses, namely gap level analysis, conformity level analysis and quadrant analysis [10]. The IPA method is also used to measure the level of user satisfaction with perceived performance by comparing the level of expectations with the level of performance with a function to provide clues to service information that affects user satisfaction [11].

Dispendukcapil Gresik Regency needs to conduct an evaluation of service quality with the aim of knowing how the quality of service that has been implemented today. In this study, researchers used the E-GovQual method where the E-GovQual method was chosen because in its development the E-GovQual method focused on measuring the quality of E-Government services by looking at the perspective of end users [12]. The Importance Performance Analysis (IPA) approach is used to measure conformity analysis and quadrant analysis to map the results of the analysis into quadrants so that which attributes need to get special priority for improvement or development [13]. The results of this study are expected to be the basis for developing and improving services to service providers to improve the quality of the Poedak website.

2. Research Method
2.1 Previous Research
The previous research was entitled "Evaluation of User Satisfaction to Service Quality of Regional Development System (Simbangda) Using Electronic Government Quality Method". The purpose of this study was to evaluate the satisfaction of Simbangda service users using the E-GovQual method [14]. The second study was conducted by (Jayanti et al., 2022) with the title "Evaluation of the Implementation of E-Government Public Service Content Complaints Using E-GovQual, Importance Performance Analysis and Heuristic Evaluation (Case Study: Ministry of Communication and Information, APTIKA Directorate) [15]. The third research is a study conducted by Prasetyo et al., with the title "Evaluation of the Quality of Regional Native Income Electronic Services (E-PAD) in Banyuwangi Regency Using the E-GovQual and IPA Methods" [16].

2.2 E-GovQual
Measurement of service quality aims to understand what customers need and want by conducting an analysis based on customer experience of the services provided in order to maintain customer satisfaction and trust [17]. Service quality is a benchmark for the success of an agency, company or organization that focuses on user satisfaction by providing good service so that it is able to meet expectations and satisfy users for the services they receive [18]. E-Government is a form of effort in supporting government performance on an electronic basis and with the aim of improving the quality of services provided to the community effectively and efficiently [19]. In the implementation of E-Government itself, it is necessary to prepare several things including regulations, readiness of human resources (HR), cost budgets, and the availability of facilities and infrastructure [20]. The phenomenon of shifting communication media through the internet, which is one of the drivers of the E-Government concept, is expected to be a forum to facilitate and accelerate the exchange of information, provide service facilities both to the public (G2C), business people (G2B) and with intergovernmental agencies (G2G) [21]. The instrument test in this study was carried out to test the questionnaire, namely by conducting two tests, namely the validity test and the reliability test. The validity test was carried out after the questionnaire was distributed to 30 respondents. The number of samples was taken as many as 30 respondents because the minimum number of questionnaire trials was 30 respondents [22]. The questionnaire was developed in the form of a Likert Scale with the following score conditions: score 1 = very poor; score 2 = less good; score 3 = good; and score 4 = excellent [23]. This research is included in quantitative research where quantitative research is a research method using raw data in the form of numbers obtained through research instruments in the form of questionnaires then processed using statistical programs with the aim of drawing conclusions [24]. Secondary data in this study is the study of literature such as documents and journals [25]. E-Govqual's development aims to measure the quality of government services by looking at the end user's perspective [12]. The E-GovQual method consists of 47 attributes in 6 dimensions mapped in the Figure 1.
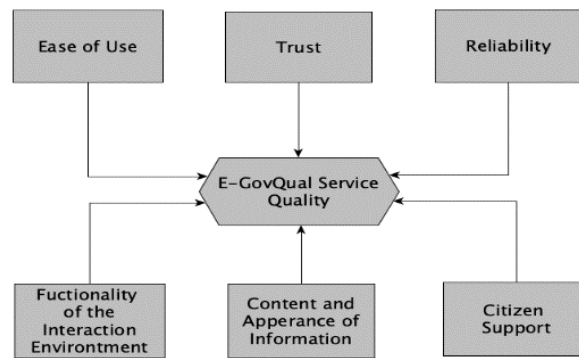
Figure 1. E-GovQual dimension

1. Ease of Use: This dimension reflects how easily users can interact with the website, including 7 attributes in it.
2. Trust, this dimension reflects how confident users are in the available services, such as about ensuring the security of users' data and personal information from cybercrime, including 11 attributes in it.
3. Functionality of the Interaction Environment in this dimension reflects the completeness and ease of users in getting help and entering data, including 4 attributes in it.
4. Reliability in this dimension reflects the ability and accuracy in providing services, including 5 attributes in it.
5. Content and Appearance of Information This dimension reflects the accuracy of the information provided on the Website and the appearance on the Service, including color, graphics, page size, and the 10 attributes in it.
6. Citizen Support, this dimension reflects how easy users find information and get help when using the service, including 10 attributes in it.

2.3 E-GovQual Analysis
        E-GovQual analysis will produce the value of the difference (gap) in the average performance value with the average importance value of each attribute in it. if the difference between the average performance value and the average importance value is positive (+) or produces a value > 0. In this case Equation 1, it can be said that the quality of government services (E-Government) has met the interests or expectations of users. This indicates that the system performance has exceeded user expectations.

$$Gap\ Rate = \overline{X}performance - \overline{X}importance \qquad (1)$$

Description:
$\overline{X}performance$ = Average performance score
$\overline{X}importance$ = Average value of importance

2.4 IPA Analysis
        IPA analysis will determine which components or attributes in the Poedak service need to get repair priority. In this study, two science analyses were used: conformity level analysis and quadrant level analysis.
1. Conformity analysis is the result of a comparison in the form of a percentage between the assessment of the level of performance and the level of importance used to assess the level of suitability of the services provided with the interests or expectations of users. Conformity level analysis is considered appropriate if the resulting conformity level value > 100% or equals 100%. Here is the formula for determining the value of the conformity analysis in Equation 2.

$$TK_i = \frac{X_i}{Y_i} \times 100\% \qquad (2)$$

Description:
TKi   = i-th respondent suitability rate
Xi   = Performance level appraisal score
Yi   = Importance assessment score

2. Quadrant analysis is used to determine which attributes in a service need repair priority. The quadrant analysis is mapped into 4 parts, namely quadrants on the priority scale in the form of a cartesian diagram.
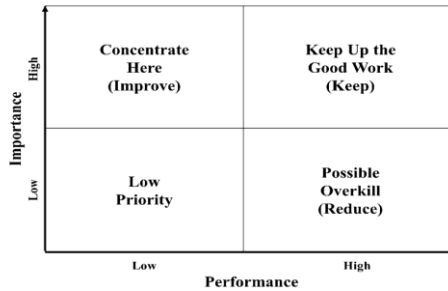
Figure 2. IPA cartesian diagram

In Figure 2, it is divided into two dimensions, namely the X axis (horizontal) which is the level of performance (Performance) and the Y axis (vertical) which is the level of importance (Importance). IPA quadrant analysis uses a cartesian diagram which is divided into four quadrants, namely quadrant 1 with low performance value but high importance value, quadrant 2 with high performance value and high importance value, quadrant 3 with equally low performance value and importance value, and quadrant 4 with high performance value but low importance value.

2.5 Improvement recommendations

The results of the IPA quadrant analysis will show which attributes need to get improvement priority. Based on the results of discussions with Poedak service providers, it was determined that improvement recommendations were only given for quadrant 1, namely with the top priority scale quadrant where performance values were low but user expectations were high.

3. Results and Discussion
3.1 Research Samples

Sampling in this study was carried out using the Probability Sampling technique, which later samples will be taken randomly (random sampling). Probability sampling is a technique used in sampling, where all members of the population have an equal opportunity or opportunity to become samples. The sample in this study was 394 Gresik Regency people who had applied through Poedak. This figure was obtained based on the total applicant population on the Poedak website of 28,803, using the Slovin formula with an error rate of 5% then the number of samples was obtained as many as 394.

3.2 Calculation of the level of performance and impotance assessment

E-GovQual analysis is used to measure the quality of E-Government website services according to end-user perceptions. Perception refers to how the end user experiences in using the Poedak website. Of the 47 existing attributes, this study uses 31 attributes in e-GovQual. E-GovQual analysis is carried out to determine the value of the gap between the value of importance and the value of service performance. If the value of the gap is positive or > 0, then the service's performance already meets the user's interests. Meanwhile, if the value of the gap is negative or < 0, then the service performance has not met the interests of users. The results of the e-GovQual analysis on each variable are as follows Table 1.

Table 1. GAP Analysis

Variable	Attributes	Performance	Importance	Gap
Ease of Use	EUA1	3,27	3,15	0,12
	EUA2	3,20	2,76	0,43
	EUA3	3,37	3,28	0,09
Trust	TA1	3,41	3,23	0,17
	TA2	3,45	3,29	0,16
	TA3	3,55	3,53	0,02
	TA4	3,23	3,19	0,04
	TA5	3,22	2,51	0,71
	TA6	3,43	3,15	0,28
Functionality of the Interaction Environment	FIAA1	3,48	3,43	0,05
	FIAA2	2,25	3,22	-0,96
Reliability	RA1	3,46	3,29	0,17

	RA2	2,25	3,21	-0,96
	RA3	3,24	3,18	0,06
	RA4	3,22	2,49	0,74
	RA5	2,53	3,37	-0,84
Content and Appearance of Information	CAIA1	2,91	2,62	0,29
	CAIA2	3,39	3,33	0,07
	CAIA3	3,53	3,37	0,16
	CAIA4	3,69	3,65	0,03
	CAIA5	3,30	3,18	0,12
	CAIA6	2,43	3,38	-0,95
	CAIA7	2,92	2,46	0,46
	CAIA8	2,99	2,93	0,06
	CAIA9	3,35	2,37	0,98
Citizen Support	CSA1	3,34	3,14	0,20
	CSA2	3,24	3,13	0,11
	CSA3	2,98	2,96	0,02
	CSA4	3,05	3,02	0,04
	CSA5	3,17	2,37	0,80
	CSA6	3,24	2,25	0,98

Table 2 shows the gap values of each research variable. The total average performance value in all E-GovQual variables, shows a value above the likert score of 3 (good) which is 3.13. This can be interpreted to mean that Poedak services already have good performance based on user perception. However, if you look at the average total importance assessment score of 3.08, it creates a gap between performance and importance of 0.05. This means that the overall performance of Poedak services has met the expectations or interests of users.

Table 2. GAP of each variable

Variable	Performance	Importance	Gap
EUA	3,28	3,06	0,21
TA	3,38	3,15	0,23
FIAA	2,87	3,32	-0,46
RA	2,94	3,11	-0,17
CAIA	3,17	3,03	0,14
CSA	3,17	2,81	0,36
E-GovQual Analysis	3,13	3,08	0,05

3.3 Conformity Analysis

Conformity rate analysis is used to measure how well a service is provided with the expectations that users want. The suitability value is concentrated by dividing the performance value by the importance value. The results of the conformity analysis on each variable are as follows Table 3.

Table 3. Average Conformity of Each Variable

Variable	Performance	Importance	Conformity
EUA	3,28	3,06	107%
TA	3,38	3,15	107%
FIAA	2,87	3,32	86%
RA	2,94	3,11	95%
CAIA	3,17	3,03	105%
CSA	3,17	2,81	113%
Analisis *Kesesuaian*	3,13	3,08	102%

Table 3 shows the conformity values of each research variable. It was found that the total value produced at the performance level of all E-GovQual variables was above the likert score of 3 (good) which was 3.13. This shows that the Poedak website already performs well according to user perception. If, looking at the total importance assessment score of 3.08, it gives rise to a conformity value of more than 100% which is 102%. This means that the overall performance of the Poedak website has met the interests of users.

3.4 Quadrant Analysis

Quadrant analysis on the IPA method uses a cartesian diagram with the intersection of the X-axis and the Y-axis. Y axis is the average of the overall interest assessment of 3.04. Figure 4.7 presents the results of quadrant analysis using the help of the SPSS 25 application. The results of the quantification analysis are presented in Figure 3.
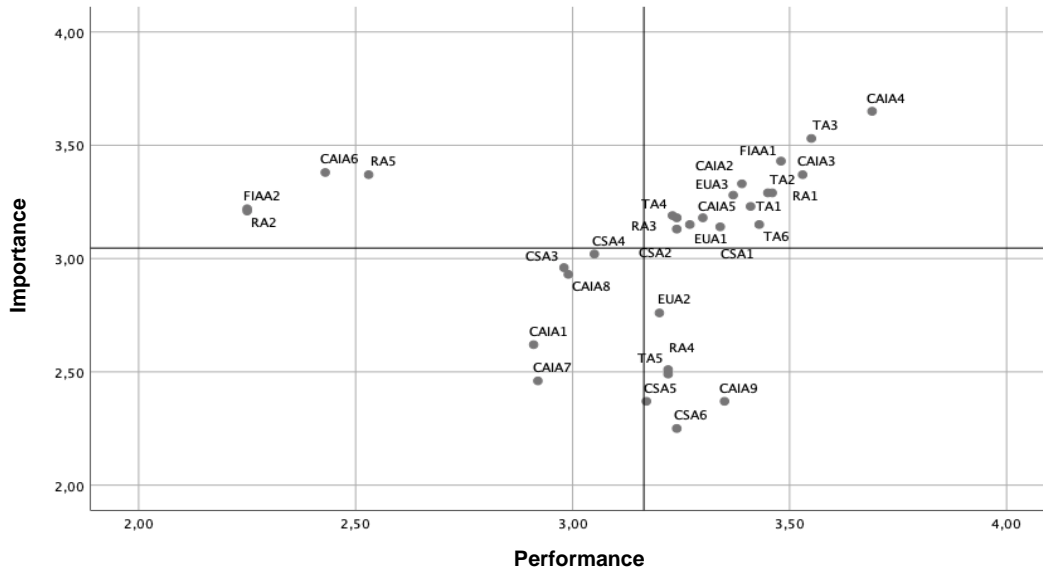

Figure 3. Quadrant Analysis Results

Quadrant I is a section that contains attributes with a high value in the importance assessment, but has a low value in the performance assessment. Thus, the attributes contained in this quadrant are attributes that require top priority in terms of improvement and or development. The attributes that are in quadrant I are as follows:
- Adequate response format
- Providing services in a timely manner
- The loading time on the website is quite fast
- Ease of understanding the content of information

Quadrant II is a section that contains attributes with high values at the level of importance and also the level of performance. Thus, the attributes contained in this quadrant are attributes that can be said to have succeeded in accordance with user expectations. The attributes that are in quadrant II are as follows:
- Website structure is clear and easy to understand
- Easy-to-remember URLs
- Not sharing personal information with others
- Users' personal data is securely archived
- Success in making transactions
- Access control
- Automatic calculations available on forms
- Success in performing services appropriately
- Easily accessible website
- Accuracy of available information and conciseness of data
- Data relevance
- Information is always updated regularly
- All links work fine
- The existence of facilities in tracking transactions
- Employees are able to solve problems faced by users

Quadrant III is a section that contains attributes with low values at the level of importance and also the level of performance. Thus, the attributes contained in this quadrant are attributes that require low priority in terms of improvement and or development. The attributes that are in quadrant 3 are as follows:
- Completeness of user data and information
- Attractive website colors

- Attractive website graphics
- Employees are able to answer user questions quickly
- Employees have knowledge in answering user questions

Quadrant IV is a section that contains attributes with low values at the level of importance and having high values at the level of performance. Thus, the attributes contained in this quadrant can be interpreted as excessive in their development. The attributes that are in quadrant IV are as follows:
- Accurate website search
- Digital signatures
- Browser system fit works fine
- Website page size according to
- Employees have politeness
- Ability of employees to convey information confidently

3.5 Improvement recommendations
Improvement recommendations are given to attributes with high improvements, namely attributes with low performance values but with high importance values. The attributes that have a high priority of improvement are located in quadrant I. The following are presented recommendations for improvement in quadrant I:
- Adequate response format (FIAA2)
FIAA2 attributes are in quadrant I. Some respondents stated that they had difficulty logging in to the website and when filling out the file application form there was no warning notification when an error occurred, such as when entering the NIK beyond the maximum digit limit. So that Poedak service providers need to improve the performance of the Poedak website system in order to provide a response in the form of warning notifications in filling out the submission form and success in logging in to the website.

- Providing services in a timely manner (RA2)
The RA2 attribute is in quadrant I. Some respondents said that processing population files was not timely as promised. Based on this, service providers need to improve the performance of dispendukcapil staff by evaluating the performance of Human Resources (HR) or scheduling systematically by adjusting the average completion of files in one day and the average file request that comes in one day. So that the file submission process can be completed precisely and in accordance with the promised time.

- Loading time on websites is quite fast (RA5)
RA5 attributes are in quadrant I. The Poedak service provider provides information that the server used by Dispendukcapil Gresik is a server owned by Diskominfo Gresik where in its use the server capacity is divided and often experiences system down. In facing the obstacles of often down systems, namely by increasing server capacity or providing its own internal server so that the performance of the Poedak website is expected to increase. So it is necessary to get the top priority for improvement.

- Ease of understanding the content of information (CAIA6)
The CAIA6 attribute is in quadrant I. Some respondents gave statements when respondents wanted to find information related to file submission requirements, they experienced problems, namely difficulty in finding information related to the intended requirement form. However, the information related to the form was felt to be confusing for respondents because the naming of the form was almost the same. So that the service provider needs to summarize the information displayed regarding the requirements for submitting a file application in a simpler appearance and also provide a form title that is easy for users to understand.

4. Conclusion
This research has resulted in a finding that the quality of the Poedak website. The total average E-GovQual score in the performance assessment received a score of 3 (good) which was 3.13. This shows if the performance of Poedak services has been good in accordance with user expectations. The total average importance assessment shows a score of 3.08, resulting in a gap between performance and importance assessment of 0.05. A gap with positive values can mean that the performance of the service perceived by the user already meets the interests or expectations of the user. Based on the results of the analysis of the suitability between the level of performance and the level of importance shows a value of 102%. This can be interpreted to mean that the performance of Poedak services is good and meets the expectations or interests of users.

The resulting quadrant analysis using the IPA method will map each attribute based on the improvement priority scale. These results can be a reference for Poedak service providers, namely the Population and Civil Registration

Service (Dispendukcapil) of Gresik Regency, to improve service quality. There are 4 attributes that fall into quadrant I, including an adequate response format (FIAA2), providing timely service (RA2), loading time on the website (RA5) and ease of understanding the content of information (CAIA6).

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