



Analysis of Lampung Provincial Social Service website using PIECES framework

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Abstract — The official website of the Lampung Provincial Social Service contains news content, routine activities, and information on public services. The website has been changed from an internal point of view but does not satisfy its users based on user perceptions. As a result, users no longer want to visit the social service website, which is one of the problems, so it is necessary to build a measurement model to classify website user problems using the PIECES framework. Previously, the reliability and validity test of the questionnaire was performed on 338 samples of respondents. After that, the data is analyzed based on its user characteristic with the Likert scale and class intervals. PIECES framework successfully classifies the problems of 338 samples in the range of good and poor. The website scores 3.62 points for the performance domain, 2.57 points for the information or data domain, 3.35 points for the economics domain, 3.61 points for the control or security domain, 3.36 points for the efficiency domain, and 2.60 points for the service domain. Thus, a data center is needed to improve the information or data domain. It also needs a fast response two-way communication system to improve its service domain.

Keywords – framework pieces, Lampung Provincial Sosial Service, website usability

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I. INTRODUCTION

Website is an implementation of information technology that can improve the performance of an organization so that it will increase productivity [1]. Implementation of information technology is also known by the term governance. The government has established an Information and Communication Technology (ICT) development program with the term E-Government [2]–[4]. The Provincial Government of Lampung also has regulations related to information management governance [5].

The Lampung Provincial Social Service uses dinsos.lampungprov.go.id as its website address, a subdomain of The Lampung Provincial Government website portal. It contains news content, routine activities, and information on public services. It has undergone several changes based on an internal point of view, but it is not built to enhance the experience and satisfaction of its users based on user perceptions. As a result, the users want to avoid visiting the Social Service website, which has become the central problem theme of this

research. So it is necessary to construct a usability measurement model for the website. In the end, the website is needed to improve its usability by analyzing the website from the user's point of view [6].

Based on the problem above, this research will build a measurement model using the Performance, Information and Data, Economy, Control and Security, Efficiency, and Service (PIECES) framework. This research aims to measure the Lampung Provincial Social Service website and to identify the problems experienced by the users using the PIECES framework. The PIECES framework is a tool for analyzing computer-based information systems, which consists of essential points that are useful to be used as a guide/reference in analyzing the system. In short, the PIECES framework contains essential things in evaluating systems, such as Performance, Information and data, Economics, Control and security, Efficiency, and finally, Service [7]–[9]. By using PIECES as a system analysis tool, a detailed and comprehensive report of the system will be obtained so that the strengths and weaknesses of the system can be identified and later can be used as

a reference for the company's further progress.

II. RESEARCH METHOD

The methodology of this research is shown in Fig. 1, which describes the flow of the research. It starts with the identification of problems, data collection, initial analysis, data analysis using PIECES framework, and conclusion.

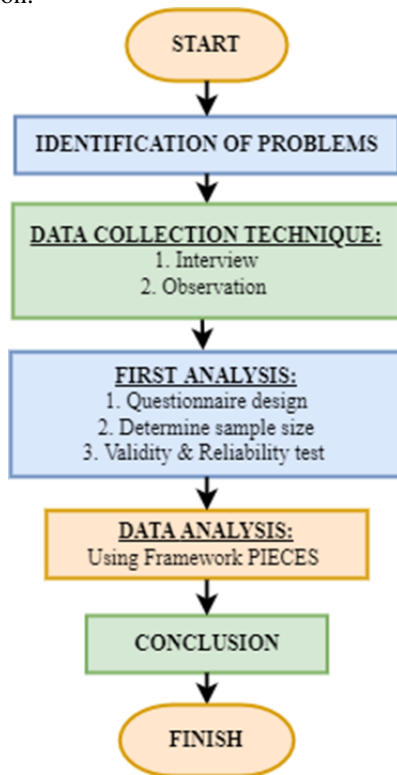


Fig. 1. Research methodology.

A. Problems Identification

Problems identification will be answered through data collection and processing. The purpose of problem formulation is to clarify the main problems that will be studied and discussed in this study. After determining the problem formulation, the next step is to conduct a preliminary survey to sharpen the identification of website problems [10].

B. Data Collection

- a) Interview; An interview is a conversation that is carried out with a specific purpose and is carried out by two parties, namely the interviewer (interviewer) who submits a statement and the interviewee who answers the statement [11].
- b) Observation; Jonathan Sarwono, stated that observation activities include systematically recording events, behaviors, objects seen and other things needed to support the research being carried out. Meanwhile, according to Sugiyono, collecting the data with observation is used if the research is related to human behavior, work processes, natural phenomena and if the observed respondents are not too large [11].

C. Initial Analysis

- a) Designing a questionnaire; designing a Framework Pieces instrument which consists of 6 domains to classify the problems of website users;
- b) Determine the sample size; The sampling technique used in this study is Cluster Sampling. For members of the population in one cluster is heterogeneous using Slovin's formula, which is a mathematical system used in calculating the number of populations of certain objects whose characteristics aren't yet known specifically [12].
- c) Validity & Reliability test; The validity test of the questionnaire was used to determine the relationship and shows the hypothesis that the relationship between two or more variables is the same [13]. The reliability test to measure the reliability of the instrument in this study is using Cronbach's Alpha technique. A study is said to be reliable if has met the instrument criteria, namely if the reliability coefficient $r > 0.6$ [14], [15].

D. Analysis using PIECES Framework

PIECES framework are frameworks for classifying a problem, opportunities, and directives contained in the scope definition of the system [16]. There are 6 domains used for Analysis websites, including:

- 1) Performance; an analysis is carried out to determine the performance of the system, whether it is running well or not. This performance is measured by the amount of data generated and how quickly data is found;
- 2) Information; an analysis is used to find out how much and how clear the information will be generated from the search;
- 3) Economics; an analysis is carried out to find out whether a system is appropriate to be applied in an information institution and from a financial point of view and the costs incurred;
- 4) Control and Security; an analysis is used to monitor the extent to which supervision and control are carried out so that the system runs well;
- 5) Efficiency; an analysis is carried out to find out whether a system is efficient or not with few inputs that can produce satisfactory outputs;
- 6) Service; an analysis is used to find out how services are carried out to find out problems that arise related to services [17].

A likert scale is used to measure attitudes, opinions and perceptions of a person or group of people about social phenomena [18]. The choice of each answer for respondents' responses to the quality dimension of satisfaction is given a score as shown in Table 1.

The next step is to determine the class interval and the average value. The class interval, i , can be calculated as $i = \frac{r}{k}$, where r is the range from the highest point to the lowest point, and k is the number

Table 1. Likert Scale [8]

Answer Option	Acronym	Score
Strongly Disagree	SD	1
Disagree	DA	2
Fair	FR	3
Agree	AG	4
Strongly Agree	SA	5

of classes. In this case, $k = 1 + 3.22 \log n$, where n is the number of respondents. The average value, r , can be calculated as $r = \frac{f}{n}$, where f is the frequency [18].

The results of the questionnaire were summarized using class interval expressions, averaged, and measured based on the evaluation of the characteristics of each domain from the PIECES framework. The results of the calculation of the Satisfaction Average (SA) for each domain derived from the Total Questionnaire Score (TS) divided by the Number of Questionnaires (NQ). The equation used to measure SA can be seen at (1) [19].

$$SA = \frac{TS}{NQ} \quad (1)$$

III. RESULT AND DISCUSSION

Based on the observation on the website condition, the result can be drawn as follows.

A. Problem Formulation

The website contains news content, routine activities, and information on public services. The Social Service does not yet know whether the usability website is based on the level of user satisfaction, it seems that users no longer want to visit the website, so it is necessary to build a usability measurement model website. Furthermore, how to classify the problems of users of the Lampung Provincial Social Service website by involving users based on the principles of the PIECES framework [10].

B. Data Collection

The next step is to perform interview activity directly to the Head of the General and Personnel Sub-Section as the Coordinator of the Information Services and Documentation Division of the Information Management and Documentation Officer (PPID) of the Lampung Provincial Social Service.

Observation activities are carried out directly to the research case study, namely the Lampung Provincial Social Service, which is located at Jl. Basuki Rahmat No.72 Sumur Putri, North Telukbetung to obtain information about the object of research, namely the Lampung Provincial Social Service website. The results of these observations include information about who is the admin of the Lampung Provincial Social Service website, governance and public service systems that are already running, as well as the use of the website and the problems contained in it.

C. Designing Questionnaire

In this step is to design a statement instrument. The 27 statements formed can be seen in Table 2.

Table 2. Statement PIECES Framework [20]

No.	Domain	Code	Indicator Statement
1.	Performance (PE)	PE1	The website of the Lampung Provincial Social Service is easily accessible by user;
		PE2	The exiting Menu can be clicked, then quickly open a new page;
		PE3	The Lampung Provincial Social Service website runs stably, even though it is opening another application or browser;
		PE4	The Lampung Provincial Social Service website can print the information that visitors are looking for;
		PE5	The Lampung Provincial Social Service website can quickly open the Photo Album of activities on the GALLERY Menu;
		PE6	All regulations in the INFORMASI PUBLIK Menu can be downloaded;
		PE7	The flow of services in the PELAYANAN PUBLIK Menu can be downloaded all;
		PE8	The Lampung Provincial Social Service website has never experienced an error when used
2.	Information (& Data) (ID)	ID1	The Lampung Provincial Social Service website has provided Information and Data Terpadu Kesejahteraan Sosial;
		ID2	Availability of information in the form of Grafik/Chart Poverty Data Lampung Provincial;
		ID3	The Lampung Provincial Social Service website is able to present detailed information and data;
		ID4	Availability of a catalog Information System and Provided Data Lampung Provincial;
		ID5	The information and data presented are always up-to-date.
3.	Economics (EC)	EC1	Users do not need to pay for social service information;
		EC2	Users benefit from information obtained after opening of the Lampung Provincial Social Service Website;
		EC3	There is a user consultation service to get information on social services.
4.	Control & Security (CS)	CS1	The structure of the MENU and NAVIGATION of the Lampung Provincial Social Service website is easy to understand;
		CS2	There is a BACK Menu on every website page;
		CS3	The Lampung Provincial Social Service website does not contain viruses that can interfere with computer activities;
		CS4	Existing information and news cannot be changed by website visitors
5.	Efficiency (EF)	EF1	Can be accessed from various electronic devices;
		EF2	Users can easily learn and operate the Lampung Provincial Social Service website system;
		EF3	The services provided by the Lampung Provincial Social Service website are in accordance with the needs of visitors.
6.	Service (SV)	SV1	There's a contact on the Home Page that can be contacted, if visitors haven't found the information they're looking for;
		SV2	There is information/flow from several public services in terms of social services;
		SV3	The service menu (FAQ) can be opened and there is a list of questions and answers to problems;
		SV4	There is a Link menu that can connect other applications that are integrated with the Lampung Provincial Social Service website.

D. Determining Sample Size

Questionnaires of PIECES framework were distributed to respondents who visited the Lampung Provincial Social Service website. For the selected population, there are Human Resources and Social Welfare Resources (SDM PSKS) Lampung Provincial in 2021 under the guidance of The Field of Social

Protection and Security with a total of 2166 people, which can be seen in Table 3.

Table 3. Proportion of Respondent Sample

No.	Cluster	Population	(fi)	(ni)
1.	SDM PKH	1.684	0,78	263
2.	TAGANA	444	0,20	69
3.	PORDAM	38	0,02	6
Sum		2.166		338

Human Resources tasked with overseeing and accompanying the business process of the Family Hope Program (PKH), one of the flagship programs of the Ministry of Social Affairs. TAGANA are social volunteers or Social Welfare Workers from the community who have concern and are active in disaster management in the field of social protection. Pordam are social volunteers whose job is to assist in handling and anticipating social conflicts in the community.

Furthermore, the answer data were collected and summarized, as many as 338 respondents who filled out the questionnaire, 77.8% worked as SDM PKH, 20.4% worked as Tagana and 1.8% worked as Pelopor Perdamian which can be seen in Fig. 2.

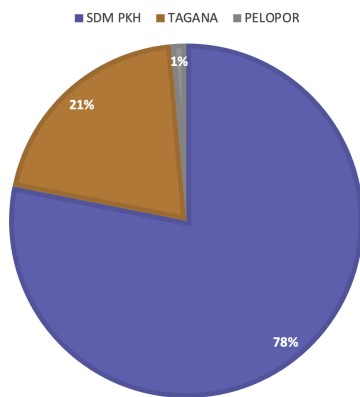


Fig. 2. Percentage respondent's profession category.

As for the age criteria as much as 62.4% have an age between 31 to 40 years, 22.8% have an age above 41 years and 14.8% have an age between 21 to 30 years, can be seen in Fig. 3.

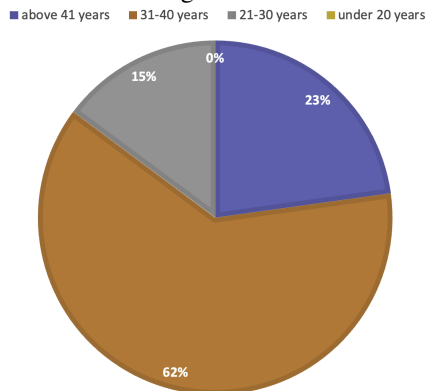


Fig. 3. Percentage respondent's age category.

E. Validity Test

Validity testing of the questionnaire; Of the 27 statements given to the respondents, it is counted that

all of these statements have an Rcount that is greater than the Rtable. In Table 4, all statement indicators have an Rcount value greater than Rtable so that all statement indicators on the PIECES framework instrument used are all declared valid.

Table 4. Validity Questionnaire Test Result [21]

Indicator Code	Rcount	Rtable	Description
PC1	0,599	0,107	Valid
PC2	0,652	0,107	Valid
PC3	0,468	0,107	Valid
PC4	0,536	0,107	Valid
PC5	0,679	0,107	Valid
PC6	0,690	0,107	Valid
PC7	0,602	0,107	Valid
PC8	0,425	0,107	Valid
ID1	0,929	0,107	Valid
ID2	0,932	0,107	Valid
ID3	0,834	0,107	Valid
ID4	0,933	0,107	Valid
ID5	0,865	0,107	Valid
EC1	0,914	0,107	Valid
EC2	0,913	0,107	Valid
EC3	0,925	0,107	Valid
CS1	0,805	0,107	Valid
CS2	0,675	0,107	Valid
CS3	0,566	0,107	Valid
CS4	0,348	0,107	Valid
EF1	0,631	0,107	Valid
EF2	0,429	0,107	Valid
EF3	0,711	0,107	Valid
SV1	0,847	0,107	Valid
SV2	0,254	0,107	Valid
SV3	0,877	0,107	Valid
SV4	0,868	0,107	Valid

F. Reliability Test

Reliability testing of the questionnaire; of the 6 PIECES framework domains is greater than the minimum value of Cronbach's Alpha (α) which is 0.6. So it can be concluded in Table 5, that the PIECES framework questionnaire used is really reliable.

Table 5. Reliability Questionnaire Test Result [22]

No.	Domain	Cronbach's Alpha	Result
1	Performance (PC)	0,739	Reliable
2	Information & Data (ID)	0,826	Reliable
3	Economics (EC)	0,867	Reliable
4	Control & Security (CS)	0,729	Reliable
5	Efficiency (EF)	0,692	Reliable
6	Service (SV)	0,797	Reliable

G. Data Analysis using PIECES Framework

To perform data analyze, the mean value of each statement included in the survey was determined. However, before determining the average, the class interval value must be known to determine website characteristics using (2).

$$i = \frac{r}{k} = \frac{5 - 1}{5} = \frac{4}{5} = 0.8 \tag{2}$$

The obtained class interval value is 0.8. Thus, based on the combination Likert scale and class intervals, it

Table 6. Satisfaction Characteristics [23]

No	Scale	Satisfaction Level
1	1.00 – 1.80	Bad
2	1.81 – 2.61	Poor
3	2.62 – 3.42	Moderate
4	3.43 – 4.23	Good
5	4.24 – 5.00	Excellent

will produce Satisfaction Characteristics that can be seen at Table 6.

The results of distributing questionnaires to 338 people from 3 different professional groups were summarized using class interval expressions, averaged, and measured based on the evaluation of the characteristics of each domain of PIECES framework. The results of the Satisfaction Average (SA) for each domain derived from the Total Questionnaire Score (TS) divided by the Number of Questionnaires (NQ) [24].

- a) From the results of calculations and analysis for the **Performance** domain, there are 8 articulation statements that are identified with the website performance as shown in Table 7.

Table 7. A score of Performance Domain [25]

Performance Domain					
Indic. Code	Level 1	Level 2	Level 3	Level 4	Level 5
	5	4	3	2	1
PC-1	66	140	132	0	0
PC-2	63	165	110	0	0
PC-3	65	254	18	1	0
PC-4	15	104	195	24	0
PC-5	34	118	157	29	0
PC-6	17	134	169	18	0
PC-7	48	101	135	54	0
PC-8	28	136	161	12	1
Total	336	1.151	1.074	136	1

$$SA = \frac{(5 \cdot 336) + (4 \cdot 1152) + (3 \cdot 1077) + (2 \cdot 138) + (1 \cdot 1)}{2704} = 3.62 \quad (3)$$

Based on (3), satisfaction score average from Performance domain assessment gets value 3.62, and based on Table Satisfaction Characteristics Scale are in **GOOD** category. So this shows a positive sign that reliability from website performance in the process something order already could accept and run with good and without obstacle.

- b) From the results of calculations and analysis for the **Informations & Data** domain, there're 5 articulation statements that are identified with Informations & Data website as shown in Table 8.

$$SA = \frac{(5 \cdot 84) + (4 \cdot 457) + (3 \cdot 201) + (2 \cdot 550) + (1 \cdot 398)}{1690} = 2.57 \quad (4)$$

Based on (4), satisfaction score average from Informations and Data domain assessment get

Table 8. A Score of Informations and Data Domain

Informations and Data Domain					
Indic. Code	Level 1	Level 2	Level 3	Level 4	Level 5
	5	4	3	2	1
ID-1	9	87	15	93	134
ID-2	14	82	11	89	142
ID-3	20	107	62	144	5
ID-4	15	87	47	77	112
ID-5	26	94	66	147	5
Total	84	457	201	550	398

value 2.57, and based on Table Satisfaction Characteristics Scale are in **POOR** category. So this shows a negative sign that the website is not capable produce output, input data as well as stored and processing information and data so that no could be received either by the user.

- c) From the result of calculations and analysis for **Economics** domain, there are 3 articulation statements that are identified with economic values on the website, shown in Table 9.

Table 9. A Score Economics Domain

Economics Domain					
Indic. Code	Level 1	Level 2	Level 3	Level 4	Level 5
	5	4	3	2	1
EC-1	38	117	137	46	0
EC-2	37	98	88	115	0
EC-3	44	102	148	44	0
Total	119	317	373	205	0

$$SA = \frac{(5 \cdot 119) + (4 \cdot 317) + (3 \cdot 373) + (2 \cdot 205) + (1 \cdot 0)}{1014} = 3.35 \quad (5)$$

Based on (5), satisfaction score average from Economics domain assessment get value 3.35, and based on Table Satisfaction Characteristics Scale are in **MODERATE** category. So this shows that less result maximum from costs that have been issued after Social Service applies system information. System website information is not yet capable give more profit good to the Social Service, even though score economy this enter in category enough.

- d) From the result of calculations and analysis for **Control or Security** domain, there are 4 articulation statements that are identified with the value of control or security on the website, shown in Table 10.

Table 10. A Score Control or Security Domain

Control or Security Domain					
Indic. Code	Level 1	Level 2	Level 3	Level 4	Level 5
	5	4	3	2	1
SV-1	17	72	10	167	72
SV-2	64	181	93	0	0
SV-3	3	56	10	143	126
SV-4	1	60	12	160	105
Total	85	369	125	470	303

$$SA = \frac{(5 \cdot 232) + (4 \cdot 617) + (3 \cdot 260)}{1352} + \frac{(2 \cdot 230) + (1 \cdot 13)}{1352} = 3.61 \quad (6)$$

Based on (6), satisfactions score average from Control or Security domain assessment get value 3.61, and based on Table Satisfaction Characteristics Scale are in **GOOD** category. So this shows a positive sign that Control or Security of the website has been enough fine, so party from the outside system does not easily enter and destroy the running system.

- e) From the result of calculation and analysis for **Efficiency** domain, there are 3 articulation statements that are identified with the superiority value of the website, shown in Table 11.

Table 11. A Score Efficiency Domain

Indic. Code	Efficiency Domain				
	Level 1 5	Level 2 4	Level 3 3	Level 4 2	Level 5 1
CS-1	89	148	98	3	0
CS-2	3	89	244	2	0
CS-3	5	59	157	117	0
Total	97	296	499	122	0

$$SA = \frac{(5 \cdot 97) + (4 \cdot 296) + (3 \cdot 499)}{1014} + \frac{(2 \cdot 122) + (1 \cdot 0)}{1014} = 3.36 \quad (7)$$

Based on (7), satisfaction score Average from Efficiency domain assessment get value 3,36, and based on Table Characteristics Website users are in **MODERATE** category. So this shows that fewer results have a score advantage, not many changes what you get from using the system manually.

- f) From the result of calculations and analysis for Service domain, there are 4 articulation statements that are identified with the value of Service on the website, shown in Table 12.

Table 12. A Score Service Domain

Indic. Code	Service Domain				
	Level 1 5	Level 2 4	Level 3 3	Level 4 2	Level 5 1
SV-1	17	72	10	167	72
SV-2	64	181	93	0	0
SV-3	3	56	10	143	126
SV-4	1	60	12	160	105
Total	85	369	125	470	303

$$SA = \frac{(5 \cdot 85) + (4 \cdot 369) + (3 \cdot 125)}{1352} + \frac{(2 \cdot 470) + (1 \cdot 303)}{1352} = 2.60 \quad (8)$$

Based on (8), satisfaction score average from **Service** domain assessment get value 2.60, and based on Table Satisfaction Characteristics Scale are in

POOR category. So this shows a negative sign that the website does not yet give good service to users, so users do not yet feel interested and satisfied with the service information provided by the Social Service website.

Finally, the results from the PIECES framework questionnaire can be seen in Fig. 4.

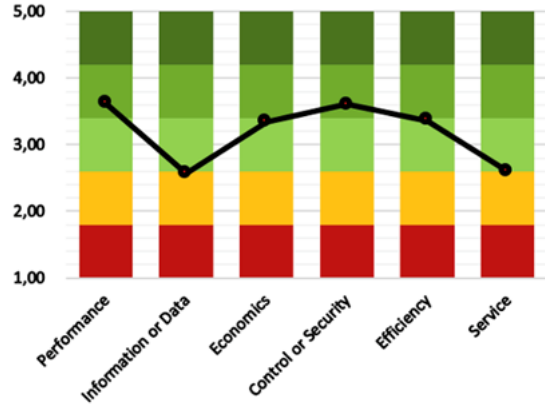


Fig. 4. Percentage respondent's age category.

IV. CONCLUSION

This study uses the PIECES framework to develop and improve the Lampung Provincial Social Service system with some successes. PIECES framework successfully identified the Lampung Provincial Social Service website problems based on 338 sample respondents. As a result, it could be concluded from each domain as follow.

- 1) The Performance domain scores 3.62 points (Good), the Information or Data domain scores 2.57 points (Poor), and the Economics domain scores 3.35 points (Moderate).
- 2) The Control or Security domain scores 3.61 points (Good). It shows that the control and security of the website are good enough so that parties from outside the system cannot enter easily and damage the running system;
- 3) The Efficiency domain scores 3.36 points (Moderate). It shows that the moderate result does not change the overall results obtained from the system.
- 4) Finally, the Service domain scores 2.60 points (Poor), which shows that the website does not provide good service to users. Thus, users do not feel interested and satisfied with the information services provided by the Social Service website.

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