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Application of the Pieces Method in the Analysis and Evaluation of Satisfaction Levels in SMARD Applications

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ABSTRACT

At this time, technological advances are developing rapidly, and many have taken advantage of technology to help and facilitate the data processing process for users, one of which is in the office. There is a data processing and data transmission application developed by official organizations, the Population and Civil Registration Office of Semarang Regency has a division or section that develops a data processing application called SMARD. This study aims to obtain what affects the satisfaction of every SMARD application user. The method used to analyze and evaluate the level of user satisfaction in the SMARD application is PIECES (performance, information, economics, control, efficiency, and service). This study uses a quantitative approach, performance, information, economy, control, efficiency, and service. The average result of SMARD application user satisfaction reached 4.03. It means that users are satisfied with the SMARD application.

Introduction

Technological advances are something that cannot be avoided in daily life because every technology is created to provide benefits in human life. Technology provides a lot of convenience and flexibility for every human activity. Every human being has enjoyed the many benefits that have been produced by every technology with innovations that are always evolving. In the current era, technology is a reference for every country so that it can be considered a developed country. Meanwhile, a country that cannot adapt to technology is considered a failed country (Alshaheen, 2018).

The development of applications by each service institution is the first step in the development of information systems in the service, where the sending of population data is an important means that aims to accelerate the service performance process. The Population and Civil Registration Office (Disdukcapil) of Semarang Regency is one of the implementers of public administration services in the Semarang Regency area. This population service includes population registration and civil registration. Registration includes the creation of Family Cards (KK), Electronic Identity Cards (KTP-EL), moving letters, and Child Identity Cards (KIA), while civil registration includes making citations

of birth certificates, citations of death certificates, citations of divorce certificates, recording of child recognition and legalization of children, recording of name changes, and recording of changes in nationality (Alshaheen, 2018).

The Population and Civil Registration Office has created an application innovation that can facilitate the sending of data and files from villages, sub-districts, and offices. SMARD is an application from the Capil Office formed by the Capil Office Information System section team. SMARD was originally an application used by villages and sub-districts to the Civil Service Office, but now SMARD has been developed into a service application from each village which will later be directed by village officials to operators from each sub-district and delivered directly to the district office. The apparatus from the village is of course not as long as it is appointed which must meet the criteria and later will be chosen by the regent, while the sub-district operator is selected from the capital office.

With the SMARD application that has been developed, of course, it is necessary to identify problems to find out the satisfaction of operator users and the efficiency of the SMARD application. One of the methods that can be used to evaluate is to use the PIECES method which has variables, namely performance, information, economics, control, efficiency, and service (Aggelidis & Chatzoglou, 2012). By conducting an analysis using the PIECES method, it is hoped that it can provide an assessment of the application of SMARD, and it is hoped that it can be a reference for continuous development (Arvianto, 2023). The SMARD application itself has had several complaints over the past 1 year that have made users troublesome, complaints that often occur include bugs in the application, difficulty connecting databases, and database errors.

The purpose of this study is to evaluate the level of user satisfaction and efficiency of the SMARD application. This study will discuss what are the problems that often occur in the use of the SMARD application and also user satisfaction from the variables Performance, Information, Data, Economy, Control, Efficiency, and Service of the SMARD application

PIECES evaluation is a framework developed by James Weatherby to analyze both manual and computerized systems (Brown, 2023). By using PIECES as a system analysis tool (Putri & Indriyanti, 2021), a detailed and comprehensive system will receive special attention, so that the strengths and weaknesses of the system can be known to later be used as a reference for the company's future progress.

The PIECES framework has six categories in calculation and problem-solving, namely Performance, Information and Data, Economics, Control and Security, Efficiency, and Service (Fahmi, Zulkieflimansyah, & Esabella, 2022). This variable will be used to find out the problems that occur in the application.

Method

This study uses a data collection methodology and data analysis method, the results of data collection, then the data obtained will be analyzed, to present the data or information needed to overcome the problems and shortcomings in this research.

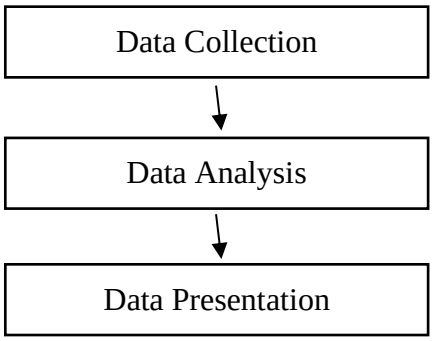

Figure 1. Research Stages

The stages of research carried out as shown in the example image above start from collecting data from each sub-district and civil registry office regarding problems that often occur when operating the SMARD application. Next is the data analysis process where the data from the survey results will later be processed by the PIECES Framework (Arfian, Yana, Sulaiman, & Astrilyana, 2022), then the results of the data analysis will be presented in the form of information on what problems often occur from each sub-district and population and civil registry office.

There are 3 data collection methods used in this study, namely observation, interviews, and questionnaires. Observation is a method of collecting data by observing directly in the field (Apriliawati, Irawati, & Styati, 2020). This study conducts observations and surveys by paying attention to and following every technological guidance carried out in each sub-district (Ranjan & Vinayak, 2020), accompanied by recording the necessary data. Interviews for data collection regarding the system and database used were conducted directly with resource persons who understood the SMARD application, as well as discussing problems that often occurred and also solutions for the development of the SMARD application. Furthermore, a questionnaire will be shared where each question containing the PIECES domain will be shared to get more valid data (Putra, 2018).

The method used in this study uses the PIECES method because, in the PIECES analysis, there is a framework to classify problems or problems based on performance, information, economics, control, efficiency, and service (Muliansah & Budihartanti, 2020). The data used in data collection uses a Likert scale which is to measure the perception or level of satisfaction about the condition of the application. Later the score selection will be rated as follows:

Table 1
Likert Scale

Answer	Criterion	Score
Highly satisfied	SP	5
Agree Satisfied	P	4
Enough	C	3
Dissatisfied	TP	2
Very Dissatisfied	STEP	1

The research in analyzing the use of SMARD applications uses the PIECES method. The researcher chose this method as a data analysis technique to measure the level of satisfaction which has six variables. Performance on this variable is analyzed to find out how the application system performs. The information on this variable is analyzed to find out how much and how the information has been obtained. Economics on this variable is an analysis carried out to find out whether the quality of service is proportional to the cost or tariff incurred for application development. Control and Security variables are used to analyze and later be able to find out the level of difficulty and security when using the application. Efficiency is an analysis that is carried out to find out whether the variable is efficient or not with a small input can produce a satisfactory output. The last is the service where continua will be analyzed, this is done to find out how the service is carried out to find out how the service is provided and problems or service disruptions.

To get the average satisfaction level of SMARD application users, you can use the formula (Ledro, Nosella, & Vinelli, 2022):

$$RK = \frac{JSK}{JK}$$

Where:
RK = Average satisfaction
JSK = Total Score from the questionnaire
JK = Number of questionnaires

In PIECES, there are 6 variables including Performance, Information, Economy, Control, Efficiency, and Service. The following are the variable tables and the characteristics of the PIECES method:

Table 2
Number of Questions for Each Variable

Variable	Number of Questions
Performance	4
Information	2
Economy	2
Control	3
Efficacy	2
Service	4

In determining the level of satisfaction analysis, it is necessary to calculate the average score of each questionnaire that has been prepared. Therefore, the model created by Kaplan and Norton [13] was used. It can be seen in the table below:

Table 3
Assessment Characteristics

Scale	Valuation
4.92 – 5	Highly satisfied
3.4 – 4.91	Satisfied
2.6 – 3.39	Enough
1.8 – 2.59	Dissatisfied
1 – 1.79	Very Dissatisfied

Results and Discussion

Based on the results of the questionnaire adapted to the users of the analysis application in measuring user satisfaction with the SMARD application, it can be measured using the Likert scale to determine the level of satisfaction with the SMARD application. The following are the results of the analysis of user satisfaction reduction data on the SMARD application using the PIECES method:

Performance

Table 4. Performance Indicators

It	Question	Respondents				
		SP	P	C	TP	STEP
1	SMARD Information System is very accessible to users	12	18			
2	The performance of the SMARD information system has been running stably	2	21	7		
3	The time used when processing data to produce information has been done quickly	8	22			
4	The amount of data that can be processed by the SMARD information system in a unit of time is by expectations.		15	8	7	
	Sum:	22	76	15	7	

$$RK = \frac{(22 * 5) + (76 * 4) + (15 * 3) + (7 * 2) + (0 * 1)}{22 + 76 + 15 + 7} = 3.94$$

Based on the results of the calculation of the average satisfaction level obtained, the value is 3.94 on the Performance variable. User satisfaction means that it can be said to be SATISFIED. We can conclude that the quality of performance provided by the SMARD application still plays a good role.

Information and Data

Table 5
Information and Data Indicators

It	Question	Respondents				
		SP	**P**	**C**	**TP**	**STEP**
1	The SMARD Information System cannot store the same data, resulting in duplication	1	25	4		
2	Data containing errors or incorrect data cannot be stored by the SMARD information system	16	14			
	Sum:	17	39	4		

$$RK = \frac{(17 * 5) + (39 * 4) + (4 * 3) + (0 * 2) + (0 * 1)}{17 + 39 + 4} = 4.21$$

Based on the results of the calculation of the average satisfaction level obtained, the value is 4.21 in the Information and Data variable. User satisfaction means that it can be said to be SATISFIED. We can conclude that the information and data presented by the SMARD application can be well received.

Economy

Table 6
Economy Indicators

It	Question	Respondents				
		SP	**P**	**C**	**TP**	**STEP**
1	At the time of the construction and implementation of the SMARD information system, the costs incurred by the company were quite high.		26	4		
2	There have been significant changes in terms of development and growth with the SMARD information system	9	21			
	Sum:	9	47	4		

$$RK = \frac{(9 * 5) + (47 * 4) + (4 * 3) + (0 * 2) + (0 * 1)}{9 + 47 + 4} = 4.08$$

Based on the results of the calculation, the average satisfaction level obtained is 4.08 on the Economy variable. User satisfaction means that it can be said to be SATISFIED. We can conclude that the economy used can be said to be appropriate and feasible with the costs incurred.

Control and Security

Table 7
Control and Security Indicators

It	Question	Respondents				
		SP	**P**	**C**	**TP**	**STEP**
1	The form of security contained in the SMARD information system can protect data or information from various forms of fraud or crime.	6	18	6		
2	The security system in the information system is good.	6	19	5		
3	Storage media can organize data well	1	26	3		
	Sum:	13	63	14		

$$RK = \frac{(13 * 5) + (63 * 4) + (14 * 3) + (0 * 2) + (0 * 1)}{13 + 63 + 14} = 3.98$$

Based on the results of the calculation, the average satisfaction level obtained is 3.98 on the Control and Security variables. User satisfaction means that it can be said to be SATISFIED. We can conclude that the quality of security and control provided by the SMARD application is good.

Efficiency

Table 8
Efficiency Indicator

It	Question	Respondents				
		SP	**P**	**C**	**TP**	**STEP**
1	The system used now is easier for users both in terms of cost and time	23	7			
2	In operating the system on the daily SMARD activity, the system can avoid the corresponding output.		21		9	
	Sum:	23	28		9	

$$RK = \frac{(23 * 5) + (28 * 4) + (0 * 3) + (9 * 2) + (0 * 1)}{23 + 28 + 9} = 4.08$$

Based on the results of the calculation of the average satisfaction level obtained, the value is 4.08 on the Efficiency variable. User satisfaction means that it can be said to be

SATISFIED. We can conclude that although the system sometimes does not produce the appropriate output, the user of the SMARD application can still receive it well.

Service

Table 9
Service Indicators

It	Question	Respondents				
		SP	**P**	**C**	**TP**	**STEP**
1	SMARD Information System is easy to use	3	27			
2	SMARD Information System is flexible when used for new situations		28	2		
3	SMARD Information System can be flexibly changed	1	29			
4	SMARD Information System can provide you with satisfaction as a user to upload and receive information		20	10		
	Sum:	4	104	12		

$$RK = \frac{(4 * 5) + (104 * 4) + (12 * 3) + (0 * 2) + (0 * 1)}{4 + 104 + 12} = 3.93$$

Based on the results of the calculation, the average satisfaction level obtained is 3.93 on the Service variable. User satisfaction means that it can be said to be SATISFIED. We can conclude that the quality of service provided by the SMARD application development team can be said to be good.

Table 10
Overall Average of PIECES Variable Values

Variable	Average Score
Performance	3.94
Information and Data	4.21
Economy	4.08
Control and Security	3.98
Efficiency	4.08
Service	3.93
Average Amount	**4.03**

Based on the calculation using the Likert scale on each variable Performance, Information, and Data, Economy, Control and Security, Efficiency, Service, the average

number of user satisfaction levels with a value of 4.03 is obtained, then it can be concluded that the user satisfaction level of the SMARD application is included in the SATISFIED category.

Conclusion

From the research that has been carried out by looking for the results of calculations and data analysis using the PIECES method, it can be concluded that the SMARD application used by users such as employees can be satisfied with an average score of 4.03. This result shows that users of the SMARD application can be said to be satisfied with the performance of the system that has been developed so far. Overall, this study can show which variables must be further developed and improved such as Performance, Service, and Control and Security where the average value of each of these variables is below 4.00, this result can also be an aspect for SMARD application developers to be improved and developed again. Of course, this is expected to provide a deeper understanding and tell you about Performance, Information and Data, Economy, Control and Security, Efficiency, and Service from the SMARD application. With this demikin, this research can make a meaningful contribution to the SMARD application system and is expected to be a reference for future studies as well as for interested parties in the development of the SMARD application system.

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