

Evaluation of e-Service Quality Impacts Customer Satisfaction: One-Gate Integrated Service Application in Indonesian Weather Agency

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Abstract—Badan Meteorologi, Klimatologi, dan Geofisika (BMKG) is the weather agency in Indonesia. It has One-Gate Integrated Service Application, also known as *Pelayanan Terpadu Satu Pintu (PTSP) BMKG Application*, which is a web-based e-commerce concept application. Its goal is to provide users with information and services related to Meteorology, Climatology, and Geophysics (MCG) by using information and communication technology. This is part of Indonesia's move toward e-government. Since January 2020, all MCG service and information activities through PTSP BMKG must be done using the application. With a questionnaire and multivariate analysis, this study aims to determine how the quality of service affects customer satisfaction with the PTSP BMKG application. Scientists use the E-S-Qual scale to prove that it works and is a good measure. The results of this study show that customer satisfaction is affected positively and significantly by efficiency, fulfillment, system availability, and privacy simultaneously. Partially, customer satisfaction with the PTSP BMKG application is affected positively and considerably by how well the application works and how well it meets customers' needs. This has implications for the evaluation that BMKG needs to do.

Keywords—e-Service quality; one-gate integrated service; e-government; multivariate analysis; Partial Least Square (PLS); Structural Equation Model (SEM)

I. INTRODUCTION

The advancement of Information and Communication Technology (ICT) has provided convenience in social interaction, including in delivering public goods to the community [1]. The era of globalization, with the development of the ICT field, encourages a new paradigm, namely e-government, which is a reform of the implementation of government that refers to public information disclosure and gives responsibility to the government to provide information about government activities. Information technology is believed to have an essential role in changing the conventional way of doing government work to be more efficient and effective. Information technology is also one of the keys to supporting the implementation of e-government and good governance through increased government transparency and accountability.

Badan Meteorologi, Klimatologi dan Geofisika (BMKG), is tasked with carrying out government duties in meteorology, climatology, and geophysics [2][3]. It has been explained in the Presidential Regulation of the Republic of Indonesia Number 61 of 2008 that the need for data and information in the fields

of meteorology, climatology, and geophysics is necessary not only to support national development but also to protect society and minimize the impact of damage caused by disasters caused by nature. In all elements of the BMKG environment, in performing its duties, the BMKG must apply the principles of coordination, integration, and synchronization within the internal BMKG and in relations between central and regional government agencies [2][3].

The Public Service Act has mandated that every government institution establish an integrated service system formally and legally. Every institution has the right to have the authority to make public policies to provide services and increase participation in empowering society [4].

BMKG One-Gate Integrated Service Application, also known as PTSP BMKG Application is a web-based application intended to provide information and services related to MCG for users by utilizing information and communication technology so that it is hoped that public services can be achieved optimally in the digital transformation towards e-Government. PTSP BMKG application is currently focused on serving requests for data and information to customers, both individuals from the community and companies from Indonesia. Based on information from BMKG employees who participated in the development, this application is designed like a marketplace or e-commerce. e-Commerce refers to business conducted electronically or over the internet. Generally, it refers to individuals who use the internet to either purchase and sell goods or give paid services through payments and data flows [5][6]. In PTSP BMKG Application, Customers can choose the type of data, information, or services they want by entering the shopping cart, paying, and information can be downloaded on the application. The application can be accessed at <https://ptsp.bmkg.go.id/>.

Since January 2020, all MCG service and information activities through PTSP BMKG must be served using the application. Many complaints are related to services and information reported through the PTSP BMKG application. Of course, if not handled, the complaint will have a destructive impact on the government, especially the BMKG. Even worse is that it can generate distrust from users. In addition, based on Community Satisfaction Index Report in 2022 by the BMKG Database Center, the value of the "system" aspect experienced the highest decline. This component has an index value of 3.96 with a percentage of 79.12 percent in 2021, but it only reached a value of 3.81 with 76.29 percent in 2022. This can mean that

public satisfaction with the service system has decreased. Therefore, it is necessary to evaluate public services to direct actions that can positively impact the quality of services provided by the government [7].

Based on information from one of the BMKG Public Relations division employees, BMKG has surveyed customer satisfaction. Still, it has yet to include ICT aspects, especially web applications used by customers to obtain MCG services. Therefore, BMKG itself doesn't know whether there is an influence in terms of web quality on customer satisfaction in using the service.

e-Service Quality is a way to determine how a website can facilitate user activities that include product purchase and delivery transactions efficiently and effectively [8]. There are several measures for evaluating the quality of electronic services in the literature. The E-S-Qual measurement scale developed by Parasuraman et al. (2005) is well regarded and utilized by scientists to validate this scale's effectiveness [9][10][11]. To quantify the quality of electronic services more accurately from an e-commerce standpoint, this method successfully considers the concerns highlighted while maintaining the fundamental principles of E-S-Qual [12]. However, from previous studies [13][14][15], not all dimensions or variables of E-S-Qual can be accepted from hypothesis testing, so in this study, the authors tried to retest the dimensions contained in E-S-Qual for case the PTSP BMKG website as one of the government services, which has the concept of e-commerce. This study also aims to analyze the effect of service quality on customer satisfaction in using the PTSP BMKG application as one of the steps to evaluate BMKG services.

The study was organized into five sections. The first section is an introduction containing the research's background and objectives. The second section is a literature study containing previous research, explanations of fundamental theories, and conceptual framework. The third section describes the research methodology. The results and discussion are described in the fourth section. Finally, our work on this paper is concluded in the last section.

II. STUDY OF LITERATURE

A. Previous Research

We construct in this study a theoretical framework based on prior research on the measurement of E-S-Qual. Consider several dependent and independent variables, such as efficiency, fulfillment, system availability, and privacy, as a calculation of customer satisfaction.

Ahmed et al. (2020) used the E-S-Qual model to analyze customer satisfaction, the quality of electronic banking services, and the direct relationship between these two variables. The immediate research results showed that the E-S-Qual dimensions positively and significantly influenced customer satisfaction. The results of the indirect connection showed that customer satisfaction and E-S-Qual dimensions are mediated by perceived value and trust [13].

The E-S-Qual model has been the subject of more studies. The E-S-Qual technique is used by Dastane et al. (2018) to

research service aspects impacting customer satisfaction and loyalty. As a result, although efficiency, system availability, and responsiveness have no direct or indirect influence on customer happiness, fulfillment and security immediately impact it [14].

Research using E-S-Qual is also carried out in the public sector. This was done by Shafira (2021), who used the E-S-Qual methodology to research the quality of E-procurement services in Malaysia. In this study, three variables are E-S-Qual: efficiency, privacy, and system availability. The result is that efficiency, privacy, and system availability impact user satisfaction [15].

Based on these three studies, we need to retest all dimensions of the PTSP BMKG application used by BMKG to serve its users.

B. E-S-Qual

The functional performance of a service when clients shop, buy and get it via electronic media is known as "e-service quality" [6][9]. In obtaining services and information from BMKG, customers are currently using electronic-based services, so electronic media presently facilitate the interaction between sellers and buyers in the form of sites specifically designed to carry out buying and selling transactions.

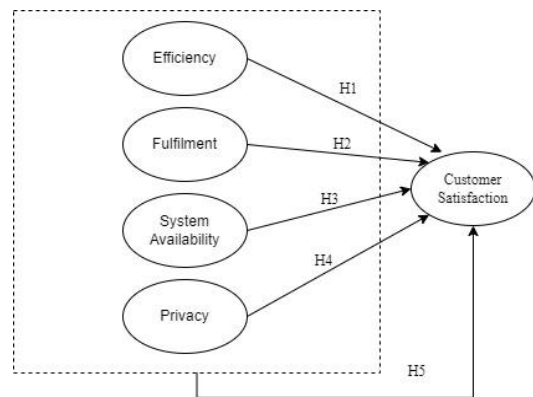


Fig. 1. Conceptual model

Several professionals have created electronic service quality measuring scales in various versions. One is E-S-Qual, which Parasuraman et al. created [9][11]. They argue that pre-existing measurement scale instruments still need to improve assessing the quality of electronic services because measurements cover only some stages in the interaction between users and services. Therefore, they developed two measurement scales, E-S-Qual, and E-RecS-Qual. There are four dimensions of E-S-Qual, including:

- Efficiency: The simplicity and quickness of utilizing the website.
- Fulfillment: How well the website delivers on its claims about order fulfillment and item availability.
- System Availability: the website's proper technical operation.
- Privacy: The website's level of security and privacy protection.

When an issue occurs throughout the service delivery process for customers, the E-RecS-Qual scale is used to gauge the quality of e-services [9]. In this study, the E-Recs-Qual scale was not included because in getting the service, customers can download data and information that has been ordered on the application or directly take it to the BMKG office.

C. Customer Satisfaction

According to Tjiptono, Customer satisfaction is the personal feeling of joy or disappointment generated by comparing perceived product performance (or results) with expected expectations [16]. In this study, we use several indicators of consumer satisfaction consisting of [17][18]:

- Expectation Conformity: Correspondence between consumer expectations and consumer perceptions.
- Returning Interest: Consumer willingness to revisit or reuse related services.
- Willingness to Recommend: Willingness of consumers to recommend recognized services to friends and family.

D. Conceptual Framework

Based on the theory in the literature study, Fig. 1 describes a research model that can be compiled that will be used to test the dimensions or variables of E-S-Qual on the PTSP BMKG application against its customer satisfaction.

From previous research, it is said that dependent and independent variables such as efficiency, fulfillment, system availability, and privacy have a positive effect as a calculation of customer satisfaction [13], so a hypothesis can be compiled in Table I.

TABLE I. HYPOTHESIS

Code	Description
H1	Efficiency positively and significantly affects customer satisfaction using PTSP BMKG Application.
H2	Fulfillment positively and significantly affects customer satisfaction using PTSP BMKG Application.
H3	System availability positively and significantly affects customer satisfaction using PTSP BMKG Application.
H4	Privacy positively and significantly affects customer satisfaction in using PTSP BMKG Application.
H5	Efficiency, Fulfillment, System Availability, and Privacy simultaneously positively and significantly impact Customer Satisfaction using PTSP BMKG Application.

Based on these five hypotheses, a questionnaire can be prepared. Customers of the PTSP BMKG Application will answer that by adjusting operational conditions.

TABLE II. STATEMENT OF QUESTIONNAIRE

Indicators (code)	Statement
Efficiency (X1)	<ol style="list-style-type: none"> 1. PTSP BMKG application makes it easy to explore what is needed related to Meteorology, Climatology, and Geophysics services and information [9][11]. 2. PTSP BMKG application makes it easy to quickly complete service transactions and information on Meteorology, Climatology, and Geophysics [9] [11]. 3. PTSP BMKG application can load pages quickly [9][11]. 4. All features in the PTSP BMKG application are well organized [9][11]. 5. The information in the PTSP BMKG application is well organized [9][11].
Fulfillment (X2)	<ol style="list-style-type: none"> 1. PTSP BMKG application provides services according to what you need [9][11]. 2. PTSP BMKG application following the public service offer (completed within 14 working days) [9][11]. 3. PTSP BMKG application responds quickly to requests for services and information [9][11].
System Availability (X3)	<ol style="list-style-type: none"> 1. PTSP BMKG application is always available when the user needs it [9][11]. 2. PTSP BMKG application rarely experiences errors [9][11].
Privacy (X4)	<ol style="list-style-type: none"> 1. PTSP BMKG application doesn't disseminate customer personal information to other parties [9][11]. 2. PTSP BMKG application protects the personal information of its users [9][11].
Customer Satisfaction (Y1)	<ol style="list-style-type: none"> 1. Customers are satisfied with the service of the PTSP BMKG application because the application service is in line with expectations. [17][18] 2. Customers are satisfied with the PTSP BMKG application service, so they are interested in reusing it. [17][18] 3. Customers are satisfied with PTSP BMKG application service to say positive things about the application to others [17][18]

III. METHODOLOGY

This research is a quantitative study using primary data obtained from questionnaires. In Table II, the questionnaire is prepared based on the variables E-S-Qual and customer satisfaction. In each variable, statements are mapped based on the dimensions and indicators of each variable. The compiled questionnaire will be distributed to customers BMKG One-Gate Integrated Service Application. The stages of the study can be seen on the Fig. 2.

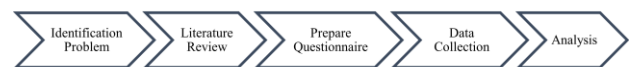


Fig. 2. The stages of study

A. Data Collection

Data collection is carried out at BMKG by providing an online questionnaire that customers of the PTSP BMKG Application can fill out. The requirement to fill out the questionnaire is that the customer has transacted using the PTSP BMKG application. The population of this study is customers who have been registered and have used the PTSP BMKG application to obtain data and information from BMKG. However, in this study, using sampling, the number of respondents in this study was 72 respondents. A total of 85 respondents were distributed online questionnaires using email by attaching a google form link, assisted by the admin of the PTSP BMKG application; 13 customers did not fill out the questionnaire. The respondent's demographic profile of the data collection can be seen in Table III.

TABLE III. RESPONDENT'S DEMOGRAPHIC PROFILE

Items	Categories	Percentage
Gender	Male	68
	Female	32
Educational Background	High School	13
	The diploma I/ diploma III	7
	Bachelor's Degree	69
	Master's degree	11
Profession	Civil servant	17
	Private Employee	58
	Students	15
	Entrepreneur	4
	Others	6

The research questionnaire consists of several questions based on the E-S-Qual model and consumer satisfaction indicators. All items are measured using a Likert scale. The Likert scale was modified to clear doubts in respondents using a scale of four, including strongly agree, agree, disagree, and strongly disagree.

B. Analysis

After collecting the questionnaire data, the next step is to process and analyze the data. The data obtained were processed using the *Smart PLS 4* application to test hypotheses and relationships between variables. This study uses a multivariate analysis method by testing the outer and inner models on PLS-SEM. A technique frequently used to process various variables is multivariate analysis [19]. The objective is to simultaneously look for these different variables' effects on an object. According to Hair et al. (2017b), by employing the PLS-SEM model, one can get beyond some of the drawbacks of covariance-based SEM, including data dispersion, limited sample sizes, complex models with numerous indicators, and model construction and testing [19] so that the results of the analysis can be used as the basis for evaluating e-service quality.

IV. RESULTS AND DISCUSSION

A. Assessing Reflective Measurement Models

According to Hair et al. [20], there are four stages in reflective measurement models: delivered *reflective indicator loadings, internal consistency, convergent validity, and discriminant validity*.

TABLE IV. OUTER LOADINGS

Code	Outer Loading	Code	Outer Loading	Code	Outer Loading
X1-1	0.822	X2-1	0.805	X4-1	0.902
X1-2	0.746	X2-2	0.784	X4-2	0.937
X1-3	0.793	X2-3	0.909	Y1-1	0.936
X1-4	0.872	X3-1	0.946	Y1-2	0.922
X1-5	0.855	X3-2	0.839	Y1-3	0.860

Based on Table IV, all outer loading on each indicator has a value above 0.708. More than half of the indicator's variability can be accounted for by the construct, which also ensures a sufficient level of dependability [20]. All indicators can proceed to the next stage.

Internal consistency reliability is the extent to which indicators measuring the same structure are related [19]. When evaluating internal consistency reliability, Joreskog's (1971) composite reliability should almost always be used [21][20]. The range of reliability values from 0.6 to 0.7 is considered "acceptable in research exploration," but the range of reliability values from 0.7 to 0.9 is classified as "satisfactory to good." However, results that are either equal to or higher than 0.95 are unsatisfactory because it is considered that these values are excessive, which can reduce the validity of the construct. Based on Table V, the composite reliability value on the fulfillment construct is the lowest, with a value of 0.873, and the highest in the system availability construct, with a value of 0.933. Therefore, all the construct validity is well accepted and satisfactory.

TABLE V. CONSTRUCT RELIABILITY AND VALIDITY

Indicators	Cronbach's alpha	Composite reliability	The average variance extracted (AVE)
Customer Satisfaction	0.891	0.933	0.822
Efficiency	0.877	0.910	0.671
Fulfillment	0.780	0.873	0.697
System Availability	0.763	0.888	0.799
Privacy	0.819	0.916	0.846

Convergent validity means a set of indicators explained by the construct. Representations can be demonstrated through one-dimensionality that can be expressed using Average Variance Extracted (AVE) values. An adequate convergent validity is defined as a construct's ability to account for more than 50 percent of the variance among its indicators [9][22]. In Table V, the AVE values for all variables are greater than 0.5; therefore, it can be concluded that all the indicators developed for this study demonstrate strong convergent validity [23].

Researchers employ discriminant validity to ensure that each construct's ideas are distinct. The purpose of validity testing is to determine how precisely a measuring instrument performs its measurement function [24]—calculating the discriminant validity of this study using the heterotrait-monotrait (HTMT) ratio. To evaluate the validity of the discriminants, Henseler, Ringle, and Sarstedt (2015) propose an alternative method based on the multitrait-multimethod matrix: HTMT [25][26]. Structural models with similar constructs should have a threshold value of 0.90 [20]. Based on Table VI, all indicators have a value of < 0.90; it can be interpreted that the matter is reasonable to describe the discriminant validity of each indicator used in this study.

TABLE VI. HETERO-TRAIT-MONOTRAIT RATIO OF CORRELATIONS (HTMT)

Indicator	Y1	X1	X2	X4	X3
Y1					
X1	0.783				
X2	0.880	0.898			
X4	0.504	0.585	0.543		
X3	0.540	0.671	0.703	0.571	

B. Assessing Structural Model

The structural model should be checked for collinearity first, as stated by Hair et al. (2017). Examine the structural model's VIF values for each predictor construct [27]. In this study, no collinearity problems were found, which can be seen in Table VII. Collinearity values are still between 0.5 and 3.0. This follows what Cenfetelli & Bassellier (2009) said: It is possible to examine the VIF value, and if it is less than 3.0, multicollinearity is probably not a concern [28]. Testing bivariate correlations between construct scores is an alternate strategy. When the bivariate correlation is greater than 0.50, multicollinearity may impact the path coefficient's magnitude and/or direction [27].

TABLE VII. VIF VALUE

Indicators	Customer Satisfaction
Efficiency	2.572
Fulfillment	2.361
Privacy	1.374
System Availability	1.691

The next step is the significance and relevance of the path coefficients [17][22]. The results of the coefficient path test for direct effect can be seen in Fig. 3. The route coefficients are standardized numbers with a possible range of +1 to -1; however, they only sometimes get close to +1 or -1. This is especially true for large models with many separate structural elements [22]. This study found that efficiency, fulfillment, and system availability have a positive relationship with customer satisfaction, while system availability has a negative association with customer availability.

The following assessment recommended is multiple regression models or the coefficient of determination [27][22]. The coefficient of determination quantifies all endogenous constructions' in-sample prediction accuracy. Because the prediction only estimates the predictive power for the sample data used in the findings, R² should not be generalized to the population (Rigdon, 2012; Sarstedt et al., 2014) [22]. The results of the R² test showed a value of 59.6%. This can mean that 59.6% of customer satisfaction is due to efficiency, fulfillment, system availability, and privacy.

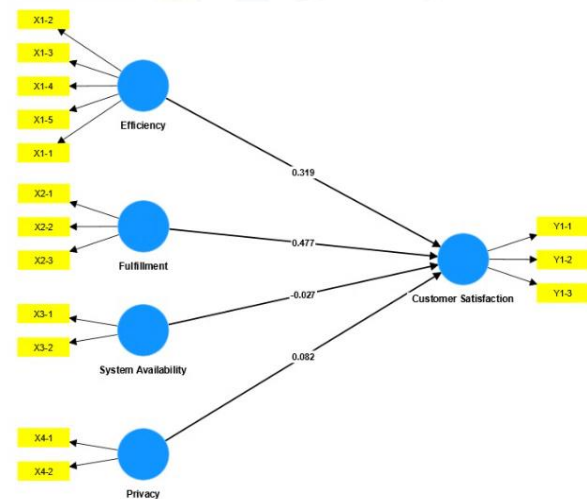


Fig. 3. Path coefficient

C. Hypothesis Testing

The first for hypothesis testing is the assessment of the T-statistics or P-value. The result can be seen in the table for the T-statistics is more than 1.96 ($\alpha = 0,05$) [19] and for P-value less than 0.05 [20]. Based on the T-statistics and P-value in Table VIII, the first hypothesis (H1) is accepted since the score of the T-statistics is 2.086, more than 1.96, and the score of P-value is 0.019, less than 0.05. So that the first hypothesis, Efficiency positively and significantly affects customer satisfaction using the PTSP BMKG Application, is acceptable. Where Efficiency positively and significantly affects customer satisfaction is 31.9%. The effect of efficiency is 31,9% based on a value in the original sample.

The second hypothesis (H2) is validated by the T-statistics shown in Table VIII because the T-statistics score is 3,181, which is more than 1.96, and the P-value is 0.001, which is less than 0.05. So that the second hypothesis is that Fulfillment positively and significantly affects customer satisfaction using PTSP BMKG Application. The second hypothesis is

acceptable. Where Fulfillment positively and significantly affects customer satisfaction is 47.7%. The effect of Fulfillment is 47.7% based on a value in the original sample.

The T-statistics reject the third hypothesis (H3) in Table VIII because its score is 0,211, less than 1.96, and its P-value is 0.416, which is more than 0.05. So, system availability positively and significantly affects customer satisfaction using the PTSP BMKG Application is rejected. Based on the t-statistics, p-value, and original sample, System availability to customer satisfaction is negative and does not significantly affect customer satisfaction.

The fourth hypothesis (H4) is shown to be rejected by the T-statistics in Table VIII because the T-statistics score is 0.767, less than 1.96, and the P-value score is 0.222, more than 0.05. So, privacy positively and significantly affects customer satisfaction in using the PTSP BMKG Application is rejected. Based on the t-statistics, p-value, and original sample, privacy positively impacts customer satisfaction but does not significantly affect customer satisfaction.

TABLE VIII. ORIGINAL SAMPLE, T-STATISTICS, P-VALUES

Code	Original Sample	T-statistics	P-values	Conclusion
H1	0.319	2.082	0.019	Accepted
H2	0.477	3.181	0.001	Accepted
H3	-0.027	0.211	0.416	Rejected
H4	0.082	0.767	0.222	Rejected

To test the fifth hypothesis, we use simultaneous F testing. Simultaneous F tests are intended to find whether concurrently independent variables (simultaneously) impact dependent variables. The F test was performed to prove the impact of all free variables simultaneously on bound variables [24]. The test results found that the F value was 24.9 or greater than the F table, which were 2.51. This follows the fifth hypothesis (H5) that Efficiency, Fulfillment, System Availability, and Privacy simultaneously positively and significantly impact Customer Satisfaction using the PTSP BMKG application. Hence, the results of the fifth hypothesis are acceptable.

TABLE IX. F-SQUARE

Direct Relationship	F-Square	Impact
Efficiency → Customer Satisfaction	0.098	Small
Fulfillment → Customer Satisfaction	0.238	Medium
Privacy → Customer Satisfaction	0.012	-
System Availability → Customer Satisfaction	0.001	-

In this study, the F-square value is used to measure the extent to which several aspects of the PTSP BMKG application, including efficiency, fulfillment, privacy, and system availability, influence customer satisfaction. According to Hair et al. [29], if the value of f-square is more significant than or equal to 0.02 but is less than 0.15, then the effect has a minor influence and falls into the category of "small.". If the f-square value is greater than or equal to 0.15 and less than 0.35,

it belongs to the medium impact category. If the value of f-square is greater than or equal to 0.35, then it belongs to the category of a significant impact. Based on Table IX, the efficiency indicator has an f-square of 0.098, meaning that the efficiency indicator has a negligible effect on customer satisfaction using the PTSP BMKG application. At the same time, the fulfillment indicator has an f-square of 0.238. This can mean that the fulfillment indicator moderately impacts customer satisfaction using the application. The privacy and system availability indicators have a very small f-square value, so the two indicators have no impact on customer satisfaction using the PTSP BMKG application.

D. Implication of Study

This study has various implications for problems relating to the e-service practice paradigm, which affects consumer satisfaction in government apps utilized for public services, especially in the PTSP BMKG application, which is one of the BMKG services. BMKG needs to improve the quality of its application so that users can be more satisfied in obtaining services and information through PTSP, including in the dimension of efficiency, which focuses on ease of transactions, web speed, features, and information that is better laid out. Not only that, but the most crucial focus to be noticed and improved by BMKG is on the fulfillment dimension, where the speed of response to customer requests and submissions to get services is at most 14 working days.

This research can be used as a reference that demonstrates that E-S-Qual has developed into an efficient scale in government services with a concept like e-commerce, in which a website can help users with their activities, such as product purchases, and obtain transactions efficiently and effectively. Based on the theory explained by Parasuraman et al. (2005), efficiency and fulfillment are the most critical aspects of the quality of website services [6]. This is in line with the results of this study that these two dimensions have an impact on customer satisfaction in using applications to obtain data and information services from BMKG. The efficiency indicator itself is related to the design of the web application interface used by customers to get the information needed. Fulfillment indicators related to how all customer needs can be available and met quickly, as stated on the PTSP BMKG web application. Customers PTSP will feel more satisfied if the service can be obtained on time or faster than the promised time.

Wolfenbarger and Gilly (2003) claim that consumers who often use online applications to transact may not find privacy to be as crucial as they formerly did since experience may diminish worries about website security [30][9][14]. This is also in line with the results of this study that privacy does not significantly influence customer satisfaction who have transacted through the PTSP BMKG web application in obtaining data and information services from BMKG. Even so, BMKG must still maintain customer privacy, which has been regulated by the government so as not to cause leakage of customer data using the PTSP BMKG application.

The system availability aspect is an essential attribute in measuring overall customer satisfaction. However, BMKG does not fully control this dimension because the device and

internet used can affect this dimension [9]. System availability does not affect customer satisfaction with the PTSP BMKG application. It could be because customers using the application are fine with this dimension. It could also be due to the number of respondents, as said by Dastane et al. (2018) [14]. Even so, BMKG must still inform customers when the website is being maintained. BMKG must think of the right time to maintain the website PTSP BMKG so customers are not bothered when they want to use the application.

V. CONCLUSION

BMKG Indonesia has changed how it serves the community conventionally to be more efficient and effective since 2020 by presenting the PTSP BMKG application. To improve service quality in obtaining customer satisfaction, it is necessary to evaluate the PTSP BMKG application. The research made use of the E-S-Qual instrument. Considering the outcomes of data analysis from 72 respondents of application users that have been carried out in this study, it can be concluded that the results of statistical calculations show Efficiency, Fulfillment, System Availability, and Privacy simultaneously has a positive and significant impact on customer satisfaction using the PTSP BMKG application.

But partially, we can conclude that the ease of users in searching to find what services and information are needed, the ease of completing transactions, the speed of loading web pages, and the features and availability of information that is better organized on the PTSP BMKG application have an impact on customer satisfaction in using the application. This is shown in the results of the H1 hypothesis test received, where efficiency positively and significantly affects customer satisfaction in using the PTSP BMKG application, so BMKG must be concerned about efficiency indicators so that customers can be more satisfied with the MCG data and information services obtained from the PTSP BMKG Application.

Moreover, the suitability of MCG's service and information needs and the speed of response to requests and submissions to obtain services and information will have a moderate impact on customer satisfaction in using the application. This is shown in the results of the H2 hypothesis test received, where fulfillment positively and significantly affects customer satisfaction in using the PTSP BMKG application. Customers will be happier if the service is provided on time or earlier than promised. Hence, BMKG needs to evaluate fulfillment indicators to be able to increase customer satisfaction with the PTSP BMKG application.

A. Limitation of Study

This paper is focused on PTSP BMKG Application, which serves customers to get services and information from BMKG. This study only used E-S-Qual without involving E-Recs-Qual indicators in analyzing service quality's impact on customer satisfaction in using the PTSP BMKG application through a questionnaire survey of very limited respondents.

B. Future Works

Furthermore, research can be continued by analyzing the usability aspect to determine the user experience to improve

PTSP BMKG Application services. In addition, further analysis can also be carried out to find out why this E-S-Qual model does not all dimensions have a positive relationship with customer satisfaction, especially in government services.

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