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Measurement and Improvement Analysis of Applications and Services with IT Balanced Scorecard on Online Transportation in Bandung

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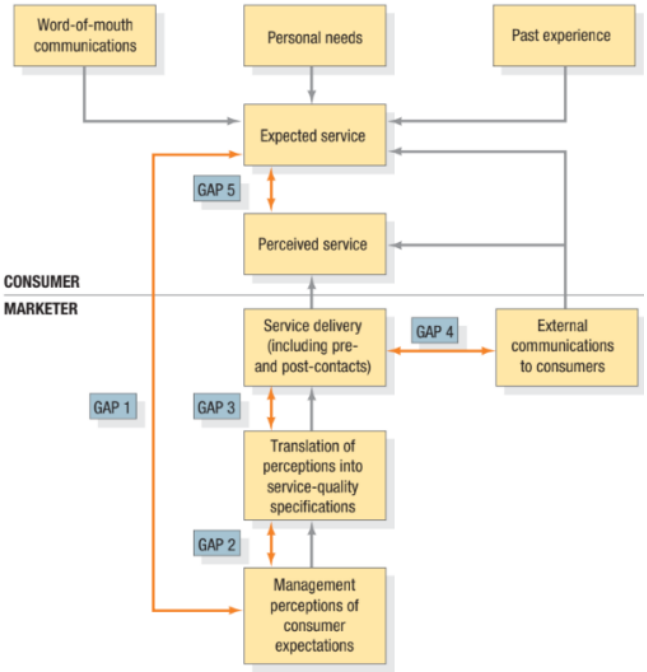
***Abstract*— Research aims to measure and improve services and applications to the performance of online transportation companies, namely the IT Balanced Scorecard. Measurement and analysis of data using the R-Commander application by measuring and analyzing several parameters in it. The result is that the data is valid because r (item, total) for each question 0.6. Whereasfor the classical assumption test, that is, no problemwith multicollinearity, there is nopositive and negative autocorrelation,and there is no problem with heteroscedasticity, but research datais not normally distributed because the data in the questionnaire is ordinal. Furthermore,for thelinear test and descriptive tests, it explainsthat thereis apositive influence between XI and X2 onY andthe results of the respondents areincluded inthegood category.So that it can be concluded that the service and application of the balanced scorecard is currentlyin the feasible category, there is a aresitive influence of services and applications onit balanced scorecardso that if an online transportation company wants to improve theperformance of the company can use these references.**

Keywords— service, application, measurement, improvement, IT Balanced Scorecard

I. INTRODUCTION

Measurement and improvement of services, applications and it balanced scorecard on the use of online transportation in Bandung is needed. Because, at this time users of online transportation services have been very numerous. However, there are still perceived problems, such as the YLKI survey which found consumer disappointment or complaints about online transportation services. The complaint can be divided into 2 types, namely related to services and applications.

Service measurement by identifying five gaps that cause unsuccessful delivery [1].



PICTURE 1. Service-Quality Model [1]

While the application measurement is defines five characteristics related to outcomes of interaction with a system [2].

PICTURE 2. Quality in Use Model

In previous studies, it was never discussed about the measurement and improvement of services and applications in online transportation systems. However, on other systems, such as Rohmad Dwi Jayanto and Handaru Jati, which discussed about quality evaluation of dictionary network mobile application on android platform with standard ISO/ IEC 25010 [3]; Gunardi, Dedi Sulistiyo S., and Suryana Taryana discussed about strategic map proposal using CSF and IT Balanced Scorecard [4]; Cindi Wulandari, Lin Yan Syah, and Leon Andretti A. discussed about analysis of

satisfaction level of IT services [5]; Anal Acharya and Devadatta Sinha discussed about Assessing the Quality of M-Learning Systems using ISO/IEC 25010 [6]; and Indra Balachandran and Ibrahim Bin Hamzah discussed about influence of customer satisfaction on ride sharing services in Malaysia [7].

Therefore, researchers are interested in conducting research on the measurement and improvement of services and applications against the use of online transportation to the IT balanced scorecard.

II. METHOD

A. Validity and Reliability Test

First is Validity Test is done to see how far the score / value / size obtained actually states the measurement / observation results. While the reliability test is done to show how far a measuring device can be trusted or reliable. Each measuring device should have the ability to provide measurement results that are relatively consistent over time. Both tests are carried out on each question on the questionnaire distributed to respondents.

B. Classical Asumption Test

There is some Classical Assumption Test.

1) Multicollinearity Test is used to determine existence of high correlation between variables in a multiple regression model. If there is a high correlation between the independent variables, then relation between them of the dependent variable will be disrupted [7]. Multicollinearity testing can be done by looking at value of Variance Inflation Factors (VIF). If the value of VIF < 10 then not multicollinearity, and if the value of VIF > 10 then there is multicollinearity.

2) Autocorrelation Test: is used to see that there is a linear relation between the errors on a series of observations, sorted by time (time series) [7]. Testing can use the Durbin Watson (DW) test method. If the value of DW < Durbin Lower (dL) then there is positive autocorrelation, and if the value of 4 – DW < Durbin Upper (dU) then there is negative autocorrelation

3) Heteroscedasticy Test: is used to test there is a regression model residual variance inequality from one observation to another observation. Regression formula obtained by assuming confounding variables (error) has a constant residual variance (range of errors approximately equal). Heteroscedasticity occurs if there is residual variance is not constant [7]. If the value of probability < alpha (0.05) then there is problem of heteroscedasticy, and If the value of probability > alpha (0.05) then there is no problem of heteroscedasticy. The regression model to be good if there is no problem of heteroscedasticy.

4) Normality Test: a form of testing about the distribution of data. The purpose is to find out whether the data taken is normally distributed data. The normality testing can be done by Shapiro Wilk test. If p-value < alpha (0.05) then data is not normally distributed, and if If p-value > alpha (0.05) then data is normally distributed

5) Linearity Test: is used to determine whether two or more variables have a significant linear relationship or not. The results of these tests can then be used to help make decisions in determining the regression model that will be used appropriately [7].

C. Descriptive Test

Descriptive analysis is used to determine the characteristics of the variables studied from the primary data obtained in the research. Descriptive analysis helps in answering research hypotheses that have been determined, such as:

Ho : p = 0, Service, Application and IT Balanced Scorecard not in a feasible category for consumers of online transportation (Grab) in Bandung

Ho : p ≠ 0, Service, Application and IT Balanced Scorecard in a feasible category for consumers of online transportation (Grab) in Bandung.

In this study, descriptive analysis was carried out by examining the feasibility of the variables studied. There are five categories of feasibility categories [8], can be seen in Table 1 .

TABLE 1. FEASIBILITY CATEGORY

Number	Percentage (%)	Feasibility Category
1.	< 21 %	Very Unfeasible
2.	21 % - 40 %	Not feasible
3.	41 % - 60 %	Decent enough
4.	61 % - 80 %	Feasible
5.	81 % - 100 %	Very Feasible

III. RESULTS AND DISCUSSION

In this research, data were obtained from questionnaires distributed to 100 online grab users. Data is tested using the R-commander application. R-commander is a graphical user interface (GUI) for the R programming language that can be used for statistical analysis.

A. Result of Validity and Reliability Test

The results of the validity test for each questions can be seen in Table 2:

TABLE 2. RESULT OF VALIDITY TEST

Questions	r(item, total)	r-tabel
Question 1	0.3478	0.1654
Question 2	0.3894	0.1654
Question 3	0.4596	0.1654
Question 4	0.5194	0.1654
Question 5	0.5093	0.1654
Question 6	0.4935	0.1654
Question 7	0.3627	0.1654
Question 8	0.4068	0.1654
Question 9	0.6239	0.1654
Question 10	0.3459	0.1654
Question 11	0.4087	0.1654
Question 12	0.5047	0.1654
Question 13	0.3695	0.1654
Question 14	0.4136	0.1654
Question 15	0.5548	0.1654
Question 16	0.5181	0.1654
Question 17	0.2211	0.1654
Question 18	0.3459	0.1654
Question 19	0.2532	0.1654
Question 20	0.1962	0.1654
Question 21	0.5164	0.1654
Question 22	0.6149	0.1654
Question 23	0.5682	0.1654
Question 24	0.4974	0.1654
Question 25	0.5480	0.1654

Question 26	0.3876	0.1654
Question 27	0.2397	0.1654
Question 28	0.1727	0.1654

The validity of each indicator can be measured through the numbers which are stated in the box of Item Total Statistic, referring to the column named Corrected Item – Total Correlation. The values of each indicator from the independent and dependent variables have to be bigger than the numbers in the r table [9]. Based on the output of results in Table 1, show that the value of r (item, total) for each questions < r table, so it can be concluded that the research data is valid.

Then, the results of the reliability test for each questions can be seen in Table 3:

TABLE 3. RESULT OF RELIABILITY TEST

Questions	Alpha	Questions	Alpha
Question 1	0.8556	Question 15	0.8500
Question 2	0.8547	Question 16	0.8511
Question 3	0.8523	Question 17	0.8589
Question 4	0.8507	Question 18	0.8560
Question 5	0.8514	Question 19	0.8588
Question 6	0.8521	Question 20	0.8609
Question 7	0.8551	Question 21	0.8505
Question 8	0.8541	Question 22	0.8489
Question 9	0.8489	Question 23	0.8499
Question 10	0.8556	Question 24	0.8522
Question 11	0.8540	Question 25	0.8511
Question 12	0.8514	Question 26	0.8544
Question 13	0.8550	Question 27	0.8638
Question 14	0.8541	Question 28	0.8694

According to Ghozali (2001), a variable is considered reliable if it scored > 0.60. When the score of its Cronbach Alpha test gets closer to 1, it is more reliable [9]. Based on the output of results in Table 2, show that the value of alpha for each questions > 0.6, so it can be concluded that the research data is reliable.

B. Results of Classical Assumption Test

1) Multicollinearity Test.
The results of the VIF value is 1.298834. VIF < 10, so it can be concluded that there is no problem with multicollinearity. If the VIF value is greater than 10 value, the data is considered Multicollinearity and which indicates that this independent variable should be removed from the analysis [9].

2) Autocorrelation Test.
The results of the Durbin Watson can be seen in Table 4.

TABLE 4. RESULT OF DURBIN WATSON

Durbin-Watson (D)	1.8828
p-value	0.2769
DL	1.63369
DU	1.71517

Based on the output of results in Table 3, D > dL and 4 – D > dU so it can be concluded that there is no positive autocorrelation and there is no negative autocorrelation. There is no positive and negative autocorrelation because the data is not time series data. Autocorrelation test is only performed on the time series data, so in this study is not necessary to autocorrelation testing [7].

3) Heteroscedasticy Test.
Heteroscedasticy Test using Breusch-Pagan and the results can be seen in Table 5:

TABLE 5. RESULT OF HETEROSCEDASTICY

Breusch-Pagan	0.031909
p-value	0.8582

Based on the output of results in Table 4, sow tat the value of p-value > alpha (0.05), so it can be conclude that there is no problem with heteroscedasticy.

4) Normality Test.
The results of normality test can be seen in Table 6.

TABLE 6. RESULT OF NORMALITY TEST

Variabel	Sub Variabel	P-Value
Services (X1)	X1.1	3.084e-13
	X1.2	7.349e-10
	X1.3	2.379e-11
	X1.4	5.389e-10
	X1.5	7.03e-12
Application (X2)	X2.1	3.642e-11
	X2.2	4.025e-11
	X2.3	4.214e-10
	X2.4	7.155e-10
	X2.5	0.0000001776
IT Balanced Scorecard (Y)	Y1	1.006e-10
	Y2	3.286e-12
	Y3	1.459e-11
	Y4	0.0000006599

Based on the output of results in Table 5, p-value < alpha (0.05) so it can be conclude that the research data is not normally distributed. If the data is not normally distributed, then one kind of the way to overcome that is to use a device (method or model) that does not require assumption of normality [7]. Because data in questionnaire is ordinal. Nonparametric test is a mathematical model does not require the assumption of normality, so in this study used Nonparametric test for studying.

5) Linearity Test.
The results of linear model can be seen in Table 7.

TABLE 7. RESULT OF LINIER MODEL

	Estimate	Std. Error
(Intercept)	1.16437	0.44815
X1	0.45281	0.10300
X2	0.23642	0.09365

These results show the linear regression model of the relationship between X1 that is gap and X2 application

to Y which is the IT Balanced Scorecard based on sample data.

Y = 1.16437 + 0.45281 X1 + 0.23642 X2 + 0.44815

The linear regression model explains that there is a positive influence between XI and X2 on Y. The value of β_1 of 0.45281 can be interpreted as an average increase of X1 and the value of β_2 of 0.23642 can be interpreted as an average increase of X2.

C. Results of Descriptive Test

Based on the results of the descriptive test, the average value percentage of the questionnaire for the service variable is 72.26 % which is in the feasible category, can be seen in Table 8.

TABLE 8. RESULT OF SERVICE DESCRIPTIVE TEST

Question	N	Min	Max	Mean	Percentage
Question 1	100	2	5	3.76	75.2 %
Question 2	100	2	5	3.61	72.2 %
Question 3	100	1	5	3.26	65.2 %
Question 4	100	2	5	3.44	68.8 %
Question 5	100	2	5	3.55	71 %
Question 6	100	2	5	3.75	75 %
Question 7	100	2	5	3.62	72.4 %
Question 8	100	2	5	3.52	70.4 %
Question 9	100	2	5	3.67	73.4 %
Question 10	100	2	5	3.95	79 %
				3.613	72.26 %

While for the application variable, the average value percentage of the questionnaire is 69.2 % where the entry is also in the feasible category, can be seen in Table 9.

TABLE 9. RESULT OF APPLICATION DESCRIPTION TEST

Question	N	Min	Max	Mean	Pecentage
Question 11	100	2	5	3.56	71.2 %
Question 12	100	2	5	3.62	72.4 %
Question 13	100	1	5	3.19	63.8 %
Question 14	100	2	5	3.98	79.6 %
Question 15	100	2	5	3.92	78.4 %
Question 16	100	2	5	3.72	74.4 %
Question 17	100	1	5	3.16	63.2 %
Question 18	100	1	5	3.22	64.4 %
Question 19	100	1	5	3.21	64.2 %
Question 20	100	1	5	3.02	60.4 %
				3.46	69.2 %

Then for the balanced scorecard variable obtained the average value percentage of the questionnaire is 70.2 % which is in the feasible category, can be seen in Table 10.

TABLE 10. RESULT OF IT BSC DESCRIPTIVE TEST

Question	N	Min	Max	Mean	Percentage
Question 21	100	1	5	3.49	69.8 %
Question 22	100	2	5	3.76	75.2 %
Question 23	100	2	5	3.87	77.4 %
Question 24	100	2	5	3.78	75.6 %
Question 25	100	2	5	3.54	70.8 %
Question 26	100	2	5	3.61	72.2 %
Question 27	100	1	5	3.06	61.2 %
Question 28	100	1	5	2.98	59.6 %
				3.51	70.2 %

IV. CONCLUSION

Based on the research, can be concluded that first the average respondent assessed the use of online transportation in terms of service, application and it balanced scorecard was feasible. Second, Service and applications variables have a linear effect on it balanced scorecard. So, if the value of services and applications increases then the value of the balanced scorecard increases. Third, the IT Balanced scorecard value is used to help align IT and business, so that if you want to increase IT Balanced Scorecard, balanced scorecard can be improved on services and applications.

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