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Original Article

Study Travel Time in the Movement of Passengers and Baggage at the Arrival Station of Sultan Hasanuddin International Airport Makassar

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Abstract: Airport provides facilities for services to aircraft, passengers, and goods. One of the activities at the airport is handling your luggage. At some particular time, especially in crowded flight, a passenger still faces delays in receiving baggage at the arrival terminal. The purpose of the research is to know the travel time difference and the factors that influence the travel time differences in the movement of passengers and baggage at the arrival terminal of Sultan Hasanuddin International Airport of Makassar. The type of research is a correlation study, using primary data in the form of data direct field measurements as well as secondary data from the monthly reports-MATSC Support Operations Division Aeronautical Information Service in the form of fixed flight schedules and Side Air Operations Division in the form of data movement apron. Processing the data is by using SPSS version 18:00 The findings is: the smallest time difference between the passenger and baggage occurs when using the bus, followed a garbarata and the greatest difference in time when walking, so that it can be concluded that the use of buses more effective in reducing delays in receiving the baggage at the arrival terminal of International Airport Sultan Hasanuddin of Makassar.

Keywords: passenger travel time, travel time baggage, ground handling services

1. Introduction

Selecting the transportation modes can be adjusted based on the needs and conditions which available in the field. Air transportation is the fastest transportation with a wide reach [1,2]. In the operation of the airport, there are various interactions among the main components, namely: airport, airline operator, and service user. The airport provides facilities for service to aircraft, passengers, and goods [3]. The baggage service is part of Ground Handling service of the aircraft, starting in the parking position at the apron in a stop engine and block-on position. The performance of the airport service is one of the points that must be considered [4-5]. The Delayed that the passengers faced in receiving their luggage at arrival terminal is because of the travel time difference between the time of the passenger from the plane to the arrival terminal and the luggage from the plane to the baggage room in the arrival terminal [6]. To answer the existing problems, where the purpose of this study can be formulated as follows: to find out the difference of travel time of passengers and baggage movement, and factors that affecting the difference at the arrival terminal of Sultan Hasanuddin International Airport of Makassar [7-8].

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2. Methodology of the Research

The research is conducted at Sultan Hasanuddin International Airport of Makassar, 2017. Type of research is correlation research; it aims to test the relationship among variables by using quantitative data approach. The data is collected by observing and measuring the travel time of passengers' movement and passengers' baggage from moving off from the plane to the arrival terminal, while the secondary data is written materials from data source which is consist of monthly recap report operations in the Aeronautical Information Service's Support-MATSC Division of Fixed Aircraft Operations and the Apron Movement Control (AMC) Division in the form of apron motion data. The technique of data analysis is regression and comparison analysis by using SPSS, processing regression statistical analysis, and one-way Anova [9-11].

The comparison of Moda access:

1. Variables of the research
   The variables of the research are: X1 (number of Ground Service personnel), X2 (Number of Ground Service equipment), X3 (the distance of the passenger's movement to Arrival terminal), X4 (the distance of baggage movement to Arrival terminal), dan Y (travel time different of the passengers and baggage movement)
2. Result of Garbarata analysis (Avio) [12].

Table 1. The Anova analysis of a garbarata with dependent variable of time

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	861.982	4	215.496	25.448	.000[a]
	Residual	7375.703	871	8.468		
	Total	8237.685	875			

a. Predictors: (Constant), distance of baggage, number of ground service personnel, number of equipent, distance of the pasanger)
b. Dependent Variable: time

Based on the table 1 above, the significant value of 0,000 with a 95% belief level or $\alpha = 0.05$, this means that the position of the test point of significance and F-count on the normal distribution curve resides in the *Ho* rejection [13,14]. It shows that the four independent variables (X1, X2, X3, X4) have a significant influence on the variable Y [15]. Thus, Ho stating that no influence X1, X2, X3, X4 to Y is rejected as presented on Table 2.

Table 2. RegressionCoefficients garbarata analysis with time as dependent variable

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	6.820	2.668		2.556	.011		
	Personnel	-.968	.486	-.068	-1.991	.047	.875	1.143
	Tools	-.376	.516	-.025	-.730	.466	.876	1.142
	Passenger's distance	-.005	.001	-.135	-3.719	.000	.777	1.287
	Baggage's distance	.015	.002	.325	9.900	.000	.952	1.050

a. Dependent Variable: time

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It can be shown as follows:

$$Y=\alpha+\beta\_1\ X\_1+\beta\_2\ X\_2+\cdots+\beta\_4\ X\_4+\varepsilon$$
$$Y=6{,}820-0{,}968X\_1-0{,}376X\_2-0{,}005X\_3+0{,}015X\_4 \quad (1)$$

It can be shown that (X1) affect the Passenger and Baggage time difference (Y). With the regression coefficient β_1 (X1) is negative, indicating the influence of variable X1 inversely with Y, the variable X2 has no effect on Y, the variable X3 affect Y. With negative regression coefficient β_3 (X3), this indicates that the effect of X3 is proportional reversed by Y, the X4 has an effect on Y. The regression coefficient β_4 (X4) is positive [16-17]. This shows that the influence of X4 is unidirectional with Y. So that not all independent variable (X) has significant effect. Variable X2 has no significant effect on Y, then the new model is produced, as follows:

$$Y=6{,}820-0{,}968X\_1-0{,}005X\_3+0{,}015X\_4 \quad (2)$$

3. Results

The result of a bus analysis is presented on Table 3.

Table 3. Anova bus with time as dependent variable

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1394.430	4	348.607	72.945	.000[a]
	Residual	4162.569	871	4.779		
	Total	5556.999	875			

a. Predictors: constanta, distance of baggage, number of ground service personnel, number of equipent, distance of the pasanger). Dependent Variable: time

Based on the Table 3 above, a significant value of 0,000 at a 95% beliefe level or α = 0.05, this means that the position of the test results of significance and F-count on the normal distribution curve is in the rejection of Ho, it means that the four independent variables (X1, X2, X3, X4) have a significant effect on the variable Y as on Table 4. Thus *Ho* stating that no influence X1, X2, X3, X4 to Y is rejected [18-20].

Table 4. Result of Regression Coefficients bus analysis with time as dependent variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constanta)	6.024	1.300		4.633	.000		
	Personnel	-1.444	.239	-.193	-6.049	.000	.842	1.187
	Tools	.328	.285	.036	1.151	.250	.902	1.109
	Passanger's distance	-.010	.001	-.708	-12.729	.000	.278	3.600
	Bagage's distances	.014	.001	.838	14.920	.000	.272	3.670

a. Dependent Variable: Time

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Based on Table 4, it can be formulated as follows:

$$Y=\alpha+\beta\_1\ X\_1+\beta\_2\ X\_2+\cdots+\beta\_4\ X\_4+\varepsilon$$
$$Y=6{,}024-1{,}444X\_1+0{,}328X\_2-0{,}010X\_3+0{,}014X\_4 \quad (3)$$

Also, it can be known that variable X1 effect on Y. With regression coefficient β_1 (X1) inversely proportional to Y, variable X2 does not affect Y, X3 affects Y. Regression coefficient β_3 (X3) is inversely proportional to Y, X4 variables affect Y [21-23]. The regression coefficient β_4 (X4) is positive, so it is inversely proportional to Y.

It means that not all independent variables (X) have a significant effect. Variable X2 has no significant effect on time (Y), then the new model formed as follow:

$$Y=6{,}024-1{,}444X\_1-0{,}010X\_3+0{,}014X\_4 \quad (4)$$

The result of foot-steps analysis is presented on Table 5.

Tabel 5. Anova of footstepswit time as dependent variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3161.569	4	790.392	342.780	.000[a]
	Residual	2008.376	871	2.306		
	Total	5169.945	875			

a. Predictors: constanta, distance of baggage, number of ground service personnel, number of equipent, distance of the pasanger). Dependent Variable: time

Based on Table 5 above, it can be shown that the position of the test result point of significance and F-count is in the rejection of Ho, so Ho stating that no influence X1, X2, X3, X4 to Y is rejected [18, 22-24].

Tabel 6. Result of Regression Coefficients foot steps analysis with time as dependent variable

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	-.789	1.104		-.715	.475		
Personnel	-.022	.109	-.004	-.199	.843	.973	1.028
Tools	.056	.264	.005	.213	.832	.983	1.018
Passenger's distance	-.005	.000	-.282	-9.589	.000	.516	1.938
Baggage's distances	.025	.001	.949	32.448	.000	.521	1.918

a. Dependent Variable: Time

it can be seen as follow:

$$Y=\alpha+\beta\_1\ X\_1+\beta\_2\ X\_2+\cdots+\beta\_4\ X\_4+\varepsilon$$
$$Y=-0{,}789-0{,}022X\_1+0{,}056X\_2-0{,}005X\_3+0{,}025X\_4 \quad (5)$$

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It can be known that for the variable X1 does not affect Y, the variable X2 has no effect on Y, X3 variables affect time (Y). With Regression Coefficient β_3 (X3) is inversely proportional to Y, X4 variables affect Y. Regression coefficient β_4 (X4) is in line with Y. based on the explanation above, it can be seen that not all independent variables (X) have a significant effect. Variable (X1) and (X2) has no significant effect on time (Y) then it can be removed from the model, as can be formed as follow:

$$Y=-0,789-0,005X\_3+0,025X\_4 \quad (6)$$

based the results of the regression analysis, it can be concluded that the variables that affect the delayed luggage is the distance of passenger and baggage, as on Table 7.

Tabel 7. The average og time different

Tipe		N	Subset for alpha = 0.05		
			1	2	3
Duncan[a,b]	Bus	86	2.9419		
	Avio	876		3.6233	
	Jalan Kaki	187			5.1604
	Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 165.590.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Based on the table 7 above, it shown that the smallest time-different averages between passengers and luggage occur when using Bus 25%, Avio / Garbarata 31% and Walk 44%. It means the use of Bus more effectively to reduce the delays of passenger movement time.

4. Discussion

Based on data presented above, the equation of partial test can be calculated as presented on Table 8. It shows that the value of X1, X2, and X3 is inversely proportional to Y, whereas the movement of the bus and walk or foot-steps, the value of X_1, and X_3 are inversely related to the value of Y, while the significant value of X_2 in the movement of the garbarata and buses does not affect the Y, it is different with values at the movement of the foot-steps where the independent variables X_1, and X_2 have no effect on the value of Y.

Tabel 8. Equation of partial test

Access	Value					
	Equation	Constanta	β X_1	β X_2	β X_3	β X_4
Garbarata	Y =	6.820	- 0.968	- 0.376	- 0.005	+ 0.015
	Sig.	0,011	0,047	0,466	0.000	0.000
Bus	Y =	6.024	- 1.444	+ 0.328	- 0.010	+ 0.014
	Sig.	0.000	0.000	0.250	0.000	0.000
Walking	Y =	- 0.789	- 0.022	+ 0.056	- 0.005	+ 0.025
	Sig.	0.475	0.843	0.832	0.000	0.000

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The Anova mean square calculation results obtained that there is an influence on 3 passenger and baggage access to the average value of time difference, whereas Duncan test results can be known the average of time difference between the movement of passengers and luggage with access movement, those are : the smallest time difference when using buses, followed by garbarata and on foot, so it was concluded that using bus was more effective in reducing luggage reception at the arrival terminal of Sultan Hasanuddin International Airport Makassar [24,25].

5. Conclusions

Based on the 3 patterns of passenger movement (avoid bridge, bus, and walking), those have significant mean travel time difference between passengers and luggage, where the travel time of passenger movement is always smaller than the travel time of baggage movement. Variables that affect baggage delays are the position of parking stand (distance of movement of passengers and luggage to arrival terminal) and number of ground service personnel. To improve the quality of airport service, it is better to improve aircraft stand position, and increase the number of ground service personnel who have special expertise related to the field of responsibility in handling passengers and baggage, so can be minimize the errors in service and to accelerate the ground service worker. The ground service personnel from the starting airport is also expected to includes baggage which has been grouped / separated between the destination baggage and the transit baggage by using the net into the plane, so the luggage is neatly arranged and the destination airport service personnel no longer need to observe the baggage code when removing baggage from the aircraft.

References

1. Algifari. 1997. Analisis Regresi, Teori, Kasus dan Solusi, Edisi pertama. BPFE
2. Dickson, F. 2009 Evaluasi Pelayanan Bagasi Penumpang di Bandara Adi Sumarmo solo, Volume 21, Nomor 5.
3. Gujarati, D. 1999. Ekonometrika Dasar Alih Bahasa Sumarno Zain. Erlangga Jakarta.
4. Hastono, Y.S. 2008 Pelayanan Publik di Bandar Udara Polonia Medan, USU e-Respository
5. Hendarto 2001, Dasar-dasar Transportasi, lecture handout departemen Teknik Sipil ITB-Bandung
6. Horonjeff, R 1993 Planning and Design of Airport Book 4rd ISBN: 0-07-045345-4 by McGraw-Hill.Inc
7. IATA-Standart Ground Handling Agreament (SGHA)
8. Jinca, I.M.Y.Prof.Dr. 2011, Perencanaan Transportasi Program Pascasarjana UNHAS Makassar
9. Majid, S.A dan Warpani E.P.D Sekolah Tinggi Manajemen Transportasi (STMT) Trisakti 2009. Ground Handling-Manajemen pelayanan darat perusahaan penerbangan PT Rajagrafindo Persada, Jakarta
10. Mardoko, A. Desember 2008 Analisis Tingkat Kesesuaian dan Kesenjangan kualitas Pelayanan di Terminal Domestik Bandar Udara Juanda Surabaya, Warta Ardhia Vol.34 No.2
11. Morlok, E. K. 1991 Pengantar Teknik dan Perencanaan Transportasi. Penerbit. Erlangga,. Jakarta
12. Morlok, E. K 1984, Pengantar Teknik dan Perencanaan Transportasi ISBN: 32-00-017-6 Penerbit Erlangga
13. Mulyanto, R.F.H 1999 Ground Handling Tata Operasi Darat Gramedia Pustaka Utama Jakarta
14. Nasution, M.N 2008 Manajemen Transportasi edisi ke-3 Ghalia-Bogor Indonesia
15. Neufert, E. 1973 Data Arsitek jilid I Erlangga Jakarta
16. Rustian, K. 2003 Ekonomi Transportasi Karakteristik, Teori dan Kebijakan, Ghalia Indonesia Jakarta
17. Salim, A. 2008 4rd Manajemen Transportasi Grafindo Jakarta
18. Samsudin, R.S.IP. Juni 2008 Pelayanan bagasi di Bandar Udara Syamsudin Noor-Banjarmasin, Warta Aridhia Vol.34 No.1
19. Santoso, S. 2000, SPSS Statistik Parametik. PT Elex Media Komputindo Gramedia Jakarta.
20. Santoso, S. 2003. SPSS Mengolah Data Statistik Secara Profesional. PT. Elex Media Komputindo. Jakarta.
21. Sudjana. 1996 Universitas Gajah Mada, Yogyakarta Teknik Analisis Regresi Dan Korelasi Tarsito Bandung

e-ISSN: 2715-6958 p-ISSN: 2721-5342

22. Susetyadi, A. Desember 2007 Pengkajian Pelaksanaan Kegiatan Pelayanan Bagasi Penumpang di Bandar Udara Juanda Surabaya, Jurnal Penelitian Perhubungan Udara Vol.33 No.2
23. Suwardjoko, W 1990. Merencanakan Sistem Perangkutan. Bandung Penerbit ITB.
24. Tamim, O.Z 2008 Perencanaan dan Pemodelan Transportasi. ITB-Bandung
25. Yuliawati, E. Pengkajian Perilaku Konsumen Terhadap Pemilihan Moda Warta Ardhia Vol.34 No.2, Desember 2008