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Using Factor Analysis to Evaluate e-Commerce of Airline Industry in Indonesia

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ABSTRACT

In line with the development of Information Systems and Technology, the business processes in the airline industry is also changing, especially on reservations or passenger booking activity increases at the facility and purchase tickets online through Internet Booking Portal. Competition between the airlines become increasingly stringent, because the quality of the airline website becomes important and strategic to provide facilities and services to prospective passengers in the purchase of its products, namely the availability of seats for a particular time and a particular purpose. Through factor analysis method, analysis can be carried out against a number of indicators of the factors that affect the quality of e-Commerce Airline Industry in Indonesia that can affect passenger satisfaction in the process of buying tickets online. The findings showed that there are 4 (four) new factors that shape the level of passenger satisfaction in the process of purchasing tickets online, namely: the quality of the trust, the quality of the user interface, the quality of information, and quality of interaction that can then be considered as independent variables and through the value factor can also be made subsequently formed a mathematical model that can be used to predict picture quality improvement of e-Commerce in the future.

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INTRODUCTION

Electronic commerce (e-commerce) may represent the most radical force of change that nations have encountered since the Industrial Revolution. E-commerce can transform an entire national economy, and can change business models, revenue streams, customer base and supply chains (Sushil, 2004). That mean, efficient, effective, reliable and inexpensive public transport provision remain the lifeline of economic, social and environmental wellbeing of increasing urbanization of cities all over the world in the face of globalization and world economies integration (Parviz, 2012).

Systems and Information Technology in the airline industry has become a vital necessity to be able to serve its passengers well. One part of the system information spearheading the airline to make a sale is Internet Booking Portal, the web site that serves as a means of flight information and flight bookings on-line. With the existence of this web site then the airline can do direct selling and is expected to reap more profits because if sales made by travel agents, the travel agents are entitled to a commission on every transaction they make, while through a website that is no longer needed and from the point of view of direct marketing sales channel is the most significant for the international aviation market (Ko et al., 2007).

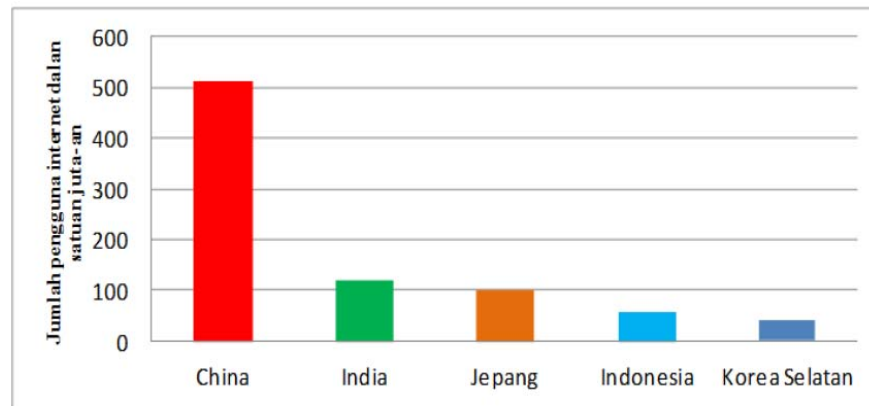
Looking at the growth pattern of the increasing number of airline passengers each year (Table 1.) and the increase of Internet users in each year, the airline sites in the future will be the primary means for passengers to purchase tickets directly. To be able to attract passengers in the transaction through the website, the factors that affect customer satisfaction online airline sites need to be further identified.

Statistical data of Internet users in the world in 2011 were obtained from the site is as much internetworldstats.com 2,267,233,742 people or 32.7% of the total population of the whole world. The growth rate of Internet users worldwide reached 528.1% in 2000-2011. Users in Asia are Internet users when compared to the other continents as the number of internet users 1,016,799,076 people or 44.8% of total internet users in the world. When viewed from the grouping of countries, Indonesia is in the fourth position for the Asian region with a total number of 4 internet users as much as 55 million people or 22.4% of the total population of Indonesia (internetworldstats.com, 2012). (Figure. 1.).

Table 1: Number of passengers at the Soekarno-Hatta International Airport, Indonesia.

Year	Internasional	Domestic	Total
2002	5,169,421	9,492,729	14,662,150
2003	4,921,694	14,768,403	19,690,097
2004	5,781,739	21,201,056	26,982,795
2005	5,964,525	21,984,313	27,948,838
2006	7,759,900	22,784,948	30,544,848
2007	6,953,019	25,505,927	32,458,946
2008	7,167,945	25,009,623	32,177,568
2009	7,648,509	29,495,210	37,143,719
2010	9,696,018	34,661,793	44,357,811
2011	10,860,172	40,273,431	51,133,603
Total	71,922,942	245,177,433	317,100,375

Source: Indonesia Airport Authority, 2012

**Fig. 1:** State's Largest Internet Users in Asia 2011

Sources: www.internetworldstats.com accessed in 2012

Seeing the potential of the distribution channels through the internet, almost all airlines have built an online reservation site. In Indonesia, for example: Garuda Indonesia, Lion Air, Batavia Air, Citilink, and others. At these sites the passengers can book tickets online, to check in, print boarding passes, view flight schedules, and view company information. Competition among companies in the airlines industry is intensive due to the pressure to reduce costs and to enhance service to customers. Majority of the airline operators used their websites not only for the purpose of making available the company's information but also to provide online e-ticketing service to their customers (Teck-Chai, 2011).

MATERIALS AND METHODS

Marketing in general is something that identifies activities and bring together the human and social needs. The shortest definition of marketing is best suited to meet the needs profitably. Kotler and Keller (2009) stated that "marketing is defined as an organizational function and a set of processes for creating, communicating, and delivering value to customers and for managing customer relationships in ways that benefit the organization and its stakeholders". The definition of marketing rests on the core concepts that include requirements (needs), desires (wants), and requests (demands).

Consumer Behavior:

Lim et al. (2010) stated that online consumer behavior can be categorized into 5 is the amount of time spent online, the products or services purchased online, the desire to buy and purchase online, the use of internet and online search activity. While the relationship between the company and consumers related to the functions of marketing, sales, and services included in the concept of Customer Relationship Management (CRM) is defined as a business model that serves to integrate and automate the various processes in serving customers. The airline is responsible for passenger satisfaction begins when the ticket purchase to the customer to place the goal. This requires learning and research on customer needs, behavior and lifestyle then use that information to make a more specific value proposition. Strategy that is the path to loyalty in general consumers (Buhalis, 2004). In the value chain model made by this Buhalis, airline sites that serve as distribution channels and information is part

of the Marketing & Sales activities. These activities include Online Sales, Promotion, Advertising, Special Offers and Online Services.

Information Systems User Satisfaction Concept:

Doll and Torkzadeh (1988) developed the instrument End-User Computing Satisfaction (EUCS) consists of 5 components, namely: content, accuracy, format, ease of use, and timeliness. To measure the level of satisfaction of users of information systems, the two global indicator used is the success and satisfaction. While the WebQual is one method developed by Barnes and Vidgen (2002) to measure the quality of a website is based on the perception of the end user (end user). WebQual 4.0 is based on three research areas: usability quality, information quality, and service quality.

Multivariate Analysis:

Regression analysis was used to measure the strength of the relationship between two or more variables, and to show the direction of the relationship between the dependent variable with the independent variable dependent variable is assumed random / stochastic, which means it has a probabilistic distribution. Independent variable is assumed to have a fixed value (in repeated sampling). Malhotra (2010) states that factor analysis is defined as a form of multivariate analysis, which generally aim to find one or several variables or concepts are believed to be the underlying source of a set of real variables. Factor analysis is used to recognize or identify the underlying dimensions or factors that explain the correlation between a set of variables.

Thinking Framework:

On the dimensions of e-commerce usability, information quality and service quality is a dimension that represents a good quality of e-commerce. Perception of a good system of user information is a reflection of user satisfaction on the quality of an information system which in this case is an e-commerce. Next the user satisfaction analogous to satisfaction of passengers on the process of buying tickets online because the website that made the object of research is the e-commerce site.

Two indicators of the satisfaction can be used to measure the level of satisfaction of the passengers in the process of purchasing tickets online in accordance with what was developed by Doll and Torkzadeh (1988). This measurement instrument is quite evident considering the many studies that use EUCS (End Users Computing Systems)

This research using quantitative analysis techniques. Quantitative analysis was done by analyzing a problem that is manifested by quantitatively. In this study, because the type of data used is the qualitative data, the quantitative analysis was done by quantifying research data in the form of figures using scale ratio (ratio scale) and a 5-point Likert scale (5-point Likert scale). Analysis tools used in this research is the analysis of factors and multiple linear regression analysis using SPSS 19. Factor analysis is used to find the factors that influence customer satisfaction online on 5 sites airline in Indonesia. Reason for the use of multiple linear regression analysis was due to compatibility and ease of use.

Data results of the questionnaire were tested before hand and reliability validity by using SPSS software version 19. Test is a test to measure the reliability of a questionnaire which is an indicator of the variables or constructs. A questionnaire said to be reliable or reliable if someone answers the statement is consistent or stable over time. Measurement reliability in this study with measurements done only once. Having measured and the results were compared with another question or measure the correlation between the answers to questions. A construct or variable is said to provide reliable if the Cronbach Alpha value > 0.60 . Used to test the validity of measure the validity of the questionnaire. The questionnaire is valid if the questions on the questionnaire is able to reveal something that will be measured by the questionnaire. Level of validity can be measured by comparing the calculated value in the table column r Corrected Item-Total Correlation with r table value with provisions for the degree of freedom $(df) = n - k$, where n is the number of samples used and k is the number of independent variables. After that, the data obtained will be tested whether it is feasible analyzed using factor analysis method, the MSA test methods, KMO and Bartlett's. Once the testing process is complete, the factor analysis was performed. The goal of factor analysis is to look for quality factors that affect airline sites online customer satisfaction. The analysis used was Principal Component with Varimax Rotation. Rotation criteria used are eigen values greater than one and explained variance must be greater than 50%. Once the factors are found, the model and relationship factors were analyzed using multiple linear regression analysis

RESULTS AND DISCUSSION

There are two business models which until recently employed by companies serving the commercial aviation services, namely:

Premium airline:

The hallmark of the premium airline is a full service they provide services to their passengers. Premium airline in general do have the addition of value added services with the addition of catering, provision of newspapers or magazines, in-flight entertainment, in-flight shop, lounge, free taxi after landing, exclusive frequent flier services, and so forth. Examples of premium airline is Garuda Indonesia and Air Batik.

Low-cost airlines (Low Cost Carrier):

Low-cost airlines is a unique flight model of the operational cost reduction strategies. With cost efficiency in all lines, airlines do things out of the ordinary airline in general. Examples of low-cost airlines are Lion Air, Batavia Air, Citilink, Air Asia and Air Sriwijawa.

Development and growth of the airline industry is closely linked to an increase in the number of users of air transport services. There are several reasons consumers use the services of air transportation, including for business interests, the interests of tourism and various other matters. An examination of the implementation cost airlines, there are two types of activities, namely flying commercial and non-commercial flight. Commercial flights or commercial is a form of air transportation charge for its users.

Based on data from 124 respondents who did purchase tickets online. customer profiles obtained with the proportion of 71.8% men and 28.2% women. When viewed from age, with respondents under the age of 21 years as much as 2.4%, 21 to 30 years as much as 43.5%, 31 to 40 years as much as 36.3% and more than 41 years by 4.8%. When viewed from the type of work, private sector employees as much as 58.1%, 13.7% civil servants, businessmen, 11.3%, student / student 6%, and others 12.1%. When viewed from the amount of income, respondents with incomes under 1 million as much as 3.2%, 1 to 5 million were 21%, 5 to 10 million 36.3%, and over 10 million as much as 39.5%. When viewed from the preferences used airline websites, respondents who use as much as 56.5% of Garuda Indonesia, Lion Air as much as 33.1%, 2.4% Sriwijaya Air, Batavia Air, Citilink as much as 2.4% and as much as 5.6% . When viewed from the preferences of online payment methods that are used, respondents who use credit cards as much as 47.6% of e-Banking as much as 46.8% and other 5.6%.3.2.

In terms of respondent behavior, the spotlight is a preference payment method. Based on the results of this questionnaire, users airline sites in Indonesia both facilities like online payment ie credit card (47.6%) and e-Banking (46.8%) despite a difference in the sound between the two. The majority of respondents used the Internet more than 5 hours per day with a percentage of 59.7%. This is due to the majority of internet users are private sector employees who have an internet connection at his office.

Majority purpose of use of the Internet is to find information with a percentage of 71.8%. While that has the objective to carry out a transaction is only 4.8%. Indonesian airline websites in the most of the respondents is a reference site Garuda Indonesia (56.5%). Then successively Lion Air (33.1%) and Citilink (5.6%). Batavia Air and Sriwijaya Air comes out the bottom with a percentage of 2.4%. The majority of respondents aim is to open the site to buy airline tickets is equal to 69.4%. While 25.8% would like to see the information displayed on the site.

From a variety of ticket sales distribution channels, respondents prefer websites (71.8%) as a means to buy air tickets compared to other distribution channels, which include call centers, travel agents, ticketing office and the airport. More picture are shown in Table. 2.

Comparison of the influence of each factor on online customer satisfaction, can be seen on a standardized beta values. Quality User Interface has a standardized beta value among the three factors most of the other, that is equal to 0.420. This suggests that factors User Interface is the most influential factor when compared with the trust factor, the quality of information and interaction quality. Quality of trust is in second with standardized beta value of 0.299. Quality of information is in third place with a standardized beta value of 0.131. Quality of the interaction is in fourth place with a standardized beta value of -0.002.

Based on the results of factor analysis found four factors determine the quality of airline sites that affect customer satisfaction online. The first factor was formed consisting of the privacy indicator, credible, feedback, relevant, up to date, format, and reputation, researcher interpretation of these factors as the quality of trust. The second factor is formed consisting of a responsive, layout, knowledge, URLs, design, and easy, researcher interpretation of this factor as a quality of user interface. The third factor is formed consisting of a clear, trusted, understandable, and detail interpretation of this factor as the quality of the information. The fourth factor is formed consisting of a secure, uniformity, and navigation. researcher interpretation of these factors as the quality of the interaction.

Table 2: Behavior of respondents to the existence of the e-Commerce industry

No	Profil Responden	Pilihan Jawaban	Frekuensi	Prosentase (%)
1	Metoda pembayaran di internet yang menjadi preferensi anda	Kartu kredit	59	47,6%
		e-Banking	58	46,8%
		Lainnya	7	5,6%
2	Frekuensi penggunaan internet	< 2 jam per hari	8	6,5%
		Antara 2 sampai 5 jam per hari	42	33,9%
		> 5 jam per hari	74	59,7%
3	Alasan paling sering menggunakan internet (pilih salah satu)	Mencari informasi	89	71,8%
		Jual-beli barang/jasa	6	4,8%
		Hiburan	8	6,5%
		Lainnya	21	16,9%
4	Situs maskapai penerbangan Indonesia yang menjadi preferensi anda/ yang sering anda kunjungi	Citilink	7	5,6%
		Garuda Indonesia	70	56,5%
		Lion Air	41	33,1%
		Sriwijaya Air	3	2,4%
		Batavia Air	3	2,4%
5	Keperluan membuka situs maskapai penerbangan	Melihat informasi	32	25,8%
		Membeli tiket	86	69,4%
		Lainnya	6	4,8%
6	Pilih salah satu tempat favorit anda untuk membeli tiket pesawat	Website	89	71,8%
		Call center	4	3,2%
		Agen travel	27	21,8%
		Ticketing office	2	1,6%
		Bandara	2	1,6%

Source: Results of Researcher Data Processing, 2012.

Then proceed with the processing of factors that shape the model equation as follows:

$$Y = 55.40 + 3.82 X_1 + 5.37 X_2 + 1.67 X_3 - 0.03 X_4$$

with:

Y = In the Passenger Satisfaction with online ticketing.

X_1 = Quality of Trust, where: $-5.49 \leq X_1 \leq 2.07$

X_2 = Quality User Interface where: $-3.41 \leq X_2 \leq 2.37$

X_3 = Quality of Information, where: $-3.12 \leq X_3 \leq 3.49$

X_4 = Quality Interactions, where: $-3.58 \leq X_4 \leq 2.53$

The description of the results is as follows:

1. The value of the constant of the model is 55.43. This figure shows that in the model, if all the independent variables that there is zero, then the value of online customer satisfaction rose by 55.430. Assuming that all other independent variables is 0.

2. The magnitude of the coefficient is 3.82 for the X_1 . The relationship shows a positive relationship, this means that any increase in the value of the CTF it will raise the value of online customer satisfaction as much as 0.153. Assuming that all other independent variables fixed value.

3. The amount for X_2 coefficient is 5.37. The relationship is a positive relationship. Which means that any increase in this variable as a value, will result in online customer satisfaction scores increased by 5.37. Assuming that all other independent variables fixed value.

4. The magnitude of the coefficient for the X_3 was 1,67. The relationship is a positive relationship. This means that any increase in this variable as a value, will result in the value of online customer satisfaction increased by 1,67. Assuming that all other independent variables fixed value.

5. The magnitude of the coefficient is 0.03 for KIT The relationship is a negative relationship. Which means that any increase in this variable as a value, it will decrease the value of online customer satisfaction as much as 0.3.

In a tight competition in the airline industry, the airlines need to pay attention to the quality of the trust factor, user interface quality, information quality, and interaction quality in e-Commerce is dimilkiki to maintain and improve the satisfaction of prospective passengers. Quality factor of trust and quality user interface has a

significant positive relationship to customer loyalty. Therefore, airlines can increase both of these factors in order to improve customer satisfaction, especially in maintaining and increasing revenue from ticket sales online.

Based on the mathematical model is obtained, the airlines can focus first on the quality of the user interface, because these variables have the greatest influence on the three other variables, then the variable quality of the trust, the variable quality of information and the variable quality of the interaction.

To improve the quality of the trust, the airlines can improve service quality customer service in providing solutions and customer complaints, provide facilities in the refund process if there is a problem with the ticket purchasing process and ensure the security of transactions using the network komunikasi order of protection against data sent can not be intercepted by others. In addition to the logos included banks and companies that guarantee the security of data such as "Norton Secured" and "Verified by Visa" can increase the confidence of users to perform transactions. To improve the quality of the user interface, the airline needs to analyze whether the site of the user comfortable and easy to use. It can be analyzed by using analytics tools such as Google Analytics that can give you a website user behavior. If there is one page that indicated many customers do not continue to the next process, hence the need to reform the page.

To improve the quality of information, the airlines need to ensure that the information presented is current and valid information. Price and schedule information from other systems whose data is updated automatically. Therefore, the relationship between the website and other systems related should be properly addressed. Needs to be checked periodically to minimize system related to customer complaints over the price discrepancy and flight schedules.

To improve the quality of the interaction, the airlines need to innovate where the interaction between online customers and website reduced. In terms of site design and navigation of current airline sites generally have several stages in the purchase of tickets online. If these steps could be shortened, then the time it takes the passengers in the process of purchasing tickets online in the transaction may be shorter.

Conclusions:

Based on the results of the questionnaire data processing involving as many as 124 respondents, researchers proved that:

1. From the results of factor analysis performed in the study, 4 (four) new factors affecting of e-Commerce quality at the airline industry.
2. Indicators that affect the e-Commerce quality at the airline industry is:
 - a. Quality of Trust
 - b. Quality User Interface
 - c. Quality of Information
 - d. Quality Interactions
3. Portrait model of e-Commerce quality of the airline industry in Indonesia is:

$$Y = 55.40 + 3.82 X_1 + 5.37 X_2 + 1.67 X_3 - 0.03 X_4$$

With an average value of 55.40%, showing the current airline passenger still see that the quality of e-commerce are provided for tickets purchased online are at an average rate of 55.40%. At the model equation above, it can be concluded that passengers still expect an increase in the quality factor of trust through the convenience of transacting with using the internet, and an increase in the quality factor of the user interface that makes it easy to use features that already exist become more simple and quickly, including an increase in the quality factor of the right information and uncertain, while the interaction of factors, respondents representing passengers with transactions that have been made online can expect reduced direct interaction can dikurangi with a smooth or automation of e-Commerce transactions.

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