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E-Commerce Recommender For Usage Bandwidth Hotel

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Article Info	ABSTRACT
	The customer interest is often affected the promotions or product offered it his/her access. The aim of this research is to evaluate the recommendation system, as a promotion model or product offered, on e-commerce to the customer interest. This research focuses on e-commerce which offers the bandwidth internet for a hotel. Firstly, prototype of e-commerce which has recommendation system is built. Then, the eCommerce is evaluated by value creation of an eCommerce. There are four factors value creation, efficiency, lock-in, complementary and novelty based on R. Amit's and Zott theory. After conducting the evaluation, two factors, efficiency and complementary, are significant to the value creation for eCommerce recommendation, yet the other factors, lock-in and novelty are not significant. This research also confirms that the number of subscribers' eCommerce increases until 45.06% with using the recommendation than without recommendation. *Copyright © 2018 Institute of Advanced Engineering and Science.* *All rights reserved.*

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1. INTRODUCTION

Nowadays, the use of internet technology gives an impact on e-business (Electronic Business). The term e-Business was initially used by IBM in 1997 "e-business is the transformation of key business processes through the use of internet technologies". Dave (2009) introduced two terms in the use of the term "e-business" in the organization, namely: (1) "e-business" is used as an operations; and (2) "e-business" is used as an online business strategy [1]. E-commerce as an application for e-business through the internet technology has been widely used.

The journey of a company by using the e-commerce is dependent on the strategy, which was made to deal with situations in the future. This strategy relates to the overall plan to deploy its resources in the enterprise. Utilization of these resources should be strictly in accordance with company requirements. In addition, companies need to leverage technology to support them in running a business, however, technology is only a tool, not a determinant of the decision.

Many e-commerce companies in Indonesia have a variety of online sales system as in bhinneka.com, elevenia.co.id, Oxl.co.id (toko bagus) and many others. But not all companies have been using a system that can help customers find the items they want to buy. Company XYZ as Internet Service Provider (ISP) company has used e-commerce to offer the bandwidth as its product. Company XYZ has some various type customers. However, the use of e-commerce is not optimal. The increasing of customers during the last four years only about 15 % (2010-2014). To solve this problem, e-commerce of the company should be facilitated by the recommendation system which is expected to boost product sales. Because of various type customers, company XYZ has a various recommendation system as the preferences' customer. This study will discuss focus the recommendation system for hotels. In addition, study will also evaluate the system of value creation.

E-commerce users feel that the website as an online business does not provide the complete information and their preferences [1]. The prepious study states that a recommendation system is an important tool that gives advice to the users or customers to make a good decision when shopping online [2-4]. Thus, to help the customers to find their preferences, the recommendation system can be used. The recommendation system is used for many applications such as social network [5], transactions (selling and buying) [6], in light of big data [7], and so forth. A recommender system is a software and engineering provide suggestions for items to be useful for users [8]. The advice is given aims to support users in various decision-making processes. In addition, recommender systems are also used to customize the environment with the needs of the site users.

E-commerce recomender needs to process a information in web e-commerce and can analyze the user on the basis of their historical assessment [10].The recommendation based on features to the user and personal profile [10]. Personal profiles are generated automatically through feedback from users [11]. In study [12] has proposed recommending the product recommendation system to incorporate customer preferences and generate a list of recommended products for specific customers. This proves that the system can be used as a strategy for sales through e-commerce [13-14]. Thus, the system recommendation in e-commerce can boost product sales.

In addition, in study [15] on the value creation in the video game industry showed there is increasing economic and industrial benefits for consumers. Research Zott et al. (2000) has proposed a strategy for value creation in e-commerce [16]. Value creation from these studies is enhancing transaction efficiency, complementary, lock-in, and novelty. Efficiency: customemrs do not have to bother looking for items to the store or shop offline, they can make the selection of goods through online so it can save time. Complementary: the customer not only gets the products and service of the goods they are looking for but also get other products, such as a book reader visited travel sites, at the customer's site gets information about weather, currency exchange information, where such information is a value for the main products that are sold (travel tickets and package holidays). Lock-in: Customers will reselect the type of product or service that is on offer at the site where it increased sales revenue value. Novelty: Customers get a new product offerings and service of the company's new system.

2.   RESEARCH METHOD

The analysis was made based on data from 2013 to 2015 on the website of e-commerce companies. The data obtained will be analyzed to determine an indication of the existence of customer interest for products and promotions. Analysis is done by looking at the data type of the company in subscribing to products and promotions. The results of the analysis will be used as the basis for product recommendations and promotions.

In order to implement relations and promotion of the products offered for the customer's interest, this research will propose prototype recommendation. This prototype is a development of the previous web. Relations and promotional products offered for the customer's interest. Prototype recommendation made by recommending products and promo offers to each type of company. It is based on analysis of customer interest has been discussed in section 3.1. The proposed prototype is a display of registration, recommendation of products and promotional offers, as well as statistics to determine the number of customers

This research used primary data collected using questionnaires with the help of an online survey tool. The questionnaire is divided into two parts, namely A and B. Part A of the questionnaire contains questions about the demographic profile of respondents such as: age, gender, job, educational background, and domicile. Part B of the questionnaire comprised 6 questions theoretical framework of the study, which are: two questions for efficiency, one for complementary, two for lock-in, one for novelty.

This measurement model was implemented using bivariate correlation, that is, to confirm the reliability of the measures, to determine validity and test hypothesis as shown Figure 1. The hypotheses for the study are (1) hypothesis_1 (H1) : efficiency factor affects the value creation of the system recommendations; (2) hypothesis_2 (H2): lock-in factor affects the value creation of the system recommendations; (3) hypothesis_3 (H3): complementary affects the value creation of the system recommendations; and (4) hypothesis_4 (H4): novelty factor affects the value creation of the system recommendations.
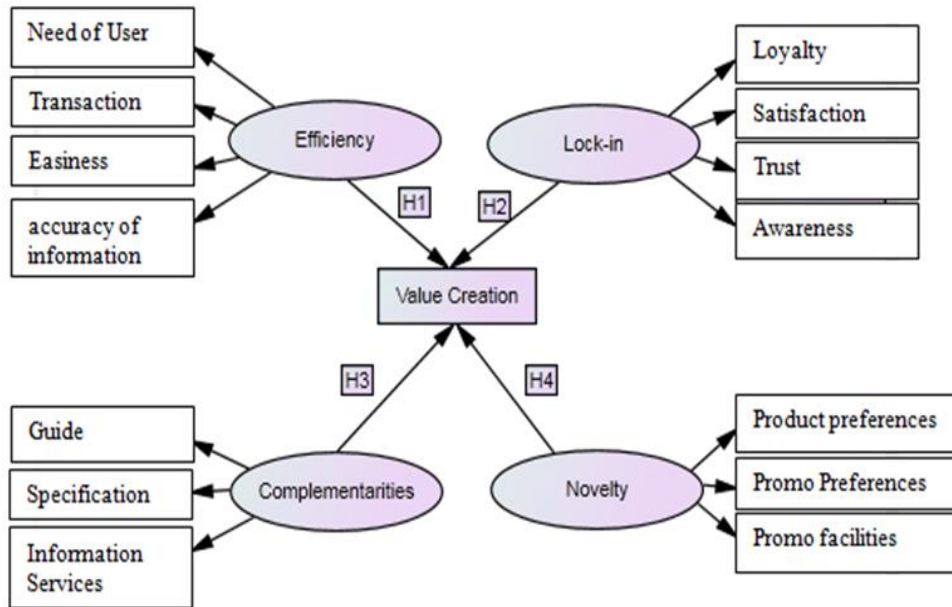
Figure 1. Value creation system design recommendations

For impact test, prototype testing carried out within one year (2015), the testing is done to prospective customers who visit an e-commerce website. This website has a recommendation system that offers products and promotions according to type of packet based on the proposed recommendations. In this stage, the data obtained will be made a comparison with the customer data without the recommendation of the company from year 2010-2014 with data tested using recommendation systems.

3. RESULTS AND ANALYSIS

In this section, it is explained the results of research and at the same time is given the comprehensive discussion. Results can be presented in figures, graphs, tables and others that make the reader understand easily [4], [7]. The discussion can be made in several sub-chapters.

3.1. Analysis of Results of Customer Interests

In this section, the customer interest to the product will be analyzed. There are 54hotels as customers are evaluated. Table 1 shows data customers' interest of the product company XYZ.

Table 1. Data customer interest for products

Type Hotel	Package A	Percentage Package A (%)	Package B	Percentage Package B (%)	Package C	Percentage Package C (%)	Total
Star5	2	100	0	0	0	0	2
Star4	4	80	1	20	0	0	5
Star3	4	50	2	25	2	25	8
Star2	2	20	3	30	5	50	10
Star1and Other	1	3.4	12	41.4	16	55.2	29
	13		18		23		54

Table 2. Data customer interest for products

Type Package	Bandwidth upload (Mbps)	Bandwidth download (Mbps)	Rate (IDR)/month
Package A	75	100	15,000,000
Package B	45	60	10,000,000
Package C	25	40	4,000,000

The product is packed on three various packages which is shown Table 2. Based on this table, the lower star hotel tends to subscribe the lowest package. Contrarily, the higher star hotel tends to to subscribe the higher package. The five star hotels tend to have a bigger bandwidth for their needs. This relation can be used as a reference to make the recommendation system.

3.2. Prototype Recommendations

Prototype recommendation consists of three main views: registration, recommendations and promo product offerings. The promo product is offered at a special event for only in temporary period. The Registration form can be seen in figure 3. It is used to fill customer personal information in order to determine the biodata customers and as a basis for determining recommendations of products and promotional offers. Figure 4 showns recommendation syystem for the bandwidth hotel based registration form.

Figure 3. Registration Form

Figure 4. Recommendation System for the bandwidth hotel

Based on Figure 4, the recommendation system is built based on the need of customers. Therefore, in this eCommerce system, the users have to input the information of the hotel. The system then calculates the need of bandwidth of hotel according the information which is input by the user. There are some variables to determine the size of bandwidth hotel such as : number room, number employee, connect index and device index.In the system also provide the usage of bandwidth which is classified in three categories (light, medium and heavy). At last the system offers the bandwidth size for hotel users. The recommendation can be agreed by choosing the button "Yes" in the system.

3.3. Evaluation of Value Creation Prototype and Impacts

Reliability using Cronbach's Alpha was conducted to measure the inter-reliability. An instrument has an acceptable level of reliability when Cronbach's Alpha is greater than 0.70. Thus the reliability test results with IBM SPSS Statistics 22 Cronbach's Alpha values of the six variables that have a value greater than 0.7, which is 0.755 so it can be said that the instrument used in the research said to be reliable.Furthermore, validity testing is conducted by using Pearson correlation (r-value). If r-value is greater than 0.3, it can be identified as a valid correlation. The complete result of reliability and validity can be shown in Table 3.

Table 3. The Validity and Reliability of Evaluation

	Corrected *Item* – Total Correlation	Validity (r-value > 0,3)	Cronbach's Alfa
efficiency			
efi1	.636	valid	0.755
efi2	.867	Valid	
efi3	.522	Valid	
efi4	.515	valid	
lock-in			
lock1	.707	valid	0.793
lock2	.855	valid	
lock3	.802	valid	
lock4	.493	valid	
Complementary			
compl1	.723	valid	0.711
compl2	.565	valid	
compl3	.461	valid	
Novelty			
nov1	.899	valid	0.865
nov2	.843	Valid	
nov3	.411	Valid	

The evaluation of the hypotheses is then conducted. The result on Table 4 shows that two variables are significant to affect the value creation of eCommerce recommendation. They are efficiency factor and complementarity. From Table 4 shows that p-value for efficiency, lock-in, complementary and novelty are 0.0001, 0.579, 0.0002, and 0.121, respectively. If a p-value of variable is lower than 0.05, it means affect for recommendation system.

Table 4. Hypothesis testing using Regression Analysis

Variables	Estimate	S.E.	C.R.	p-value
Efficiency	.822	.244	3.365	0.0001
Lockin	.010	.018	.555	.579
Complementarity	9.660	2.914	3.316	0.0002
Novelty	-.974	.628	-1.551	.121

Table 5. Data customer interest for products

Type Hotel	Package A	Percentage Package A (%)	Package B	Percentage Package B (%)	Package C	Percentage Package C (%)	Total
Star5	2	67	1	33	0	0	3
Star4	8	67	3	25	1	8	12
Star3	5	45	3	27.5	3	27.5	11
Star2	3	23	4	31	6	46	13
Star1and Other	1	3	18	48.5	18	48.5	37
	19		29		28		76

Based on table 5, H1 and H3 are significant for affect the eCommerce recommended system for usage the bandwidth hotel, while H2 and H4 are not significant.

The result implementation of the eCommerce recommendation system can be seen on the Table 5. This result is obtained after the recommendation system is embedded on the website of eCommerce. It shows that there is a significant increasing of customer of company XYZ. There are increasing 41 % customers in 2015 (using the eCommerce recommendation system) comparing 2014 (without using the eCommerce recommendation system). It shows the increasing customers, because usually the increasing of customers is only about 15 % in last four years.

This study confirms studi that the efficiency factor and complementary influence the creation value in e-business [17]. However, several studies about show that the four factors (efficiency, lock-in, complementary and novelty) influence the value creation in e-business or e-commerce [11] [18]. Therefore, the efficiency factor and complementary are the variable which should be considered for value creation in e-commerce and lock-in, novelty factors as well.

4. CONCLUSION

This research proposes the eCommerce recommendation system for bandwidth hotel. There are some variables to determine the size of bandwidth hotel such as: number room, number employee, connect index and device index. In the system also provide the usage of bandwidth which is classified in three categories (light, medium and heavy). Evaluation of the eCommerce recommendation system is conducted by using four variables (efficiency, lock-in, complementary and novelty). The result shows that the efficiency and complementary variables are significant to recommendation system. The comparison of data from the company without recommendation with data using a recommendation system showed an increase of 41%. It is better than the last four years (2010-2014) which increases only about 15%. It is an interesting research if the recommendation system is implemented in the other type such as banks, public service, school or education, and so forth.

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