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Game Theory Analysis on Marketing Strategy Determination of KAI Access and Traveloka based on Usability of HCI (Human-Computer Interaction)

Henoch Juli Christanto[1]

[1]Information System Department, Faculty of Engineering, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia
Email: [1]henoch.christanto@atmajaya.ac.id

Abstract

In the era of digitalization, KAI finally transformed train ticket booking transactions by launching the KAI Access application. By applying the optimal strategy of Game Theory, KAI Access will be able to compete with marketplaces such as Traveloka to be able to represent itself to the community as a credible company. Game Theory was chosen to analyze the existing competition to find the optimum strategy. Because both applications sell the same product, the strategy will be seen from the services provided by both applications using the usability of HCI. The 5 strategies are Learnability, Efficiency, Memorability, Errors, and Satisfaction. The best strategy used by KAI Access to obtain maximum profit is the low error rate (errors) strategy, while for Traveloka the strategy used to minimize loss is the ease of application (learnability).

Keywords: Game Theory, Usability, Human-Computer Interaction, Strategy Determination, Reservation Ticket

1. INTRODUCTION

In today's digital age, everything demands that everything be done quickly. The internet has become an inseparable necessity from society. This development has caused people to use the internet for human activities. Various types of transactions were changed from conventional to online services [1]. Likewise with train ticket booking services. As a State-Owned Enterprise (BUMN) that regulates, provides, and manages rail transportation services in Indonesia, PT. KAI finally transformed train ticket booking transactions by launching the KAI Access application.

Along with technology development, a marketplace like Traveloka has become a transaction trend [2]. Almost all daily needs are met by the existing marketplace. so that the marketplace is also present in almost every field to meet existing needs. Traveloka is one of the marketplaces in the travel industry that provides services on hotel and plane ticket reservations, in which train ticket booking is included.

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Although purchasing train tickets can be done through marketplace applications such as Traveloka, PT KAI (Kereta Api Indonesia) Persero, one of the State-Owned Enterprises, certainly needs to have its application [3]. By having its application, PT KAI will be able to represent itself to society as a credible company [4]. Company credibility will affect consumer evaluation and consumer confidence in the company's brand and products [5]. In addition, by having your own application, the level of customer trust and satisfaction in the company will increase [6]. However, observation is needed to inspect whether the application owned by PT KAI has competed with other applications that also provide online train ticket sales services.

This interesting phenomenon became the basis for conducting this research. This study examines competition using Game Theory on KAI Access and Traveloka by using usability indicators as a strategy in each application to estimate the best marketing strategy to be carried out, the company must study or at least estimate the steps of its competitors. Game Theory is a method used to determine decisions when two or more parties are in a state of competition or conflict [7]. The usability indicator was chosen as a strategy because the products offered by both applications are train tickets, so what can be seen in this discussion is the usability of the train ticket provider application service, because the usability of an application affects supporting the success of a business [8]. The main key in this study uses HCI as its theoretical basis since HCI can measure a product's usability. The limitation of this study is not discussing other features besides train ticket online reservations.

2. METHODS

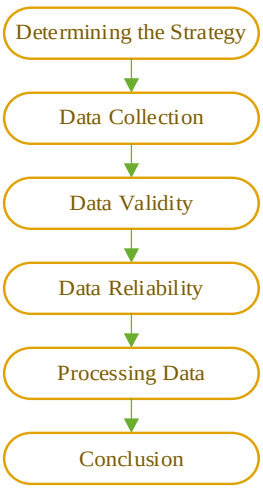

Figure 1. Research Phase

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1. Determining the Strategy
At this stage, determine the marketing strategy used by each application in Game Theory. Since both apps offer the same product, it will be seen how both apps attract customers to use their apps with usability indicators. Applications that have a high usability level, certainly have applied HCI well [9]. Therefore, the high/low level of usability of an application indicates a lot or lack of interest from both apps in booking train tickets [10]. The strategy used in this study used usability indicators from HCI (Human-Computer Interaction) proposed by Jakob Nielson [11]. Here are five indicators of usability that will be used in strategies of game theory in this study:

1. Learnability
   The application is easy to understand and use to solve existing needs.
2. Efficiency
   Fast application in carrying out available functions/features
3. Memorability
   The process/steps to complete the needs are easy to remember
4. Errors
   The error rate made by the user/system is low
5. Satisfaction
   Users are satisfied with the availability of in-app services

2. Data Collection
At this stage, using data collected by distributing questionnaires with Purposive Sampling collection techniques with inclusion criteria are KAI Access and Traveloka application users whose intensity of using train service is at least one time a month. Purposing sampling was chosen because the quality of information owned by respondents is more trustworthy. With purposive sampling, the researcher can decide what needs to be known and established to find people who can and are willing to provide information based on the knowledge or experience of the respondent [12].

3. Validity Test
At this stage, data calculations and validation are carried out based on the attributes that have been determined in the previous stage. Data validity testing is used to determine whether the attributes in the study are valid. Validity is measured using the Product Moment correlation formula from Karl Pearson by correlating the results of each item with the total value of that item to describe the relationship between the same two variables [13]. Karl Pearson's Product Moment formula is:

$$r_{xy} = \frac{N(\sum xy) - (\sum x)(\sum y)}{\left(N(\sum x^2) - (\sum x)^2\right)\left(N(\sum y^2) - (\sum y)^2\right)} \quad (1)$$

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N = Total number of subjects
r_{xy} = Correlation coefficient of variables x and y
Σxy = Total value of the multiplication between the value of the variable x and the value of the variable y
Σx = Total value of variable x
Σy = Total value of variable y

4. Reliability Test
The reliability stage is the accuracy of the results obtained from a measurement. A reliability test is carried out to determine the confidence level in the results of measurement [14]. Reliability Test with Cronbach Alpha is used in this research to test the validity value and reliability of the questionnaires. At the stage of reliability is assisted using IBM SPSS.

5. Processing Data
At this stage, the data is processed using Game Theory by specifying row players and column players. Row players are players who are considered to have an advantage, while column players are players who are considered to have suffered losses [15]. After that, determine the minimum value of the maximum earned value (minimax) for the row player and the maximum value of the minimum earned value (maximin) for the column player. Then calculate the saddle point to determine the strategy used in each application.

6. Conclusion
At this last stage, the results of data processing in the previous stage are drawn conclusions or interpreted the calculation results and then written in a journal

3. RESULTS AND DISCUSSION

The strategy that will be used by each application uses the usability indicator from HCI. 5 These strategies are learnability, efficiency, memorability, errors, and satisfaction. The variables used are divided into variable x for KAI Access and variable y for Traveloka. The following are given the attributes in the game theory used as variables in Table 1.

Table 1. Variable in Game Theory

Attribute	Variable of KAI Access	Variable of Traveloka
Learnability	x_1	y_1
Efficiency	x_2	y_2
Memorability	x_3	y_3
Errors	x_4	y_4
Satisfaction	x_5	y_5

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3.1. Validity Test

From the computation result of the validity test, it can be seen that there is not an item that fails. It can be noticed that from all items, the corrected item-total correlation of their value of corrected item-total correlation is > 0,340. There are 5 valid items in each application that have a validity coefficient in the range of 0.390 to 0.596. The results of the calculation of data validity can be seen in table 2 and table 3.

Table 2. Validity Test KAI Access

Attribute	Variable	$r_{Variable}$	r_{Table}	Validity
Learnability	x_1	0,421	0,340	Valid
Efficiency	x_2	0,596	0,340	Valid
Memorability	x_3	0,424	0,340	Valid
Errors	x_4	0,394	0,340	Valid
Satisfaction	x_5	0,471	0,340	Valid

Table 3. Validity Test Traveloka

Attribute	Variable	$r_{Variable}$	r_{Table}	Validity
Learnability	y_1	0,503	0,340	Valid
Efficiency	y_2	0,394	0,340	Valid
Memorability	y_3	0,390	0,340	Valid
Errors	y_4	0,508	0,340	Valid
Satisfaction	y_5	0,494	0,340	Valid

3.2. Reliability Test

Meanwhile, measuring the reliability of measuring instruments using the Alpha Cronbach technique. Of all valid variables, an Alpha Cronbach result was obtained between 0.704 and 0.789. Therefore, according to reliability standards, the instruments used to measure the level of usability in KAI Access and Traveloka can be said to be included in the reliable category [14].

Table 4. Reliability Test KAI Access

Name	Variable	α	Reliability
Learnability	x_1	0.704	Reliable
Efficiency	x_2	0.779	Reliable
Memorability	x_3	0.789	Reliable
Errors	x_4	0.783	Reliable
Satisfaction	x_5	0.709	Reliable

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Table 5. Reliability Test Traveloka

Name	Variable	α	Reliability
Learnability	y_1	0.774	Reliable
Efficiency	y_2	0.785	Reliable
Memorability	y_3	0.782	Reliable
Errors	y_4	0.776	Reliable
Satisfaction	y_5	0.776	Reliable

Table 6. Recapitulation Value for KAI Access and Traveloka

	y_1		y_2		y_3		y_4		y_5	
		314		312		293		291		283
x_1	319		319		319		319		319	
		314		312		293		291		283
x_2	311		311		311		311		311	
		314		312		293		291		283
x_3	305		305		305		305		305	
		314		312		293		291		283
x_4	326		326		326		326		326	
		314		312		293		291		283
x_5	294		294		294		294		294	

With the value of the competition obtained, the acquisition value is formed. The earned value is the number of row players minus the number of column gains. The acquisition value of the KAI Access acquisition amount is reduced by the amount of Traveloka earned. With the acquisition value started tried the first step using a pure strategy. For row players, will use maximin rules and column players will use minimax rules.

Table 7. Game Value

	y_1	y_2	y_3	y_4	y_5	Minimum
x_1	5	7	26	28	36	5
x_2	-3	-1	18	20	28	-1
x_3	-9	-7	12	14	22	-9
x_4	15	18	33	35	43	**15 maximin**
x_5	-20	7	1	3	11	-20
Maximum	**15 minimax**	18	33	35	43	

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From the KAI Access and Traveloka game matrix in table 7, it can be seen that the maxillary value is equal to the minimax value, which means that the saddle point has been achieved and is the Optimum Strategy, then the game can be solved using Pure Strategy. Where the minimax value is 15 and the maximin value is 15.

4. CONCLUSION

From the discussion that has been described, usability can be used as a strategy in competition in Game Theory. From the calculations that have been done, it can be concluded that the game data between KAI Access and Traveloka obtained an optimal game value (saddle point) of 15. From the value of the saddle point, the optimal strategy for each application uses a pure strategy, whereas KAI Access uses Strategy x4 low error rate (errors) of 100% to produce a maximum profit of 15. While the Traveloka application uses Strategy y1 Ease of application (learnability) of 100% to generate a minimum loss of 15. By applying the optimal strategy of Game Theory, KAI Access will be able to compete with marketplaces such as Traveloka to be able to represent itself to the community as a credible company.

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