Kano Model for Identification Car Modification Features of Mobile Application

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Abstract: Modification was an activity to replace the object more attractive especially car modification. Lately, car modification become the one of the promising business since that were providing high profits. The owner of car look for the accessories for their car frequently. Then, the owner of car modification should increasing their facility to make the consumer satisfied. Furthermore, if the consumer satisfied with the service than it provided high profit. For increasing high profit than the owner of car modification should made the innovation. One of the innovation was car modification with mobile application (apps.) by Kano model. The aims of this study was to identify the features in car modification using Kano model. Kano model used to identify consumer needs that divided into 3 category. There are must be, one dimensional and attractive. The result from open questionnaire would be proceed by Kano model. This study revealed that feature of selection car body colour, feature of selection lamp model and feature engine cap model of into one dimensional category, feature of selection car velg, and matching the tire into must be category and feature of selection cutting sticker, and selection of bumper model into attractive category, and priority to develop are feature of selection car body colour, cutting sticker and selection of bumper model. This category should be the reference to be the resource for car modification apps.

1 Introduction

In this era, business competitions in Indonesia were getting strict. From that reason above business people should have some strategic that the product would be accepted in the market. One of the strategic which used by the business people were providing the best services and expanding the market in unreached area [1]. As well as business competition in car market. Lately, based on Gabungan industri kendaraan bermotor Indonesia (Gakindo) the sales of car on 2016 reached 1, 06 million. It increased about 4,5 % from year 2015 to 2016. This finding shows that the consumers of car were increasing. Department of design and sales have the high contribution to increase the car sales. The consequence of high sales was swelling of the machine shop. It was for not only machine maintenances but also car modification. Generally, Car Company releasing original car. However, some of consumer needs to modify their car for better performance although small or huge modification. Modification was the activity, which changed the object to be more interesting. The car modification such as changing the colour of car or alloy wheels. Lately, business modification very promising. Some of machine shop got turnover around 40-50 million per month and profit about 30% from that [2].

Because the growths of workshop then the owner must to attract the consumer with good services and low price. Nowadays, even though the consumer got good services and price, they could not satisfices the consumer. It happened because of the first target was they satisfied about the result even though they got high price. If they were not satisfied yet, they would remain to modify their car until pleased. If that happened consequently the consumer would spending a lot of money. For keep away from repeated modification and good services accordingly the workshop need applications (apps.) for car modification on android based. This app. could help the consumer with simulation modification on android. With that, simulation would be helpful for consumer. These apps. Will help the consumer to choice the modification and for workshop workshop would give the best services for consumer.

To create the apps., needs identification for user. There are model to apps. identification. One of them is Kano model. Kano model used to identify the consumer needs frequently. This model could give the priority for the needs based on three category. [3], [4], [5], [6]. [7]. Kano model is methods of overcoming bias of result from survey to find consumer needs traditionally [8]. In the Kano model there are 3 main requirements that affect the needs or customer satisfaction is must be requirement, one dimensional requirement, and attractive requirements [9]. Must be requirement was the basis requirement or minimal criteria that should be full filled by the produce. However if the requirement weren't that will not affect the product; one dimensional requirement was if the fulfilment more completed then the costumer more

pleasure and attractive requirements was if they weren't then the product or services couldn't influences but if they were could be increasing the consumers satisfaction. Those requirements would determine the apps. Which is necessary or not.

From the reason above, the purposes for this study was to identify the app., of car modification which required by the workshop owner and consumer. These apps., be expected to improve the profit for the workshop owner, improving the consumer satisfaction, save cost for consumer and reduce the wasted work.

2 Material and Methods

2.1 Research Design

Design of this study was survey by using primary and secondary data.

2.2 Data Collection

These data collected by interview with open questionnaire for primary data and study literature for secondary data. The questionnaire content was about the features, which needed in these apps. and desire analysis about the desire for car modification apps. Study literature would support the information about apps. These studies have four questionnaires that distributed to the consumers. First questionnaires were the open questionnaires which used to know the customer needs on information systems which would be created; second questionnaires was the questionnaires for the decision level, are they valid enough to be attributed for design; third questionnaires was Kano model questionnaires which ask about functional and dysfunctional questions, the purposes for this Kano model questionnaires were to identification the features which needed in this apps. such as positive for functional and negative for dysfunctional question; fourth questionnaires ask about the features specification which proposed to car modification apps.

2.3 Subject

Subject on this study were the consumer who has ever had modification their car and the owner of workshop, which served car modification with inclusion criteria, was the people, which could make the decision by age range between 17-35 years old. The number of samples based on the formula 1 and the minimum sample based in formula 2 [10]:

$$n = \frac{Z^2.P(1-p)}{E^2} \qquad (1)$$

The formula of number sampling (n: number of sample; Z: level of confidence; P (1-p): variation of population; E: sampling error) [10].

$$n = \frac{1,645^2.0,5(1-0,5)}{0,1^2} \qquad (2)$$

n = 67, 65~68 sample

2.4 Data processing and analyses

After data were collected, then the data processing and analyses were done. The data that obtained would be analyses by validity and reliability using Pearson Product Moment. The data was valid if p value > 0.05 and reliable if r count > r table the criteria of reliability were 0,00 – 1,19: reliability was very low; 0,20 – 0,39: low reliability; 0,40 – 0,59: moderate reliability; 0,60 – 0,70: high reliability; 0,80 – 1,00: very high reliability.

2.4.1. Kano model category

The valid and reliable data would be process with Kano model for evaluation attribute. These methods to determine the attribute for the customer satisfaction then categorization were needed. The result of categorization would be used for features of apps. The evaluation of Kano model by input the data based on evaluation Kano model table (Table 1).

Table 1. Kano model evaluation [11]

Consumer needs		Dysfunctional				
		L	E	N	T	D
Functional	L	Q	A	A	A	O
	E	R	I	I	I	M
	N	R	I	I	I	M
	T	R	I	I	I	M
	D	R	R	R	R	Q

A : Attractive
O : One dimensional
M : Must be
I : Indifference
R : Reverse
Q : Questionable

L : Like
E : Expect
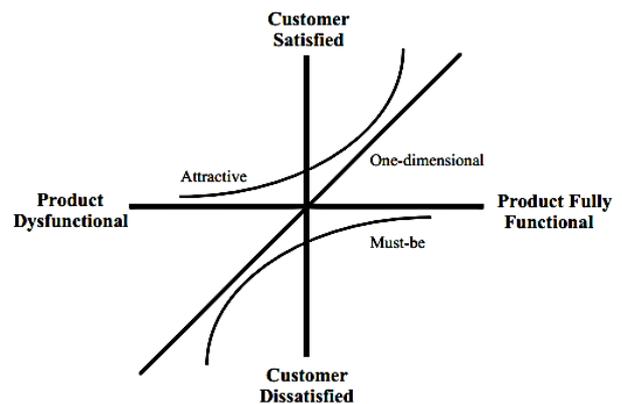N : Neutral
T : Tolerance
D : Dislike

Figure 1. Kano Diagram [12]

In the Kano model, there are 5 categories of quality factors: must-be, one-dimensional, attractive, indifference and reverse which each have different characteristics and levels of influence on consumers (M, O, A) [3], Indifference (I): this feature will not have an impact on consumers and; Reverse (R): a feature that if held will cause dissatisfaction on the consumer.

Kano model can know the influence of each attribute by identifying relative values to meet user satisfaction or not. In the same conditions, Kano model can be separated into two conditions, namely customer satisfaction and customer dissatisfaction following formula 3 & 4 [11]:

Customer Satisfactions (CS)=A+O/(A+O+M+I)   (3)

Customer Dissatisfactions (CD)=O+M/(A+O+M+I)   (4)

If CS value is closed to 1, then attribute increasingly influence consumer satisfaction, If CS value is closed to 0, that means that attribute does not affect consumer satisfaction. If the CD value is closed to -1 then the attribute if not met will greatly affect customer satisfaction and if close to 0 means that the attribute has no effect on customer disappointment [13]

2.4.2. Conclusion and recommendation

After the step have done, furthermore the features for apps. Were decided.

3 Result and discussion

3.1. Feature attributes determination

From the open questionnaire about feature attribute, the subject explained that these feature were needed. They are features of selection car Body Colour (**BC**), selection of Car Velg model (**CV**), selection of Tire model (**T**), selection of colour Car Seat (**CS**), selection of Cutting Sticker (**CSt**), selection of design Interior for Audio (**IA**), selection of Bumper Model (**BM**), selection of Windshield Glass (**WG**), selection of Lamp Model (**LM**), selection of Cap Engine model (**CE**), and selection of Steering Wheel model (**SW**). These results would be needed as attributes for car modification app.

3.2 Validity

Table 2. Validity and reliability test of feature attributes for car modification app.

Feature attributes	R-table	R-Count	Explanation	Reliability	Explanation
BC	0.235	0.473	valid	0.830	reliable
CV	0.235	0.460	valid	0.830	reliable
T	0.235	0.544	valid	0.830	reliable
CS	0.235	0.613	valid	0.830	reliable
CSt	0.235	0.602	valid	0.830	reliable
IA	0.235	0.689	valid	0.830	reliable
BM	0.235	0.672	valid	0.830	reliable

WG	0.235	0.606	valid	0.830	reliable
LM	0.235	0.742	valid	0.830	reliable
CE	0.235	0.663	valid	0.830	reliable
SW	0.235	0.635	valid	0.830	reliable

The results of open questionnaire about the feature attributes have been done validity and reliability test. The result shows that all of the features attributes were valid and reliable (Table 1).

3.3 Kano model category

Table 3. Features attributes category for car modification app. By Kano model

Attributes	A	O	M	I	R	Q	Total (n)	Category
BC	9	46	8	6	1	0	70	O
CV	10	15	37	8	0	0	70	M
T	8	16	34	5	6	1	70	M
CS	4	17	8	38	3	0	70	I
CSt	39	12	8	10	1	0	70	A
IA	15	11	8	32	3	1	70	I
BM	32	18	6	12	1	1	70	A
WG	8	13	6	37	6	0	70	I
LM	10	32	9	14	5	0	70	O
CE	15	28	10	14	3	0	70	O
SW	14	20	6	25	5	0	70	I

Based on table 3, selection of car velg model (**CV**), and selection of tire model including categories must-be. Feature of selection car body colour (**BC**), selection of lamp model and selection of cap engine model (**CE**) including categories one-dimensional. Selection of cutting sticker (**CSt**), selection of bumper model (**BM**) including categories attractive. Selection of colour car seat (**CS**), selection of windshield glass (**WG**), selection of steering wheel model (**SW**) including categories indifference. Indifference category has low influence for customer satisfaction.

After obtained the categorization of each attribute, continued processing data to determine the level of consumer satisfaction of product features based on the formula 3 and 4. Tabulation data can show in table 4:

Table 4. Satisfaction level of respondents.

Attributes	Category	CS	CD
BC	O	0,797	-0,783
CSt	A	0,739	-0,290
BM	A	0,735	-0,353
LM	O	0,646	-0,631
CE	O	0,642	-0,567
SW	I	0,523	-0,400
AI	I	0,394	-0,288
T	M	0,381	-0,794
CV	M	0,357	-0,743
WG	I	0,328	-0,297
CS	I	0,313	-0,373

Base on table 4 found attributes include to the priority category to develop, because these category can influence customer satisfaction. Feature selection car body colour became the first priority, feature of selection cutting sticker became the second priority and feature of selection bumper model became third priority.

Feature which has been identified from this research continued with observation and identify special feature for workshop owner. The result of observation was found that the selected features need to add the spare part price. Then, the consumer can calculate directly how much it will cost to modify his car. This apps in the design connected with the database owner of the workshop to know the inventory spare part, invoices to customers and monthly reports to the owner of the workshop.

4 Conclusion

Kano model effective to divide attributes into 3 categories, making it easier for programmers to prioritize the attributes that should be developed. The features application that recommended for car modification could be divided are:

1. Must be category: feature of selection car velg, feature of selection tire.
2. One dimensional category: feature of selection car body colour, feature of selection lamp model
3. Attractive category: feature of selection cutting sticker, and selection of bumper model.
4. Priority to develop are feature of selection car body colour, feature of selection cutting sticker and selection of bumper model.
5. The addition of a price list to selected features for the consumer user interface, inventory features, invoices and monthly reports to the user interface of the workshop owner.
6. Further research can be done in making the application and testing usability of application design that has been made

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