Designing Service Blueprint of Self-service Technology (SST) Based Public Transportation Service in Indonesia using SSTQual, Kano Model, and QFD

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Abstract. Indonesia as one of developing countries has started to slowly implement self-service technology to its public transportation services which are e-ticketing and e-gate. Regardless of the public's enthusiasm for these self-service technologies implemented, users' complaints regarding the services implies the importance to redesign services that are focused on user satisfaction. This study attempts to result a design recommendation method for self-service technology based public transportation service to improve customer satisfaction by integrating SSTQual method, Kano Model, QFD and service blueprinting. Result shows that there are 12 service attributes belong to attractive category which need to be prioritized in increasing customer satisfaction. 12 attributes are then translated into technical requirements to obtain innovations to be used in the service blueprint. Through this research, there are 10 technical requirements which need to be applied to improve customer satisfaction. The technical requirements are then detailed in operational actions to be mapped in the service blueprint.

1 Introduction

Public service principally is under responsibility of government agencies or state-owned enterprises to fulfil community needs. This study using the case study of public railway station in Jakarta, the capital city of Indonesia. The declaration of Less Cash Society or also known as Gerakan Nasional Non Tunai (GNNT) in August 2014 has influenced the usage of self-service technology in this sector. Self-service technology allows customers to produce services independently. Self-service technology in this case which are e-ticketing and e-gate, has started to be implemented massively in Jakarta. On the other hand, number of train passengers around Jakarta (Jakarta, Bogor, Depok, Tangerang, Bekasi) in the last 7 years has been increasing and can be said to be constantly high [1]. It indicates the importance of service quality related to this kind of public service. A preliminary study is conducted through a questionnaire involving 31 respondents resulting that there are 3 important issues to be followed up which are station's facilities, station's service procedures, and information. These types of complaints can be accommodated with planning of activities, infrastructure, communications, material components, and services or commonly referred to the service design. However, the existing service design still received a lot of complaints which indicate that improvement regarding to its

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service quality is needed. From the previous explanation, it is necessary to redesign services that are focused on customer satisfaction which leads to the need for service redesign. The goal to be achieved in this study can be divided into three stages sequentially: (1) to analyse the voice of customers, (2) to identify the priority of innovation based on the voice of customers, and (3) to design the service blueprint related to innovation chosen.

2 Theoretical review

2.1 Service design, service redesign, and service blueprint

Service design can be interpreted as the design of services which make the service becomes easier to use [2]. Service design as an essential component in the whole development of the service process focus on basic operational development activities that involve understanding and designing interactions from a variety of physical, technology and human elements [3]. According to ISO 9004-2: 1991, service design is a process that involves changing a service description into specification for service, service delivery and control, as well as looking for options from organizations including goals, policies and costs. A good service design can provide good interaction between human, human with system, and human with environment [4,5]. Meanwhile, service redesign is a process of reconstitution, rearrangement, or replacement of processes in services where innovation in the service process will be formed [6]. This enables an organization to reassess its current service design and provide some alternative ways of delivering more effective services for customers [7]. Redesigned service can add value to customers by increasing the benefits of a service or reducing the burden of the service [8]. There are several methods used in service redesign such as user diaries, safari service, user personas, user journey mapping, design brief, business model canvas, and service blueprinting. In this study, the method used is service blueprinting. A method was found by Shostack in a study of service management regarding the service development tool [9]. This related study was further developed by Kingman-Brundage to visualize the service or service process [10]. The blueprint service is a detailed map of activities and interactions of service designed to describe all the activities required to function, both visible and invisible ones for customers. Therefore, service blueprint can objectively understand and is not influenced by the individual's point of view according to their respective roles in the service [11].

2.2 SSTQual, Kano model, and QFD integration

Self-service Technology Quality or usually known as SSTQual presents the basis of calculation for customer-technology interaction context in the kind of same way as ServQual applies to human interaction. It assumes a linear relationship between customer satisfaction and performance quality. The implication is that low customer satisfaction will result low quality of service. This assumption is not entirely right because of giving extra attention to certain attributes may not always result the higher customer satisfaction, otherwise customer satisfaction can also greatly increase just by giving a small enhancement to other certain attributes with sort of unexpected but pleasant service. The integration of Kano models into SSTQual can answer these limitations. The Kano model can help categorize the attributes of measuring customer satisfaction based on the relationship between performance and customer satisfaction. The integration of Kano and SSTQual models assumes that the relationship between performance and customer satisfaction is not always linear. While Quality Function Deployment (QFD) is used to translate customer requirement into a technical response that can be used to actualize customer desires. This study uses a combination of SSTQual and Kano model which is then integrated into QFD, where the research model will refer to the combined framework of ServQual, Kano model and QFD sourced from Tan & Pawitra (2001) research. Referring to Tan & Pawitra (2001), SSTQual is used to identify gaps between services received with expected services and collect data on the level of importance of service attributes [12]. From these two outputs, value of

customer satisfaction score can be calculated from the service attribute. Meanwhile, the Kano model is used to identify the categories based on the kano evaluation tables. The result of customer satisfaction score and weighted kano model is then used to calculate the value of adjusted importance of service attribute in HOQ diagram.

3 Research Methodology

For data collection, a questionnaire of integration of the SSTQual and the kano model is distributed in this stage. Respondents involved in this study amounted to 375 people. After collecting the questionnaire data, the result of voice of customer from the questionnaire is then analysed with QFD to translate customer needs into technical responses that can be used to actualize the needs. Innovation in the form of operational action is then visualized in service blueprint to provide the details of innovation in service.

3.1 SSTQual

According to Lin & Hsieh (2011) SSTQual can be used as a very useful diagnostic method to escort SST service provider from time to time. Furthermore, SSTQual research is a quality method to discover advantages or disadvantages of service and measuring the impact of improvements made. For example, an organization can use SSTQual to compare the performance of its current service with its previous service performance so that it can recognize the repetition actions that need to be applied when one of the following dimensions is below the required level. SSTQual can also be used both quantitatively and qualitatively to categorize the customer segmentation of the service provider. As customer expectations continue to change over time, service providers will gain deeper understanding of customer expectations and pain points in certain areas that have significant gaps (performances – expectations) through SSTQual. The SSTQual used in this study refers to Lin & Hsieh (2011) which consist of 7 dimensions including 20 attributes [13]. Likert scale (1-5) usage in SSTQual questionnaire for service performance and service expectation helps to determine each attribute's gap. The result of SSTQual attributes' gaps are shown in Table 1.

Table 1. SSTQual dimensions and attributes.

No	Dimension	Attribute	Gap
1	Functionality	I can get my service done with the firm's SST in short time (FUN1)	-0.424
		The service process of the firm's SST is clear (FUN2)	-0.515
		Using the firm's SST requires little effort (FUN3)	-0.448
		I can get my service done smoothly with the firm's SST (FUN4)	-0.267
		Each service item/function of the SST is error-free (FUN5)	-0.472
2	Enjoyment	The operation of the firm's SST is interesting (ENJ1)	-0.163
		I feel good being able to use the SSTs (ENJ2)	-0.323
		The firm's SST has interesting additional functions (ENJ3)	-0.075
		The firm's SST provides me with all relevant information (ENJ4)	-0.525
3	Security/Privacy	I feel safe in my transactions with the firm's SST (SEC1)	-0.565

No	Dimension	Attribute	Gap
		A clear privacy policy is stated when I use the firm's SST (SEC2)	-0.493
4	Assurance	The firm providing the SST is well-known (ASU1)	-0.067
		The firm providing the SST has a good reputation (ASU2)	-0.152
5	Design	The layout of the firm's SST is aesthetically appealing (DES1)	-0.523
		The firm's SST appears to use up-to-date technology (DES2)	-0.384
6	Convenience	The SST has operating hours convenient to customers (CON1)	-0.605
		It is easy and convenient to reach the firm's SST (CON2)	-0.488
7	Customization	The firm's SST understands my specific needs (CUS1)	-0.528
		The firm's SST has my best interests at heart (CUS2)	-0.496
		The firm's SST has features that are personalized for me (CUS3)	-0.235

3.2 Kano model

In this study, innovation is only applied for prioritized service attributes. This priority is done so that redesign is focusing on important attributes to generate high satisfaction. In addition, it will certainly be difficult for the organization if they have to make improvements to the overall attributes since it may take longer time and higher cost. Kano model questionnaire is used for prioritizing all 20 attributes by questioning what-ifs for each attribute's functionality and dysfunctionality. Based on 20 SSTQual attributes, there are 12 attributes belong to attractive category. This study focuses on attributes that are included in attractive category because these attributes need to get more attention since they have big impacts in satisfying customer.
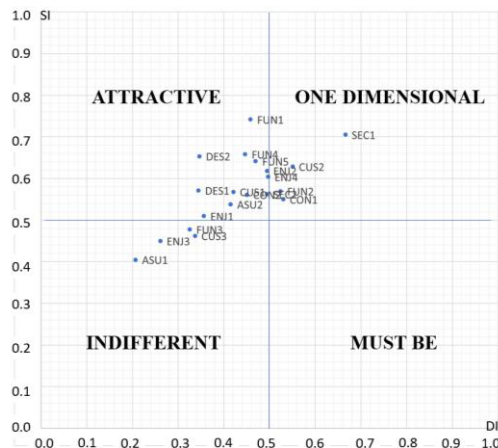

Figure 1. Kano category diagram.

Based on the results which can be seen in Figure 1, FUN1, FUN4, FUN5, ENJ1, ENJ2, ENJ4, SEC2, ASU2, DES1, DES2, CON2 and CUS1 are included in the attractive category. Based on their SI-DI values, these attributes have greatest or significant effect on customer satisfaction and least significant effect on dissatisfaction.

3.3 QFD

Literature review for technical responses is conducted with inputs related to 12 attributes which results 10 corresponding technical responses. SSTQual Integration and Kano model into QFD will provide operational and systematic guidance in improving service quality by obtaining priority of these 10 technical responses. In this stage, experts are needed to determine the relationship between each customer requirement and technical requirement. These relationship scores are then used to calculate the absolute importance and relative importance of each technical requirement. The priority result from QFD where customer requirements are the 12 attributes and technical requirements are the 10 technical responses can be seen in Table 2.

Table 2. Technical requirement priority.

Technical Requirement	Absolute Importance	Relative Importance	Priority
Determination of supporting information facilities in required spots	266,599	16.91%	1
Development of IT service quality support equipment	242.746	15.40%	2
Procurement of information services and 24 hours complaints	196,464	12.46%	3
Use of *social media, websites,* and applications as supporting activities	187.656	11.90%	4
Assessment of employee performance	139.888	8.87%	5
Implementation of *preventive maintenance system*	135,943	8.62%	6
Implementation of *knowledge management* principles in the company	121,379	7.70%	7
Implementation of user satisfaction evaluation system	107,443	6.82%	8
Implementation and management of cooperating with other public transportation organization	95,738	6.07%	9
Standardization of service time	82,537	5.24%	10

3.4 Service blueprint

Based on the technical requirement previously formulated, before visualizing these requirements to the blueprint, there is one stage that need to be done to generate the service innovation needed in the blueprint. In this study, all 10 technical requirement priorities are used to formulate the service innovation by dividing them into three levels: strategic level (level 1), management level (level 2), and operational level (level 3). Examples of a technical requirement at all three levels can be seen in Figure 2.
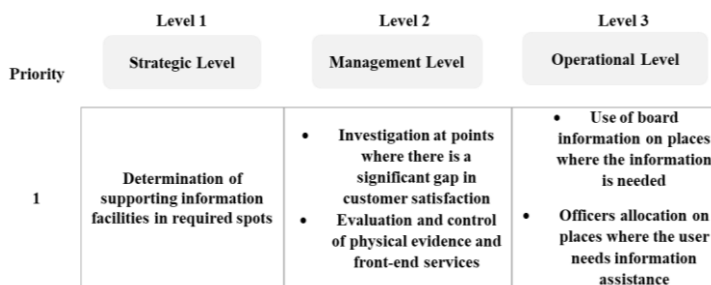

Figure 2. Technical requirement levels.

In result, 10 technical requirements in strategic level are formulated into 16 innovations (operational level technical requirement) for service blueprint. As service design focus on basic

operational development activities, the actions that can be continued to be mapped to service blueprint are in level 3 (operational level) based on customer journey. Out of 16 actions, only 14 actions which can be mapped to the service blueprint. Those two operational actions cannot be mapped into blueprint due to their irrelevance to the customer journey of the service which should directly be related to customer.

4 Conclusion

Overall, the integration of SSTQual, kano model, and QFD is proven to support service redesign process specifically service blueprinting. In analysing the voice of customers, SSTQual is a right method to acquire customer expectation related to service performance by presenting the service gap between performance and expectation. In identifying the priority of innovation based on voice of customers, the integration of kano model and SSTQual helps to categorize 20 attributes of SSTQual in each category allowing service provider to choose the priority based on its goals. Since this study aims to reach high customer satisfaction, category chosen is the attractive one. In designing the service blueprint related to innovation chosen, QFD helps to translate those attributes into 10 technical responses which then formulated into three levels of action. This part is important because the flow of service blueprint is determined by customer journey so that operational actions which directly connected to customer can easily be mapped or visualized.

Acknowledgements

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