African Journal of Hospitality, Tourism and Leisure, GCBSS Special Edition (2019) ISSN: 2223-814X


# Quality improvement initiatives for public transportation based on a customers and service providers approach

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**Abstract**

The competition between application-based and conventional transportation has become a global issue. Then conventional transportation needs to develop a comprehensive strategy. One offensive strategy is to create opportunities for innovation through ownership of information on service quality requirements from the perspective of consumers, competitors and companies so that quality improvement decisions are based on a matrix of relationships from all stakeholders. The purpose of this study is to analyse the comparison of service attributes and describe the quality management practices between consumer perspective and service provider's perspective. This research was conducted in Indonesia with the unit of analysis being users and drivers of online transportation services in West Java specifically four big cities namely Bekasi, Bogor, Bandung and Cirebon. While those considered are 100 respondents with 20 drivers. The research method used was a survey method using a questionnaire as a data collection tool. Data were analysed by the method of Quality Function Deployment (QFD) from Miles & Huberman. The results showed Service priority from the perspective of consumers is the evaluation related to drivers and driving safety, while based on service provider's standards the value of weight is considered important, namely Training and SOP drivers as well as prioritizing the company code of ethics applied to drivers.

**Keywords:** Service quality, online transportation services, quality functional deployment (QFD).

## Introduction

The diversity caused by the concept of the sharing economy in this era of disruption has resulted in changes in business processes, including the phenomenon of online-based transportation. The positive side of this phenomenon is that customers, as users of online transportation services, are given online-based mode options with relatively low rates and a variety of vehicle facilities. However, the negative side is causing the taxi business, which has long been operating, to be disrupted.

Thus, the public is faced with a variety of choices of transportation modes and the operator also strives to provide the best quality service performance. This research aimed at determining customer perspectives on how the service quality of online-based transportation operators can evaluate service quality performance. There are various service quality parameters in the mode of transportation, namely reliability, comfort, safety, efficiency, and transportation planning. The time interval also affects the service quality performance, both between rush hours and non-rush hours and weekdays and weekends (Bilisik et al, 2018).

Previous research revealed that the reference to the service quality of the service industry was more difficult than the manufacturing industry (Bilisik et al, 2018; Nicolaides, 2008; 2012; Ramphal & Nicolaides, 2014;Lovelock et al, 2010). The service quality performance of the transportation system had also been studied by several studies (Furqon, 2019; Bilisik et al, 2018; Iseki, 1995; Apostolopoulou et al 2000; Celik et al 2010; Hassan et al, 2013; Eboli and Mazulla, 2011; and Zak, 2011). Furqon (2019) conducted a research on commuter line mass transportation in Jakarta and revealed that there were several important aspects to be considered regarding the quality of transportation services, namely the accuracy of train

departure and arrival schedules, safety and comfort when boarding and disembarking trains, availability of priority seats for people with disabilities, pregnant women, elderly, and mothers with young children, and the frequency of train departures (per day).

Research conducted by Bilisik (2018) aimed at improving the service quality and passenger satisfaction by listening to passenger voices, determining their requirements, and integrating these requirements into public transportation services in Istanbul. The results of his research revealed the passengers' demand to reduce complaints and improve the quality of public transportation services. To reduce congestion, bus and / or BRT line optimization was needed. Measurement of the quality of transit performance services was conducted by Eboli and Mazulla (2011) to ensure continuous improvement of the quality of transit services, and to allocate resources among competing transit agents. The quality of transit services can be evaluated by subjective actions based on passenger perceptions. Besides, objective actions represented by disaggregated performance measures are expressed as numerical values, which should be compared with fixed standards or past performance.

Celik et al (2013) and Hassan et al (2013) suggested that predicted transport service demand trends, such as shareholder concerns and unmet service requirements, were very important for public transportation. Research conducted by Zak (2011) found that several stakeholders shared roles in the operation of transit systems that were efficient, comfortable, and effective. The findings revealed that there was a conflict of interest where passengers demanded a high level of transportation services while operators were more concerned with operating a cost-effective transit system.

Based on literature research results, it was revealed that several studies used service quality measures as a primary instrument to measure the performance of transportation services. Therefore this research focuses on service performance, specifically service quality. Research that measures service quality usually analyzes the customer's perspective as a source of reference in research because the customer is the only one who can identify service quality (Ona et al, 2012). However, these measurements should also be balanced with service measurement standards by the service provider. Therefore, a combination of these two types of service quality is needed. There have been several previous studies that used both perspectives to assess service quality in the passenger transportation industry (Tyrinopoulos and Antoniou, 2008; Eboli and Mazzulla, 2011; Nathanail, 2008).

The methodology that analyzes the perspectives of customers and service providers in designing and evaluating service processes is Quality Function Deployment (QFD). This method determines the factors that satisfy the customer and translates the customer's wishes into the target design and is implemented by every part of the organization (Heizer, 2017). The essence of this method is to capture the understanding of customer desires and to identify alternative process solutions. This information is then integrated into the developing product design. QFD is used early in the design process to help determine what will satisfy customers and where to exert quality improvement efforts (Furqon et al, 2019).

Customer satisfaction in the QFD method is closely associated to service quality, especially in optimal transportation services, which is one of the problems of this research. Service quality is intangible and more difficult to evaluate compared to the quality of goods. Many companies have difficulty understanding customer perceptions or expectations regarding service quality. Then, there should be an appropriate tool to measure how consumers feel about the services provided. (Furqon et al, 2019) The SERVQUAL approach and the results could capture the needs desired by customers as customers' voices and the QFD method was effective to improve service quality because it refered to the customer's voice (Situmorang et al, 2013; Furqon et al. , 2019; Khorsidi et al., 2016). Based on explanation this research aimed at developing service quality research using SERVQUAL and QFD methods, focused on the indicators that were the main priority for improving service quality.

## Literature Review

The stages in the QFD process are the stages in building a House of Quality (HOQ) and consist of 6 parts. Such as:

- Part 1: Identifying the product quality attributes desired by consumers and their priority scale. This information was collected using questionnaires. Product quality attributes assessed are: Performance, Features, Reliability, Conformance, Durability, Serviceability, and Aesthetics
- Part 2: Describe the production strategy adopted by the company
- Part 3: Conducting ccompetitive analysis of product quality attributes (Part 1)
- Section 4: Analyzing the relationship / correlation between product quality attributes desired by consumers and the company's production strategy (part 1 and part 2). The relationship can be divided into three: Strong relationship (high) score 9, moderate relationship (medium) score 3, and low relationship (low) score 1.
- Section 5: Analyzing the relationships between the various production strategies carried out. The relationship can be divided into three,: Strong relationship (high) score 9, moderate relationship (medium) score 3, and low relationship (low) score 1.
- Section 6: Section 6 is the final result of the Quality Function Deployment analysis showing the priority of the production strategy that the company should undertake based on the results of the analysis of parts 1 through section 5.

## Research Methodology

This research employed a descriptive methodology. Data were collected through observations, interviews, questionnaires, and literature studies. Respondents in this research were service users and on line transportation drivers. This research was a qualitative research. Thus, the sample size was determined by the snowball method and the sample selection was determined by the purposive sample method. The sample size in this research was 100 respondents and 20 drivers. The analysis technique used to answer the research objectives was the servqual method and Quality Function Deployment. The survey was conducted at four locations in West Java, namely Bandung, Bogor, Cirebon, and Bekasi.

## Results

The initial stage of the research was conducting a survey of customer perspectives. The results of mapping the customer's perspective were presented below: Priority (1 smallest, 21 largest), and Number of values for each Customer Requirements item.

**Table 1. Customer Perspective**

| Costumer Requirements | Priority | Number of respondent |
|---|---|---|
| Drivers prioritize safety by driving in accordance with traffic regulations | 18 | 1309 |
| Drivers sent is is the same as application | 21 | 1525 |
| Vehicle number is the same as the application | 20 | 1470 |
| The driver checks the baggage cabin when all passenger luggage has been unloaded | 12 | 1186 |
| The vehicle makes you comfortable | 19 | 1424 |
| The air conditioner in the car is functioning properly | 16 | 1206 |
| In-car entertainment facilities are functioning well (RadioTape) | 4 | 906 |

| | | |
|---|---|---|
| Fleet is easy to get | 14 | 1286 |
| The driver has the initiative to carry passenger goods into the trunk | 10 | 1162 |
| The driver asks that you wear a seat belt before leaving. (especially if you sit in front) | 8 | 1081 |
| The driver saves your belongings which are left behind and informs you immediately | 17 | 1305 |
| The driver greets you before and after traveling | 9 | 1106 |
| The fleet arrives on time (according to the order time) | 15 | 1295 |
| The company provides consumer services. (to provide complaints and suggestions | 5 | 932 |
| The company provides the latest information about the latest services on social media or that is informed by the driver | 3 | 862 |
| The driver is polite | 11 | 1201 |
| Drivers look neat and clean | 6 | 1019 |
| Drivers know alternative roads when needed (especially when traffic jams) | 7 | 1052 |
| The driver masters technical matters relating to car engines | 2 | 855 |
| Minimum fleet of cars output in 2014 | 1 | 745 |
| Rates are according to application | 13 | 1238 |

The next step is Functional Requirements, which are service standards that are in accordance with service provider standards (Fig.2 and Table.3).

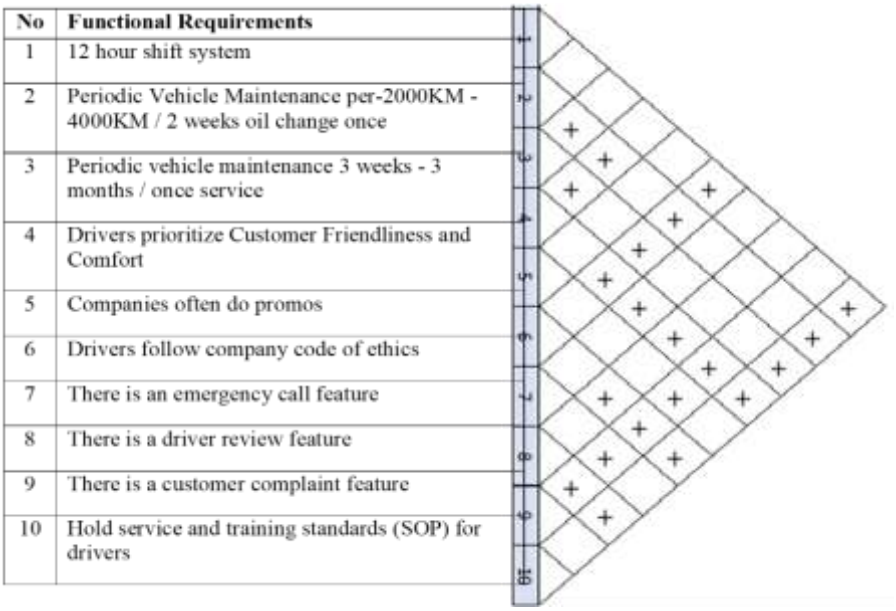


**Figure 2.** Functional Requirements for service providers

In Fig.2 it shows all of the customer's requirements and (part 1) has positive correlation with functional requirements (part 2). The result showed the relationship between part 1 and part 2 almost have high relationship. Showed at Table.3.

**Table 3.Technical Importance Rating**

| Functional Requirements | Max Relationship | Technical Importance Rating | Relative Weight | Weight Chart |
|---|---|---|---|---|
| 12 hour shift system | 9 | 82.25108 | 0.043941 | \|\| |
| Periodic Vehicle Maintenance per-2000KM - 4000KM / 2 weeks oil change once | 3 | 35.06494 | 0.018733 | |
| Periodic vehicle maintenance 3 weeks - 3 months / once service | 9 | 112.987 | 0.060361 | \|\|\| |
| Drivers prioritize Customer Friendliness and Comfort | 9 | 183.1169 | 0.097826 | \|\|\|\| |
| Companies often hold promos | 9 | 107.7922 | 0.057586 | \|\| |
| Drivers follow company code of ethics | 9 | 342.4242 | 0.182932 | \|\|\|\|\|\|\|\| |
| There is an emergency call feature | 9 | 28.13853 | 0.015032 | |
| There is a driver review feature | 9 | 391.7749 | 0.209297 | \|\|\|\|\|\|\|\|\| |
| There is a customer complaint feature | 9 | 129.0043 | 0.068918 | \|\|\| |
| Hold service and training standards (SOP) for drivers | 9 | 459.3074 | 0.245375 | \|\|\|\|\|\|\|\|\|\| |

## Discussion

In table 1, the customer perspective was ranked as priority from highest to lowest. It was found that the ten highest priorities were Drivers according to application; Police number is according to application; Fleet makes you comfortable; Drivers prioritize safety by driving in accordance with traffic regulations; The driver saves your belongings which are left behind and informs you immediately; The air conditioner in the car is functioning properly; The fleet arrives on time (according to the order time); The fleet is easy to get; Rates are according to application; The driver checks the baggage cabin when all passenger goods have been unloaded and the driver says polite and polite to you. Customer perspective on the service quality is a top priority to be used as a measure of service performance of service providers. Based on the above HOQ, the highest. Functional Requirements are Conducting Training and SOP drivers with a value of 459.3 (25%), there is a driver review feature with a value of 391.77 (21%), then the driver puts forward a company code of ethics with a value of 342.42 (18 %).

## Conclusion

The findings revealed that the service quality that is a priority for customers to describe the performance of the service is related with the driver, especially the evaluation of the drivers, such as the driver following the application and driving safety issues. Meanwhile, based on service provider service standards, the weighting values considered important are the drivers' Training and SOP and the company code of ethics applied to drivers. To get more measurable results one should combine several customer satisfaction measurement methodologies and other decision making methods such as Analytic Hierarchy Process (AHP) and Fuzy Method or integrating the Kano model into QFD to design services for the public transportation industry.

**Acknowledgements**
The research was funded by the Indonesian Ministry of Higher Education through a husk research grant for the Higher Education Applied Research in 2019.

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