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THE ANALYSIS OF DELIVERY SERVICE QUALITY USING SIX SIGMA AND SERVQUAL METHODS IN IMPROVING CUSTOMER SATISFACTION

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Abstract: In the logistics business, service quality in terms of delivery services is an essential factor continually enhanced. Drawn from the study case of JNE Express, a company specializing in the shipping and delivery of products and documents, this research aimed to determine the implementation of the SERVQUAL and Six sigma methods in the logistics service industry. JNE Express requires quality improvement efforts using the SERVQUAL and Six Sigma methods to increase customer satisfaction. The mixed method was used in this study, which mixed quantitative data from surveys with qualitative data from interviews and observations. The results indicated that the highest GAP of service quality was on-time delivery of products (X2.1), with a GAP of -0.63, and the most complaints were about the provision of compensation for any damage or loss of goods (X4.1).

Keywords: *Service Quality, Six Sigma, SERVQUAL, Customer Satisfaction, Quality Improvement, Delivery Services*

Introduction

The pandemic of the coronavirus, often known as covid 19, and the limitations enforced to limit movement has influenced consumption patterns and how people spend their money. As there is no direct interaction between suppliers and consumers, internet buying is appealing. As a result, the importance of delivery services or couriers in linking buyers and sellers has grown.

In comparison to January 2020, online shopping during the pandemic showed an upward trend. Online shopping in March 2020 accounted for 320% of online sales at the beginning of the year. According to the Central Bureau of Statistics (BPS), the upward trend continues, online sales increased by 480% in April 2020 compared to January 2020. As online sales and consumer demand for products delivery services grow, the logistics industry seeks to collaborate with online marketplaces to create services that make it easier for customers (Rizki, Cahyadi, and Slamet 2020).

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In a highly competitive industry, service quality is critical for identifying their services (Nakhai 2009). The quality of service significantly impacts consumers expectations because customers simultaneously want to meet their needs and find high quality of services. The quality is related to just-in-time supplies and other customers requirements. The most important quality parameters for the courier industry are timeliness delivery, the effectiveness of delivery, and loss ratio (Karcz 2016). Companies must conduct frequent service reviews to maintain client connections and enhance service quality in the future. SERVQUAL and Six Sigma are two techniques for enhancing and assessing service quality.

The SERVQUAL method is a concept to measure the performance of public services based on the evaluations of service users, which was first introduced by Parasuraman, Zeithaml, and Berry (1985, 1988). According to Parasuraman et al. (1985), the SERVQUAL scale used to measure service quality comprises tangibles, reliability, responsiveness, assurance, and empathy. The SERVQUAL method is based on comparing two primary factors there are customer perceptions of actual service and customer expectations. As a result, the SERVQUAL method is a concept for evaluating customer perceptions of services received to expectations.

Six Sigma is a method for measuring and eliminating defects, errors, and failures in a processor system (Jirasukprasert and Garza-reyes 2013). The primary purpose of a Six Sigma strategy in services is to eliminate deviations in the tolerance limits or service performance standards (Antony 2006). According to prior research, the supply chain industry (Madhani 2016), banks (Zhuo 2019), healthcare (Antony et al. 2017), and other industries have been analyzed utilizing the Six Sigma method.

Method

The researchers employed mixed methods to complete this study. This combination of the research methods utilized a sequential explanatory design model, which meant that data collection and analysis of quantitative data were

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carried out in the first phase of the study, followed by qualitative methods in the next phase. This study used two data, namely quantitative and qualitative data. Quantitative data was obtained through surveys to JNE Express customers, and qualitative data were obtained through interviews. From this data, customer satisfaction with JNE Express services and the root causes of customer dissatisfaction with JNE Express services were obtained, then analyzed using the Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) method.

The objectives of this research are as follows, The first objective is to know the level of customer satisfaction with JNE Express delivery services. Second, to identify the underlying reason for the dissatisfaction with JNE Express services. Third, to know the implementation of the Six Sigma DMAIC and SERVQUAL method in assessing JNE Express's level of service quality.

Discussion and Results

1. **Instrument Test**

Validity Test

A validity test is used to measure the validity of a questionnaire (Ghozali 2011). A questionnaire is considered valid if the questions on the questionnaire can reveal something that the questionnaire will measure. In this study, The results of testing the validity of the questionnaire on 17 statements about the service quality at JNE Express indicate that all statement items in each of these variables are that r count is bigger than 0.1757 with a significant level below 5%, it can be concluded that the questionnaire used to collect data is valid.

Reliability Test

Reliability is a tool for assessing the validity of a questionnaire that serves as an indicator of a variable or construct (Ghozali 2011). This test using Cronbach's alpha method is deemed reliable when Cronbach's alpha value is greater than 0.6.

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Table 1. Reliability Test of Performance

Reliability Statistics	
Cronbach's Alpha	N of Items
0,857	17

Source : Data sample (2021)

The results obtained in this analysis are presented in Table 1, showing that Cronbach's alpha value of 0,857 is greater than 0.6, so it can be stated reliable.

Table 2. Reliability Test of Expectation

Reliability Statistics	
Cronbach's Alpha	N of Items
0,944	17

Source : Data sample (2021)

The results obtained in this analysis are presented in Table 2, showing that Cronbach's alpha value of 0,944 is greater than 0.6, so it can be stated reliable.

2. Service Quality Measurement

The data analyzed is a sample of data obtained by distributing questionnaires to 123 JNE Express users. An analysis of the level of satisfaction will be carried out in this SERVQUAL calculation, especially by calculating the gap or the difference between performance and expectations. Table 3 shows the results of the calculation of the gap between performance and expectations.

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Table 3. Results of GAP calculation between performance and expectation

Dimension	Indicator	Attribute	Performance Score	Expectation Score	Gap Score
Tangible	X1.1	Clean and comfortable room facilities	3.76	4.28	-0,52
	X1.2	Complete and adequate office equipment to support services	3.98	4.34	-0,36
	X1.3	Employee's clean and neat appearance	3.95	4.36	-0,41
	X1.4	Availability of packing goods in various sizes	4.37	4.44	-0,07
	X1.5	Variations in types of regional and international logistics tariffs	4.17	4.43	-0,26
Reliability	X2.1	On time delivery of goods	3.69	4.32	-0,63
	X2.2	Compatibility of billing calculations with goods weight and delivery distance	4.13	4.40	-0,27
	X2.3	Broad delivery destinations	4.46	4.58	-0,12
	X2.4	Availability of tracing service (tracking the position of goods)	4.41	4.59	-0,18
	X2.5	Types of services offered (YES, REG, OKE)	4.53	4.57	-0,04
Responsiveness	X3.1	Quick and responsive employee in handling customer complaints	3.69	4.24	-0,55
	X3.2	Employee willingness and ability to provide information on existing services to customers	4.04	4.21	-0,17
Assurance	X4.1	Providing compensation or money back guarantee (MBG) for any damage to goods sent or loss that occurs in accordance with the procedure	3.55	4.06	-0,51
	X4.2	Weighing accuracy of goods delivered	4.12	4.34	-0,22
Emphaty	X5.1	Employee friendliness and courtesy in serving customers who come	3.91	4.36	-0,45
	X5.2	Company communication channel that is easy to contact (phone, fax, e-mail, website, online, etc.)	3.78	4.35	-0,57
	X5.3	Strategic location and easy to reach	4.43	4.59	-0,16

Source : Researcher (2021)

3. Six Sigma Steps

Define Phase

According to Table 3 in the calculation at the SERVQUAL phase, the X2.1 indicator, meaning time delivery of products has the highest gap with a gap of -0.63. The following indication with a high gap is the X5.2 indicator, which represents the company's communication channel and has a gap of -0.57. The X3.1 indicator, which deals with consumer complaints, is the third-highest one, with a gap of -0.55.

Measure Phase

The satisfaction level, Defects Per Million Opportunities (DPMO), and sigma values are calculated during the measure phase to determine if the

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process is running at several sigma levels. In this study, the level of satisfaction to be obtained is with a score of 5, which indicates that the respondent is very satisfied with the answer using a Likert scale, where a score of 1 indicates that the respondent is extremely dissatisfied, and a score of 5 indicates that the respondent is very satisfied. The performance baseline in Six Sigma is generated using the results of the DPMO measurement and the sigma level, as indicated in Table 4.

Table 4.Results of Sigma Value Measurement of Each Indicator

CTQ	Dimension	Performance	Expectation	Gap	Satisfaction Target	Satisfaction Level	DPMO	Sigma
1	X1.1	3.76	4.28	-0,52	5	75,2%	248000	2,18
2	X1.2	3.98	4.34	-0,36	5	79,6%	204000	2,32
3	X1.3	3.95	4.36	-0,41	5	79%	210000	2,30
4	X1.4	4.37	4.44	-0,07	5	87,4%	126000	2,64
5	X1.5	4.17	4.43	-0,26	5	83,4%	166000	2,47
6	X2.1	3.69	4.32	-0,63	5	73,8%	262000	2,13
7	X2.2	4.13	4.40	-0,27	5	82,6%	174000	2,43
8	X2.3	4.46	4.58	-0,12	5	89,2%	108000	2,73
9	X2.4	4.41	4.59	-0,18	5	88,2%	118000	2,68
10	X2.5	4.53	4.57	-0,04	5	90,6%	94000	2,81
11	X3.1	3.69	4.24	-0,55	5	73,8%	262000	2,13
12	X3.2	4.04	4.21	-0,17	5	80,8%	192000	2,37
13	X4.1	3.55	4.06	-0,51	5	71%	290000	2,05
14	X4.2	4.12	4.34	-0,22	5	82,4%	176000	2,43
15	X5.1	3.91	4.36	-0,45	5	78,2%	218000	2,27
16	X5.2	3.78	4.35	-0,57	5	75,6%	244000	2,19
17	X5.3	4.43	4.59	-0,16	5	88,6%	114000	2,70
Average		4.05	4.38	-0.32	5	81.14%	188588	2,40

Source : Researcher (2021)

Analyze Phase

This phase analyzes the problems in the quality of JNE Express services. Problems occur if the sigma value is less than the average. The subsequent table revealed that the average satisfaction rate was 81.14 percent,

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with DPMO 188588 and sigma 2.40. Table 5 shows the eight of JNE Express service qualities that are less than the sigma average.

Table 5. Attributes that need to be analyzed

Attributes	DPMO	Sigma Value
Clean and comfortable room facilities (X1.1)	248000	2,18
Complete and adequate office equipment to support services (X1.2)	204000	2,32
Employee Clean and Neat Appearance (X1.3)	210000	2,30
On time delivery of goods (X2.1)	262000	2,13
Quick and responsive employee in handling customer complaints (X3.1)	262000	2,13
Providing compensation or money back guarantee (MBG) for any damage to goods sent or loss that occurs in accordance with the procedure (X4.1)	290000	2,05
Employee friendliness and courtesy in serving customers who come (X5.1)	218000	2,27
Company communication channel that is easy to contact (phone, fax, e-mail, website, online, etc.) (X5.2)	244000	2,19

Source : Researcher (2021)

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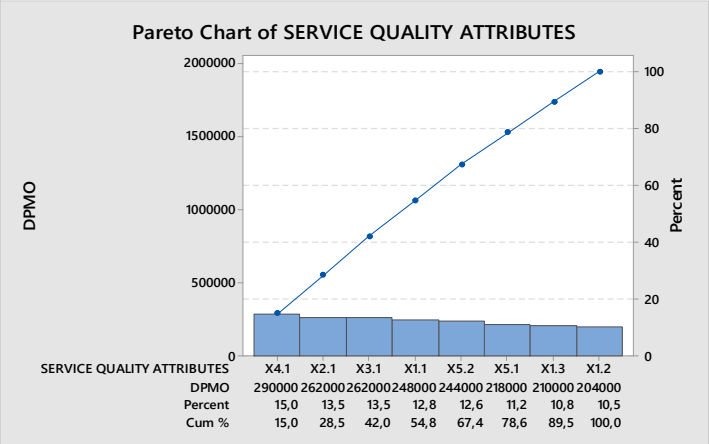

Figure 1. DPMO level of service quality attributes below the average sigma value

Source : Researcher (2021)

According to the Pareto diagram above, the characteristic or indicator of X4.1, meaning the provision of compensation or money-back guarantee (MBG) for any damage to products shipped or loss that happens, has the highest level of discontent. It is followed by the characteristics of X2.1 and X3.1, i.e., dealing with product delivery and the management of consumer complaints, respectively. Customers will soon lose trust in JNE Express delivery services if these characteristics are not improved.

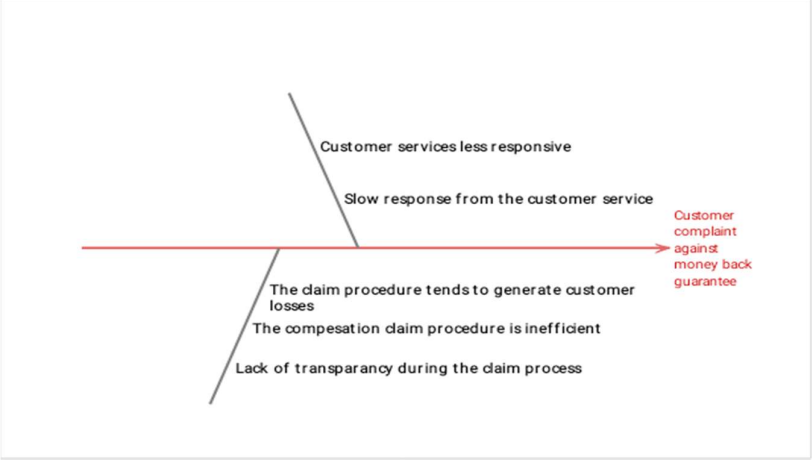

Figure 2. Cause and effect diagram of complaints on the Money Back Guarantee (MBG) system

Source : Researcher (2021)

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As shown in the cause and effect diagram above, customer complaints against the MBG system at JNE Express are caused by several factors, including complaints caused by human factors, slow response from customer services, and non or less responsive customer services when serving customer complaints. The second aspect is the factor of JNE's method, namely the compensation claim procedure, which is inefficient and tends to generate customer losses and a lack of transparency during the compensation claim process.

Improve Phase

The root causes of the problems discovered in the analysis phase are remedied in the improvement phase. The 5W+1H technique of consumer complaints against the MBG system is used in this step of the analysis:

Table 6. 5W+1H technique to improve phase

No	Questions	Problems
1	What	**What can be done to reduce complaints from customers regarding this compensation claim?** Giving suggestions to customers to add insurance if the goods sent are valuables or electronic goods to make it easier to claim the compensation.
2	Why	**Why is it necessary to enhance the system for customer compensation claims?** In order to correct the negligence caused by man factor (humans).
3	Where	**Where can customers contact JNE to claim compensation?** Customers can reach out to the agent who delivered the goods, the call center, or JNE's customer service social media.
4	When	**How long does the claim for compensation take?** The compensation claim process is at least 14 days or until the problem investigation is completed.

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5	Who	**Who is responsible for customer compensation refunds?** The central JNE agency is responsible for refunds if the items are damaged during transit. If there is any damage or a problem at the JNE origin or destination, the agent in charge of the shipment will be held responsible.
6	How	**How to reduce customer complaints related to claims for compensation?** If the goods sent are valuables, advise customers to add insurance to make it easier to claim compensation.

Source : Researcher (2021)

According to Figure 2, the man and method aspects are the variables that determine the high level of customer complaints regarding compensation. As a result, the recommendation made on the man factor is to offer training to JNE workers. Hence, they can handle customers quickly and accurately, develop a separate line to handle MBG claims that the claim procedure is easier and faster, and clarify JNE employees work areas to better serve and react to clients. In comparison, the technique factor proposal is to strengthen the MBG mechanism to increase consumer trust in JNE. Also, improvements may be made to promote JNE's brand image and the Standard Operating Procedure (SOP) system to make the process more transparent. Moreover, it explains the maximum time to handle incoming complaints and requires timely and transparent follow-up from JNE in order for consumers to feel respected.

Conclusion

A study of JNE Express customers found that the most significant gap in service quality, namely on-time delivery of products (X2.1), revealed that JNE Express's delivery of goods fell well short of consumers expectations, with a gap of -0.63. Meanwhile, the most prevalent reason for discontent with JNE Express services is the failure to pay compensation or MBG for any damage to or loss of items delivered or lost (X4.1). The high volume of

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consumer complaints about reimbursement for products transported or lost might be attributable to two issues. The first is human (Man), and it comprises less responsive customer service and JNE's poor responses. Meanwhile, the method aspect, meaning the lack of transparency while carrying out the procedure for giving compensation, appears to be damaging to the consumer, and the procedure for claiming compensation appears to be impracticable.

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