

# Quality-Service of Courier Companies Using Six Sigma Approach

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# Quality-Service of Courier Companies Using Six Sigma Approach

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## Abstract

The aim of controlling service quality is to reduce defects and even achieve zero defects. The focus of this paper is to analyze the service attributes that need to be developed by courier companies in Indonesia with the Six Sigma method. The results of the discussion showed that the quality of service was not maximal; it was still far from level 6 sigma with DPMO 3.4. Hence it was necessary to improve services. The calculation results in six Sigma show that the dominant critical attribute is Rel2 (on-time delivery of goods) to be the dominant attribute causing customer dissatisfaction.

**Keywords** — Consumer Satisfaction, Quality Service, Six Sigma

## I. INTRODUCTION

The potential and opportunities of the delivery service industry make competition in the industry increasingly fierce, delivery service companies in Indonesia try to win in the real competition. Courier companies as a provider of shipping services function as a liaison between parties who entrust the delivery of goods. Courier companies in Indonesia are required to provide satisfactory services to its customers, both individuals and business customers.

Business activities of courier companies in Indonesia are not only limited to receiving goods from consumers (business to consumer) but involve other companies in business activities (business to business) as inland transportation services in Indonesia's courier companies. Guaranteed goods are damaged or lost by the courier companies in Indonesia. A cash transfer product in cooperation with Western Union.

Complaints in companies are often found in this business because of the complexity of activities in service companies. Speed and accuracy become important things for service companies. That is because service providers and service users interact directly, at the same time, service users enjoy the services offered by service providers if it is not in line with customer expectations; it will cause complaints. The goal of quality control is to reduce defects and achieve zero-defect need to be done by companies. In 2018 the total customer's number of delivery service companies in Indonesia reached 1855 people, while in 2019 it reached 1763 people or 92 people. It shows that the company experienced a decrease in service, which could be

caused by the quality of service of courier companies in Indonesia.

Based on these problems, the researchers tried to find the main problems and solutions in the delivery service company in Indonesia. The focus of this research is to analyze the service attributes that need to be developed by a delivery service company in Indonesia with the method. Six Sigma was chosen because it is a quality improvement analysis method oriented to world-class quality, with a level of 6 Sigma or 3.4 DPMO (Defect per Million Opportunities). It is under the vision of courier companies in Indonesia, which is to become the most significant global supply chain company in the world. Approach Six Sigma with five stages, known as DMAIC, aims to improve existing business processes (Dewi and Widiyanto, 2015: 162).

Through Six Sigma, researchers will provide information about the factors that cause customers to be dissatisfied with the services provided by delivery service companies in Indonesia. Six Sigma is a program designed to reduce dissatisfaction with products, reduce costs, save time, and increase customer satisfaction (Heizer and Render, 2011: 45). Six Sigma can be applied to close all gaps, but Six Sigma metric can be defined for gaps, which are based on perception or performance (Deghan, 2012: 5-6).

Quality in service companies is essential as an effort to satisfy customers. Excellent service quality can maintain customer loyalty; hence the company's existence towards its competitors can be maintained. It also applies to delivery service companies in Indonesia, which are found complaints that are still frequently read by consumers. Based on this background, the objectives of this study are to find out the quality of service at delivery service companies in Indonesia and find out the critical service attributes that need top priority in improvement.

## II. LITERATURE REVIEW

### A. Six Sigma Theory

The mid-1980s, engineers at Motorola Inc. (United States) uses the term "Six Sigma" as an informal name for initiatives in companies to reduce defects in the production process. Motorola engineers Bill Smith and Mikal Harry felt that measuring errors in thousands was an inadequate standard.



Figure 1. Basic Principles of Quality Management

Furthermore, they increased the measurement scale to in millionths, or commonly known as DPMO (Defect per Million Opportunities) where the Six Sigma value is equivalent to the value of 3.41 DPMO (Syukron and Kholil, 2013: 34).

Six Sigma is an organizational approach to eliminate deviations and reduce waste in the process by using a statistical science approach. Six Sigma is defined as a business improvement strategy to eliminate waste, reduce costs due to poor quality, and improve the effectiveness of all operations, to meet the of consumers (Anthony and Banuelos in Syukron and Kholil, 2013: 2). Six Sigma is based on three main principles of quality, such as: focus on customers, participation and cooperation of all individuals in the company, and focus on processes that are supported by continuous improvement and learning. A genuine focus on quality will make the company actively strive to understand customer needs and demands continuously.

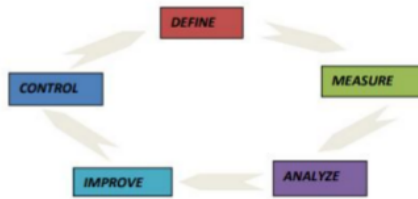


Figure 2. Six Sigma Model

The aim of Six Sigma is to reduce the amount of customer experience to three in one million (for level six sigma). The methodology is Six Sigma used to obtain factual information about customer satisfaction (Dewi and Widiyanto, 2015: 162).

According to (Dewi and Widiyanto, 2015: 162), the measurement steps of the service quality improvement process carried out in using the analysis Six Sigma are as follows.

**a) Definition Phase**

This stage defines process improvement and keeps it focused on customer requirements and company strategy. The output of this phase is some information about the critical quality of production (Critical to Quality) from customers.

**b) Measuring Phase**

This stage aims to measure the current performance so that it can be compared with the targets set. The process at this stage is in the form of mapping and data collection related to key performance indicators.

**c) Analysis Phase**

Management analysis phase seeks to understand why deviations occur and look for reasons that cause them to occur. Look for the main attributes of dissatisfaction that occur so that the company can immediately make improvements. The third stage is looking for one or two factors which if fixed, will improve dramatically (Mangala in Wisnubroto (2012: 120).

**d) The Improve phase**

This step is to design a solution (action plan) to make improvements and quality improvement six Sigma in processes which require improvement—the design of the form of the proposed improvement of quality for every potential and design of experiments.

**e) Phase Control**

After the proposal and design improvements have been made and compiled has been implemented, then this stage will be retained in order to do not go back to the initial conditions before repair.

**B. Cause and Effect Diagram**

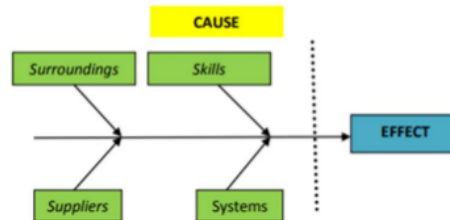


Figure 3. Example of Cause and Effect Diagram

After the level of quality was discovered, then find out the problems that cause the defect or complaint. As is the cause of the problem Quality is the factors that cause complaints nor defect. How to determine the cause of the quality problem is recommended is to use group agreement techniques (group decision making), to then do a survey or study the data.

According to Syukron and Kholil (2013: 47), a causal diagram is a diagram that shows the relationship between causation. Cause and effect diagrams as in Figure 3 can be used for the following needs:

1. Help identify the causes of a problem.
2. Search for causes and take corrective action
3. Assist in a further investigation or factor search
4. Selecting analytical methods for problem

### C. Solving Research



Figure 4. Framework of Research

Courier companies with good or bad service systems will have implications for customer satisfaction. The researcher tried to identify the problems in the delivery service companies in Indonesia. The problem is reviewed by the theory that supports the resolution of company problems to determine the attributes of the problem. The attributes are then analyzed using analysis Six Sigma. The method Six Sigma will translate service quality based on the results of the DPMO formula calculation from five dimensions of service quality, such as tangibles, responsiveness, assurance, empathy, reliability. Sigma six is used to see variations or complaints that cause consumer dissatisfaction with a service through five stages or commonly referred to as DMAIC which consists of: Define, Measure, Analyze, Improve, and Control.

## III. RESEARCH METHOD

### A. Research Design

This research used a quantitative descriptive method. Quantitative research is required to use numbers, ranging from data collection, interpretation of data, and the appearance of the results (Arikunto, 2013: 27).

### B. Measurement of Variables

There are five dimensions of service quality in Indonesia's courier companies such as; physical facilities, reliability, responsiveness, assurance. Empathy can be translated into 16 service indicators. In this study, the questionnaire consisted of two parts, such as; service performance and expectations (16 statements) and the part about customer identity. The researcher then compiles statements based on a Likert scale with a range of 1 (strongly disagree) to 5 (strongly agree) for the expectation variable. The

following explains the measurement scale of the instrument and the answer choices.

- Answer 1 shows that customers strongly disagree (STS)
- Answer 2 shows that customers disagree (TS)
- Answer 3 shows that customers less agree (KS)
- Answer 4 shows that customers agree (S)
- Answer 5 shows that customers strongly agree (SS)

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### C. Population and Research Samples

Population in this study is the number of service users in Indonesia from January 2019 to December 2019. It touched approximately 1855. Samples are part of the population. The sample has characteristics that are similar to the population; hence the sampling of several samples can represent the total population (Bougie and Sekaran, 2013: 241). Determination of the size of the sample taken using the Slovin formula (Sugiyono, 2013: 57) with the formula:

$$n = \frac{N}{1 + Ne^2}$$

Based on the above formula, the following calculation is obtained:

$$n = \frac{1855}{1 + 1855 \times 0.05^2} = \frac{1855}{1 + 46.375} = \frac{1855}{47.375} = 39.17 \text{ adjusted to } 40$$

Based on the calculation above, the sample used by respondents is adjusted to be 100. This is done to facilitate data processing and for better results (Suliyanto, 2009: 100). Researchers determine the sample will determine as many as 100 samples from consumers of freight forwarding services in Indonesian shipping service companies by using probability sampling technique and utilizing simple random sampling where respondents are considered homogeneous, and sampling is done randomly without regard to the strata of the population (Sugiyono, 2013: 82).

### D. Data Source

#### a) Type of Data

Quantitative data is data that is obtained in the form of numbers that can be calculated are obtained from direct observation that the data results of questionnaires perceptions of performance and service expectations in the courier companies in Indonesia. Qualitative data is data in the form of opinion and the form of words or sentences.

Qualitative data were obtained from interviews with company leaders and employees at the company and information from other parties relating to the quality of service issues at delivery service companies in Indonesia.



**b) Data Source**

Primary data used by researchers in this study are in the form of data from questionnaires, data from polls with private company parties from service attributes, and company service products. Secondary data that researchers use in this study in the form of textbooks and journals about Six Sigma in service companies.

**c) Data Collection Method**

The questionnaire is a data collection technique that is done by giving a set of questions or written statements to the respondent to be answered. Observation. This direct observation activity aims to obtain data on the relevant agency conditions in real terms. This interview activity aims to conduct a preliminary study to find problems that must be examined and also to find out matters related to respondents.

**d) Instruments**

**1) Validity Test**

The test aims to show the accuracy of a measurement tool and tested its stability and consistency in measuring what you want to be measured. According to Ghozali (2011: 311) if the results of the factor analysis show that if the Kaiser-Mayer-Olkin, anti-image and factor loading 0.5, then it is declared valid and the sample can be further investigated. This research uses factor analysis techniques using SPSS version 17.0 application assistance.

**2) Reliability**

The test is used to determine the consistency of the measuring instruments that usually use questionnaires. The method used in the reliability test is the method Chronbach's Alpha. This method is suitable for use on a scale or stretch score (such as the Likert 1-5 scale). The limit used is 0.6 (Priyatno, 2012: 120). The provisions are as follows:

- i.  $\alpha \geq 0.6$ , the questionnaire is reliable.
- ii.  $\alpha < 0.6$ , then the questionnaire is not reliable.

**E. Method of Analysis of Six Sigma Method**

This research uses Six Sigma Method. Six Sigma method is one of the methods used to control and improve quality in an organization or company that is by knowing the amount of DPMO (Defect Per Million Opportunities) and the quality level of each service attribute.

The higher the target sigma achieved, the better the company's system performance. How to find out the amount of DPMO value and level of Sigma each service quality dimension is to do the calculation. According to Friedman (2012: 54), the measurement steps of the process of improving service quality in using analysis Six Sigma are:

**a) Definition Phase**

This stage will determine the expectations of the improvement effort and keep it focused on customer requirements. This do the determination of the attributes of the five dimensions of service quality, namely physical facilities, reliability, responsiveness, assurance, and empathy.

**b) Measuring Phase**

This stage aims to measure current performance so that it can be compared with the targets set. The process at this stage is in the form of mapping and data collection related to key performance indicators. These key attributes are then calculated for each service user.

**1) Expected Measurement**

$$E_{ij} = \frac{\sum_{i=1}^{N_j} TE_{ij}}{N_j}$$

Note:

$E_{ij}$  = Expectation score on dimension  $j$

$TE_{ij}$  = Customer expectation score of attribute  $i$

$N_j$  = Number of respondents

**2) Performance Measurement**

$$P_{ij} = \frac{\sum_{i=1}^{N_j} TE_{ij}}{N_j}$$

Description:

$P_{ij}$  = Score performance on the dimension  $j$

$TP_{ij}$  = Customer performance score of attribute  $i$

$N_j$  = Number of respondents

**3) Measurement gaps**

$$Gap = P_{ij} - E_{ij}$$

Description:

$E_{ij}$  = Score of hope  $i$  on the dimension  $j$

$P_{ij}$  = Performance score  $i$  on a dimension  $j$

Source: Dewi and Widiyanto (2015: 163)

**4) Measurement of Satisfaction Level**

$$\text{Satisfaction Level} = \frac{P_{ij}}{E_{ij}} \times 100\%$$

Note:

$E_{ij}$  = Expectation score  $i$  on dimension  $j$

$P_{ij}$  = Performance score  $i$  on dimension  $j$

**5) Measurement of DPMO (Defect per Million Opportunity)**

$$DPMO = \frac{P_{ij}}{\text{Satisfaction Target}} \times 1000000$$

Note:

DPMO = Defect per Million Opportunities

$P_{ij}$  = Performance score  $i$  on dimension  $j$

Source: Dewi and Widiyanto (2015: 163)

This research target satisfaction to be achieved is a score of 5 (very satisfied) from the range of satisfaction scores 1 to 5

#### 6) Measurement of sigma level (sigma level)

$$\text{Sigma Level} = \text{normsinv} \left( \frac{DPMO}{1000000} \right)$$

As a description of the number 1,000,000 is the number of possible failures in Six Sigma (failure value is calculated based on 1,000,000 events) while 1.5 is a constant under the Motorola concept which allows a shift in the average value of  $\pm 1.5$  sigma (Wisnubroto in Dewi and Widiyanto, 2015: 168). The calculations in this study are assisted by using Microsoft Office Excell 2010 to facilitate calculations.

**Analyze phase.** In the analysis phase management sought to understand the source of distortion resulting in dissatisfaction and causes which led, for attributes is a major cause of damage or dissatisfaction. In this third style is done by company management is determining the factors that most influence the service process. The point is to look for one or two factors that if corrected, will improve the process dramatically (Mangala in Wisnubroto (2012: 120).

**Improve Phase.** This stage is to design solutions to make improvements and improve quality. Recommendations for these solutions are obtained from the results of polls and brainstorming of the company based on the main problems found.

**Control Phase.** This stage is in the form of monitoring activities so that there will be no defects more in the future. This stage, the researcher was not involved because it included the internal domain of the company.

### IV. RESULT AND CONCLUSION

#### A. Respondent Demographic Profile

Data collection began in December 2018 by distributing questionnaires to 100 respondents with a method simple random sampling that is respondents determined by researchers without regard to population strata. The general description of customers from the results of questionnaire distribution is described as follows:

##### a) Frequency of Usage of Courier Services

Frequency of use of delivery services with the result 41% of customers use delivery services more than five times, 55% of customers use delivery services 2-5 times, 4% one-time new customers use delivery services in shipping goods. It can be concluded that customer loyalty is quite good, but there may be customers who still use the services of other companies that are similar to delivery services.

##### b) Gender

The results of the study showed that 75% of courier service customers, male customers and 25% of customers are female. It can be concluded that male customers mostly do delivery needs.

##### c) Age

Obtained a result that 12% of customers aged 16-20 years, 28% aged 21-30 years, 32% aged 31-40 years, 20% aged 41-50 years, and 8% aged over 50 years. It can then be concluded that most of the age of customers are productive age customers who have jobs or activities in specific fields.

##### d) Latest Education

Obtained results in 71% of high school education and 29% in tertiary education. It can be concluded that the level of education of the customer is a high, medium delivery service.

##### e) Employment

From the results obtained it can be concluded that 12% are still students and students, 37% are civil servants, 32% are private employees, 13% are self-employed, and 6% are housewives. It can be concluded that most of the courier service customers are civil servants and private employees.

##### f) Expenditures Per Month

It can be concluded that 8% of customers spend expenses per month under Rp1,000,000, 52% Rp.1,000,000-Rp. 2,000,000, 34% Rp2,000,000-Rp. 3,000,000 and 6% Rp3,000,000. It was concluded that the monthly expenditure for courier service customers is quite high because the majority of customers are productive ages who work as employees.

### B. Validity Test and Reliability

#### a) Validity Test

Validity measurement in this study was carried out by measuring each variable using a factor analysis method with the help of SPSS 17.0 application. The questionnaire is declared valid if the statement on the questionnaire can reveal something that will be measured by the questionnaire. The validity test technique used in the study is a factor analysis technique with the assumption that the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO MSA) is more significant than 0.5, the Anti Image is at least 0.5, and the Loading Factor is at least 0.5 Ghazali (2011: 311). KMO MSA values greater than 0.5 are declared valid, and the analysis process can be continued. A KMO MSA value of less than 0.5 is declared invalid, and the attribute is issued first and so on until the KMO MSA value is more than 0.5.

The validity test results explained that the figures Kaiser-Meyer-Olkin (KMO), Anti Image, and Loading Factor of the Physical Facilities, Reliability, Responsiveness, Assurance, and Empathy variables on each item were more than 0.5. Thus variables and attributes were stated valid.

**b) Reliability Test**

The following are the results of calculating the 16 item reliability test on five dimensions of service quality. Reliability test using coefficient Cronbach's Alpha with the help of SPSS 17.0. The reliability test was conducted on 100 respondents of customers of the delivery service company in Indonesia, assuming the value of Cronbach's Alpha  $\geq 0.6$  can be said to be reliable. The calculation results obtained that Cronbach's Alpha  $\geq 0.6$  in each dimension because the results of this calculation are said to be valid.

**C. Description of Service Performance**

**a) Physical Facilities**

Obtained information that service performance in statement 1 as many as 82% stated good consisting of 45% strongly agreed and 37% rated agreed performance was considered good, only 18% who rated less agree on the value of the company's excellent performance. Statement 2 customers rated good, that is 100% consisting of 41% of customers expressed strongly agree, and 59% agreed. Statement 3 explains as much as 94% stated good consisting of 41% strongly agree and 53% rate agreed performance was considered good, only 6% who rated less agree on the value of the company's excellent service performance.

The dimensions of physical facilities in statement 1, namely the condition of the room and supporting facilities, only a few customers rated it well, so the condition of the room and supporting facilities need to be considered such as the layout of the service process room. Maybe the packaging room is made of its own space to reduce the noise due to the packaging process. The location of the musholla that can be accessed by customers also needs attention. Besides, the procurement of queuing machines also needs attention to anticipate the accumulation of customers.

**b) Reliability**

It was revealed that the performance of companies on statement 4 as much as 75% assess both consists of a 24% strongly agree and 51% judge agreed performance is considered good, while 24% rate the less agree, seta 1% judge did not agree on the performance of both companies. Statement 5 is considered suitable for customers, which is 69% consisting of 27% of customer rate strongly agree, and 42% agree, while 20% rate less agree, and 11% disagree. Statement 6 shows as many as 71% stated that good consisting of 41% strongly agreed and 53% considered agreeing that service performance was considered good, while 25% rated disagreement, and 4% rated disagreeing about the value of the company's excellent service performance. Statement 7 shows as many as 76% of customer rate excellent service performance consisting of 28% strongly agree,

and 48% agree. Dimensions of reliability the majority of customers judged unfavourable about the company's service performance, it was shown that many customers disagreed, especially in statement 5, namely the accuracy of delivery of goods followed by statement 6 and statement 4 so it needed to be improved again.

It can also be seen from the number of percentages agreed to the company's low service performance. Statement 7 regarding the timeliness of service has a good percentage of performance appraisal slightly better than the previous three statements although some disagree with the company's excellent performance, so it needs to be also improved to increase customer satisfaction. Dimensions reliability on the five-question obtains worst performance assessment for the need for attention to this attribute to establish communication to the customer-related delays.

**c) Response (CSR)**

It was revealed that the performance of companies with 8 statement. 98% stated that both consist of 49% strongly agree and 49% disagree. The performance is considered good, only 2% believed less agree on the value of the excellent performance of the service company. Statement 9 customers rate the company's service performance is good at 100% consisting of 45% of customers expressed strongly agree, and 55% agreed. Statement 10 explains as much as 99% stated excellent service performance consists of 52% strongly agree and 47% rate agree the company's service performance is considered good, only by 1% who rate less agree on the value of excellent service performance.

Dimensions of responsiveness on the eight questions obtain worst performance assessment for the need for attention to this attribute as establishing communications to customers related to the certainty of goods up if any cause related human error or force Majeure.

**d) Guarantee**

Obtained information that the company's service performance in statement 11 as many as 92% stated good consisting of 50% strongly agree and 42% rate agreed performance was judged good, only 8% who rated less agree about the company's excellent performance. Statement of 12 customers rates the excellent performance of the company's services at 100% consisting of 44% of customers expressed strongly agree, and 56% agreed.

Statement 13 shows that 96% stated that the company's excellent service performance consisted of 40% strongly agreed and 56% rated that agreeing that the company's service performance was considered good, only 4% who rated disagreement about the reasonable value of service performance.



Dimensions guarantee on the statement of 11 little customer service performance good company so employees must be guaranteed security of the transaction and delivery of goods by establishing risk-related communication damaged goods to customers and provide detailed knowledge goods in case of damage or non-conformity to the customer.

#### e) Empathy

Obtained information that the company's service performance in statement 14 as many as 92% stated good consisting of 56% strongly agreed and 36% rated agree performance was considered good, only 8% rated less agree about the value of excellent service performance. Statement of 15 customers rate good service performance that is equal to 100% consisting of 46% customers strongly agree and 54% agree. Statement 16 explained that 96% stated that excellent service performance consisted of 40% strongly agreed and 56% agreed that agreed service performance was considered good, only 4% considered disagreeing.

The empathy dimension in statement 14 only a few customers rate excellent service performance so the company must accept criticism or suggestions from customers. It is still found in the account comments column or the official application of the courier service for this purpose, and it is necessary to evaluate the company to improve its service performance.

### D. Description of the Expectations of Services

#### a) Physical Facilities

A piece of information was obtained that the most significant expectations of customers regarding the company's services are contained in statement 2, which is 73%. Statement 1 only has a service expectancy-value of 72% while statement 3 has a service expectancy-value of 69%, so statement 2 needs primary attention to meet customer expectations. The dimensions of physical facilities have high expectations. There needs to be a realization by the company for customers in order to increase customer satisfaction.

#### b) Reliability

It was revealed that the highest expectations of customers contained in statement 6 that is equal to 81%. Statement 7 only has the percentage expectancy by 75%, the statement of 4 by 77% while statement 5 was only 79%, so the statement 6 takes a significant concern to meet customer expectations. Dimensions reliability have higher expectations. It is essential for their realization by the company to its customers.

#### c) Response (CSR)

It was revealed that the highest expectations of customers contained in the statement are equal to 80.10. Statement 8 contains only 75%, while the

expected value statement 9 has a value of 77% expectation that statement 10 need significant attention needed to meet customer expectations—dimensions of responsiveness—their expectations for the company's actual customer satisfaction. Dimension to improve responsiveness higher expectations. It is essential to realization by the company to customers in order to increase customer satisfaction.

#### d) Guarantee

Obtained information that the highest expectations for customers contained in statement 11 that is equal to 77%. Statements 12 and 13 each have a 71% expectation value, so statement 11 needs primary attention to meet customer expectations. Dimensions guarantee have high expectations—the need for realization by the company for its customers to increase customer satisfaction.

#### e) Empathy

Obtained information that the highest expectations of customers contained in statement 16 that is equal to 70%. Statement 14 only has an expected value of 64% while statement 15 has an expected value of 61%, so statement 1 needs primary attention to meet customer expectations. The dimensions of empathy have high expectations. There needs to be a realization for the company for customers to increase customer satisfaction.

### E. Analysis of Six Sigma

#### a) Stage Define

The process at this stage is done by setting targets to be achieved and looking for problems that can hinder the achievement of these targets. The goal to be achieved is to improve service performance under customer expectations. Therefore, it is necessary to define the attributes of the dimensions that become parameters of service quality. Based on the defining attributes of the five dimensions of service quality, facilities, reliability, responsiveness, assurance, and empathy obtained 16 attributes.

#### b) Phase Measure

At this stage, measurement is carried out baseline performance at the attribute level. The measurement baseline results of the current performance in the table show that: the average performance score is 4.3; expectation score of 4.73; gap -0.43; satisfaction level of 91%, DPMO value of 140250, and level of sigma 2.4.

#### c) Analyze Stage

The third stage of the company determines the factors that most influence the service process, which means finding one or two factors that if corrected will improve the process dramatically (Mangala in Wisnubroto (2012: 120). Based on the



measurements baseline performance in the table, the four attributes obtained below average, as shown in the table below. Four service attributes are below the average, namely Rel 1, Rel 2, Rel 3, and Rel 4 attributes, as presented in Table 4. The Rel 2 attribute (on-time delivery) becomes a factor or attribute most critical that needs to be prioritized to be corrected immediately to obtain dramatic service improvements

#### 1) Pareto Diagram

Pareto diagrams are used to determine the dominant critical attributes that require the most priority improvement to reduce dissatisfaction

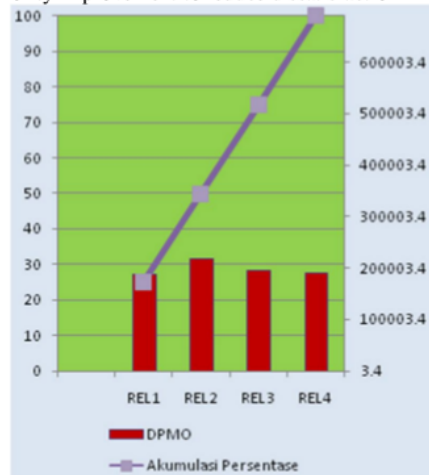


Figure 4. Pareto Diagram

Description of the attributes on diagram Pareto Figure 4 is as follows:

1. The ability of employees to deal with problems faced by customers (Rel1)
2. Delivery of goods on time (Rel2)
3. Condition of goods received by customers is good and appropriate (Rel3)
4. Punctuality of service in accordance with the promise given (Rel4)

Pareto diagram Figure 4 shows that the attributes Rel1, Rel2, Rel3 and Rel4 are problematic. Based on Figure 4 it is shown that the attribute Rel2 (on-time delivery of goods) becomes the dominant and most critical attribute causing customer dissatisfaction so factors must be found that cause these problems that result in customer dissatisfaction.

#### 2) Cause and Effect Diagram

Cause and effect diagrams present the causal factors of the most dominant problems in the service process. The calculation results show that the service process Rel 2 attribute (the accuracy of the delivery of goods) is the dominant attribute causing customer dissatisfaction so that the cause of the problem must be found. Based on the identification of the problematic attributes, the process of identifying the causes of complaints on these attributes is done

through mapping the problem with the help of Xmind8.

#### d) Improve Phase

This stage is carried out by making a plan in the form of solutions to make improvements and improve quality service on Rel2 critical attributes (on-time delivery of goods) to increase customer satisfaction.

#### 1) Human

The proposal wants to overcome employee negligence due to fatigue is sufficient rest before work. Proposal to overcome employee unemployment due to lack of competence is to add training to employees. The proposal to overcome user misunderstanding is to build communication with customers proposal to address incomplete data and addresses unclear goal is to remind customers of negligence committed.

#### 2) The Method

Proposed to overcome this is to simplify the claim process for customers by extending the claim period compared to competitors. Build an understanding of the importance of insurance customers, if the price of the product is more than ten times the cost of shipping.

#### 3) The System

Proposed for overcoming this problem is to carry out regular repairs and maintenance on the website. As well as developing Information Technology.

#### 4) Environment

Proposed overcome this problem is to coordinate with the fleet that transports the shipment and always update the availability of goods to the customer if there is a possibility of a delay.

#### 5) Machines or Equipment

Proposed to overcome this problem is to add tools, especially computers, to improve the performance of the service process. Besides, queuing machines need to be added to make it easier for customers to know the queue and avoid stacking on certain days.

#### e) Phase Control

The process at this stage, the company, always monitors service performance and standardizes sound service systems with specific criteria set by the company. Establish a daily receipt reporting system as a form of supervision to reduce the problem of forwarding delivery. Fleet control is used for shipments in which time-sensitive shipments must be sent outside routine schedules and fixed routes, as long as flight schedules are still available—ensuring employee discipline under applicable SOPs.

### F. Conclusion

Service quality is not maximal, which is far from level 6 sigma with DPMO 3,4 for that service needs to be improved. It is indicated from the results of measurements with the method six Sigma showing an average performance score of 4.3; expectation score of 4.73; gap -0.43; satisfaction level of 91%, DPMO value of 140250, and level of sigma 2.4.

The calculation results from six Sigma show that the dominant critical attribute is Rel2 (on-time delivery of goods) to be the dominant attribute causing customer dissatisfaction so it must be a priority for improving service performance from the human side, methods, systems, environment, and machines.

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