

**APPLICATION OF THE SIX SIGMA METHOD AS A TOOL FOR MANAGEMENT TO IMPROVE
QUALITY OF SERVICES
(Case Study on Bank BNI Syariah Bandung)**

Gagah Mohamad Aditya¹, Herry Irawan, ST., MM²

¹Student, MBTI, Faculty of Economic & Business, Telkom University.

²Lecturer, MBTI, Faculty of Economic & Business, Telkom University.

[¹adityagagah@icloud.com](mailto:adityagagah@icloud.com), [²ir.herry@gmail.com](mailto:ir.herry@gmail.com)

Abstract

The banking industry in running its business always wants to focus on customers in the hope that customers can feel satisfied and fulfilled their needs. This can be done by increasing the quality of service by increasing the number of product variations and their features. Good service quality includes five dimensions, namely reliability, responsiveness, assurance, empathy, and tangibility. Bank BNI Syariah Bandung is a bank that prioritizes service quality in order to retain its customers, but sometimes there are still customers who are less satisfied with the services provided by Bank BNI Syariah Bandung. This is known by the number of complaints from quite a number of customers. The Six Sigma method with the DMAIC approach and service quality method as an additional method is expected to reduce customer dissatisfaction with the quality of services provided by Bank BNI Syariah Bandung.

The results of the service quality baseline of Bank BNI Syariah Bandung are at the level of 2.05 sigma with a Defect Per Million Opportunity (DPMO) value of 291,160 DPMO and the percentage obtained is 70.92%. This can be interpreted that the service provided by BNI Syariah Bank Bandung is able to provide good results and has sufficient process capability because it is at the 2.05 sigma level, so as to be able to provide sufficient maximum service. The conclusion that can be drawn in this study is Bank BNI Syariah Bandung is a bank that is concerned with and gives attention to improving the quality of service to its customers. In addition, Bank BNI Syariah Bandung needs to pay attention to service attributes that are classified as needed but the level of satisfaction is still low.

Key Word: DMAIC, Quality of Service, Satisfaction, Six Sigma.

1. Research Background

Every company, including a bank in carrying out its business, always wants to focus on customers in the hope that their customers can feel satisfied and fulfill their needs. By focusing on this, a bank tries to make improvements on its service performance. This is done by doing a re-analysis of human resources, service processes, and other things so that it is expected to achieve work efficiency and in accordance with what the company wants. Work efficiency can be achieved, if the bank can maintain and improve the quality of services provided. Improving the quality of service is one of the most important things. Good service quality, at least includes five things, namely reliability, responsiveness, assurance, empathy, and tangible [1]. In carrying out these matters, the bank must really pay attention to the interests of customers and customer complaints by knowing the weaknesses and strengths of service quality, BNI Syariah Bandung is one example that must apply this.

According to internal data from the BNI Syariah, the number of customer complaints from Bank BNI Syariah Bandung has increased every year. In 2017, the number of customer complaints reached 277 and in 2018 increased to 665. In the first half of 2019, the number of customer complaints reached 610 and is likely to continue to grow until the end of the year [2]. In order to be able to serve customers' needs or complaints effectively, it requires customer service that can bridge customers with bank services. Customer service is the quality of treatment received by customers during the business contract with the company. Good service is a service that addresses goals in accordance with the needs and demands of the customers or customers. Therefore the demands of these customers, including through customer service activities that are in charge of serving, provide information about bank products and what facilities are owned by Bank BNI Syariah Bandung and creating harmonious relationships with customers or prospective customers.

Customer expectations for Bank BNI Syariah Bandung certainly have a high quality of service. In fact, what is felt by customers about the quality of BNI Syariah Bank Bandung services is not as customer expectations. the problem in this study is the existence of customer dissatisfaction with the quality of service by customer service at Bank BNI Syariah Bandung which is indicated by customer complaints to customer service. Therefore it is necessary to make efforts to improve the customer service system by customer service that focuses on customer satisfaction in order to be able to improve the quality of customer service by customer service at Bank BNI Syariah Bandung. The Six Sigma Method is expected to reduce customer dissatisfaction with the quality of services

provided by Bank BNI Syariah Bandung, which is then assessed to benefit from eliminating these failures into zero failure rates supported by data and facts in the bank.

2. Theoretical Review And Scope Of The Research

2.1 Theoretical Background

2.1.1 Operation Management

There are several definitions of operations management from several experts:

1. Operational management is a series of activities that produce value in the form of goods and services by converting inputs into outputs [3].
2. Operational management can be interpreted as a continuous and effective process of using management functions to integrate various resources efficiently in order to achieve goals [4].
3. Operational management is the application of management science to regulate all production or operational activities so that it can be carried out efficiently [5].

2.1.2 Total Quality Management

Total Quality Management or abbreviated as TQM is a quality management system that focuses on customers by involving all levels of employees in making improvements or continuous improvements (continuously). Total Quality Management or TQM uses effective strategies, data and communication to integrate quality discipline into company culture and activities. Quality management is defined as a way to continuously improve performance improvement at every level of operations or processes, in every functional area of an organization, using all available human and capital resources [6].

Total Quality Management (TQM) refers to an emphasis on quality that covers the entire organization, from suppliers to customers. TQM emphasizes management's commitment to get company directives that continue to want excellence in all aspects of products and services that are important to customers [3].

2.1.3 Six Sigma

Six Sigma is a business strategy that aims to identify and eliminate the causes of failure or defects in business processes by focusing on critical output on customers. Six Sigma also measures quality to near the loss of defects using statistical methods. Defect (defect) here is defined as anything that can make customers become dissatisfied. The basic objective of the Six Sigma method is the implementation of a measurement strategy that focuses on increasing and reducing variation [7].

There are several terms in the Six Sigma concept [6], including:

1. Critical-to-Quality (CTQ): is a very important attribute to consider because it is directly related to the needs and satisfaction of consumers.
2. Defect: is a failure to provide that is in accordance with customer requirements. Defect per Million Opportunities (DPMO): is a measure of failure in the Six Sigma quality improvement program, which shows failure per million opportunities.
3. Process Capability: The ability of the process to produce or deliver output in accordance with the expectations and needs of consumers.
4. Define, Measure, Analyze, Improve, and Control (DMAIC): is a process for continuous improvement towards Six Sigma targets. DMAIC is carried out systematically, based on science and facts (systematic, scientific, and fact-based).
5. Six Sigma: a vision of quality improvement towards the target of 3.4 failures per million opportunities (DPMO) for each product transaction (goods and / or services).

Currently Six Sigma has been widely applied in almost every industry and many organizations in the world to modify the methodology and tools to suit their companies. In the current era of global competition, not only manufacturing companies are faced with high pressure from customers (to reduce labor) and competitors (to win market share) but this is a challenge in other industries. This factor has contributed to the integration of the Six Sigma concept with the complete production process [8].

2.1.4 DMAIC Process

In the six sigma known the term Six Sigma Improvement Model commonly known as the DMAIC which is divided into 5 stages of the process [6]:

1. Define

Define stage is the first phase used to determine the problem or opportunity, process, and customer requirements that will be corrected. In this phase, Six Sigma is responsible for the use of key equation formulas that define several vital factors that need to be measured, analyzed, corrected, and controlled to achieve financial results. Some vital factors are factors that directly explain the cause and effect relationship of the output process that is measured in relation to the input that drives the process.

2. Measure

The measure phase is a quantified evaluation of specific characteristics and or levels of performance based on observable data. This stage aims to determine critical to quality (CTQ) which is directly related to the specific needs of the customer and performance measurement is now in the size of the sigma value. Measurements made in the measure phase always consider each service dimension in a service business or product dimension in the

industry to find out the occurrence of irregularities that cause disruption of process capability.

3. Analyze

This stage is the stage of analyzing, finding and finding the root cause of a problem. This can be done using a causal diagram [6]. Regarding the control of statistical processes, causal diagrams are used to indicate the causal factors and quality characteristics (effects) caused by the causative factors [9].

4. Improve

This stage, FMEA (Failure Mode and Effect Analysis) is used to determine the priority of the improvement plan. FMEA is a systematics of activities that identify and evaluate potential failures that exist in systems, products or processes, especially in the parts of the product or process functions on factors that affect the product or process. The aim of FMEA is to develop, improve, and control the probability values of failure detected from the source (input) and also reduce the effects caused by the occurrence of "failure" [9].

5. Control

Control phase is the stage that determines the ability to control several vital factors and implement a control system. This stage aims to ensure that improvements to the process, once implemented, will last and that the process will not return to the previous stage. So the main goal of the control phase is to avoid a company to return to old habits and processes.

2.2 Research Framework

To improve service quality in BNI Syariah Bandung, researchers used the DMAIC method in Six Sigma. Six Sigma mainly has five phases: Define, Measure, Analyze, Improve and Control (DMAIC):

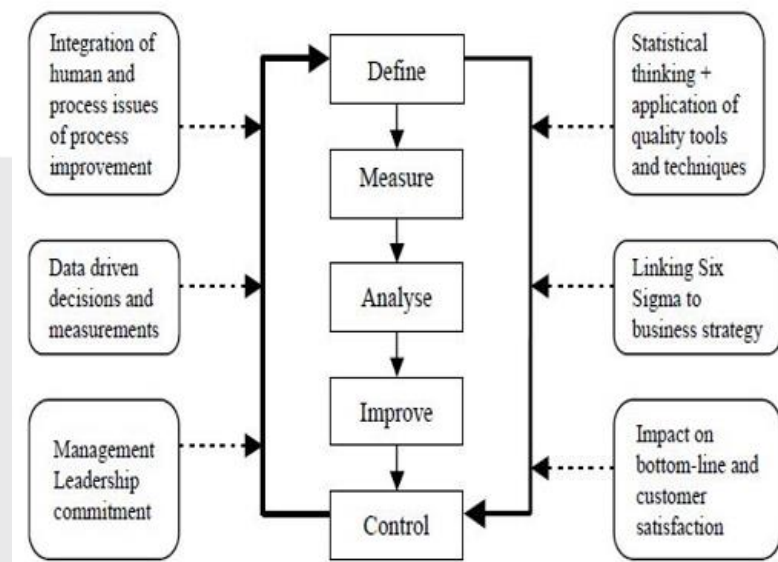


Figure 1 Research Framework

3. Result and Discussion

3.1 Data Collection

Data obtained from the results of the questionnaire for 100 respondents as customers of BNI Syariah Bank. As for the results of the recapitulation of respondents' answers based on two measurement scales namely the level of importance and customer satisfaction:

a. Important Rating Scale

The level of importance in the reliability dimension, on average, as much as 83,50% of the customers stated that it is very important because the customer considers that dimension to be beneficial when customers carry out their activities in the bank. It can be seen that the customer considers the timeliness in providing services is considered very important. On the responsiveness dimension, an average of 89.67% of customers stated that it is very important because it can help speed up the services provided to customers and in accordance with what customers want. In the assurance dimension, an average of 88.50% of customers stated that it was very important because of the friendliness and professionalism of employees in providing services to customers, thus giving confidence to customers to be loyal customers. On the empathy dimension, an average of 92% of customers stated that the customer stated that it was very important because the employee's ability to understand and understand the customer's needs was highly needed by the customer. In the tangible dimension, in general the customer is very important with an average of 87.20% because the customer considers that the dimension is the service that was first felt by the customer.

b. Satisfaction Rating Scale

in the dimensions of reliability, the average level of satisfaction of 58,50% of customers stated very satisfied with the timeliness in providing services and accuracy in diagnosing the completeness of forms submitted by customers. But there are still 29,50% of customers who said they were quite satisfied with this, because of the time delay in providing services to customers. This is due to an inaccuracy with the standard processing time.

On the responsiveness dimension, as many as 58,67% of customers said they were very satisfied with the speed of employees in providing services to customers if the required documents were lacking and if an ATM card or credit card had been made. So that there are still 2% of customers who said they were not satisfied with the speed of employees in contacting customers if the required documents were lacking and 1% of customers who said they were very dissatisfied with the speed of employees in contacting customers when an ATM card or credit card was ready.

61,50% of customers said they were satisfied with the assurance dimension. This can be seen by the ability of employees to show their caring attitude towards customers, so that customers feel that their business and goals coming to the bank are satisfied with the bank's satisfaction and professionalism of their employees. But it can still be found as many as 26,50% of customers said they were quite satisfied and 0,50% of customers said they were dissatisfied with the ability of employees, especially in terms of professionalism of an employee. Sometimes employees who are less professional can not explain what the customer wants or asks, so the employee asks for help from other employees or the employee's supervisor.

In the empathy dimension, as many as 26% of customers who expressed quite satisfied with the ability of employees to understand and understand customer difficulties. But there is still a percentage of 5% of customers who say they are dissatisfied with the ability of employees to understand and understand customer difficulties.

As many as 60.50% of customers said they were satisfied with tangible dimensions, the biggest satisfaction of customers was on the neatness of the employee's appearance in serving customers as indicated by a percentage of 75% of customers who were satisfied. Whereas 26% of customers stated that they were quite satisfied with the cleanliness of the room due to lack of cleaning staff or cleaning service and 32% of customers stated that they were quite satisfied with the form provided, sometimes not very clear.

3.2 The Application of the Six Sigma Method with a DMAIC Approach

3.2.1 Define

In the define phase, researchers try to describe the things needed by Bank BNI Syariah Bandung in order to be able to implement the Six Sigma method, namely: choosing the Six Sigma research object, and setting the objectives to be achieved. One of the ways that Bank BNI Syariah Bandung can survive in the banking world is by continuing to review the quality of existing services and continue to provide quality services to its customers. Five dimensions in service quality at BNI Syariah Bank Bandung, namely:

- a. The Reliability dimension is the ability of an employee to carry out tasks in accordance with the vision and mission launched by Bank BNI Syariah Bandung. In addition, employees must be reliable in serving customers by providing timeliness in providing services to customers and accuracy in diagnosing the completeness of forms submitted by customers.
- b. The Responsiveness Dimension is the willingness of employees to help customers and provide fast services that meet customer expectations. In this dimension include the speed of employees in serving customers, the speed of employees in contacting customers when the required documents are lacking, and the speed of employees in contacting customers when the required documents are lacking.
- c. The Assurance dimension is a guarantee given by an employee to a customer. In this case an employee must be able to provide good service in a friendly manner to customers, have a high level of competence, have high credibility, have high professionalism and be able to provide security to customers.
- d. The Empathy dimension is the attitude of caring for customers and the attitude of attention given by banks to their customers. This can be demonstrated by the way employees understand customer difficulties.
- e. Tangible Dimension is the physical appearance of facilities, equipment, personnel, and communication materials. In this case, including: the neatness of the employee's appearance, the comfort of the room, the cleanliness of the room, the form of the form provided must be clear, and the technological advancements used by the bank.

3.2.2 Measure

In the measure phase, researchers try to describe the things needed by Bank BNI Syariah Bandung in order to implement the Six Sigma method, namely: establish key Critical To Quality (CTQ), develop data collection plans, and measure current performance to be set as a performance baseline at the start of the Six Sigma project.

- a. Critical To Quality (CTQ)

Num.	Customer Needs	
	Dimension	Quality Characteristics (CTQ)
1	Reliability	Providing services according to the promised time
		Thorough in diagnosing the completeness of forms submitted by customers
2	Responsiveness	Fast in serving customers
		Quick in contacting customers when the required documents are lacking
		Quickly contact customers when an ATM card or credit card is ready
3	Assurance	Employees are always friendly
		Employees are always professional
4	Empathy	Employee understanding of customer difficulties
5	Tangible	Neat-looking employees
		Comfortable room
		Clean room
		The form provided must be clear
		Advances in technology used

Figure 2 CTQ

b. Develop a Data Collection Plan

The data used are the results of the questionnaire given to customers who carry out activities in the bank from September to October 2019. From the results of the questionnaire, 100 customers were drawn from various types of jobs, namely: 46 customers working as students, 4 customers working as civil servants, 17 customers working as entrepreneurs, 12 customers working as private employees, 3 customers work as traders, and 15 customers work as jobs that are not mentioned in the questionnaire.

The quality of services provided by Bank BNI Syariah Bandung to customers is supported by existing company data, and questionnaires are also distributed to customers who have conducted activities or transactions at the bank. There are service quality indicators on the questionnaire involving 5 service dimensions (Reliability, Responsiveness, Assurance, Empathy, and Tangible). In each of these questions, the customer evaluates the quality of service on the importance & satisfaction rating.

c. Measuring Current Performance to be Implemented as Performance Baseline at The Beginning of Six Sigma Projects

The quality of services of Bank BNI Syariah Bandung in each service dimension has process capability which is at the sigma level of 1.95 to 2.05 sigma. Overall, the average sigma can be obtained from the sum of all total values in five dimensions, namely reliability, responsiveness, assurance, empathy. Then the actual performance value is obtained from the number of results S (Satisfied) and VS (Very Satisfied) of 70.92% (61.92 + 34.20%), to find the DPMO and Sigma values obtained from the attached table by matching the percentage of the values actual performance, DPMO value obtained 291.160 and Sigma 2.05. So the average sigma level is 2.05 sigma with a DPMO value of 291,160 DPMO and a 70.92% service quality satisfaction level. This shows that the performance of the services provided by BNI Syariah Bank Bandung during the study period gave good results and was able to compete with other banks, because the average Indonesian industry was at the 2-Sigma level.

No.	CTQ	Result					Actual Performance (yield)	DPMO	Sigma
		VD	D	SS	S	VS			
1	Reliability	0%	0,50%	29,50%	58,50%	11,50%	70%	301.532	2,02
2	Responsiveness	0,33%	1,67%	30,33%	58,67%	9%	67,67%	326.355	1,95
3	Assurance	0%	0,50%	26,50%	61,50%	11,50%	73%	270.931	2,11
4	Empathy	0%	5%	26%	61%	8%	69%	312.067	1,99
5	Tangible	0,08%	1,23%	27,77%	61,92%	9%	70,92%	291.160	2,05

Figure 3 Performance Baseline

3.3.3 Analyze

After the researchers discuss define and measure, the next step is to analyze. In the Analyze site, researchers try to describe the things needed by Bank BNI Syariah Bandung in order to apply the Six Sigma method, namely: establish process stability and capability, identify sources and root causes of defects, and calculate the opportunity cost.

a. Establish The Stability and Capability of The Process

The attitude of employees who are always friendly in serving customers gets the highest sigma value so that it greatly affects the service of Bank BNI Syariah Bandung if the attitude of employees is less friendly towards customers. Therefore, BNI Syariah Bank Bandung must continue to make improvements to the quality of its services in line with the growing needs of customers.

b. Identify The Source and Root Cause of The Defect

The problems faced by Bank BNI Syariah Bandung can be corrected with a fishbone diagram that will illustrate the 5M and 1P principles, namely: Materials, Methods, Machines, Size, Nature, and Humans. This picture also provides an overview of the source of Bank BNI Syariah Bandung problems in the speed of employees in contacting customers, when the required documents are lacking, employee understanding of customer difficulties, contacting customers when an ATM card or credit card is ready and also the clarity of the form provided. Therefore, the problem at BNI Syariah Bank Bandung is explained in the fishbone diagram below:

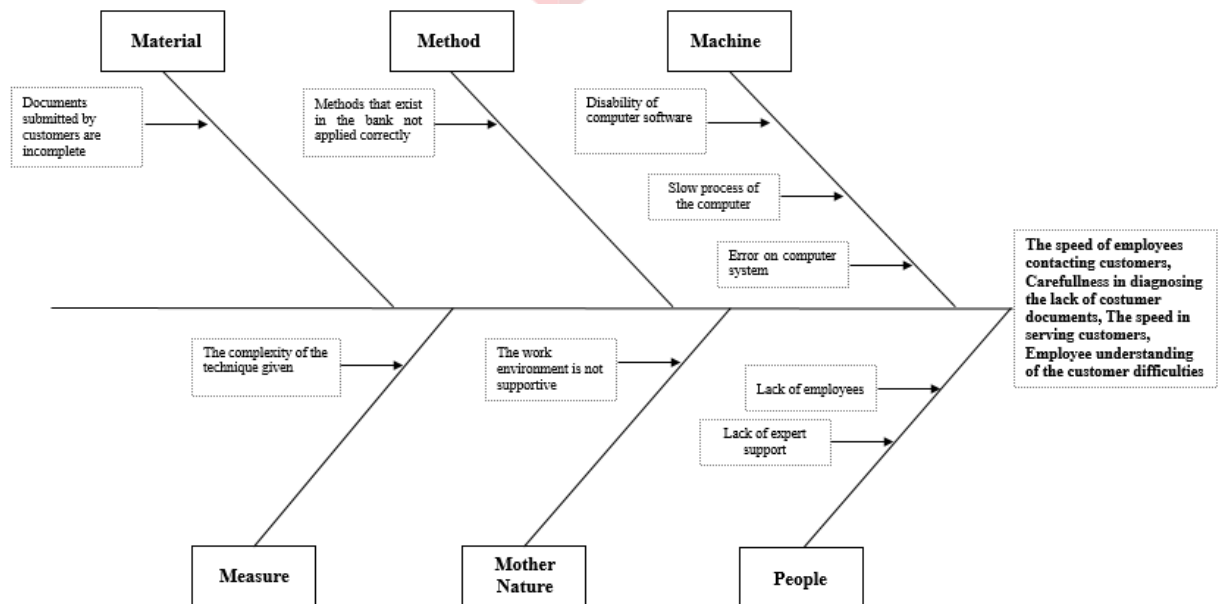


Figure 4 FishBone Diagram of The Speed of Employees Contacting Customers, Carefulness in Diagnosing The Lack of Customer Documents, etc.

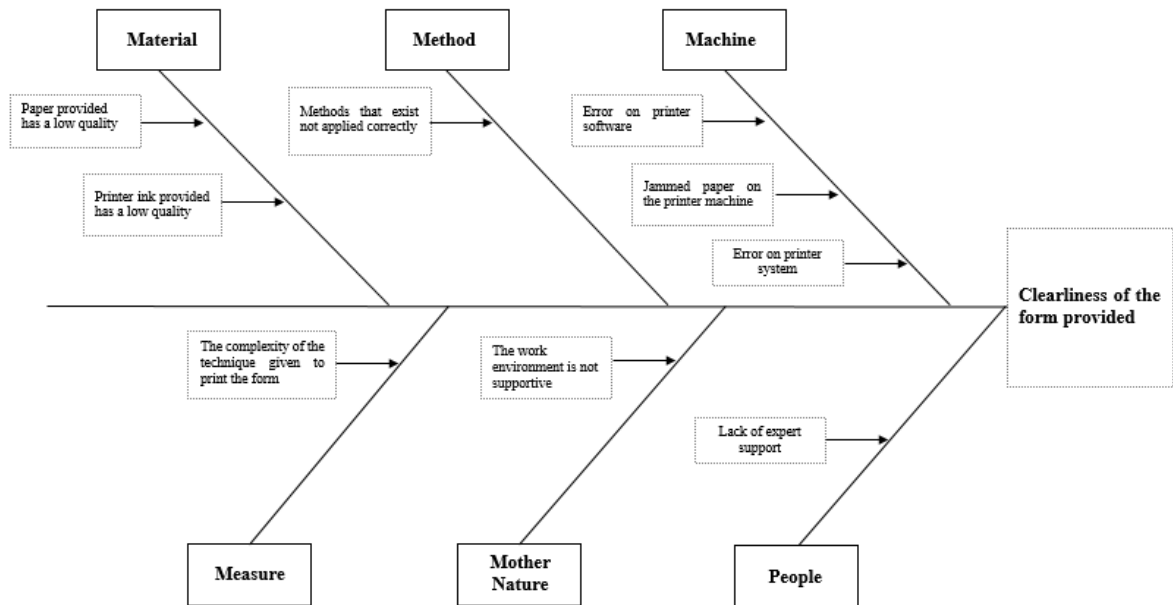


Figure 5 Fishbone Diagram of Clearlines of The Form Provided

3.3.4 Improve

In the improve phase, researchers try to recommend strategies to improve the things needed by BNI Syariah Bank in order to be able to implement the Six Sigma method, namely: set the proposed improvements so that it is expected that many defects are within the established tolerance limits, and set a proposed action plan to implement Six Sigma quality.

Establishing a proposed action plan to implement Six Sigma quality seen from the five service dimensions explained above, it is recommended that corrective actions be taken, namely:

- The active role of all employees to improve the quality of service. This certainly cannot be achieved without the support of the manager, namely conducting training to improve service quality, for example conducting training on customer satisfaction. However, to conduct the training encountered a big obstacle that usually comes from employees because sometimes employees consider the training to have no meaningful benefits, so that the quality of existing services does not show improvement. Therefore, the manager should force employees to attend trainings held to increase employee professionalism towards customers.
- There is an active role of managers in supporting every activity carried out by employees, so as to create a harmonious and pleasant work atmosphere that will have an impact on improving employee performance in front of customers.
- Conduct employee performance evaluations more openly or transparently, so employees can find out their weaknesses and strengths in serving customers.
- Carry out new developments in service quality and apply them to customers. This was done by means of the quality of service being implemented that was already well maintained, while the quality of the service being implemented was not yet well replaced with the development of new service quality so that service quality was obtained in accordance with the wishes of its customers.
- Planning for the development of existing human resources to make it easier to do work, so that the workload of employees is reduced which then impacts on a better relationship with their customers.

3.3.5 Control

To exercise control over the existing system in order to obtain superior quality, the following steps must be taken:

- Pay attention to dimensions that have a sigma value below 3.
- Pay attention to criticism and suggestions from customers. Measuring employee performance in conducting banking services to customers regularly every month.
- Conduct training on improving employee performance to reduce or minimize errors in service.

3 Conclusion and Suggestion

3.3 Conclusion

- At the Define stage it is found about the selection of Six Sigma research objects which are five dimensions of service quality, namely reliability, responsiveness, assurance, empathy and tangibility that can

determine the level of customer satisfaction at Bank BNI Syariah Bandung. And also setting goals to be achieved by the Six Sigma method as a tool to improve customer satisfaction with the quality of services provided to the level of satisfied (4) or the level of very satisfied (5).

- b. Then in the Measure phase, the details of what is needed by Bank BNI Syariah Bandung in order to be able to apply the Six Sigma method, namely: establishing Critical To Quality, developing data collection plans, and measuring current performance to be applied as baseline for initial performance in Six Sigma projects. Data development was carried out by distributing questionnaires to 100 BNI Syariah Bank customers from various jobs. Service quality indicators on the questionnaire involved five dimensions of service quality. Then to achieve the objectives to be achieved an actual performance calculation is calculated from the number of satisfied and very satisfied levels from each dimension and points of the five dimensions. Then the actual performance percentage results are matched with the defect-free conversion table to get the DPMO and Sigma values.
- c. During the Analysis phase, the details of what is needed by BNI Syariah Bank Bandung in order to be able to implement the Six Sigma method, namely: determining the stability and capability of the process and identifying the sources and root causes of defects using the FishBone Diagram tool. The results obtained are 5 root causes which are the main causes of the lack of quality of services provided by BNI Syariah Bank Bandung, namely accuracy in diagnosing customer documents, speed of contacting customers when documents that customers provide are lacking, speed in serving customers, employee understanding of employee difficulties and unclear form provided.
- d. In the Improve stage, the recommendation for improvement strategies at Bank BNI Syariah Bandung is done by setting the proposed improvement so that it is expected that the number of defects is within the established tolerance limits and setting a proposed action plan for implementing Six Sigma quality.
- e. In the Control phase to avoid recurring problems, proposals are made that can help managers by controlling several aspects. Control of some aspects is assisted with a flow chart that is expected to help fix the existing system.

3.4 Suggestion

1. Practical Aspects for Industry

- a. Companies should be able to implement the Six Sigma method as a program of continuous improvement to provide solutions and improve the quality of the process better.
- b. The level of service performance of Bank BNI Syariah Bandung which is still relatively low requires improvement in the quality of its services so as to be able to stabilize and reduce disability in the services of Bank BNI Syariah Bandung.
- c. Seeing the problems that exist in the company, the most customer complaints are accuracy in diagnosing customer documents, speed in contacting customers when the documents they provide are lacking, speed in serving customers, understanding employees on employee difficulties and lack of clarity on the form provided. The company should be able to make improvements that are carried out continuously so that it can reduce the number of customer complaints or disabilities in the service process of BNI Syariah Bank Bandung

2. Academic Aspects For Future Research

For further research, deeper identification is needed not only related to internal factors but also can be in-depth on external factors such as social factors, geographical factors and others that may have different results with other branches in Indonesia. The addition of a longer time span to the quality of service, so that calculations and analyzes are more specific. The addition of the lean six sigma method to the service quality process can be proposed to determine the flow in the service quality process that is burdensome and unnecessary.

Daftar Pustaka:

- [1] Supriyanto, S. (2003). *Manajemen Pemasaran Jasa Pelayanan Kesehatan*. Surabaya: Universitas Airlangga.
- [2] Bank BNI Syariah. (2018). *Data BNI Syariah 2017*.
- [3] Heizer, J., Render, B. (2014). *Manajemen Operasi*. Jakarta: Salemba Empat.
- [4] Herjanto, E. (2010). *Manajemen Operasi*. Jakarta: Gramedia.
- [5] Subagyo, P. (2000). *Manajemen Operasi*. Yogyakarta: BPFE.
- [6] Gaspersz, V. (2002). *Manajemen Kualitas dalam Industri Jasa*. Jakarta: PT Gramedia Pustaka Utama.
- [7] Antony, J. (2008). Can Six Sigma Be Effectively Implemented In SME. *International Journal of Productivity and Performance Management*. Vol. 57 No. 5, pp. 420-3.
- [8] Roesekar., Ravi, S., Pohekar, S, D. (2016). Six Sigma Methodology: A Structured Review. *International Journal of Lean Six Sigma*. Vol. 5 Iss 4 pp. 392 - 422.
- [9] Caesaron, D., Simatupang, S.Y.P. (2015). Implementasi Pendekatan DMAIC Untuk Perbaikan Proses Produksi Pipa PVC (Studi Kasus PT. Rusli Vinilon). *Jurnal Metris*, pp. 91 –96, ISSN: 1411 –3287.



