INTEGRATION OF SERVICE QUALITY AND QUALITY FUNCTION DEPLOYMENT WITH NEUTROSOPHIC AHP METHODS IN CUSTOMER SATISFACTION MEASUREMENT MODEL (CASE STUDY: PT NARMADA AWET MUDA LOMBOK)

Submitted to International Program
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By

Sri Cempaka (19522368)

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UNIVERSITAS ISLAM INDONESIA

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AUTHENTICITY STATEMENT

For the sake of Allah SWT, I admit this work is the result of my own work except for the quotations and summaries from which I have explained the source. If in the future it turns out that my confession is proven to be untrue and violates the legal regulations in the paper and intellectual property rights, then I am willing to get a bachelor's degree that I have received to be withdrawn by the Universitas Islam Indonesia.

Yogyakarta, 06 – 12 – 2023

(Sri Cempaka)

19522368

PT. NARMADA AWET MUDA
Narmada, Lombok – Indonesia
Kantor : Jalan Sandubaya No. 88 Bertais, Mataram – NTB
Telp. 0370 – 672944, 672945, 672947 Fax. 0370 - 672946
Pabrik : Desa Montong Selat Kecamatan Narmada, Lombok – Indonesia, Telp. +62 370 659097
Website : www.narmada.co.id

SURAT KETERANGAN

PT. Narmada Awet Muda dengan ini menerangkan bahwa:

Nama	**: Sri Cempaka**
Sekolah	**: Universitas Islam Indonesia**
Program Studi	**: Teknik Industri**

Telah melaksanakan Penelitian / Pengambilan Data di PT. Narmada Awet Muda dengan pokok bahasan **"Integration of Customer Satisfaction Measurement Model Using Service Quality and Quality Function Deployment with Neutrosophic AHP Methods (Case Study : PT Narmada Awet Muda Lombok)"** terhitung mulai tanggal: 21 November 2022 s.d 21 Desember 2022.

Demikian surat keterangan ini diberikan untuk dapat dipergunakan sebagaimana mestinya.

Mataram, 25 Desember 2022
PT. Narmada Awet Muda

Kepala Pabrik

THESIS APPROVAL OF SUPERVISOR

INTEGRATION OF CUSTOMER SATISFACTION MEASUREMENT MODEL USING SERVICE QUALITY AND QUALITY FUNCTION DEPLOYMENT WITH NEUTROSOPHIC AHP METHODS

(CASE STUDY : PT NARMADA AWET MUDA LOMBOK)

THESIS

Arranged by :

Name : Sri Cempaka

Student Number : 19 522 368

Yogyakarta, 7 Desember 2023

Supervisor

Ir. Muhammad Ridwan Andi Purnomo, ST, MSc, PhD, IPM

THESIS APPROVAL OF EXAMINATION COMMITTEE

INTEGRATION OF SERVICE QUALITY AND QUALITY FUNCTION DEPLOYMENT WITH NEUTROSOPHIC AHP METHODS IN CUSTOMER SATISFACTION MEASUREMENT MODEL (CASE STUDY: PT NARMADA AWET MUDA LOMBOK)

UNDERGRADUATE THESIS

Arranged by :

Name : Sri Cempaka

Student Number : 19522368

Has been defended in front of Examination Committee in Partial Fulfilment of the Requirement for the Degree of Sarjana Strata-1 Teknik Industri Faculty of Industrial Technology
Universitas Islam Indonesia

Examination Committee

Ir. Muhammad Ridwan Andi Purnomo, S.T., M.Sc., Ph.D., IPM
Examiner Committee Chair

Dr. Taufiq Immawan, S.T., M.M.
Member I

Harwati, S.T., M.T.
Member II

Acknowledge by,
Head of Undergraduate Program in
Industrial Engineering
Faculty of Industrial Technology
Universitas Islam Indonesia

Ir. Muhammad Ridwan Andi Purnomo, S.T., M.Sc., Ph.D., IPM

DEDICATION PAGE

Alhamdulillahirabbil‘alamin

This undergraduate thesis that spent a lot of time and resources is dedicated to my family, especially Mama, Kibi and Andre. To all my best friends who always share happiness and sadness to each other. This thesis also would not be possible to be completed without the assistance of my supervisor, Ir. Muhammad Ridwan Andi Purnomo, S.T., M.Sc., Ph.D., IPM. I am very lucky to have you all.

MOTTO

“For indeed, with hardship [will be] ease. Indeed, with hardship [will be] ease.”
(Q.S. Al-Insyirah: 5-6)

When My servants ask you [Muhammad SAW] about Me: I am truly near. I respond to one's prayer when they call upon Me. So let them respond [with obedience] to Me and believe in Me, perhaps they will be guided [to the Right Way]
(Q.S. Al-Baqarah: 186)

It is not for the sun to catch up with the moon, nor does the night outrun the day. Each is traveling in an orbit of their own
(Q.S. Ya Sin: 40)

Maa dumta tusyaahidu basmati ummika, fa alhayaatu laa tazaalu jamiilatan
“As long as you can see your mother's smile, your life will always be beautiful”

PREFACE

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This paper was written as one of the requirements for obtaining a Strata -1 degree in the Industrial Engineering study program at the Islamic University of Indonesia. In completing this final assignment, the author realized that there was a lot of help, support, encouragement and prayers given. The author would like to thank:

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The author hopes that in the future this Final Project report can not only be used as a reference, but can also help add experience and knowledge, especially for author. The author realizes that the writing of this report is far from perfect. Therefore, constructive criticism and suggestions are needed so that it can be better in the future. Lastly, the author hopes that the objectives of the implementation and preparation of this report can be achieved, and the results can be accepted as expected.

Wassalamu'alaikum Warahmatullahi Wabarakatuh.

Yogyakarta, 6 December 2023

Sri Cempaka

ABSTRACT

In conditions of increasingly tight industrial competition, PT Narmada Awet Muda must be able to maintain the company's survival. One of the important things that every company needs to do and pay attention to is increasing customer satisfaction. This research aims to improve the company's service quality by paying attention to service quality attributes based on consumer desires. The method used to identify, analyze and determine alternative actions to be taken is a combination of Servqual, Neutrosophic and Quality Function Deployment (QFD) methods. The results of data processing that has been carried out using the Servqual and Neutrosophic methods from 30 attributes asked to consumers, obtained 13 attributes that require priority attention for improvement. From the results of integration into QFD, the order of technical service attributes is obtained, namely: 1. Customer relationship management system (20.82%), 2. Training and job evaluation for employees (16.04%), 3. Soft skills and empathy training for employees (13.73%), 4. Job competency training (10.56%), 5. Real time customer complaint tracking system (9.13%), 6. Fast and effective response (5.91%), 7. Customization of solutions based on specific needs (4.52%), 8. Feedback and communication with agents (4.27%), 9. Work culture training (3.41%), 10. Providing the latest standard equipment and machines (3 .38%), 11. Product quality assurance and certification system (2.97%), 12. Strategic location with easy access (2.97%), 13. Standardize employee appearance (2.21%). The results of the Part Deployment Matrix show priority improvements that need to be made by the company, namely: 1. Provides a Hotline for Companies specifically Handling Customers, 2. Listening to feedback from employees and external parties provides insight into which areas need improvement, 3. Regular Training and Evaluations are Held, 4. Facilitate Mandatory Soft Skills Training for all Employees, 5. Improvements in Establishing Relationships with Customers, 6. Ensure Employees Understand their Roles and Responsibilities, 7. Make a Schedule for the Use of Uniforms that Must be Adhered to.

Keywords: Service Quality, Neutrosophic, Quality Function Deployment (QFD)

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CHAPTER I

INTRODUCTION

1.1 Research Background

Manufacturing and service industries must pay attention to the quality of their products or services as the main determinant of customer satisfaction. Consistency in providing high quality products or services is very important. Unfortunately, companies often have difficulty maintaining this quality consistently, as well as adapting and improving quality as customer needs and expectations change. This is a major challenge that must be overcome by the manufacturing and service industries so that they can maintain customer trust and loyalty in the long term. Therefore, there needs to be a constant effort for continuous improvement and innovation in production and service processes.

Accelerated population growth in the current era is one of the driving factors for increasing public demand for goods and services. This has encouraged the birth of a number of companies competing to meet these needs. The main focus in establishing a company is achieving the expected profits, which intrinsically becomes a vital support for the company's survival.

In order to win the competition, a product or service must be able to provide functions that represent consumers' wants and needs for the product or service. These functions must meet certain limitations so that they become a specification for the product or service, which ultimately affects its value in the eyes of consumers.

In general, quality is not only contained in the physical product (product quality) produced by a company, but also included in the services or services (service quality) delivered by the company to their customers. High standard service can create consumer satisfaction, which is an important aspect for companies to maintain their existence and even dominate the competition. The most complex part of service lies in its quality which is greatly influenced by consumer expectations. Consumer expectations can vary greatly from one consumer to another, even though the type of service provided is the same.

The development of the mineral water business in Indonesia continues to experience growth, especially in the Lombok area, the role of bottled drinking water is getting bigger,

this can be seen by the increasing number of bottled drinking water of various brands everywhere. So, competition among bottled drinking water companies is getting sharper. The increase in population followed by the increase in living needs is also what makes this happen. PT Narmada Awet Muda is one that plays its role in the bottled drinking water industry with the Narmada product brand. In conditions of increasingly tight competition in the bottled drinking water industry, PT Narmada Awet Muda must be able to maintain the company's survival and product competitiveness. One of the important things that every company needs to do and pay attention to is retaining existing customers.

In facing this competition, it is important for PT Narmada Awet Muda to not only consider aspects of growth and increasing sales, but also focus on maintaining relationships with customers. Customers are considered the main pillar that determines a company's sustainability, and understanding customer needs and complaints is key in maintaining their satisfaction. In this context, customer complaints regarding service quality are an aspect that cannot be ignored. Although the previous focus on improving service was mainly concentrated on end consumers, complaints from customers also indicate that the service aspect of agents and distributors needs to receive more serious attention. Customer complaints here cover a variety of problems, such as late delivery, lack of responsiveness to questions or requests, or even problems related to product quality.

With customer complaints regarding service quality, companies need to identify the root of the problem, evaluate related internal processes, and make necessary adjustments to improve service quality to agents and distributors. In this case, companies can implement effective measuring tools to evaluate and monitor the quality of services provided to their main customers. This approach can help companies gain more comprehensive insight into customer satisfaction levels and enable them to take appropriate improvement steps.

The use of the servqual method is quite appropriate for analyzing the quality level of a service because it involves five dimensions of service quality (Kaihatu, 2008). It is these dimensions that management in business must pay attention to so that various experiences that can result in failure will not occur. Not a few consumers switch to products that meet their expectations. One tool for identifying consumer needs and convert them into technical specification is Quality Function Deployment (QFD). The Quality Function Deployment concept was developed to ensure that the products or services produced can satisfy consumer needs. The main focus of Quality Function Deployment is to involve

customers in product process development as early as possible. The implementation of Quality Function Deployment can be carried out in both the goods and services sectors, including PT Narmada Awet Muda as a company that supplies bottled drinking water in the Lombok region.

Neutrosophic is a statistical method that has indeterminant conditions, there are 3 assessment categories including correctness, incorrectness and uncertainty. With the 5 servqual dimensions which have been translated into several statements, neutrosophic plays a role in assessing these statements into 3 categories with a value representation from 0 to 1. This combination is useful for interpreting unclear, inconsistent and incomplete information by considering the degree of correctness, uncertainty and incorrectness at the same time. By integrating Neutrosophic with Servqual analysis can accurately calculate the degree of criteria.

In this research, a service quality study was carried out by integrating Servqual with Neutrosophic methods into Quality Function Deployment (QFD). Research using this integration was carried out by Marliana Sonya and Rini Dharmastiti (2008) "Integration of Servqual and QFD to Improve the Quality of Trans Jogja Mass Transport Services. However, the method used in this research only emphasized two methods. In this research, a combination of servqual methods, Neutrosophic AHP methods and QFD was used to improve service quality to obtain more focused service improvement priorities. The advantage of using these three methods is that it focuses on improvements that should be made to meet consumer expectations. This integration aims to assist organizations or institutions in evaluating their customer satisfaction levels, not only to ascertain whether consumer expectations have been met or not, but also to assist in interpreting ambiguous information that can accurately measure the level of expected criteria. This is expected to accelerate the development of innovation in services by identifying and applying certain attributes to maximize consumer satisfaction.

Based on the description above, one of the efforts to achieve the vision of PT Narmada Awet Muda requires a customer satisfaction analysis of their main consumers so that PT Narmada Awet Muda can determine how its services meet standards and should be received by agents in accordance with their expectations so that they feel satisfied with the service. obtained. For this reason, the author wants to conduct research with the title Integration of Service Quality and Quality Function Deployment with Neutrosophic AHP Methods in Customer Satisfaction Measurement Model at PT Narmada Awet Muda, Lombok.

1.2 Problem Formulation

From the explanation of the background above, so the problems that can be raised in this research are:

1. What is the Narmada mineral water customer satisfaction measurement model based on the Servqual Neutrosophic AHP and QFD method approach?
2. What is the quality of service provided by PT Narmada Awet Muda based on the satisfaction measurement model that has been built?
3. What attributes are priorities that need attention and improvement in an effort to improve the quality of PT Narmada Awet Muda's services?

1.3 Research Objective

From the problem formulation above, below are the objectives of this study are as follows:

1. To determine the Narmada mineral water customer satisfaction measurement model based on the Servqual Neutrosophic AHP and QFD method approach.
2. To find out the quality of service that has been provided by PT Narmada Awet Muda.
3. Know what attributes are priorities that need to be paid attention to and improved in an effort to improve the quality of PT Narmada Awet Muda's services.

1.4 Scope of Research

There are several limitations of internship that must be identified as guidelines in carrying outthis undergraduate research. The limitations of this undergraduate research are:

1. The research was conducted at PT Narmada Awet Muda from May to June 2023.
2. This study only focuses on the service attributes provided by PT Narmada Awet Muda to its consumers.
3. The object of this study is the main consumers of PT Narmada Awet Muda Indonesia, namely distributors and agents.
4. The method used in this study is the Service Quality with Neutrosophic AHP method to measure the level of consumer satisfaction with services and the Quality Function Deployment (QFD) method is to improve quality that is oriented towards desires at PT Narmada Awet Muda.

1.5 Research Benefit

The result of this research is expected to provide contributions to several sectors:

1. For students, provide opportunities for students to increase insight and knowledge in

the application of Industrial Engineering knowledge in the field of quality control and assurance, especially regarding Service quality and Quality Function Deployment (QFD) in its application to measure the level of customer satisfaction.

2. For companies, provide additional information regarding the level of customer satisfaction with company services, which can then be used as consideration for companies in the future in formulating a decision or policy to improve the quality of services offered to customers.
3. For further research, this research can be used as a reference and comparison material in future research, especially those related to solving cases of improving service quality using the Servqual Neutrosophic AHP and Quality Function Deployment (QFD) methods.

1.6 Systematic Writing

This undergraduate research will be organized into several chapters, which will be explained below:

CHAPTER I INTRODUCTION

This introductory chapter will briefly describe the background of the problem for the undergraduate thesis or the main problems in the field, problem formulation, research objectives, the scope of the research, benefits of research and writing systematics.

CHAPTER II LITERATURE REVIEW

Chapter 2 contains a description of the basic concepts and principles needed in solving research problems and in formulating hypotheses. The main aim of this chapter is to provide a scientific basis or reference that will help in forming an essential framework for thinking in research. This is a detailed explanation of the theories used as a basis for solving problems and supporting the research being carried out.

CHAPTER III METHODOLOGY

This section explains the framework, flow diagram, and data collection methods in the research. This plays an important role in making the research more structured. This chapter also functions as a bridge that connects the theoretical basis presented in chapter II with chapter IV. This chapter details the steps that must be taken in carrying out research as well as a problem-

solving framework. Apart from that, this chapter also provides information regarding research material or subjects, research equipment and procedures, variables, data to be studied, and analytical methods used.

CHAPTER IV DATA COLLECTION AND PROCESSING

This section explains the data that has been collected during the research process and then processes the data using predetermined methods to produce analysis.

CHAPTER V DISCUSSION

This chapter discusses the research results displayed in the format of data processing tables, graphs and analysis based on the methods used to solve the problem formulation. The research results will be evaluated subjectively using theoretical explanations and statistical analysis based on findings from research and literature studies. Based on the analysis carried out in this chapter, several conclusions will be found as well as recommendations or suggestions for future research.

CHAPTER VI CONCLUSION AND SUGGESTION

This chapter outlines the conclusions that can be concluded from the entire process and results of the research that has been carried out, as well as providing several suggestions that can be given for improvement and input in future decision making. The conclusions are prepared based on the results and discussion and must answer the objectives of this research.

CHAPTER II

LITERATURE REVIEW

2.1 Deductive Review

2.1.1 Quality

Quality refers to consumer expectations that may not have been managed optimally. The goal of quality is to provide products and services that satisfy consumers. To achieve this, efforts to ensure quality must be driven by management and focused on consumers. According to Vincent Gaspersz, quality is a technical and management activity, through which we measure the quality characteristics of products (goods and/or services), then compare these results with the product specifications desired by customers, and take appropriate action if differences are found between actual performance. and standards. Quality improvement as a methodology for collecting and analyzing quality data, as well as determining and interpreting measurements that explain processes in an industrial system, to improve product quality, in order to meet customer needs and expectations (Vincent Gaspersz, 2001).

2.1.2 Service Quality

Service quality is closely related to customer satisfaction. Quality provides a special incentive for customers to establish mutually beneficial relationships with the company. Zeithaml et al. (1990) stated that service quality is a key factor that influences customer satisfaction. High quality service not only increases customer loyalty but also has the potential to increase profitability. Companies will be able to thoroughly understand customer expectations and specific needs so that they can increase customer satisfaction, which in turn customer satisfaction contributes to creating customer loyalty.

Service quality is something important that consumers or users consider. Unsatisfactory service quality will make consumers or users think about never coming back again and will even end their relationship with the company, while satisfactory service quality will make consumers continue to use the products produced by the Company.

Service is an activity or sequence of activities that occurs in direct interaction between a person and another person or with a physical machine and provides customer satisfaction.

Service quality is a dynamic condition related to products, services, people, processes and environments that meet or exceed customer expectations (Tjiptono, 2006).

According to Tjiptono (2006), service quality is the expected level of excellence and control over this level of excellence to fulfill customer desires. In other words, there are two main factors that influence service quality, namely expected service and perceived service or the expected service quality and the service quality received or felt.

Kotler and Keller (2007) state that service quality must start from customer needs and end in customer perception, where customer perception of service quality is a comprehensive assessment of the superiority of a service. Customer perception of service quality is a comprehensive value of excellence or service (Tjiptono, 2006).

Gronroos (1984) states that service quality is influenced by two main dimensions: technical service quality (what customers receive) and functional service quality (how customers receive it). Other factors that influence service quality include employee training, technology, and business processes.

Service quality can be described as the difference between customer service expectations and perceived service. If expectations are greater than performance, then the perceived quality is less than satisfactory, so customer dissatisfaction occurs (Parasuraman et al., 1985).

Dissatisfied customers will complain. Complaints submitted regarding dissatisfaction can be grouped into three categories (Tjiptono, 2006):

a. Voice response

   This category includes efforts to submit complaints directly and/or request compensation from the organization concerned. If customers do this, then the organization may still gain some benefits. First: customers give organizations one more chance to satisfy them. Second: the risk of bad publicity can be reduced, whether publicity is in the form of word-of-mouth recommendations or through the mass media. Third: provide input regarding service deficiencies that need to be improved by the organization concerned.

b. Private response

   Actions taken include warning or informing colleagues, friends or family about the service or organization in question.

c. Third-party response

Actions taken include attempts to request legal compensation, complaining via mail mass media or directly going to institutions, and so on, attempts to request legal compensation, complaining via mail mass media or directly going to institutions.

One tool that is often used to measure service quality is the SERVQUAL questionnaire. This allows companies to identify gaps between customer expectations and perceptions (Parasuraman et al., 1988). The 5 dimensions of service quality identified by Parasuraman, Zeithaml, and Berry (1998) in Tjiptono (2006) include SERVQUAL (Service Quality), namely:

a. Reliability

Reliability is the ability to provide services promptly, accurately and satisfactorily as promised. This means the company provides its services correctly the first time.

b. Responsiveness

Responsiveness is the desire and alertness of employees to help consumers provide the best possible service.

c. Assurance

Assurance, is the ability of employees to foster consumer trust in the company, in the form of:

1. Competence, this means that every person in the company has skills and knowledge related to consumer needs.
2. Courtesy, this means that it can include politeness, attention, and friendliness in individual contacts.
3. Credibility, this means being honest and trustworthy, which includes the company name, company reputation, personal characteristics, and interactions with consumers.

d. Empathy

Empathy, is sincere attention given to consumers, which includes:

1. Access includes ease of utilizing the services offered by the company.
2. Communication is the ability to communicate to convey information to customers or obtain input from consumers.
3. Understanding the Customer Includes the company's efforts to know and understand consumer needs and desires.

e. Tangibles

Tangible or direct evidence, is physical evidence of services that support service delivery, for example physical facilities, equipment, personnel, communication media, etc.

In an increasingly competitive world, companies often face challenges in maintaining or improving the quality of their services. Some of the major challenges include coping with changing customer expectations, adapting to new technologies, and training employees to remain relevant to evolving industry standards (Berry et al., 2002).

2.1.3 Customer Satisfaction

The word satisfaction comes from the Latin words "satis" (meaning good enough, adequate) and "facio" (to do or make). Satisfaction can be interpreted as "an effort to fulfill something" or "to make something adequate" (Tjiptono and Gregorius, 2006). Meanwhile, according to Kotler (2006), in general, satisfaction is a person's feeling of happiness or disappointment that arises after comparing the performance or results of the product they are thinking about with the expected performance or results. If the expected performance is below expectations, the customer is dissatisfied. If performance meets expectations, customers are satisfied. If performance exceeds expectations, then the customer is very satisfied or happy.

Through the responses received from consumers, companies can measure their level of satisfaction. This input is important for improvements and innovations focused on increasing customer satisfaction. This response becomes an indicator for the company to evaluate its performance. Complaints from consumers provide an opportunity for companies to improve their services. Generally, consumers tend to be loyal to companies that respond well to their complaints.

According to Tjiptono (2006), satisfied consumers will become customers, and they will: 1) Make repeat purchases 2) Say good things about the company to other people 3) Pay less attention to brands or advertisements for competing products 4) Buy other products from the company the same one.

Kotler in Lupiyoadi and Hamdani (2006) suggests that achieving customer satisfaction through service quality can be improved with several approaches as follows: 1). Minimize the gaps that occur between management and customers. 2). Companies must be able to build a joint commitment to create a vision in the service improvement process. 3). Provide opportunities for customers to submit complaints. 4). Develop and implement accountable, proactive & partnership marketing according to the marketing situation.

Customer satisfaction can provide several benefits, including (Tjiptono, 2001). The benefits of customer satisfaction are:

a. Contribute to preparing the company to face competition.

b. The relationship between the company and its consumers becomes harmonious.

c. Can encourage the creation of consumer loyalty.

d. Forming word of mouth recommendations that benefit the company.

e. The company's big name becomes good in the eyes of consumers.

f. The profits obtained can increase.

The factors that influence customer expectations by Zeithaml in Tjiptono, (2006) are as follows:

a. Enduring Service Intensifiers

   It is a factor that is stable and encourages customers to increase their sensitivity to services. These factors include expectations caused by others and a person's personal philosophy about services. A customer will hope that he or she deserves to be served well if other customers are served well by the service provider.

b. Personal Needs

   The needs that a person feels are fundamental to his well-being also determine his hopes. These needs include physical, social and psychological needs.

c. Transitory Service Intensifiers

   This factor is a temporary (short term) individual factor that increases customer sensitivity to services. These factors include:

   1. Emergency situations when customers really need services and want the company to help them.

   2. The last service consumed by a customer can also be a reference for determining whether the next service is good or bad.

d. Perceived Service Alternatives

   It is a customer's perception of the level or degree of service of other similar companies. If consumers have several alternatives, then their expectations for a service tend to be greater.

e. Self-Perceived Service Roles

   This factor is the customer's perception of the level or degree of involvement in influencing the services they receive. If the consumer is involved in the process of providing services and the service turns out to be not very good, then the customer cannot blame the service provider entirely. Therefore, this perception of the degree of involvement will influence the level of service or service that they are willing to receive.

f. Situational Factors

   This factor consists of all possibilities that can affect service performance, money is beyond the control of the service provider.

g. Explicit Service Promises

This factor is a statement (personal or non-personal) by the organization about its services to customers. This promise can be in the form of advertising, personal selling, agreements or communication with the organization's employees.

h. Implicit Service Promises

This factor concerns instructions related to services, which provide conclusions for customers about what services should and will be provided. Instructions that provide an overview of this service include the costs to obtain it (price) and the means of supporting the service.

i. Word of Mouth (Recommendations or suggestions from other people)

Word of Mouth is a statement (personal or non-personal) conveyed by someone other than the organization (service provider) to the customer. This word of mouth is usually quickly accepted by customers because those who convey it are those they can trust, such as experts, friends, family and mass media publications. Apart from that, word of mouth is also quickly accepted as a reference because service customers usually find it difficult to evaluate services that they have not purchased or have not experienced themselves.

j. Past Experience

Past experience includes things that customers have learned or know from what they have received in the past.

2.1.4 Factors Affecting Customer Satisfaction

There are five main factors that companies must pay attention to in determining the level of customer satisfaction, namely:

1. Product Quality

   Customers will feel satisfied if the evaluation results show that the products they use are of high quality. Rational consumers always demand quality products for every sacrifice made to obtain the product. In this case, good product quality will provide added value in the minds of consumers.

2. Service Quality

   Service quality, especially in the service sector, customers will feel satisfied if they receive good service or that meets expectations. Satisfied customers will show the possibility of purchasing the same product again. Satisfied customers tend to provide perceptions of the company's products.

3. Emotional

   Customers will feel proud and gain confidence that other people will admire them if they use products from certain brands which tend to have a higher level of satisfaction. The satisfaction obtained is not due to product quality, but from social values or self-esteem which makes customers satisfied with a particular brand.

4. Price

   Products that have the same quality but set relatively cheap prices will provide higher value to customers.

5. Cost

   Customers do not need to incur additional costs or do not need to waste time to get a product or service and tend to be satisfied with that product or service. Customer expectations can be shaped by past experiences, comments from their relatives and the promises and information of marketers and rivals. Satisfied consumers are loyal longer and give good comments about the company.

2.1.5 Customer Satisfaction Measurement Model

In essence, measuring the quality of a service or product can be obtained through measuring customer satisfaction which is shown through the variables of customer expectations and perceived performance (Tjiptono, 2001). Kotler (1997:95) explains that services can be ranked according to customer importance and company performance.

There are several methods used to measure the level of customer satisfaction (including competitors' customers). One of them is the method developed by Kotler (2002) which suggests 4 measurement methods, namely as follows:

a. Complaint and suggestion system

   Every customer-oriented company needs to provide as wide an opportunity as possible for customers to convey their suggestions, opinions and complaints. The media used can be in the form of suggestion boxes, postal comment cards, special telephone lines (hotlines) and so on. The information obtained through this can provide new ideas and valuable input for the company and can provide a fast and responsive response to problems that arise. The weakness of this method is that it tends to be passive, making it difficult to get a complete picture of customer satisfaction and dissatisfaction. Not all dissatisfied customers complain, perhaps they immediately switch suppliers and will not use the company's services. Efforts to obtain suggestions (especially quality

suggestions) from customers are also difficult to realize using this method, especially if the company does not provide adequate feedback for customers who have taken the trouble to "think" by contributing ideas for the good of the company.

b. Customer satisfaction survey

   Researchers who use survey methods can do so via post, interviews (in person or via telephone). The company will obtain responses and feedback directly from customers and at the same time provide a positive signal that the company pays attention to customers. Measuring customer satisfaction through this method can be done in various ways, including directly reported satisfaction (respondents are asked to convey directly whether they are satisfied or not on a certain scale), revised dissatisfaction (respondents are asked to convey the magnitude of their expectations and the magnitude of their perceived performance), problem analysis (respondents are asked conveying the problem in the offer and suggestions for solutions) and importance performance analysis (respondents were asked to rank the company's performance on each attribute).

c. Ghost shopping

   This method is implemented by employing several people (ghost shoppers) to act as customers or potential buyers of the company's products and competitors' products, then convey their findings regarding the strengths and weaknesses of the company's products and competitors' products based on their experience. Apart from that, ghost shoppers observe and assess the way the company answers customer questions and handles any complaints.

d. Lost customer analysis

   The company tries to contact its customers who have quit or switched to competing companies, in the hope of obtaining information on the cause of this. This information is very useful for companies to take further policies in order to increase customer satisfaction in the hope of becoming loyal customers.

2.1.6 Service Quality (Servqual) Dimension

Wijaya (2011) SERVQUAL is an instrument developed with a choice of scales that are concise but have a fairly high level and truth that can be used by company management to better understand consumer perceptions and consumer expectations of the services provided. Customer expectations are considered to play an important role as a standard of comparison in evaluating the quality of services provided. The quality measurement method is carried out by comparing the values of variables that influence consumer expectations of a service quality

with consumer perceptions, so that it can be seen whether there is a match between consumer expectations and perceptions.

In the servqual method there are ten main factors or servqual dimensions that most determine service quality (Parasuraman et al. 1988), namely:

1. Tangible (physically real things), for example, floors, staff uniforms, layout of goods, interior.
2. Reliability (consistency, dependability), for example, promises kept, product quality, product cleanliness, opening hours, working without chatting.
3. Responsiveness (responsiveness, responsibility), for example staff's quick and creative response to requests or problems faced by consumers.
4. Competence (capable, expert, skilled), for example, staff who are skilled at work and master product knowledge.
5. Credibility (trustworthiness), for example honesty, trustworthiness.
6. Courtesy (respect), for example the politeness of staff.
7. Security (security), for example consumers feel free from danger, risk/doubt, no danger, feel safe physically and financially.
8. Access (easy to reach, contact), for example staff are easy to contact, managers are easy found, consumers do not have to wait long.
9. Communication, for example understandable language, correct information about service.
10. Understanding the customer, for example staff understand needs customers, matters relating to the personal concerns of consumers.

The service dimensions above were then summarized into five servqual dimensions by Parasuraman.et al: namely tangible, reliability, responsiveness, assurance and empathy.

Parasuraman et al (1990), stated that service quality is a function of customer expectations at pre-purchase, in the process of providing the quality received and in the quality of output received. Service quality is defined as a concept that accurately represents the core performance of a service, namely a comparison of reliability in service counters carried out by customers. In further research, Zeithaml et al (1990), identified and summarized ten dimensions of service quality into five dimensions, namely:

1. Tangibles (direct evidence)

   It is a physical manifestation of reality which includes facilities, equipment, employees and means of information or communication.
2. Reliability

   It is the ability to provide promised services promptly, accurately and satisfactorily.

3. Responsiveness

It is the staff's desire to help customers and provide services that are responsive and caring about customer complaints or expectations.

4. Assurance

It is such competence that it provides a sense of security from danger, risk or doubt and certainty that includes the knowledge, politeness and trustworthy attitude of staff.

5. Empathy

It is the nature and ability to provide full attention to customers, ease of contact, good communication and understanding individual customer needs.

Servqual is an effective tool for measuring the level of customer satisfaction by measuring the five dimensions of customer satisfaction. This model consists of two parts, where the first part contains customer expectations for a service class, and the second part is the customer's perception of the service received. A score for service quality is calculated from the difference between the rating values given by customers for a pair of expectation and perception statements.

Service quality is measured from each of the dimensions above by calculating the variable G which describes the difference or gap between customer perceptions of the services provided and customer expectations.

According to Tjiptono (2011), the Servqual instrument is widely applied in various companies because it has a number of advantages, namely:

1. The Servqual instrument has developed into a kind of standard for assessing various dimensions of service quality
2. Various studies have shown that the Servqual instrument is valid for a variety of service contexts.
3. Research also indicates that the servqual questionnaire is reliable, meaning that the statements can be interpreted the same by different respondents.
4. The Servqual instrument meets the parsimony criteria, because it only consists of 22 items, so it can be filled in quickly by respondents.
5. The Servqual instrument has standard analysis procedures that make it easier to interpret the results.

SERVQUAL is used to calculate the gap between consumer perceptions of services and expected value. The value of the difference between consumer expectations and perceptions that has a positive value indicates that the service perceived by consumers is in line with expectations, whereas if it is negative, it indicates that the quality of service perceived by

consumers is not in accordance with expectations.

The following is the SERVQUAL equation according to Zeithmal et al (in Tjiptono, 2005).

G = P (Perceived Service) – E (Expected Service)

Notes:

G = Service quality gap value

P = Perception of delivered service

E = Expectation of service

If the gap is positive (perception > expectations), then the service is said to be satisfactory.

If the gap is zero (perception = expectation), then the service is said to be quality and satisfying.

If the gap is negative (perception < expectation), then the service is said to be of poor quality and unsatisfactory.

The flowchart simulation can be depicted as in Figure 2.1.

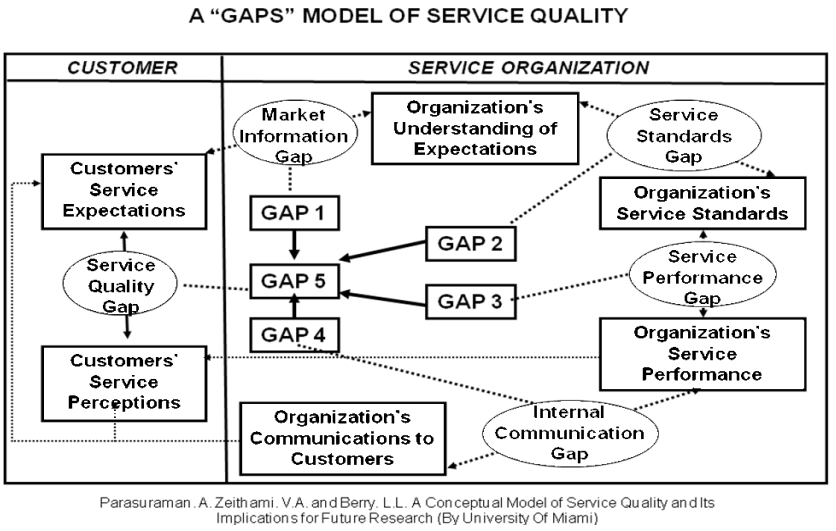


Figure 2.1. Method According to Zeithaml, Parasuraman, and Berry (1990, p.19-20)

The service quality model in the picture above identifies 5 (five) gaps that cause service failure, namely:

1. Gap 1: The gap between customer expectations and company management perceptions. Management does not always understand exactly what consumers want and how consumers assess each component of the service, as a result management does not know how a service should be designed, and what supporting/secondary services consumers want. For example, catering managers may think that their customers prioritize the timeliness of food delivery, even though these customers may pay more attention to the variety of menus served.

2. Gap 2: The gap between company management perceptions and service quality specifications.

   This gap occurred as a result of an error in translating the company management's inaccurate perception of the company's customer expectations into the form of service quality specifications. Management may be correct in understanding customer desires, but incorrect in setting specific implementation standards.
3. Gap 3: The gap between service quality specifications and service delivery to customers.

   The existence of this gap is caused by the inability of human resources to meet service quality standards. There are many factors that influence the provision of services, where there may be differences between the workload given and the skills possessed, which will result in different results from what was planned.
4. Gap 4: Gaps in service delivery to customers and external communication.

   Consumer expectations are influenced by service providers through communication. It will be a problem if the consumer's expectations are different from the actual situation, resulting in consumer disappointment.
5. Gap 5: The gap between customer expectations and the reality of the service received.

   This gap arises if customers measure performance/achievement in different ways or may also misperceive the quality of the service.

From the definition of each gap as described above, gap 5, namely the gap between the services received and the services expected, is the main point of concern. The service quality of a company in the five points summarized by Parasuraman et al. can be calculated for all respondents, by calculating the average Servqual score for statements that reflect each dimension of service quality. The average Servqual score can also include the relative importance of dimensions in the eyes of customers, by assigning weights to each dimension, so that a weighted average is obtained.

Furthermore, the data obtained through the Servqual instrument can be used to calculate service quality gap scores at various levels in detail, item by item analysis, dimension by dimension analysis, and calculating a single measure of service quality or Servqual Gap. Through analysis of these various gap scores, service companies can not only assess the overall quality of their services as perceived by customers but can also identify key dimensions and aspects within each dimension that require quality improvement.

The Servqual score, which is the gap score between the correctness (perception) value and the incorrectness (expectation) value, can help to diagnose where performance

improvement is targeted. Gap scores with high negative values receive priority for improving their performance. On the other hand, if the gap score is positive, it can be seen that there is excess (over-supply) in providing treatment for that item or attribute. This can be an evaluation for redeploying resources to improve items or attributes that have low performance.

2.1.7 Neutrosophic AHP

Neutrosophic, as a concept, was born as a solution to the challenges of uncertainty, ambiguity and incomplete information that are often encountered in various fields of science. As stated by Smarandache (1999), this concept is based on accepting these three elements not as obstacles, but as realities that must be managed and understood. The creation of Neutrosophic can be traced back to the work of Smarandache, who felt that traditional, fuzzy logic was insufficient to handle the complexity of uncertainty in real-world reality. Through a Neutrosophic approach, Smarandache argues that we can understand uncertainty in a more holistic way.

Combining Neutrosophic with Analytic Hierarchy Process (AHP), we get Neutrosophic AHP. Saaty (1980), the founder of the AHP method, stated that his method focuses on solving complex multi-criteria problems. With Neutrosophic integration, AHP now allows evaluation with three scales: correctness, incorrectness and uncertainty, providing greater depth in analysis. In Neutrosophic AHP, evaluation is no longer limited to the degree of certainty alone. As explained by Wang et al. (2010), evaluations can also include levels of uncertainty and contradiction, providing an additional layer of information for decision makers.

One of the main challenges in decision making is uncertainty. Neutrosophic AHP offers a solution by introducing uncertainty as a decision parameter. According to Wang et al. (2010), this approach provides a more realistic and inclusive picture of a situation, allowing for more informed decisions. In the face of ambiguity, Neutrosophic AHP offers clarity by allowing evaluation to cover areas typically overlooked in traditional methods. This, as explained by Atanassov (1986), expands the analytical capacity of the method and allows more adaptive solutions. Often, decision makers are faced with incomplete information. With Neutrosophic AHP, as emphasized by Liu (2012), we not only identify areas of missing information but also understand the potential impact of such incompleteness.

The Neutrosophic AHP method has a number of advantages. First, as explained by Wang et al. (2010), it provides a more adaptive tool in dealing with uncertainty. Second, this method increases transparency and communication among stakeholders. Although it offers many advantages, Neutrosophic AHP is not without disadvantages. According to Liu (2012), the additional complexity introduced by uncertainty can complicate the decision-making

process. Additionally, understanding and implementing this method requires a deep understanding of Neutrosophic concepts.

Neutrosophic AHP, with its unique approach to dealing with uncertainty, ambiguity, and incomplete information, offers a powerful tool for decision making in the current era of complexity. Despite its weaknesses, the advantages it offers make it worthy of consideration for researchers and practitioners.

2.1.8 Quality Function Deployment

The Quality Function Deployment (QFD) method originates from Japan, introduced by Yoji Akao in 1966. The QFD method was first used in a Japanese supertanker company called Kobe as a way to expand and apply the views about quality taught by Deming. Then it was further developed by the Japanese automotive industry, especially Toyota, which achieved great success using QFD. The success obtained by Japanese companies encouraged American (US) companies to start using the QFD method. The use of QFD has since begun to spread even outside the automotive industry (Hales et al. 1990). QFD comes from Japanese which consists of three words which have meanings: (1) Hinshitsu which means "quality", "features", "attributes", or "qualities" (2) Kino which means "fuction" or "mechanization" and (3) Tenkai which means "deployment", "diffusion", "development" or "evolution" so that in English it is translated as Quality Function Deployment (QFD).

According to Yoji Akao (1966), QFD is a method used to process products or services that are tailored to the desires of consumers or customers (Voice of Customer or VoC). Meanwhile, according to Cohen (1995), the QFD method is in principle an effort made to translate what consumers want into what the company produces. By involving consumers, it is possible to obtain innovative responses to these desires, improve production processes and prioritize consumer desires based on the level of importance adjusted to the company's technical characteristics.

The definition of QFD according to Render and Heizer (2005: 214) is a process of determining customer desires (what) and translating them into attributes (how) so that each functional area can understand and implement them.

Uselac (in Goetsch and Davis, 1997: 485) says that Quality Function Deployment is the practice of designing a process in response to consumer needs. Quality Function Deployment translates what consumers want into what the organization produces. This enables

organizations to prioritize consumer needs, find innovative responses to each, and improve processes to maximize effectiveness.

Besterfield (2003: 315) defines Quality Function Deployment as a planning tool used to meet customer expectations. Quality Function Deployment is an approach to product design, development, production and in-depth evaluation of a product.

Quality Function Deployment was developed to guarantee that products entering the production stage will truly satisfy customer needs by establishing the required level of quality and maximum suitability at each stage of product development (Giorgio Merli in Goetsch and Davis, 1997: 163).

The main focus of Quality Function Deployment is involving consumers in the product or service development process as early as possible. The underlying philosophy is that customers will not be satisfied with a product, even if it is a product that has been produced perfectly, if they do not really want or need it (Tjiptono and Diana, 2003: 113).

The use of QFD in the product design and development process will help management gain a competitive advantage through the process of creating product or service quality characteristics and attributes that can increase customer satisfaction.

QFD uses one or a number of matrices called House of Quality, which display customer desires and satisfaction (voice of customer), as well as technical characteristics to fulfill customer desires and satisfaction. QFD will produce a series of priorities or targets that will be used to satisfy customer desires.

From the descriptions above, several key things can be concluded regarding the QFD concept, namely:

1. Is a planning process, not a tool for problem solving or analysis.
2. The input is the customer's wants and needs.
3. Use a matrix format to record important information.
4. Allows analysis and determination of prioritized matters.
5. The output is the main actions that can increase customer satisfaction based on input from customers.

There are three main benefits that companies can obtain when using the QFD method, namely:

1. Reduce costs

   This can happen because the products produced are truly in accordance with customer needs and expectations, so there is no repetition of work or disposal of raw materials because they do not comply with the specifications set by the customer. Cost reduction can be achieved by reducing costs, purchasing costs, reducing overhead costs or reducing wages, simplifying production processes, and reducing waste.
2. Increase income

   By reducing costs, the results we receive will increase. With QFD the products or services produced will better meet customer needs and expectations
3. Reduction of production time

   QFD is an important key in reducing production costs. QFD will allow the product or service development team to make decisions early in the development process. There are several ways in which QFD can reduce production costs, including: QFD reduces changes, QFD helps reduce production costs due to repetition of activities.

Other benefits that can be obtained from implementing QFD also include:

1. Customer focused

   Obtain input and feedback from customers regarding customer needs and expectations. This is important, because an organization's performance cannot be separated from its customers, especially if competitors also do the same thing. The information is then translated into a specific set of customer requirements. The performance of the organization and competitors in meeting these requirements is studied carefully. In this way the organization can find out the extent to which the organization itself and its competitors meet customer needs.
2. Time efficient

   Reduce product development time. By implementing QFD, the product development program will focus on customer needs and expectations. Therefore, there is no waste of time developing product features that provide little or no value to customers.
3. Team oriented

   Using a group-oriented approach. All decisions are based on consensus and involvement of everyone in discussions and decision making using brainstorming techniques. Because every action that needs to be taken is identified as part of the process, each individual understands their most appropriate position in the process, so that in turn this encourages stronger teamwork.

4. Documentation oriented

   Using data and documentation that contains all processes and all customer needs and expectations. One of the products resulting from the QFD process is a comprehensive document regarding all data related to the existing process and its comparison with customer requirements. This document changes constantly whenever new information is learned, and old information is discarded. Up-to-date information regarding customer requirements and internal processes is very useful if turnover occurs.

The full application of the QFD method consists of the following steps:

1. Determine the voice of the customer (customer voice/Customer Requirements).
2. Customer surveys to obtain importance ratings and competitive evaluations.
3. Create a customer position matrix (customer portion).
4. Create a technical position matrix (technical portion).
5. Analyze the matrix and select attributes that receive priority.
6. Compare the proposed design concepts and choose the best one.
7. Create a part planning matrix for priority design requirements.
8. Create a process planning matrix for priority process requirements.
9. Create a manufacturing planning chart.

The steps above form a four-phase model in the QFD methodology, known as the QFD Four-Phase Model, which consists of:

1. The first phase, namely product planning, starts with market research, collecting data from customers and will produce a product plan in the form of technical characteristics, whether in the form of ideas, sketches, concept models or marketing plans.
2. The second phase, namely design deployment, which begins with product planning which is developed into product specifications and components. At this stage the original form (prototype) of the product is created and tested.
3. The third phase, namely manufacturing planning, where the manufacturing process and production equipment are designed based on product specifications and components.
4. The fourth phase, namely production planning, the main aim of which is to produce plans regarding the control of the manufacturing process and production equipment used in making the product.

To obtain service priorities which are customer desires, this is done at the product planning stage using a matrix called the House of Quality (HoQ), which is a graphic image of the results of the planning process.

2.1.9 House of Quality

According to Day (1993), to find out company problems related to the product or service planning process involving consumers, the HoQ matrix is used. The HoQ Matrix is a structure built by information components from consumers and technical information owned by the company to plan a product or service. The HoQ matrix can be divided into two main components, namely the consumer part matrix and the company part matrix.

The consumer section of the matrix contains information from consumers obtained from survey results or consumer voices (Voice of Customer/Customer Requirements). This information is used to help companies plan services that suit consumer desires. This matrix is placed in the horizontal part of the HoQ matrix as in Figure, which consists of:

- Customer desires (Voice of Customer/Customer Requirement), namely what consumers want regarding services.
- Customer interest level (customer performance level), namely consumer opinions regarding services based on level of interest.
- Customer satisfaction level, namely the consumer's opinion regarding the level of satisfaction with the services provided by the company.
- Evaluation of customer competition (customer competitive assessment), namely comparing the level of consumer interest in the services of competing or similar companies.

The matrix of consumer interest level, consumer satisfaction level, evaluation of consumer competition, company target value for each consumer desire, improvement ratio, sales value, and weighting value is also called the planning matrix.

Table 2.1 Customer Section HOQ matrix

A		B	C	D
Customer Desires		Customer interest level	Level of Customer satisfaction	Evaluation of Customer Competition

The company section matrix, contains technical information placed in the vertical section of the HOQ matrix as in Figure 2.2 which consists of:

- Technical correlation matrix, is a matrix of relationships between technical characteristics and is placed at the top of the HOQ matrix.
- Technical characteristics (technical/Design Requirements), describe how the company responds to consumer desires by using technical characteristics determined based on consumer voices.
- Interrelationship matrix, used to record the strength of the relationship between consumer desires and the company's technical characteristics.
- Technical targets, are targets for each technical characteristic to respond to consumer desires. The company determines targets based on recommended specifications for services. Determining service specifications is based on a reflection of consumer desires, competition and market needs.
- Technical competitive assessment is the result of an evaluation of the company's technical characteristics. This evaluation is used to see whether the company can win the competition.
- Priority, where based on the interrelationship matrix the priority order of the company's technical characteristics can be determined. To determine the order of service priority based on the company's technical characteristics, it is determined by calculating the largest to smallest score values. The technical characteristics with the highest scores are the first priority that the Company must pay attention to.

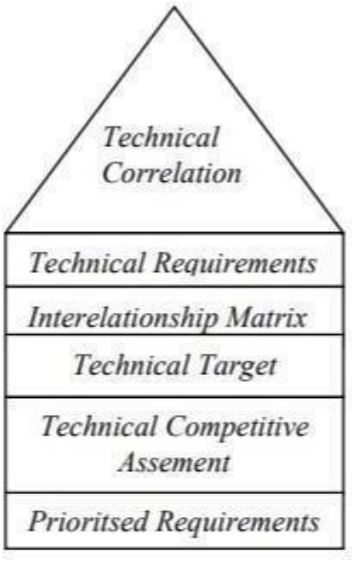
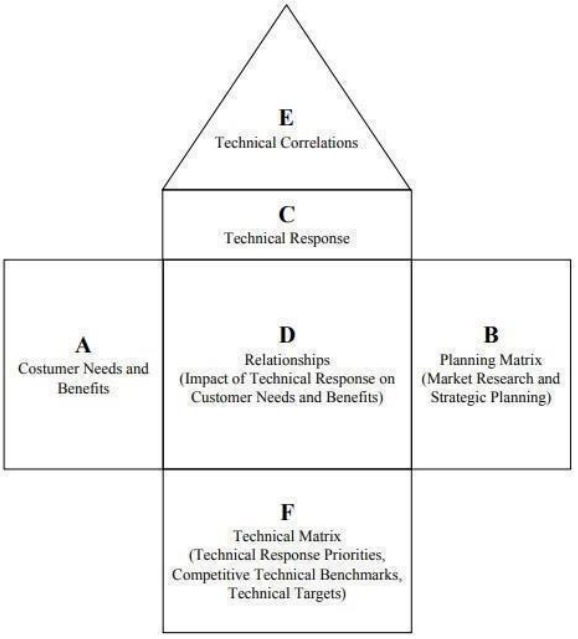


Figure 2.2 HOQ Matrix of the Company's technical information section



(*Sumber : Lou Cohen, 1995, Quality Function Deployment*)

Figure 2.3 House of Quality Matrix

The steps that need to be taken in creating a House of Quality are as follows:

1. Identify the voice of the customer

   The voice of the customer (Customer Requirement) is the main input for the HOQ creation process. From customers it is obtained what customers actually need and want in the products/services offered. These data were obtained through surveys. The steps regarding conducting the survey are discussed in the data collection sub-chapter.
2. Create a customer information matrix

   The customer information matrix or customer table is the horizontal part of the HOQ matrix. The stages in preparing the matrix are as follows.
   - Determine a list of customer desired attributes (customer requirements).
   - Identifying the level of importance.
   - Evaluate the products/services (customer competitive evaluation) offered by the company for each attribute the customer desires, which is expressed in the level of customer interest (customer rating).

The data for carrying out the first two stages was obtained from the results of the survey carried out in the previous step, while for the third step the processed data contained in the importance level table and competitive evaluation table were used.

3. Create a technical requirements matrix

In completing this technical information table, the design team can follow the following steps:

- Identify the technical responses required to fulfill customer desires. Technical response is a design characteristic that describes customer needs and desires expressed in the language of designers and engineering. In essence, the technical response is "HOWs" with which the company will respond to the "WHATs" attributes of customer desires.
- Determine the relationship between technical responses and customer requirements.
  This relationship is determined by the QFD team itself because the aspects assessed cannot be understood by lay people. The types of relationships contained in this matrix are:
  1. Strong relationship (●) is a relationship that occurs when technical responses as things that the company does, are very closely related or greatly influence the fulfillment of customer desires. The weight of strong relationships is given a value of 9.
  2. Medium relationship (○) is a relationship that occurs when the technical response is closely related to or influences the fulfillment of customer desires. Medium relationship weight is given a value of 3.
  3. Weak relationship (Δ) s a relationship that occurs when the technical response does not really influence the fulfillment of customer desires. The weight of the weak relationship is given a value of 1.
- Calculate the technical response weight value
  Technical response assessment is calculated based on the level of connection between technical responses to customer desires and level of importance. Technical response weight is a measure that indicates technical responses that need to receive attention or be prioritized in relation to fulfilling customer desires. This priority depends on absolute importance (AI) and relative importance (RI). Absolute importance is an indication that shows the customer's most important desires, which must be immediately fulfilled by the company in relation to technical matters. Meanwhile, relative importance is a figure in cumulative percent.
- Determining the direction of development
  The direction of development (DOI) is the direction of changes that the company must make to its technical response in order to increase customer satisfaction. The symbols used in the development direction space are as follows:

a. ↑, this symbol is given to a technical response that will increase customer satisfaction if it is bigger, taller, heavier or in short "more".
b. ↓, this symbol is given to a technical response that will increase customer satisfaction if it is smaller, shorter, lighter, or in short "less".
c. (○), this symbol is given to a technical response that will provide customer satisfaction if it is within a certain target (value range).

- Determining technical correlation technical correlation is an interrelated relationship between each technical response. The relationship to the technical correlation is:
    1. Strong positive relationships

       This is a relationship where if one of the technical response items experiences an increase or decrease, it will have a strong impact on the increase or decrease of the related item. This relationship is a unidirectional relationship, that is, if one item increases, other related items will also increase.
    2. Positive relationships

       This is a unidirectional relationship where if one technical response item experiences an increase or decrease, it will cause an increase or decrease in other related items.
    3. Negative relationship

       This is a relationship in the opposite direction, that is, if one technical response item increases, it will cause a decrease in other related items.
    4. Strong negative relationship

       This is a strong opposite-direction relationship, that is, the impact of increasing one item on the technical response is very strong on decreasing other related items.

Not all items from the technical response will be related or have an influence on other technical response items, so there is a possibility that the column will be empty.

4. Determine the target

From the technical response and evaluation, the company then determines the target it wants to achieve, namely determining the technical response that can fulfill customer desires. This target is determined based on the same value scale as the technical response evaluation or can also be a description of the action to be taken.

2.1.10 Part Planning Matrix (Part Deployment)

In this second house, the technical requirements chosen to be developed into a more technical design are called critical parts. Imam Djati (2003) explains that in determining critical parts, a

previous concept analysis needs to be made. In the concept analysis of the criteria which are details of customer needs, namely:

a. Customer needs from QFD are based on HOQ, technical needs are determined that allow for improvement.
b. Needs in terms of service.
c. Needs from the general characteristics of the services required by customers.

In the details of these needs, the needs that are important and related to customers and that the company is able to fulfill still need to be selected. The parts contained in the deployment part are technical requirements which contain target technical requirements which contain technical requirements and targets of critical parts obtained from the developed fault tree analysis, column weight which contains the relationship between technical requirements and critical part requirements which, if connected strong is worth 9, if moderate is worth 3 and if weak is worth 1.

Fault Tree analysis is used to identify critical parts by looking for elements that are predicted to cause non-compliance with the Technical Requirements. The general form of the part deployment matrix consists of parts as shown in the figure 2.4 below:

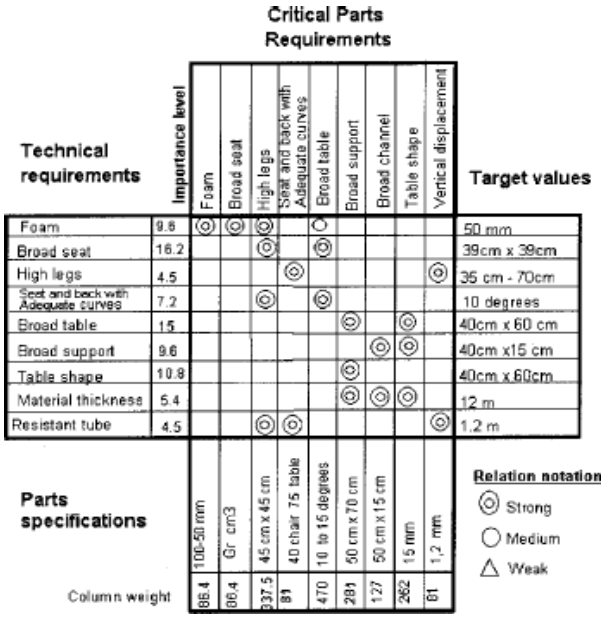


Figure 2.4 Part Deployment Matrix

2.1.11 Validity Test

Validity is the level of ability of an instrument to reveal something that is the main target of measurements carried out with that instrument (Hadi, 1991). A questionnaire is said to be valid

if the questions in a questionnaire are able to reveal something that will be measured by the questionnaire. Attribute validity analysis aims to test whether each question attribute has revealed the factors to be investigated according to the conditions of the population. An attribute is said to be valid if the correlation between the attribute and the factor is positive and r count > r table. Testing of the validity of the items in this research was carried out using the Pearson Product Moment Correlation test (validity test application using SPSS software).

2.1.12 Reliability Test

This test is used to measure the consistency of respondents' answers or responses to all the question items asked. Hadi (1991) said that a reliability test is used to show the extent to which a measuring instrument (instrument) can show stability or stability of observation results when measured with that instrument in the following time with constant conditions where when measured there is no change. Reliability means that no matter how many times the questionnaire attributes are asked to different respondents, the results will not deviate too far from the average respondent's answer for that attribute. Similar to the validity testing above, this reliability testing was also carried out using SPSS software.

2.1.13 Integration of Servqual, Neutrosophic AHP and QFD

The integration between the SERVQUAL, Neutrosophic AHP, and QFD methods aims to combine the strengths of each method to gain a more comprehensive understanding of service quality and prioritize necessary improvements. The combination of Servqual and Neutrosophic is indeed useful for identifying strong attributes and weak attributes, as well as classifying these attributes. This information is useful for making efforts to improve and improve the quality of these attributes. And furthermore, to determine the degree of correctness, incorrectness and uncertainty of the attributes. However, efforts to improve and improve the quality of these attributes cannot be carried out systematically and operationally, because the combination of Servqual and Neutrosophic does not provide the tools for this. Therefore, the combined integration of Servqual and Neutrosophic into QFD will be able to overcome these weaknesses. Through HOQ from QFD, attributes can be linked which are customer requirements and the organization's technical response. The combined integration of Servqual and Neutrosophic into QFD will provide systematic and operational steps in efforts to improve and improve the quality of these attributes. The following is an explanation of the integration and its stages:

1. SERVQUAL

   Identifying customer desires by using 5 dimensions of service quality for existing services in the company.

2. Neutrosophic AHP (Analytic Hierarchy Process)

   Uses enhanced AHP methods with neutrosophic logic to prioritize various aspects of services taking into account uncertainty and ambiguity. The stage is to determine the evaluation criteria and sub-criteria that have been obtained from the servqual method, then calculate each question item by considering 3 assessments, namely correctness (perception), incorrectness (expectation) and uncertainty. Using neutrosophic logic with the sum weight of the three assessments being 1.

3. QFD (Quality Function Deployment):

   Transform customer needs and expectations into technical specifications and improvement recommendations. The stages are determining what the customer wants (usually using output from SERVQUAL), determining how these needs can be met in the form of technical specifications, using the HOQ matrix to link customer needs with technical specifications. Prioritize technical specifications based on weights obtained from Neutrosophic AHP. Integration and Stages:

   1. Identifying Customer Needs: Use SERVQUAL to find out the gap between customer perceptions and expectations about service.
   2. Priority Determination: After knowing the gaps from SERVQUAL, use Neutrosophic AHP to determine improvement priorities by considering uncertainty and ambiguity in the assessment.
   3. Translating Requirements into Technical Specifications: Use QFD to transform prioritized customer needs and expectations into technical specifications or improvement recommendations.

The steps for integrating Neutrosophic and Servqual into QFD include identifying service attributes which are the Voice of Customer/Customer Requirements. This information was obtained through interviews and understanding their complaints. After that, the level of satisfaction and importance of the attributes identified in the first step can be collected. The level of satisfaction can be calculated by multiplying the difference between the customer's correctness (perception) and incorrectness (expectations) by the level of importance.

2.2 Inductive Review

This research uses several references from several sources which are summarized in an inductive study. Inductive studies contain summaries of research that has been conducted with topics and methods that are relevant to the research to be conducted. This inductive study was carried out in order to find out the differences between research that has been carried out and research that will be carried out and to find out the results of research that has been carried out using similar methods. The following is a summary of previous research using similar methods, namely Service Quality, Neutsosophic AHP and Quality Function Deployment which are used as references in this research:

Research conducted by Lukman & Wulandari (2018) entitled "Peningkatan Kualitas Produk Cokelat dengan Integrasi Metode Kano dan QFD". The aim of this research is to find out the attributes of chocolate products that consumers want and provide suggestions for improving quality. The methods used in this research are the Kano method and QFD. Kano aims to determine the attributes of chocolate products that suit consumer desires. QFD aims to provide development priorities. The results of this research show that there are 23 attributes that consumers desire and 11 technical responses that are development priorities, including creating new packaging designs, inspecting the composition and quality of raw materials, choosing fonts that are easy for consumers to read, adding cashew filling and being active in carrying out promotion via Instagram. The conclusion obtained from this research is that it can prioritize efforts to improve the quality of chocolate products in accordance with consumer desires, where there are 11 technical responses that can be improved by the company.

Research on consumer satisfaction was also conducted by Ikrimah et al. (2018) with the title "Penerapan Metode Quality Function Deployment dalam Memenuhi Kepuasan Konsumen pada Industri Komponen Otomotif". The method used in this research is Quality Function Deployment (QFD) to analyze customer satisfaction. The purpose of this research is to find out what the hopes or expectations of customers from manufacturing companies, especially the automotive components industry, are, then improvements will be made to meet these customer expectations. The results of this research will be used to make improvements to Machine Capacity, material specifications, storage systems and process work instructions. The results of this study have found priority matters based on the House of Quality. Some priorities include making improvements to machine capacity, material specifications and storage systems and then continuing with work instructions processes. The conclusion obtained from this research is that to reduce customer claims regarding quality and delivery,

improvements must be made based on the House of Quality that has been created, namely machine capacity, material specifications, storage systems and work process instructions.

Desrina & Octavia (2018) have conducted a study which is used as a reference in this research, namely a study entitled "Servqual dan Conjoint Analysis Dalam House of Quality Untuk Layanan Ojek Online". The method used in this research is the integration of Servqual and Conjoint Analysis in QFD to determine customer needs attributes, identify online motorcycle taxi customer segments and technical responses as an effort to improve online motorcycle taxi services. The aim of this research is to determine the multilevel preferences of online motorcycle taxi customers and to see customer needs in a segment based on preferences segmentation. Preferences segmentation is carried out as an effort to survive in the era of customization. The results obtained from this research are that the combination of online motorcycle taxi service attributes as a whole according to customer needs is online motorcycle taxi attention, information system (application), waiting time for arrival, completeness of attributes when driving, as well as security and safety guarantees. Overall, the technical responses that need to be made to achieve customer needs are additional complaint facilities, increased operational time and improved communication procedures with customers. The conclusion obtained in this research is that the order of criteria for online motorcycle taxi services that are customer needs based on relative importance and utility values is the attention of online motorcycle taxi officers, the service information system (application), waiting time between arrivals, completeness of motorbike attributes, security and safety guarantees.

The next research used as a reference is research conducted by Jatmika et al. (2018) with the title "Usulan Perbaikan Kualitas Layanan Maskapai Penerbangan Menggunakan Integrasi QFD dan Model Kano". This research uses the Quality Function Deployment (QFD) method and the Kano Model to determine consumer expectations regarding service quality and the extent of Airline X's service quality according to consumers. The aim of this research is to formulate quality improvement recommendations for Airline Next, technical characteristics that are relevant to the requirement attributes will be identified. The technical characteristics that have been prioritized will become a guide for recommendations for improvement. The results of this research are 30 airline X service attributes that can be identified using the Servqual dimensions. Furthermore, based on Servqual data processing, 14 attributes were obtained that did not meet customer expectations or were still below consumer expectations. Identifying the service attributes of airline, the conclusion obtained from this research is that corrective steps that can be taken by airline which has technology and is up to date on aircraft.

Research conducted by Annisa et al (2023) with the title "Intuitionistic Fuzzy AHP and WASPAS to Assess Service Quality in Online Transportation". The aim of this research is to propose the integration of Interval Valued Intuitionistic Fuzzy Analytical Hierarchy Process (IVIF-AHP) to determine criteria weights and Interval Valued Intuitionistic Fuzzy Weighted Aggregated Sum-Product Assessment (IVIF-WASPAS) to assess the service quality of several online transportation. The method used in this research is Multi Criteria Decision Making (MCDM) as an assessment of the service quality of online transportation service providers and uses the Pandemic-SERVQUAL 4.0 model. The Pandemic-SERVQUAL 4.0 model adds two new criteria, namely "pandemic" and "industry 4.0". The results of this research, namely IVIF-WASPAS, were used to rank alternative online transportation service providers, namely Gojek, Grab, and Maxim. Grab occupies the first position as an online transportation service provider during the pandemic, while Maxim occupies the last position. The conclusion obtained from this research is that the quality of service using IVIF-AHP and IVIF-WASPAS integration, the ranking of online transportation service providers in the new normal era is Grab-car, Go-car, and Maxim-car.

Research on Service Quality and Neutrosophic AHP was conducted by Bahar Yalcin et al (2021) with the title A three-level framework to evaluate airline service quality based on interval valued neutrosophic AHP considering the new dimensions. The aim of this research is to measure the quality of aviation transportation services which are increasingly popular compared to other types of transportation so that competition is increasing. To compete in the market and improve the quality of its services, a company must know its customers well and make improvements by analyzing their expectations correctly. The method used in this research is Servqual, which is one of the tools that is often chosen and is effective in measuring service quality. However, it is impossible to handle the impact of radical changes such as technological developments and transformations, events and trends under world influence with conventional Servqual methods. For this reason, the traditional method consisting of five dimensions was expanded to nine dimensions by adding four more dimensions, namely Environment, Pandemic, Digital Technology and Information Systems. The Modified Delphi Method was also applied to the main criteria evaluated using the Best Worst Method and sub-criteria evaluated using the Interval-Valued Neutrosophic AHP. The results indicate that airline companies should focus on many points at the same time and every important criterion needs to be met. In the evaluation, the main criterion with the highest importance was found as Pandemic. It shows that airline companies need to improve the sub criteria for the Pandemic

for better service quality. Criteria such as inflight hygiene conditions, fast ticketing and fast baggage delivery will be important for passengers. Conclusion is the proposed methodology can be used to evaluate the quality of services in airline companies. The proposed methodology can also be applied for different types of transportation; such as public transportation.

Another research that also discusses Neutrosophic AHP is research by Karasan et al (2022) with the title Customer-oriented Product Design Using an Integrated Neutrosophic AHP & DEMATEL & QFD methodology. This research aims with the increasing product variety, companies aim to become better than their competitors by providing a superior product developed with a customer-oriented product design approach and a quality strategy. In order to achieve this, companies should well understand customer expectations and quickly be able to convert these expectations to technical characteristics. The method used in this research is the Quality Function Deployment (QFD) approach which uses the neutrosophic AHP and neutrosophic DEMATEL principles which have been designed and implemented in the manufacture of car seat designs. In this approach, neutrosophic AHP is used to give weight to consumer needs. Meanwhile, interactions between technical specifications are identified through neutrosophic DEMATEL with the aim of designing consumer-focused products, while considering uncertainty and ambiguity in data as well as uncertainty in decision making. The results of this research show that seat height is the most important technical characteristic, followed by vertical range and horizontal range.

The next research used as a reference is research conducted by Serkan and Semih (2019) with the title An Innovative and integrated approach based on Servqual, QFD and FMEA for service quality improvement: A case study. The aim of this research is to propose an innovative and integrated approach based on service quality measurement (SERVQUAL), quality function deployment (QFD) and failure modes and effects analysis (FMEA) for service quality improvement. The methods used are The SERVQUAL scale is used for service quality measurement, QFD is used for service design and FMEA is used to prevent possible failures during service delivery. The results of this study show that the proposed approach can be used effectively to assess service quality in practice as seen from a case study in a public hospital in Turkey conducted to show how the proposed approach works in practice. The conclusion of this research is that service quality has become an important issue for service enterprises facing a fiercely competitive environment to provide sustainability.

Khorsidi et al (2016) also discussed service quality with research entitled Statistical Process Control Application on Service Quality Using Servqual and QFD with a case study in trains' services. The aim of this research is to implement statistical process control (SPC) in service quality using three-level SERVQUAL, quality function deployment (QFD) and internal measure. The method used in this research is QFD which is used to translate the importance weights of the SERVQUAL dimensions obtained from the Analytic Hierarchy Process into internal measures. Furthermore, the Tolerance Zone limits are used to determine service quality specification limits based on normal distribution characteristics. Control charts and process capability indices are used to control service processes. The results of this research are that SPC is used for service quality through a structured framework. Also, an adapted Servqual questionnaire was created to measure the quality of train's internal services. The conclusion of this research is that reliability is the most important dimension in internal services of train for the passengers. Also, the service process is not capable of performing at an acceptable level.

The reference for this research, which is a study using a similar method, is research conducted by Raziei et al (2018) with the title A Hybrid GDM-SERVQUAL-QFD Approach for Service Quality Assessment in Hospitals. This research aims to improve the quality of services in hospitals by proposing a hybrid approach that combines Group Decision-making (GDM), Service Quality measurement (SERVQUAL), and Quality Function Deployment (QFD). Uses QFD to translate patient needs into quality characteristics (derived from SERVQUAL), while taking into account the relationship between design requirements and quality characteristics. One important step in the QFD process is prioritizing quality characteristics from the patient's perspective. It is influenced by two uncertainties: human mental perception and patient heterogeneity. A newly proposed two-stage GDM approach is used to address these uncertainties. The proposed method was implemented in a general hospital. The research results obtained from this research are that the proposed methodology can increase the effectiveness of the quality characteristics that will be considered in QFD. The conclusion of this study is that the proposed methodology provides a framework for engineering professionals and managers in hospitals to assess and manage quality characteristics.

Further research was conducted by Apornak (2017) with the title Customer satisfaction measurement using SERVQUAL model, integration Kano and QFD approach in an educational institution. The aim of this research is to utilize the integration of QFD and the Kano model for identifying and classifying customers' needs with a focus on enhancing customer satisfaction.

The case study focuses on a semi-modern college. The method used is Utilizing QFD as an instrument, which provides descriptive information and expert advice for analyzing customers' demands and translating them into required productions. Implementing the Kano model to categorize customer needs into three categories: 'must be', 'attractive', and 'dimensional'. Integration of QFD and Kano to classify customers' needs. Application of this integrated method to a case study centered on a semi-modern college. The results of this research are The teaching method was identified as having the most significant relative weight compared to other factors. From a technical requirements perspective, using experienced teachers was categorized under the 'basic need' in the Kano model and was deemed the most crucial customer need compared to other needs. The conclusion is that by integrating the QFD and Kano models, organizations can more effectively identify and classify customers' needs, leading to the delivery of services and products that align with customer preferences. This approach has practical implications in various settings, such as educational institutions like the semi-modern college featured in the case study.

Miyoung et al (1998) conducted research entitled Quality function deployment: An extended framework for service quality and customer satisfaction in the hospitality industry. This research aims to Investigate service quality and customer satisfaction in the hospitality industry by considering not only customer aspects, but also intra-organizational service generation and delivery processes and also to explore the application of the Quality Function Deployment (QFD) framework in this context. Method used Examines the QFD framework and its relationship with similar concepts. Provides an overview of the QFD process. Develop a hypothetical application of QFD in the lodging industry to illustrate future application and analysis strategies. The results of the research present several benefits and drawbacks of the QFD process, especially when compared with existing service quality and customer satisfaction paradigms. The conclusion is that suggestions and directions are given for future applications with a particular interest in service management issues specific to the hotel industry.

Further research was conducted by Birdogan et al (2009) with the title An Application of Integrating SERVQUAL and Kano's model into QFD for Logistics Services: A case study from Turkey. The aim of this research is to attempt to provide new solutions to cargo companies' service quality efforts by integrating different scientific methodologies. The method used is to analyze the advantages and disadvantages of logistics services of a well-known cargo company in Turkey which are determined using the service quality scale (SERVQUAL), service quality

attributes are categorized using the Kano model to see how well these attributes are able to satisfy customer needs, and the findings are transferred to implementation of quality functions (QFD). The results obtained in the Kano model show that ten of the 27 service quality attributes can be categorized as "attractive", which means they have maximum influence on consumer satisfaction. Through the QFD customer priority levels, it was found that the three most important service quality attributes are: VIP service, notifying customers of the delivery time before delivery, and receiving delivery from the customer's address. In addition, strengthening information technology infrastructure is the most important technical requirement to focus on with the highest level of technical importance. In conclusion, this study provides guidance for cargo companies to use various scientific methodologies in their efforts to improve service quality.

Further research was conducted by Basset et al (2018) with the title Three-way decisions based on neutrosophic sets and AHP-QFD framework for supplier selection problems. The aim of this research is to study the three-way decision concept based on the neutrosophic set to make reasonable decisions and integrate it in the supplier selection process using Quality Function Deployment (QFD) and Analytic Hierarchy Process (AHP) in a neutrosophic environment. The method used is Proposing two three-way decision rules based on three degrees of membership of the neutrosophic set then integrating QFD with AHP in a neutrosophic environment to determine stakeholder needs and calculate the weight of these needs as well as the weight of available suppliers. The results obtained are that Neutrosophic sets represent three-way decision theory more effectively, efficiently and flexibly compared to fuzzy and intuitionistic fuzzy sets, the neutrosophic AHP-QFD approach has been integrated to select the best supplier from various alternatives. The conclusion is that the proposed methodology allows handling vague and inconsistent information, meeting stakeholder needs efficiently and effectively, and measuring the weight of stakeholder needs and supplier scores more accurately through neutrosophic AHP.

Research using QFD and Servqual was also carried out by Aysun & Ali (2008) with the title A QFD and SERVQUAL Approach to Hotel Service Design. The research objective is to develop a conceptual framework for measuring hotel service quality using the SERVQUAL model as a starting point, and then identifying service design and hotel guest needs using the Quality Function Deployment (QFD) approach. The integration of the SERVQUAL and QFD approaches in the conceptual Hotel of Quality model is illustrated through a case study. From this research, the results showed that in the development process, the modified version of

SERVQUAL was proven to be effective in determining the needs of hotel guests. Interviews with guests confirmed that SERVQUAL items can be applied and understood in the hotel industry, although they require some modifications. By using a structured AHP form, the level of customer interest was obtained. The conclusion of this research is that integrating SERVQUAL and QFD can be an effective approach to understanding and improving service quality in the hotel industry. By combining these two methods, hotel service providers can better understand hotel service attributes and improve service design characteristics according to customer needs and expectations.

Based on the studies that have been carried out, it can be seen that currently there is no research that combines subjective and objective methods for measuring customer satisfaction with service quality, especially research that combines Servqual, Neutrosophic AHP and QFD methods simultaneously. Therefore, this research uses subjective and objective methods, the subjective method is the Servqual Neutrosophic AHP questionnaire and the objective method is Quality Function Deployment. These three methods will be combined in this research to obtain data and carry out data analysis to obtain evaluation results of customer satisfaction with the services provided so far. The Servqual Neutrosophic AHP method can determine the level of customer satisfaction with services and the QFD method can be used to translate customer needs into technical requirements, so this research can provide planning recommendations for the company.

CHAPTER III

RESEARCH METHOD

3.1 Research Subject and Object Design

This research was conducted at PT Narmada Awet Muda Lombok muda located in Jl. Gora 2, East Lingsar Hamlet, Lingsar Village, Lingsar District, West Lombok, West Nusa Tenggara. The subjects in this study were customers of PT Narmada awet muda, in this case, agents of PT Narmada awet muda. The object of this research is customer satisfaction with the service quality provided by PT Narmada awet muda.

3.2 Problem Identification

After knowing the condition of PT Narmada Awet Muda, the topic of problems that will be discussed in this final assignment can be determined. At this stage, the problems faced are identified, especially related to the extent to which the services provided by PT Narmada Awet Muda have met consumer expectations and what attributes are important to pay attention to in improving services, as presented in Chapter I. Formulation of this problem aims to define the issues that will be observed and analyzed in the study. The formulation of the problem studied refers to the background described previously. With a clear problem formulation, it is hoped that when conducting research, both the problem and the object being studied will not experience expansion or change.

3.3 Types of Research Data

In this research, several types of data sources were used. The types of data sources used are primary data and secondary data. The following is a more detailed explanation regarding the two types of data sources used.

1. Primary data

   Primary data is a data source that provides data to data collectors. This data was collected directly by researchers and obtained directly from the first source or location of the research object (Sugiyono, 2018). In this research, to obtain primary data, researchers distributed questionnaires and conducted interviews regarding the satisfaction and interests of the respondents who were the research objects, namely the agents of PT Narmada Awet Muda Lombok. There were 50 respondents from agents in the age range of 35-50 years, 37 men and 13 women. Located in a maximum area of 25 km from PT Narmada Awet Muda.

2. Secondary data

Secondary data is data that is not directly collected by researchers from the research location, or it could be said that secondary data is existing data collected by the Institute (Hanke, 1998). Secondary data used in this research is data originating from several literature such as journals and books which correlate with the method or topic in this research.

3.4 Operational definition

An operational definition (Kountur 2007) is a definition that provides an explanation of a variable in a form that can be measured. Operational definitions developed by researchers provide guidance on how to measure the variables in the study. In other words, an operational definition is a definition created by the researcher himself. Further details regarding this definition can be found in Table 3.1

Table 3.1 Definition of Operational Research

No	Variable	Definition	Measuring instrument
1	Tangible	With regard to facilities such as cleanliness, professional appearance of workers, quality of equipment, availability of transportation modes for product delivery and promotion.	1. Observation 2. Questionnaire 3. Agent interview
2	Reliability	Ability to fulfill promised services accurately without making any errors and deliver services according to the agreed time.	1. Observation 2. Questionnaire 3. Agent interview
3	Responsiveness	Describes employees' desire to help customers and provide fast, responsive and appropriate service. ability to handle problems or complaints.	1. Observation 2. Questionnaire 3.Management interview
4	Assurance	Company Management is able to instill trust and a sense of security	1. Observation 2. Questionnaire

		in agents.	3.Management interview
5	Empathy	The Company understands the problems of agents and acts in the interests of agents and provides personal attention to agents and has convenient operating hours. The company serves with accuracy and speed in serving agents.	1. Observation 2. Questionnaire 3. Agent interview

3.5 Identification of Research Variables

3.5.1 Independent Variable

The independent variables in this research are:

1. Tangible, includes the needs of consumers or agents who focus on services related to physical appearance, such as: Buildings, sophisticated machines, modern equipment, complete and adequate modes of transportation, cleaning protocols, product hygiene, strict standards for product defects, availability of parking space, ability to obtain products easily.
2. Reliability, namely the ability to provide what has been presented immediately, accurately, and satisfy the agent through providing service actions.
3. Responsiveness, namely how much response the company gives to help consumers or agents in providing services.
4. Assurance, which includes the knowledge, abilities, attitudes and trustworthiness of company workers. This includes guarantees to agents so that they are given confidence in product quality, comfort when dealing, security and support so that PT Narmada Awet Muda's reputation can be good.
5. Empathy, is a form of personal service and attention provided by the Company to facilitate good communication and understand consumer and agent complaints.

3.5.2 Dependent Variable

The dependent variable (influenced variable) in this research is

1.Agent Satisfaction

The services provided can meet or exceed the agent's expectations.

3.6 Method of Collecting Data

In this research, several methods were used to collect data, the following is a more detailed explanation regarding several of the methods used in this research:

1 Observation

Observation is a method of collecting data by conducting direct observations in the field. Researchers carry out direct observations at PT Narmada Awet Muda or the objects to be studied in order to determine and create a list of questions that we will give to consumers to fill in.

2 Questionnaire

The questionnaire in this research is a reference for collecting data that will be distributed to respondents. The type of questionnaire used is a closed questionnaire, where respondents are not given the opportunity to give other answers, because the answers have been determined beforehand. After getting information about the quality of services that consumers want, the information is then made into concise and easy sentences. And grouped into 5 servqual dimensions.

3 Interviews

An interview is a meeting conducted by two people to find information or an idea by means of question and answer so that it can be narrowed down to a conclusion on a topic (Sugiyono, Quantitative, Qualitative and R & D Research Methods, 2015).

In this research, the interview method was carried out by directly asking questions and answers to interested parties, such as the company, consumers, and so on regarding the quality of service at PT Narmada Awet Muda and the required data.

4 Literature study

There are two types of literature studies carried out, namely inductive and deductive literature studies. Inductive study is a meaningful literature review to maintain the authenticity of research, deductive study is a theoretical basis used as a reference for solving research problems. Literature studies are carried out so that researchers can master the basic theories and concepts related to the problem being researched. This study was carried out by reading and studying several references such as literature, scientific reports and other scientific writings which can support the formation of a theoretical basis related to this research, namely knowing the level of consumer satisfaction to improve service quality, so that it can be used as a strong foundation. in research analysis.

3.7 Processing and Analysis of Data

3.7.1 Questionnaire

This stage begins with preparing a questionnaire, using the servqual instrument which is based on the assumption that customers compare relevant services with ideal and perfect standards for every aspect. This method of analysis uses a neutrosophic approach with 3 assessment criteria, namely correctness (perception), incorrectness (expectation) and uncertainty of the assessment which will total 1.

This questionnaire contains the level of expectations and reality felt by consumers, in this case the agent from PT Narmada Awet Muda Lombok. The statement used refers to the dimensions of service quality according to Parasuraman et.al (in Tjiptono, 2007). The next stage is the distribution of questionnaires which is carried out in two steps, namely a pilot study and a main study. The questionnaire distributed in the pilot study consisted of a minimum of 30 respondents, according to the statistical basis that the minimum sample size is greater than or equal to 30 ($n \geq 30$). Because the sample size is greater than 30, it will provide a greater opportunity to produce a normal distribution, as one of the assumptions that must be met in statistical analysis (Singarimbun (1989). To overcome questionnaires that are not returned or cannot be processed, in the pilot study questionnaires are distributed as many as 52 pieces.

3.7.2 Data Adequacy Test

After collecting sampling data, a data adequacy test is then carried out. The sample is a part or representative of the population to be studied. A good sample is a representative sample, namely one that can represent the existing population. In this research, of course, all consumers cannot be used as respondents, this is due to limited costs, time, thoughts, energy, facilities, etc., that is why researchers here use samples. Determining the sample size in this case uses statistics as a tool, because statistics provides the principles and methods used to anticipate the sample number of customers determined by a formula (Supranto, 1994).

In this study the author used a confidence level of 90% and an accuracy level of 10% Using a confidence level of 90% because the error rate obtained is no more than 10%. This means that at least 90 out of 100 average prices of consumer assessments of attributes will have a deviation of no more than 10%. To determine the minimum sample size, Paul Leedy's formula (Arikunto, 1997) is used, namely:

$$n = p\,(1 - p)\left[\frac{Za/2}{e}\right]^2$$

Notes:

n = Minimum sample size

Zα/2 = Normal distribution value

α = Level of accuracy

p = Expected proportion

e = error

3.7.3 Validity test

At this stage, a validity test was carried out on the results of the pilot study questionnaire. The validity test shows the actual differences between objects or respondents in the characteristics being measured and is not due to systematic or random error. The requirements for a measuring instrument are said to be valid if the correlation coefficient between the item score and the total attribute score is greater than the critical value. Validity testing functions to determine whether there is conformity between the parts of the instrument as a whole.

According to Supranto (2001), the validity of a measuring instrument (a questionnaire, for example) shows how far the measuring instrument can measure what it should measure. A questionnaire that is unclear or cannot be understood by the respondent is considered invalid.

One way to test the validity of the questionnaire is to use the Pearson product moment correlation method with the following stages:

a. Determine the hypothesis

   H_0 : Attribute scores are positively correlated with factor scores (valid)

   H_1 : Attribute scores are not positively correlated with factor scores (not valid)

b. Determine the $\boldsymbol{r}_{\text{table}}$ value

   With a significance level of 5%, degrees of freedom (df) = n-2, the $\boldsymbol{r}_{\text{table}}$ value can be seen in the $\boldsymbol{r}$ table (in the attachment).

c. Determine the $\boldsymbol{r}_{\text{count}}$ value

$$\boldsymbol{r}_{xy} = \frac{\boldsymbol{N}\sum \boldsymbol{XY} - (\sum \boldsymbol{X})(\sum \boldsymbol{Y})}{\sqrt{[\{\boldsymbol{N}\sum \boldsymbol{X^2} - (\sum \boldsymbol{X})^2\}\{\boldsymbol{N}\sum \boldsymbol{Y^2} - (\sum \boldsymbol{Y})^2\}]}}$$

$$\boldsymbol{r}_{\text{count}} = \frac{(\boldsymbol{r}\,\boldsymbol{xy})(\boldsymbol{SBy}) - \boldsymbol{SBx}}{\sqrt{\{(\boldsymbol{SBx^2}) + (\boldsymbol{SBy^2}) - \boldsymbol{2}(\boldsymbol{rxy})(\boldsymbol{SBx})(\boldsymbol{SBy})\}}}$$

   $\boldsymbol{r}_{\text{count}}$ can be calculated using SPSS for Windows software, with the following software steps:

   1. Enter the questionnaire question attribute coefficients in the variable view.
   2. Enter the questionnaire results data in the data view.
   3. Test validity and reliability.

4. Click Analyze – Scale – Reliability Analysis.
5. Enter all the questionnaire question attribute coefficients into items.
6. Clicking Statistics – Descriptive for – Scale if item delete.
7. Clicking Continue – OK.

These steps are carried out until all data is valid. The results of the r_{count} in SPSS software (in the attachment) can be seen in the Corrected Item-Total Correlation value.

d. Compare the value of r_{table} with r_{count}

If the r_{count} is positive and $r_{count} > r_{table}$ then H_0 is accepted

If the r_{count} is positive and $r_{count} < r_{table}$ then H_0 is rejected

If the r_{count} is negative and $r_{count} > r_{table}$ then H_0 is rejected

e. Make a conclusions

3.7.4 Reliability test

Reliability is defined as how far the measurement is free from random error variance, Supranto (2001). Reliability shows the extent to which a scale can provide consistent results if measurements are carried out several times. One method used to measure the reliability of measuring instruments is Cronbach alpha. The alpha coefficient, which is getting closer to 1, means the questions in the questionnaire are more reliable. Reliability calculations can be done using SPSS software. The following are the steps in reliability testing:

a. Determine the hypothesis

H_0: Attribute scores are positively correlated with factor scores (reliable)

H_1: Attribute scores are not positively correlated with factor scores (unreliable)

b. Determine the r_{table} value

With a significance level of 5%, degrees of freedom (df) = n-2, the r_{tabel} value can be seen in the r table (in the attachment).

c. Determine the r_{count} value

$$r_{\text{Cronbachs Alpha}} = \frac{M}{M-1}\left(1 - \frac{Jkx}{Jky}\right)$$

The results of the r_{count} in SPSS software (in the attachment) can be seen in the Cronbach's Alpha value. If the reliability coefficient is close to 1, then the questionnaire is said to have good reliability.

e. Compare the value of r_{table} with r_{count}

If the r_{count} is positive and $r_{count} > r_{table}$ then H_0 is accepted

If the r_{count} is positive and $r_{count} < r_{table}$ then H_0 is rejected

If the r_{count} is negative and $r_{count} > r_{table}$ then H_0 is rejected

f. Make a conclusions

3.7.5 Service Quality Measurement

Service Quality or often called Servqual is a choice of scale that is concise but has a high level of truth and trust so that company management can use it to better understand consumers' perceptions and expectations of the services provided. Perceptions of service quality start from customer needs and end in customer satisfaction and perceptions of service quality (Kotler, 2001). The servqual concept is used to calculate the service quality score of consumers' perceptions of the services obtained minus the expectation or hope value. Perception can be defined as a customer's belief regarding services received or experienced in reality, while expectation/hope is defined as the customer's desires or desires, namely what is offered by the service provider. With the following test criteria: If the performance on an attribute (attribute performance) is greater than the expectation (expectation) for the attribute in question, then the perception of the service will be positive or good and vice versa. Qualitative data collection uses the servqual method which uses a questionnaire containing questions related to effectiveness and is included in 5 dimensions of product quality. The five dimensions are Reliability, Tangibles, Responsiveness, Assurance and Empathy.

3.7.6 Quality Function Deployment Analysis

This method is used in structured product planning and development to clearly specify what consumers want or need and then evaluate several product proposals or systematic service capabilities. The stages carried out in the Quality Function Deployment (QFD) analysis are as follows:

1. Customer Needs Submatrix

   From the results of the service quality questionnaire, a submatrix of customer needs (Voice of Customer/Customer Requirement) and level of customer importance (importance ratings) can then be prepared.

2. Planning Submatrix

   In the Planning submatrix, data on customer needs and desires are ranked from largest to smallest.

3. Engineering Response

   The technical response submatrix is the result of the VOC (Voice Of Customer) which is translated into technical language. Then a consultation was carried out with PT Narmada Awet Muda Lombok to find out the actions that would be taken to fulfill consumer desires.

4. Correlation Submatrix

Determine the correlation submatrix which aims to analyze the relationship between each element of the technical response and each customer's wants and needs.

5. Determine targets

   From the technical response and evaluation, the company then determines the targets it wants to achieve. This target is determined based on the same value scale as the technical response evaluation or can also be a description of the action to be taken.

The measuring instrument used in this research is a questionnaire whose question attributes are built based on existing theory, including books, research results, journals, articles and other literature.

3.7.7 Neutrosophic AHP

Neutrosophy describes an approach to dealing with uncertainty and ambiguity. The neutrosophic set includes three elements, namely correctness (T), incorrectness (F), and uncertainty. Thomas L. Saaty created the AHP method as a technique for breaking down decision-making problems into simpler components and assessing their priorities.

The initial step in the Neutrosophic AHP application is to determine the relevant criteria and sub-criteria, matters related to these criteria are also included in the servqual dimension. This research will dissect each dimension into more specific sub-criteria, for example in the Tangibles dimension, sub-criteria can include 'Packaging Quality', 'Product Cleanliness', and 'Employee Appearance'. Then, respondents will be asked to provide an assessment with the total score of the three criteria being 1. After knowing the correctness (perception) value and incorrectness (expectation) value, we can calculate the difference in scores for each service attribute at PT Narmada Awet Muda Lombok with the formula: Score Servqual = Correctness value (perception) - Incorrectness value (expectation). In the context of Neutrosophic AHP, uncertainty and ambiguity in the assessment are also taken into account which will later be used as a determinant in determining the weight of technical requirements in QFD. Based on the weights and priorities obtained, the research will aggregate all information to provide recommendations or findings regarding service quality and level of customer satisfaction. Through Neutrosophic AHP, this research seeks to provide a more holistic view of service quality and customer satisfaction in mineral water companies by considering aspects of uncertainty and ambiguity in the decision-making process. The results of this approach are expected to provide more valid recommendations for improving service quality and maximizing customer satisfaction.

3.7.8 Result and Discussion

This step aims to get a complete picture of the research that has been carried out leading to an

analysis of implementation results before drawing conclusions. The research results obtained from data processing and analysis are then discussed to determine possible shortcomings or advantages of the research results so that a recommendation can be made regarding the results of this research.

3.7.9 Conclusion and Recommendation

The final stage in research is drawing conclusions based on data collection, data analysis and the decision stage. Drawing conclusions aims to answer the research objectives that have been set. Meanwhile, suggestions are also put forward to provide recommendations regarding solving the problems faced that have been researched.

3.7.10 Research Flow

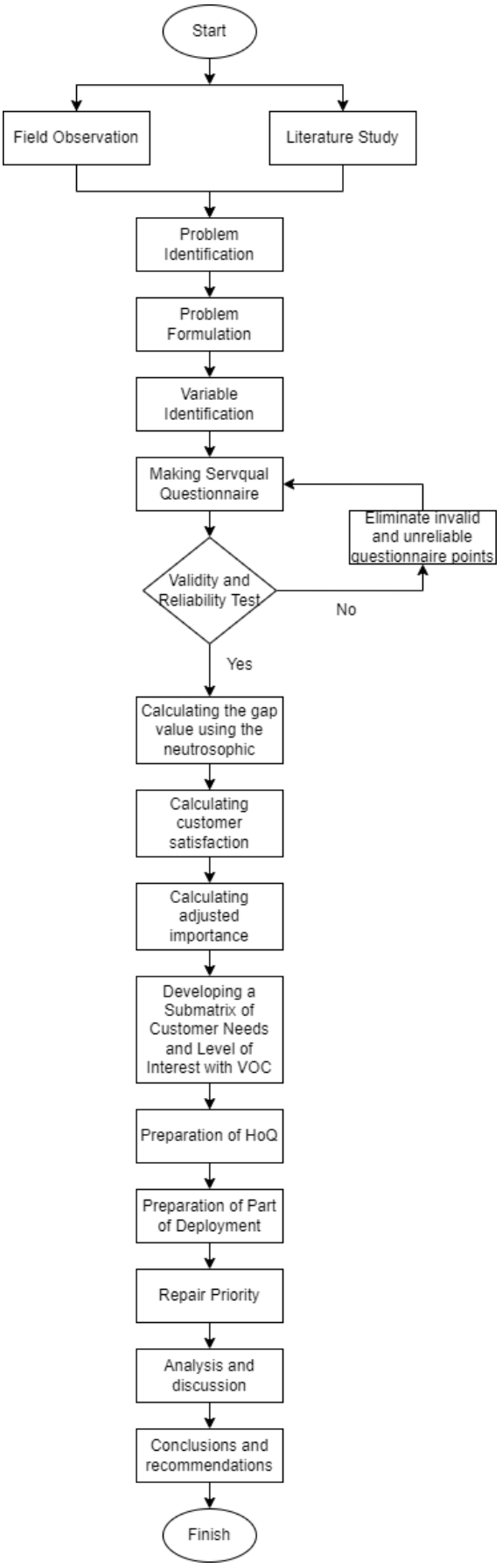


Figure 3.1 Research Flow

CHAPTER IV

Data Collection and Processing

4.1 Data Collection

4.1.1 Company Business Description

The company is engaged in the industrial business of processing mineral water into bottled drinking water (AMDK) using spring water obtained from mountain springs and according to legend comes from the flow of Mount Rinjani springs. PT. Narmada Awet Muda is the first mineral water company in Lombok, West Nusa Tenggara as a bottled drinking water company. This company also pays great attention to quality, safety, health and environmentally friendly products.

The process of producing bottled drinking water is the process from taking water from the source to filling the water into the packaging. However, there are slight differences in the production process between cup, gallon and bottle packaging. General processes include raw material supply, water purification, filler process, packaging and labeling. The following is the process of producing bottled drinking water at PT. Narmada Awet Muda:

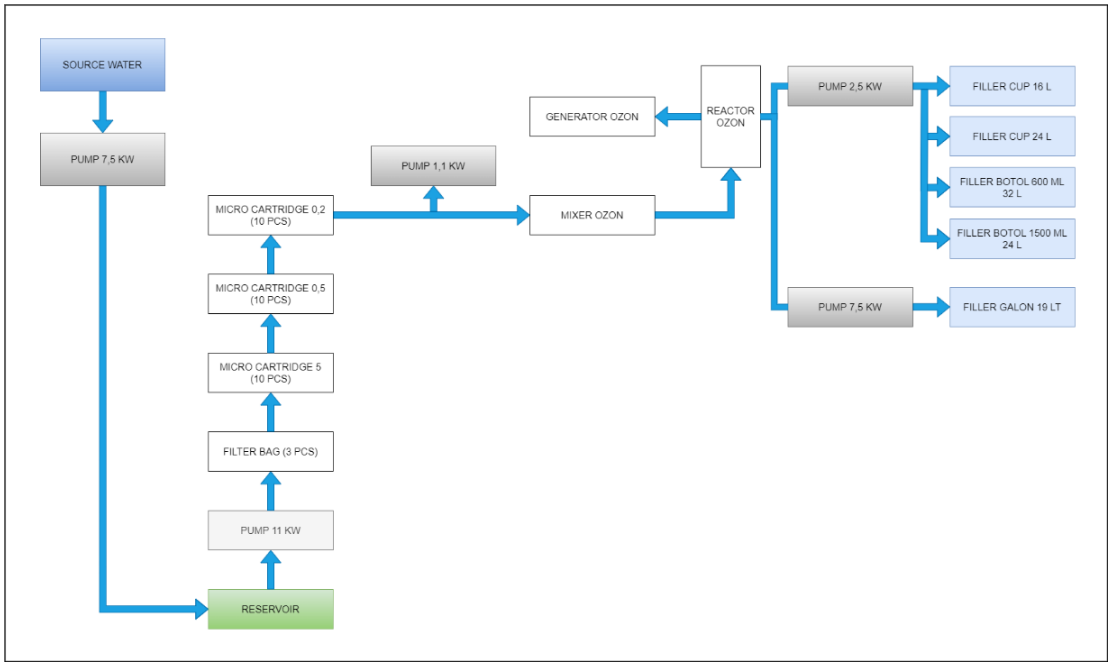


Figure 4.1 Water Treatment Unit Process PT. Narmada Awet Muda

The overall business process at PT. Narmada Awet Muda started with consumer demand for bottled drinking water products. The company will respond to this request by carrying out

quality planning, which includes determining policies, standards and regulations as product quality requirements. After carrying out quality planning, PT. Narmada Awet Muda will look for suppliers of raw materials needed for the production of bottled drinking water. This process includes selecting suppliers who can meet quality requirements and contractual agreements to ensure stable supply. The raw materials obtained will then be used as the main production materials according to the type of product to be produced. PT. Narmada Awet Muda produces three types of drinking water packaging, namely cups, bottles and gallons. In the production process, drinking water is filled into bottles through several stages. During this process, additional equipment is also carried out, such as providing an expiration date, labels and seals to ensure clear information and product safety. After the product has been produced, a quality check is carried out to ensure that the goods produced meet company standards. If the product passes inspection, packaging is carried out according to the type of packaging produced. Next, the finished product will be marketed by distributing it to previously determined distributors. This distributor will be responsible for selling the product to end consumers or may distribute to other retailers. The overall business process at PT. Narmada Awet Muda includes consumer demand, quality planning, supplier selection, production with filling and additional equipment, quality inspection, packaging, and distribution to distributors. The final goal of this process is to ensure that the packaged drinking water products produced meet company standards and can meet consumer needs well. Figure 4.2 shows the overall business process at PT. Narmada Awet Muda:

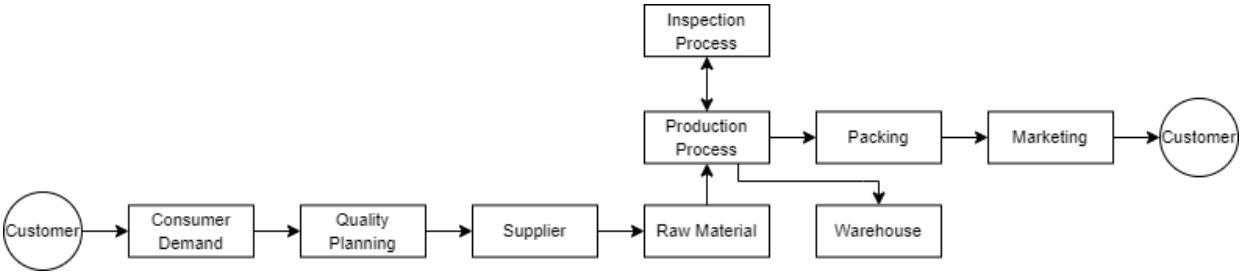


Figure 4.2 Overall Business Process PT. Narmada Awet Muda

4.1.2 Company Profile

Founded in 1994, PT. Narmada Awet Muda is a PT (Limited Liability Company) company which has been actively operating since September 1995 until now. Director of PT. Narmada Awet Muda Lingsar which is now called Pengky Jupiter, SE. This company's head office is located on Jl. Sandu Baya No. 88 Bertais-Mataram, Lombok, West Nusa Tenggara. This company has two factories, namely the first factory located in Selat, Narmada District, West

Lombok Regency, and the second factory located in East Lingsar Hamlet, Lingsar Village, Lingsar District, West Lombok NTB.

PT. Narmada Awet Muda is engaged in the mineral water processing industry using spring water obtained from mountain springs. According to legend, the spring comes from the flow of Mount Rinjani. The name "Narmada Awet Muda" is taken from one of the historical relics in Narmada District which is famous for the legend of "Water of Ageless".

This company is committed to maintaining the quality and cleanliness of processed mineral water, with the aim of providing quality and refreshing drinking water for consumers. Through strategic location and use of quality water sources, PT. Narmada Awet Muda is one of the trusted mineral water processing industry players in West Nusa Tenggara.

4.1.3 Vision and Mission of Company

The vision, mission, and corporate values of PT. Narmada Awet Muda is as follows:

A. Company vision

Vision from PT. Narmada Awet Muda is "Becoming the market leader for bottled water companies in West Nusa Tenggara by 80% with the implementation of World Class Manufacturing (WCM)".

B. Company mission

- Producing bottled drinking water that meets the requirements - SNI 01 – 3553 – 2015 - Customer requirements
- Execute delivery on time
- Prioritize customer satisfaction
- Directors and employees are committed to implementing a quality management system

4.1.4 Company Logo

PT. Narmada Awet Muda uses the following logo:

Figure 4.3 Company Logo

PT. Narmada Awet Muda itself uses a logo that is of course attractive but has a simple design, the design consists of several image components that have their meaning, including:

a. Coconut tree

   The coconut tree here is described as a very important element and can be used from root to leaf-like water (all living things need water).

b. Sun

   The sun means from sunrise to sunset all need water.

c. Narmada writing and water waves

   This means that Narmada is here to meet all the needs of the community and continues to exist during waves of competition.

4.1.5 Marketing

PT. Narmada Awet Muda distributes its products to various areas in West Nusa Tenggara and Bali. Products that are marketed are of course products that have passed the quality control process and are of good quality. As a specialist in the bottled drinking water industry, PT. Narmada Awet Muda also partners with Narmada water distributors, including PT. Narmada Air Distribution is a distributor for the Mataram area, UD. Bina Harta as a distributor for North Lombok and Bali, UD. Fortuna is a distributor for Central Lombok/East Lombok and UD. Tirta Abadi is a distributor for the southern part of West Lombok and East-West Lombok.

Figure 4.4 One of the Company's distributors

4.1.6 Company Criteria Based on Servqual Aspects

In the midst of interest fluctuations, uncertain business climate, and intense competition, the only way to retain customers is to provide all conveniences and provide good quality service. Companies must start to think more carefully about the importance of customer service through service quality, because it is now increasingly recognized that customer service and satisfaction

are vital aspects in order to survive in business and win the competition (Tjiptono, 2004). Parasuraman (1999) said that the quality of services provided to customers can be measured through Servqual analysis which consists of physicality, reliability, responsiveness, assurance and empathy.

From the various theories that have been put forward previously, it can be concluded that in evaluating the level of customer satisfaction with PT Narmada Awet Muda's services the author refers to 5 (five) aspects, namely:

1. Tangibles include the physical facilities visible in the provision of PT Narmada Awet Muda services and the available equipment and communication materials used in the service delivery process.
2. Reliability is the ability of PT Narmada Awet Muda services to provide promised services reliably and accurately so that customers can trust and rely on them.
3. Responsiveness, namely responsiveness to problems that occur with PT Narmada Awet Muda's services and the willingness or desire of PT Narmada Awet Muda to immediately provide service assistance that customers need quickly.
4. Assurance shows the ability of PT Narmada Awet Muda services to provide or inspire customer trust and the understanding and polite attitude of PT Narmada Awet Muda employees (contact personnel) is related to the employees' ability to provide confidence to customers that PT Narmada Awet Muda is capable of providing services as well as possible using the expertise and skills that PT Narmada Awet Muda must have in providing its services to customers and honesty and responsibility on the part of PT Narmada Awet Muda so that customers can trust PT Narmada Awet Muda.
5. Empathy is the ability of PT Narmada Awet Muda services to meet customer needs and the level of attention or level of individual care that PT Narmada Awet Muda can provide to its customers, namely the level of ease in contacting and meeting PT Narmada Awet Muda to its customers and the ability of PT Narmada Awet Muda always provides information in language that is easy for customers to understand and PT Narmada Awet Muda is always willing to listen to what customers have to say.

4.2 Service Attribute Data to be Tested on Consumers

The measuring instrument used in this research is a questionnaire whose question attributes are built based on existing theory, including books, research results, journals, articles and other literature. The question attributes are divided into 5 (five) question dimensions as follows:

1. Tangible

Table 4.1 Tangible dimension questions

No.	Question
1.	The location of PT Narmada Awet Muda is easy for customers to reach.
2.	The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology.
3.	Mineral water product delivery vehicles are always in good condition and clean.
4.	The waiting room or area for receiving guests at this company office is clean, neat, comfortable and representative.
5.	The quality and packaging design of mineral water products provided by the Company is very good.
6.	Employee appearance is neat and dressed politely when on duty.
7.	your assessment of the cleanliness and maintainability of the mineral water company office facilities.

2. Reliability

Table 4.2 Reliability dimension questions

No.	Question
8.	PT Narmada Awet Muda is consistent in delivering mineral water orders on time.
9.	The mineral water products received always comply with the specifications and quality promised.
10.	Service that is fast, precise and responsive in responding.
11.	The company's ability to provide solutions to complaints or problems faced.
12.	The information provided by company staff is always accurate and reliable.
13.	The company fulfills the commitments or promises that have been mutually agreed upon.

3. Responsiveness

Table 4.3 Responsiveness dimension questions

No.	Question
14.	PT Narmada Awet Muda staff work quickly in serving customers.
15.	PT Narmada Awet Muda staff are always willing to provide assistance to customers if the customer needs help.
16.	PT Narmada Awet Muda staff responds quickly to handling customer complaints.
17.	PT Narmada Awet Muda staff are easy to contact when you need help or clarification
18.	How quickly the company resolves problems or complaints you raise.

4. Assurance

Table 4.4 Assurance dimension questions

No.	Question
19.	How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product.
20.	How confident you are that the company will handle your personal information and business data with confidentiality and security.
21.	How do you assess the company's ability to provide guarantees for the quality of the products supplied.
22.	Do you feel that the company has high standards of ethics and integrity in running its business.
23.	Guarantee that PT Narmada Awet Muda employees able to carry out their work well.
24.	How confident are you that the company will be held responsible if an error or problem occurs with the product.

5. Empathy

Table 4.5 Empathy dimension questions

No.	Question
25.	The company always understands my needs and expectations as an agent.
26.	Company staff always takes the time to listen attentively to questions or concerns.
27.	The company always strives to provide solutions that suit my specific situation and needs.
28.	I feel valued as a business partner by this company.
29.	The company's staff always communicates in a friendly and empathetic manner.
30.	When there is a problem or challenge, I feel like the company is always by my side to help find a solution.

4.3 Data Processing

4.3.1 Data Adequacy Test

After distributing the questionnaire, a data adequacy test is first carried out which functions to determine whether the data taken is sufficient or not to represent a population. This calculation is carried out to find out the minimum amount of data needed. To determine the minimum amount of data (samples) that must be obtained, calculations are used using the Paul Leedy formula (Arikunto, 1997) :

$$n \geq p\,(1-p)\left[\frac{Z\alpha/2}{e}\right]^2$$

Notes: n = Minimum sample size

Zα/2 = Normal distribution value

α = Level of accuracy

p = Estimated proportion

e = Error

Level of confidence = 90 %

Level of accuracy (α) = 10 % = 0,1 ; α /2 = 0,05 ; Zα/2 = 1,645 ; e = 6 %

$P = \left(\frac{55-3}{55}\right) = 0{,}945$

By using normal distribution values. With a total of 55 questionnaires distributed and

52 valid questionnaires, the minimum amount of data (sample) obtained is:

$$n \geq 0{,}945\ (1 - 0{,}945)\ [\frac{1{,}645}{0{,}06}]^2$$

$$n \geq 39{,}07 \approx 39$$

The minimum number of data (samples) required is 39 data.

4.3.2 Validity Test

The validity test is used to measure the validity or validity of a questionnaire given to respondents during research. This validity test can be done with the help of SPSS version 23 software and can also be done with manual calculations. This validity test was carried out using the first 50 samples.

a. Determining Hypothesis

   H_0 : Attribute scores are positively correlated with factor scores (valid).

   H_1 : Attribute scores are not positively correlated with factor scores (not valid).

b. Determine the $\boldsymbol{r}_{\text{table}}$ value

   With a significance level of 5%

   Degrees of freedom (df) = n – 2 = 50 – 2 = 48

   Then the $\boldsymbol{r}_{\text{table}}$ value = 0,278

c. Determines the $\boldsymbol{r}_{\text{count}}$ value

   The results of $\boldsymbol{r}_{\text{count}}$ calculations using SPSS 23 for Windows software can be seen in Corrected Item-Total Correlation (attached output).

d. Compare the value of $\boldsymbol{r}_{\text{table}}$ with $\boldsymbol{r}_{\text{count}}$

   If the value of $\boldsymbol{r}_{\text{count}} \geq \boldsymbol{r}_{\text{table}}$ then H_0 is accepted

   If the value of $\boldsymbol{r}_{\text{count}} < \boldsymbol{r}_{\text{table}}$ then H_0 is rejected

e. Conclusions

   Example of validity test calculation for question number 1 (variable x_1)

   Notes : N : Number of Subjects (respondents): 50

   Σ X : Total x (item scores) : 183

   Σ X^2 : Total squared item score : 689

   Σ Y : Total Y (factor scores) : 5484

   Σ Y^2 : Sum of squared factor scorest : 605044

   Σ XY : Number of multiplications of x & y : 20183

   Calculation of the anchor moment correlation coefficient (rxy) between item scores (x) and factor scores (y):

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[\{N\sum X^2 - (\sum X)^2\}\{N\sum Y^2 - (\sum Y)^2\}]}}$$

$$r_{xy} = \frac{\mathbf{50}\ (\mathbf{20183}) - (\mathbf{183})(\mathbf{5484})}{\sqrt{((\mathbf{50}(\mathbf{689}) - (\mathbf{183})^2)(\mathbf{50}(\mathbf{605044}) - (\mathbf{5484})^2)}} = 0{,}426$$

Calculation of the total part correlation coefficient (r_{count})

$$JKx = \Sigma X^2 - \frac{(\Sigma X)^2}{N} = 689 - \frac{(\mathbf{183})^2}{\mathbf{50}} = 19{,}22$$

$$JKy = \Sigma Y^2 - \frac{(\Sigma Y)^2}{N} = 605044 - \frac{(\mathbf{5484})^2}{\mathbf{50}} = 3558{,}88$$

$$SBx = \sqrt{\frac{JKx}{N-1}} = \sqrt{\frac{19{,}22}{50-1}} = 0{,}626$$

$$SBy = \sqrt{\frac{JKy}{N-1}} = \sqrt{\frac{3558{,}88}{50-1}} = 8{,}52$$

$$r_{count} = \frac{(r_{xy})(SBy) - SBx}{\sqrt{\{(SBx^2) + (SBy^2) - 2(rxy)(SBx)(SBy)\}}}$$

$$r_{count} = \frac{(\mathbf{0{,}426})(\mathbf{8{,}52}) - \mathbf{0{,}626}}{\sqrt{\{(\mathbf{0{,}626^2}) + (\mathbf{8{,}52^2}) - \mathbf{2}(\mathbf{0{,}426})(\mathbf{0{,}626})(\mathbf{8{,}52})\}}} = 0{,}363$$

Notes :

JKx: Sum of squares of total item scores (knowing the distribution of data towards the center point (average x))

JKy: Sum of squares of total factor scores (knowing the distribution of data towards the center point (average y))

SBx: Standard deviation of item scores (knowing the average deviation from the center point (average x))

SBy: Standard deviation of factor scores (knowing the size of the average deviation from the center point (average y))

Data validity testing in this research was carried out with only 1 (one) iteration because the data was valid in the first iteration. To see the value of all question items that have been processed using the SPSS 23 program, can be seen in table 4.6.

Table 4.6 Attribute Validity Test Table

No	Variable	r_{count}	r_{table}	**Status**
I	***Tangible***			
1	The location of PT Narmada Awet Muda is easy for customers to reach.	0,364	0,278	**Valid**
2	The equipment and machines used by PT Narmada Awet Muda use the	0,292	0,278	**Valid**

	latest and most up-to-date technology.			
3	Mineral water product delivery vehicles are always in good condition and clean.	0,294	0,278	**Valid**
4	The waiting room or area for receiving guests at this company office is clean, neat, comfortable and representative.	0,361	0,278	**Valid**
5	The quality and packaging design of mineral water products provided by the Company is very good.	0,310	0,278	**Valid**
6	Employee appearance is neat and dressed politely when on duty.	0,602	0,278	**Valid**
7	your assessment of the cleanliness and maintainability of the mineral water company office facilities.	0,342	0,278	**Valid**
II	***Reliability***			
8	PT Narmada Awet Muda is consistent in delivering mineral water orders on time.	0,297	0,278	**Valid**
9	The mineral water products received always comply with the specifications and quality promised.	0,318	0,278	**Valid**
10	Service that is fast, precise and responsive in responding.	0,537	0,278	**Valid**
11	The company's ability to provide solutions to complaints or problems faced.	0,307	0,278	**Valid**
12	The information provided by company staff is always accurate and reliable.	0,340	0,278	**Valid**
13	The company fulfills the commitments or promises that have been mutually agreed upon.	0,335	0,278	**Valid**
III	***Responsiveness***			
14	PT Narmada Awet Muda staff work quickly in serving customers.	0,478	0,278	**Valid**
15	PT Narmada Awet Muda staff are always willing to provide assistance to customers if the customer needs help.	0,351	0,278	**Valid**
16	PT Narmada Awet Muda staff responds quickly to handling customer complaints.	0,449	0,278	**Valid**
17	PT Narmada Awet Muda staff are easy to contact when you need help or clarification.	0,423	0,278	**Valid**
18	How quickly the company resolves problems or complaints you raise.	0,372	0,278	**Valid**
IV	***Assurance***			
19	How confident are you that this mineral water company has the	0,393	0,278	**Valid**

	knowledge and expertise necessary to provide a quality product.			
20	How confident you are that the company will handle your personal information and business data with confidentiality and security.	0,325	0,278	**Valid**
21	How do you assess the company's ability to provide guarantees for the quality of the products supplied.	0,439	0,278	**Valid**
22	Do you feel that the company has high standards of ethics and integrity in running its business	0,329	0,278	**Valid**
23	Guarantee that PT Narmada Awet Muda employees able to carry out their work well.	0,460	0,278	**Valid**
24	How confident are you that the company will be held responsible if an error or problem occurs with the product.	0,344	0,278	**Valid**
V	***Empathy***			
25	The company always understands my needs and expectations as an agent.	0,317	0,278	**Valid**
26	Company staff always takes the time to listen attentively to questions or concerns.	0,418	0,278	**Valid**
27	The company always strives to provide solutions that suit my specific situation and needs.	0,424	0,278	**Valid**
28	I feel valued as a business partner by this company.	0,578	0,278	**Valid**
29	The company's staff always communicates in a friendly and empathetic manner.	0,568	0,278	**Valid**
30	When there is a problem or challenge, I feel like the company is always by my side to help find a solution.	0,416	0,278	**Valid**

Based on the validity test using the SPSS 23 for Windows software above, it can be seen that rcount is greater than rtable, so it can be concluded that the question attributes in the questionnaire are valid and able to reveal something that is the main target of the measurements carried out with these attributes.

4.3.3 Reliability Test

Question attributes that are valid are then tested for reliability. The reliability test technique used in this research is analysis using Cronbach Alpha.

Example of Reliability Test Calculation for all dimensions

- Sum of squares of total item scores (JKx)

ΣJKxi = 19,22 + 34,32 + 25,62 +….+ 15,38 + 19,38

= 598,16

- Sum of squares of total factor scores (JKy)

$JKy = \Sigma\, \boldsymbol{Y^2} - \frac{(\Sigma Y)^2}{N} = 605044 - \frac{(5484)^2}{50} = 3558{,}88$

- So the reliability coefficient sought is :

$\boldsymbol{r}_{\text{Cronbachs Alpha}} = \frac{M}{M-1}\left(1 - \frac{JKx}{JKy}\right) = \frac{30}{30-1}\left(1 - \frac{598{,}16}{3558{,}88}\right) = 0{,}861$

Reliability testing is carried out with the following steps :

a. Determining Hypothesis

H_0 : Attribute scores are positively correlated with factor scores (reliable).

H_1 : Attribute scores are not positively correlated with factor scores (not reliable).

b. Determine the $\boldsymbol{r}_{\text{table}}$ value

With a significance level of 5%

Degrees of freedom (df) = n – 2 = 50 – 2 = 48

Then the $\boldsymbol{r}_{\text{table}}$ value = 0,278.

c. Reliability test results for all dimensions

The results of the $\boldsymbol{r}_{\text{alpha}}$ calculation in SPSS 23 for Windows software can be seen in the Cronbach's Alpha value, which is 0.861.

d. Compare the value of $\boldsymbol{r}_{\text{table}}$ with $\boldsymbol{r}_{\text{count}}$

$\boldsymbol{r}_{\text{count}}$ is positive and $\boldsymbol{r}_{\text{count}}$ (0,861) ≥ $\boldsymbol{r}_{\text{table}}$ (0.278), then H_0 is accepted.

e. Make decision

Because H_0 is accepted, the questionnaire attributes are reliable. This means that the questionnaire attributes can show the stability or stability of the observation results when measured by these attributes. No matter how many times the questionnaire attributes are asked to different respondents, the results will not deviate too far from the average respondent's answer for that attribute.

4.3.4 Service Quality and Neutrosophic AHP Calculations

Servqual's measurement data includes truth data (perception) and error data (expectations) from respondents regarding PT Narmada Awet Muda service attributes. Respondents' assessments of these attributes are grouped into 3 parts, namely by measuring the degree of truth (T) of a statement or real situation, in this case performance, measuring the degree of untruth (F) of a statement and the degree of uncertainty of the statement given. By using an assessment in the form of a percentage from the three assessment scales and must add up to 100%.

The results of the questionnaire distributed, namely data on the percentage of degree of truth, degree of untruth and degree of uncertainty of respondents regarding the service attributes of PT Narmada Awet Muda can be seen in table 4.7. For complete results of the questionnaire data on the degree of truth, degree of untruth and degree of uncertainty of respondents, see the Appendix.

Table 4.7 Servqual Scores PT Narmada Awet Muda Service Attributes

No.	Question Attribute	Correctness (T)	Incorrectness (F)	Uncertainty	Gap Score (T-F)
1	The location of PT Narmada Awet Muda is easy for customers to reach.	18,36	20,32	11,32	-1,96
2	The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology.	18,62	19,97	11,41	-1,35
3	Mineral water product delivery vehicles are always in good condition and clean.	18,77	19,39	11,84	-0,62
4	The waiting room or area for receiving guests at this company office is clean, neat, comfortable and representative.	18,18	18,67	13,15	-0,49
5	The quality and packaging design of mineral water products provided by the Company is very good.	17,84	18,49	13,67	-0,65
6	Employee appearance is neat and dressed politely when on duty.	17,74	19,46	12,8	-1,72
7	Your assessment of the cleanliness and maintainability of the mineral water company office facilities.	19,32	19,92	10,76	-0,6
8	PT Narmada Awet Muda is consistent in delivering mineral water orders on time.	18,32	19,14	12,54	-0,82
9	The mineral water products received always comply with the specifications and quality promised.	18,91	19,48	11,61	-0,57
10	Service that is fast, precise and responsive in responding.	18,27	19,38	12,35	-1,11

11	The company's ability to provide solutions to complaints or problems faced.	18,76	19,94	11,3	-1,18
12	The information provided by company staff is always accurate and reliable.	19,19	20,12	10,69	-0,93
13	The company fulfills the commitments or promises that have been mutually agreed upon.	18,19	19,25	12,56	-1,06
14	PT Narmada Awet Muda staff work quickly in serving customers.	18,43	19,44	12,13	-1,01
15	PT Narmada Awet Muda staff are always willing to provide assistance to customers if the customer needs help.	18,83	19,58	11,59	-0,75
16	PT Narmada Awet Muda staff responds quickly to handling customer complaints.	18,83	19,55	11,62	-0,72
17	PT Narmada Awet Muda staff are easy to contact when you need help or clarification.	18,54	19,92	11,54	-1,38
18	How quickly the company resolves problems or complaints you raise.	19,08	20,1	10,82	-1,02
19	How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product.	18,27	19,33	12,4	-1,06
20	How confident you are that the company will handle your personal information and business data with confidentiality and security.	18,08	18,7	13,22	-0,62
21	How do you assess the company's ability to provide guarantees for the quality of the products supplied.	18,2	18,67	13,13	-0,47
22	Do you feel that the company has high standards of ethics and integrity in running its business?	19,38	19,88	10,74	-0,5
23	Guarantee that PT Narmada Awet Muda employees able to carry out their work well.	18,85	20,32	10,83	-1,47
24	How confident are you that the company will be held responsible if an error or problem occurs	18,9	19,9	11,2	-1

	with the product.				
25	The company always understands my needs and expectations as an agent.	18,04	19,4	12,56	-1,36
26	Company staff always takes the time to listen attentively to questions or concerns.	18,49	20,1	11,41	-1,61
27	The company always strives to provide solutions that suit my specific situation and needs.	17,97	19,51	12,52	-1,54
28	I feel valued as a business partner by this company.	17,85	18,91	13,24	-1,06
29	The company's staff always communicates in a friendly and empathetic manner.	18,62	20,36	11,02	-1,74
30	When there is a problem or challenge, I feel like the company is always by my side to help find a solution.	18,64	19,9	11,46	-1,26

Based on the table above, it can be seen that the gap value for the tangible dimension is item number 1, namely the location of PT Narmada Awet Muda which is easily reached by customers with a value of -1.96. Meanwhile, the gap value for the reliability dimension is item number 11, namely the company's ability to provide solutions to complaints or problems faced with a value of -1.18. Meanwhile, the gap value in the responsiveness dimension is item number 17, namely PT Narmada Awet Muda staff are easy to contact when you need help or clarification with a value of -1.38. Meanwhile, the gap value in the assurance dimension is item number 23, namely Guarantee that PT Narmada Awet Muda employees are able to carry out their work well with a value of -1.47. Meanwhile, the gap value in the empathy dimension is item number 29, namely company staff always communicate in a friendly and empathetic way with a value of -1.74. Table 4.8 will show the size of the gap for each dimension analyzed.

Table 4.8 Servqual Scores for Each Dimension

No.	Dimension	Correctness (T)	Incorrectness (F)	Average Correctness (T)	Average Incorrectness (F)	Gap
1	Tangible	128,83	136,22	18,404	19,46	-1,055
2	Reliability	111,64	117,31	18,606	19,551	-0,945

3	Responsiveness	93,71	98,59	18,742	19,718	-0,976
4	Assurance	111,68	116,8	18,613	19,466	-0,853
5	Empathy	109,61	118,18	18,268	19,696	-1,428

It has been stated that if the servqual score is negative, it indicates that the customer is less than satisfied with the quality of service from the company. The servqual score obtained for service quality at PT Narmada Awet Muda shows a negative value, which means that the service quality is not sufficient to satisfy customers.

From the table above it can be seen that the gap value for the tangible dimension is -1.055, the gap value for the reliability dimension is -0.945, the gap value for the responsiveness dimension is -0.976, the gap value for the assurance dimension is -0.853, the gap value for the empathy dimension is -1.428 .

In this data it can be seen that the Incorrectness (expectation) value is indeed higher than the Correctness (perception) value so that a gap with a negative value is obtained. This indicates that the quality of service provided by the company to customers is still weak because it has not met customer expectations, where the biggest gap is in the empathy dimension, namely -1.428.

To find out the average Gap value for each Servqual dimension, a graph was created showing the average Gap value for each dimension, namely as follows:

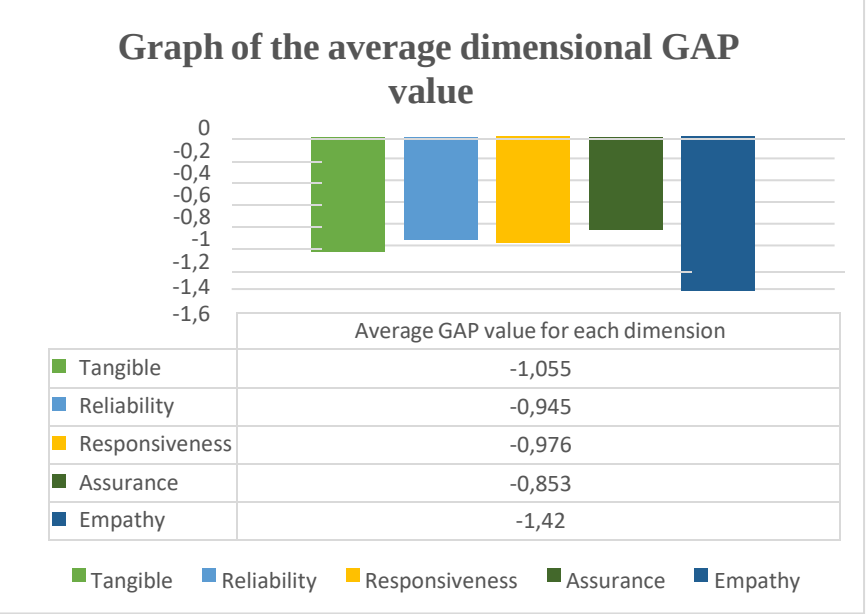


Figure 4.5 Average Gap Value for each Dimension

Then the Servqual Gap scores (Gap 5) that have been obtained and for which improvements will be proposed are ranked from the largest value to the smallest. So that improvements can achieve maximum results, more focus and priority will be placed on service attributes that have a gap value below -0.853. Because that is the lowest average gap value of the five dimensions, namely in the assurance dimension, which means that the quality of service provided by PT Narmada Awet Muda in terms of the assurance dimension is quite good, so our priority for improvement is taking a gap value that is greater than -0.853 for overall attributes. So that the focus of improvement can be maximized for attributes that require more major improvement.The results are as follows:

Table 4.9 Ranked Servqual Score Gap Values (Gap 5)

No.	Service Attributes	Gap Score
1	The location of PT Narmada Awet Muda is easy for customers to reach. (1)	-1,96
2	The company's staff always communicates in a friendly and empathetic manner. (29)	-1,74
3	Employee appearance is neat and dressed politely when on duty. (6)	-1,72
4	Company staff always takes the time to listen attentively to questions or concerns. (26)	-1,61
5	The company always strives to provide solutions that suit my specific situation and needs. (27)	-1,54
6	Guarantee that PT Narmada Awet Muda employees able to carry out their work well. (23)	-1,47
7	PT Narmada Awet Muda staff are easy to contact when you need help or clarification. (17)	-1,38
8	The company always understands my needs and expectations as an agent. (25)	-1,36
9	The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology. (2)	-1,35
10	When there is a problem or challenge, I feel like the company is always by my side to help find a solution. (30)	-1,26
11	The company's ability to provide solutions to complaints or problems faced. (11)	-1,18
12	Service that is fast, precise and responsive in responding. (10)	-1,11

13	The company fulfills the commitments or promises that have been mutually agreed upon. (13)	-1,06
14	How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product. (19)	-1,06
15	I feel valued as a business partner by this company. (28)	-1,06
16	How quickly the company resolves problems or complaints you raise. (18)	-1,02
17	PT Narmada Awet Muda staff work quickly in serving customers. (14)	-1,01
18	How confident are you that the company will be held responsible if an error or problem occurs with the product. (24)	-1
19	The information provided by company staff is always accurate and reliable. (12)	-0,93

The attributes of Servqual (Gap 5) which have been ranked from largest to smallest as in Table 4.9, will be used as Voice of Customer/Customer Requirements in the customer needs submatrix in data processing using the QFD method.

4.3.5 Preparation of House of Quality (HOQ)

In preparing the House of Quality (HOQ), data is needed relating to customer requirements resulting from PT Narmada Awet Muda service attributes as well as technical responses from management. Service attributes are a combination of Servqual and Neutrosophic methods. Therefore, it is necessary to adjust the level of importance (adjusted importance) of service attributes before being included in the HOQ. For this reason, it is necessary to calculate the adjusted importance value of the service attributes.

A. Adjusted Importance Atribut

The steps that must be taken in calculating Adjusted Importance are as follows:

1. Calculate the Satisfaction Score

   The satisfaction score has the formula:

   Satisfaction score = Gap Score x Level of Importance

   The level of importance is obtained by looking at the total expected score for each service quality attribute, whether it is in the area of unimportant, less important, quite important, important or very important. For this reason, a value must be determined for each level of importance if all respondents choose that level.

Table 4.10 Service Importance Category

IMPORTANCE LEVEL	Value
Very important	**24**
Middle value	22,5
Important	**21**
Middle value	19,5
Quite important	**18**
Middle value	16,5
Not too important	**15**
Middle value	13,5
Not important	**12**

Next, the total Incorrectness (Expectation) score for each attribute of PT Narmada Awet Muda service quality is looked at, which area it falls into. Example: Attribute 2 "The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology", with a total score of 19.97, it is included in the "important" area. This means that the level of importance of attribute 2 is 4 (important). Table 4.11 shows the total score and level of importance of all service attributes

Table 4.11 Total Score and Level of Importance of Service Attributes

No	Service Attributes	TOTAL SCORE	IMPORTANCE LEVEL
1	The location of PT Narmada Awet Muda is easy for customers to reach. (1)	20,32	4
2	The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology. (2)	19,97	4
3	Employee appearance is neat and dressed politely when on duty. (6)	19,46	3
4	Service that is fast, precise and responsive in responding. (10)	19,38	3
5	The company's ability to provide solutions to complaints or problems faced. (11)	19,94	4
6	The information provided by company staff is always	20,12	4

	accurate and reliable. (12)		
7	The company fulfills the commitments or promises that have been mutually agreed upon. (13)	19,25	3
8	PT Narmada Awet Muda staff work quickly in serving customers. (14)	19,44	3
9	PT Narmada Awet Muda staff are easy to contact when you need help or clarification. (17)	19,92	4
10	How quickly the company resolves problems or complaints you raise. (18)	20,1	4
11	How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product. (19)	19,33	3
12	Guarantee that PT Narmada Awet Muda employees able to carry out their work well. (23)	20,32	4
13	How confident are you that the company will be held responsible if an error or problem occurs with the product. (24)	19,9	4
14	The company always understands my needs and expectations as an agent. (25)	19,4	3
15	Company staff always takes the time to listen attentively to questions or concerns. (26)	20,1	4
16	The company always strives to provide solutions that suit my specific situation and needs. (27)	19,51	4
17	I feel valued as a business partner by this company. (28)	18,91	3
18	The company's staff always communicates in a friendly and empathetic manner. (29)	20,36	4
19	When there is a problem or challenge, I feel like the company is always by my side to help find a solution. (30)	19,9	4

After the level of importance is known, the Satisfaction Score calculation is carried out. Example: satisfaction score attribute 2 "The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology."

Gap score attribute 2 = -1.35

Importance level = 4

Satisfaction Score = 4 x -1.35 = -5.4

Table 4.12 Results of calculating the Satisfaction Score for service attributes

No	Service Attributes	Satisfaction Score
1	The location of PT Narmada Awet Muda is easy for customers to reach. (1)	-7,84
2	The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology. (2)	-5,4
3	Employee appearance is neat and dressed politely when on duty. (6)	-5,16
4	Service that is fast, precise and responsive in responding. (10)	-3,33
5	The company's ability to provide solutions to complaints or problems faced. (11)	-4,72
6	The information provided by company staff is always accurate and reliable. (12)	-3,72
7	The company fulfills the commitments or promises that have been mutually agreed upon. (13)	-3,18
8	PT Narmada Awet Muda staff work quickly in serving customers. (14)	-3,03
9	PT Narmada Awet Muda staff are easy to contact when you need help or clarification. (17)	-5,52
10	How quickly the company resolves problems or complaints you raise. (18)	-4,08
11	How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product. (19)	-3,18
12	Guarantee that PT Narmada Awet Muda employees able to carry out their work well. (23)	-5,88
13	How confident are you that the company will be held responsible if an error or problem occurs with the	-4

	product. (24)	
14	The company always understands my needs and expectations as an agent. (25)	-4,08
15	Company staff always takes the time to listen attentively to questions or concerns. (26)	-6,44
16	The company always strives to provide solutions that suit my specific situation and needs. (27)	-6,16
17	I feel valued as a business partner by this company. (28)	-3,18
18	The company's staff always communicates in a friendly and empathetic manner. (29)	-6,96
19	When there is a problem or challenge, I feel like the company is always by my side to help find a solution. (30)	-5,04

2. The next step is to calculate the adjusted importance, by multiplying the satisfaction score by the uncertainty value.

   Example: Adjusted importance of attribute 2 "The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology."

   Adjusted Importance = Satisfaction Score x Uncertainty

   Uncertainty value = 11.41

   Satisfaction Score = -5.4

   Adjusted Importance = -5.4 x 11.41 = -61.614

Table 4.13 Adjusted Importance of Service Attributes

No	Service Attributes	Adjusted Importance	Absolute Value
1	The location of PT Narmada Awet Muda is easy for customers to reach. (1)	-88,748	88,748
2	The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology. (2)	-61,614	61,614
3	Employee appearance is neat and dressed politely when on duty. (6)	-66,048	66,048
4	Service that is fast, precise and responsive in responding. (10)	-41,125	41,125

5	The company's ability to provide solutions to complaints or problems faced. (11)	-53,336	53,336
6	The information provided by company staff is always accurate and reliable. (12)	-39,766	39,766
7	The company fulfills the commitments or promises that have been mutually agreed upon. (13)	-39,940	39,940
8	PT Narmada Awet Muda staff work quickly in serving customers. (14)	-36,753	36,753
9	PT Narmada Awet Muda staff are easy to contact when you need help or clarification. (17)	-63,700	63,700
10	How quickly the company resolves problems or complaints you raise. (18)	-44,145	44,145
11	How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product. (19)	-39,432	39,432
12	Guarantee that PT Narmada Awet Muda employees able to carry out their work well. (23)	-63,680	63,680
13	How confident are you that the company will be held responsible if an error or problem occurs with the product. (24)	-44,8	44,8
14	The company always understands my needs and expectations as an agent. (25)	-51,244	51,244
15	Company staff always takes the time to listen attentively to questions or concerns. (26)	-73,480	73,480
16	The company always strives to provide solutions that suit my specific situation and needs. (27)	-77,123	77,123
17	I feel valued as a business partner by this company. (28)	-42,103	42,103
18	The company's staff always communicates in a friendly and empathetic manner. (29)	-76,699	76,699
19	When there is a problem or challenge, I feel like the company is always by my side to help find a solution. (30)	-57,758	57,758

B. Translating Customer Needs into Technical Requirements

One of the important steps in the service planning matrix is translating consumer needs into technical requirements so that we can know what aspects need to be developed and further specify a general design. Every consumer need that is translated into technical requirements has attributes that can be measured. Technical requirements are a translation of consumer needs into technical form so that customer desires can be realized properly. Translating customer needs into technical requirements by referring to the voice of customer obtained during interviews. Table 4.14 below is an interpretation of technical requirements (customer requirements) into technical requirements (Technical requirements).

Table 4.14 Interpretation of Customer Requirements into Technical Requirements

No	Customer Requirement	Technical Requirement	Unit
1	The location of PT Narmada Awet Muda is easy for customers to reach. (1)	Customer relationship management system	Person
		Strategic location with easy access	Unit
2	The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology. (2)	Providing the latest standard equipment and machines	Unit
3	Employee appearance is neat and dressed politely when on duty. (6)	Training and job evaluation for employees	Person
		Customer relationship management system	Person
		Work culture training	Person
		Standardize employee appearance	Person
4	Service that is fast, precise and responsive in responding. (10)	Training and job evaluation for employees	Person
		Customer relationship management system	Person
		Real time customer complaint tracking system	Person
		Soft skills and empathy training for employees	Person

		Fast and effective response	Person
5	The company's ability to provide solutions to complaints or problems faced. (11)	Training and job evaluation for employees	Person
		Real time customer complaint tracking system	Person
		Job competency training	Person
		Soft skills and empathy training for employees	Person
		Fast and effective response	Person
		Feedback and communication with agents	Person
6	The information provided by company staff is always accurate and reliable. (12)	Training and job evaluation for employees	Person
		Job competency training	Person
		Soft skills and empathy training for employees	Person
7	The company fulfills the commitments or promises that have been mutually agreed upon. (13)	Customer relationship management system	Person
		Product quality assurance and certification system	Person
		Feedback and communication with agents	Person
8	PT Narmada Awet Muda staff work quickly in serving customers. (14)	Training and job evaluation for employees	Person
		Customer relationship management system	Person
		Work culture training	Person
		Real time customer complaint tracking system	Person
		Job competency training	Person
		Fast and effective response	Person
9	PT Narmada Awet Muda staff are easy to contact when you need help or	Training and job evaluation for employees	Person

	clarification. (17)	Customer relationship management system	Person
		Work culture training	Person
		Real time customer complaint tracking system	Person
		Soft skills and empathy training for employees	Person
10	How quickly the company resolves problems or complaints you raise. (18)	Training and job evaluation for employees	Person
		Customer relationship management system	Person
		Real time customer complaint tracking system	Person
		Job competency training	Person
		Feedback and communication with agents	Person
		Fast and effective response	Person
11	How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product. (19)	Customer relationship management system	Person
		Providing the latest standard equipment and machines	Unit
		Product quality assurance and certification system	Person
12	Guarantee that PT Narmada Awet Muda employees able to carry out their work well. (23)	Training and job evaluation for employees	Person
		Job competency training	Person
13	How confident are you that the company will be held responsible if an error or problem occurs with the product. (24)	Product quality assurance and certification system	Person
14	The company always understands my needs and expectations as an agent. (25)	Customer relationship management system	Person
		Feedback and communication with agents	Person

		Soft skills and empathy training for employees	Person
15	Company staff always takes the time to listen attentively to questions or concerns. (26)	Training and job evaluation for employees	Person
		Customer relationship management system	Person
		Work culture training	Person
		Soft skills and empathy training for employees	Person
16	The company always strives to provide solutions that suit my specific situation and needs. (27)	Customer relationship management system	Person
		Job competency training	Person
		Feedback and communication with agents	Person
		Customization of solutions based on specific needs	Person
17	I feel valued as a business partner by this company. (28)	Customer relationship management system	Person
		Feedback and communication with agents	Person
		Soft skills and empathy training for employees	Person
18	The company's staff always communicates in a friendly and empathetic manner. (29)	Training and job evaluation for employees	Person
		Customer relationship management system	Person
		Soft skills and empathy training for employees	Person
19	When there is a problem or challenge, I feel like the company is always by my side to help find a solution. (30)	Customer relationship management system	Person
		Real time customer complaint tracking system	Person
		Job competency training	Person

		Soft skills and empathy training for employees	Person
		Fast and effective response	Person
		Customization of solutions based on specific needs	Person

Technical needs that have been translated from consumer needs are:

Table 4.15 Technical Requirement

No	Technical Requirement
1	Training and job evaluation for employees
2	Customer relationship management system
3	Strategic location with easy access
4	Providing the latest standard equipment and machines
5	Work culture training
6	Standardize employee appearance
7	Real time customer complaint tracking system
8	Job competency training
9	Product quality assurance and certification system
10	Feedback and communication with agents
11	Soft skills and empathy training for employees
12	Fast and effective response
13	Customization of solutions based on specific needs

C. Relationship Between Customer Requirements and Technical Requirements

The relationship between consumer needs and technical needs can be expressed at 3 levels, namely:

1. Technical needs have a strong relationship in meeting consumer needs, symbolized by ● and worth 9
2. Technical needs have a moderate relationship in meeting consumer needs, symbolized by ○ and with a value of 3
3. Technical needs have a weak relationship in meeting consumer needs, symbolized by △ and worth 1.

The relationship pattern between consumer desires and technical needs can be seen in Figure 4.6 below.

	Customer Requirement	Adjusted Importance Atribut	Training and Job Evaluation for Employees	Customer Relationship Management System	Strategic location with Easy Access	Providing the Latest Standard Equipment and Machines	Work Culture Training	Standardize Employee Appearance	Real Time Customer Complaint Tracking System	Job Competency Training	Product Quality Assurance and Certification System	Feedback and Communication with Agents	Soft Skills and Empathy Training for Employees	Fast and Effective Response	Customization of Solutions Based on Specific Needs
1	The location of PT Narmada Awet Muda is easy for customers to reach. (1)	88,7		△	●										
2	The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology. (2)	61,6				●									
3	Employee appearance is neat and dressed politely when on duty. (6)	66	○	△			●	●							
4	Service that is fast, precise and responsive in responding. (10)	41,1	○	●					●				●	○	
5	The company's ability to provide solutions to complaints or problems faced. (11)	53,3	●						●	●		○	△	●	
6	The information provided by company staff is always accurate and reliable. (12)	39,8	●							●			●		
7	The company fulfills the commitments or promises that have been mutually agreed upon. (13)	39,9	●								△	○			
8	PT Narmada Awet Muda staff work quickly in serving customers. (14)	36,8	●	●			△		○	●				●	
9	PT Narmada Awet Muda staff are easy to contact when you need help or clarification. (17)	63,7	●	●			△		●				○		
10	How quickly the company resolves problems or complaints you raise. (18)	44,1	●	●					●	●		○		○	
11	How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product. (19)	39,4		●		●					●				
12	Guarantee that PT Narmada Awet Muda employees are able to carry out their work well. (23)	63,7	●							●					
13	How confident are you that the company will be held responsible if an error or problem occurs with the product. (24)	44,8									●				
14	The company always understands my needs and expectations as an agent. (25)	51,2		●								●	●		
15	Company staff always takes the time to listen attentively to questions or concerns. (26)	73,5	○	●			○						●		
16	The company always strives to provide solutions that suit my specific situation and needs. (27)	77,1		●						●		○			●
17	I feel valued as a business partner by this company. (28)	42,1		●								△	●		
18	The company's staff always communicates in a friendly and empathetic manner. (29)	76,7	●	●									●		
19	When there is a problem or challenge, I feel like the company is always by my side to help find a solution. (30)	57,8		●					●				●	●	●

Figure 4.6 Relationship between Customer Requirements and Technical Requirements

D. Technical Requirement Target

After the technical requirements and the relationship between Customer Requirements and Technical Requirements are determined, then targets for these technical requirements are created. This target is part of the technical qualification, so all targets must be measurable. The target results to be achieved are in table 4.16 below:

Table 4.16 Technical Requirements and Target Technical Requirements

No	Technical Requirement	Unit	Target
1	Training and job evaluation for employees	Person	Regular training and evaluations are held
2	Customer relationship management system	Person	Maximized
3	Strategic location with easy access	Unit	Ease of access
4	Providing the latest standard equipment and machines	Unit	Availability of modern equipment

5	Work culture training	Person	Guidance is provided
6	Standardize employee appearance	Person	Neat and uniform
7	Real time customer complaint tracking system	Person	Fulfilled
8	Job competency training	Person	Learning was held
9	Product quality assurance and certification system	Person	Guaranteed
10	Feedback and communication with agents	Person	Effective
11	Soft skills and empathy training for employees	Person	Implemented
12	Fast and effective response	Person	Maximized
13	Customization of solutions based on specific needs	Person	Improved

E. Determination of Absolute Importance Value and Relative Importance Value of Technical Requirements

In this level of technical importance, there are two levels of importance, namely absolute importance and relative importance (adjusted importance). This level of importance indicates which priority needs need to be implemented first. The absolute importance value is obtained from the following equation:

$$Kt = \sum_{i=1}^{n} Btix Hi$$

Notes :

Kt : absolute importance value for each attribute

Bti: weight of the relative importance of consumer desires (which has a relationship with existing technical needs attributes)

Hi: relationship value for consumer desires that have a relationship with existing technical needs attributes

Example of calculating the absolute importance value "Provision of up-to-date standard equipment and machines"

Kt = (61,6 x 9) + (39,4 x 9) = 239

Complete results can be seen in table 4.17 below.

Table 4.17 Absolute Importance Value of Technical Requirements

No	Technical Requirement	Absolute

		Interest
1	Training and job evaluation for employees	4304,13
2	Customer relationship management system	5586,854
3	Strategic location with easy access	798,732
4	Providing the latest standard equipment and machines	909
5	Work culture training	915,325
6	Standardize employee appearance	594,432
7	Real time customer complaint tracking system	2450,835
8	Job competency training	2833,227
9	Product quality assurance and certification system	798,028
10	Feedback and communication with agents	1146,931
11	Soft skills and empathy training for employees	3684,011
12	Fast and effective response	1586,433
13	Customization of solutions based on specific needs	1213,929

While the level of relative importance is obtained from the quotient between each absolute interest and the total number of absolute interests multiplied by 100%:

Relative importance = $\frac{Kti}{\sum Kt}$ x 100%

Notes :

Kti = Assess the absolute importance of technical requirements

ΣKt i = The total value of the absolute importance of technical requirements

Example of calculating the relative importance value "Provision of up-to-date standard equipment and machines"

Relative importance = $\frac{909}{26821,87}$ x 100% = 3,38%

The complete results of calculating relative importance values can be seen in table 4.18

Table 4.18 Relative Importance Value of Technical Requirements

No	Technical Requirement	Relative importance (%)
1	Training and job evaluation for employees	16,04
2	Customer relationship management system	20,82
3	Strategic location with easy access	2,97
4	Providing the latest standard equipment and machines	3,38

5	Work culture training	3,41
6	Standardize employee appearance	2,21
7	Real time customer complaint tracking system	9,13
8	Job competency training	10,56
9	Product quality assurance and certification system	2,97
10	Feedback and communication with agents	4,27
11	Soft skills and empathy training for employees	13,73
12	Fast and effective response	5,91
13	Customization of solutions based on specific needs	4,52

Thus, technical requirements that have a high priority value must receive special attention to be implemented. The results of ranking technical needs based on priority can be seen in table 4.19.

Table 4.19 Ranking of Technical Needs

Technical Requirement	**Priority**
Customer relationship management system	1
Training and job evaluation for employees	2
Soft skills and empathy training for employees	3
Job competency training	4
Real time customer complaint tracking system	5
Fast and effective response	6
Customization of solutions based on specific needs	7
Feedback and communication with agents	8
Work culture training	9
Providing the latest standard equipment and machines	10
Product quality assurance and certification system	11
Strategic location with easy access	12
Standardize employee appearance	13

F. Determining the Direction of Improvement of Technical Needs

In determining the direction of improvement, there are 5 symbols used, namely:

↑ The current technical situation will be better if it is improved, so that company targets can be achieved, such as being bigger and faster

 The current technical situation would be better if it was lowered, so that company targets could be achieved, such as being smaller and shorter

 The current technical situation is in line with the company's targets

 The current technical situation is in line with the company's targets. However, it would be even better if it was improved according to consumer wishes

 The current technical situation is in line with the company's targets. However, it would be even better if it was reduced according to consumer wishes

Directions for improvement of each technical need can be seen in table 4.20:

Table 4.20 Directions for Improvement of Technical Needs

No	Technical Requirement	Improvement Direction
1	Customer relationship management system	
2	Training and job evaluation for employees	
3	Soft skills and empathy training for employees	
4	Job competency training	
5	Real time customer complaint tracking system	
6	Fast and effective response	
7	Customization of solutions based on specific needs	
8	Feedback and communication with agents	
9	Work culture training	
10	Providing the latest standard equipment and machines	
11	Product quality assurance and certification system	
12	Strategic location with easy access	
13	Standardize employee appearance	

G. Determining Relationships Between Technical Requirements

The relationship pattern between technical requirements can be stated as follows:

1. Positive correlation, symbolized by ○, this relationship occurs when both technical needs support each other to meet consumer needs.
2. Negative correlation, symbolized by **x**, this relationship occurs when the two technical requirements do not support each other or conflict with achieving consumer desires.

By knowing the pattern of relationships between these technical needs, management can find out which technical needs can hinder each other, so that solutions must be sought. Meanwhile, technical needs that support each other can be implemented simultaneously. The pattern of synergistic relationships between technical needs and directions for improvement can be seen in Figure 4.7

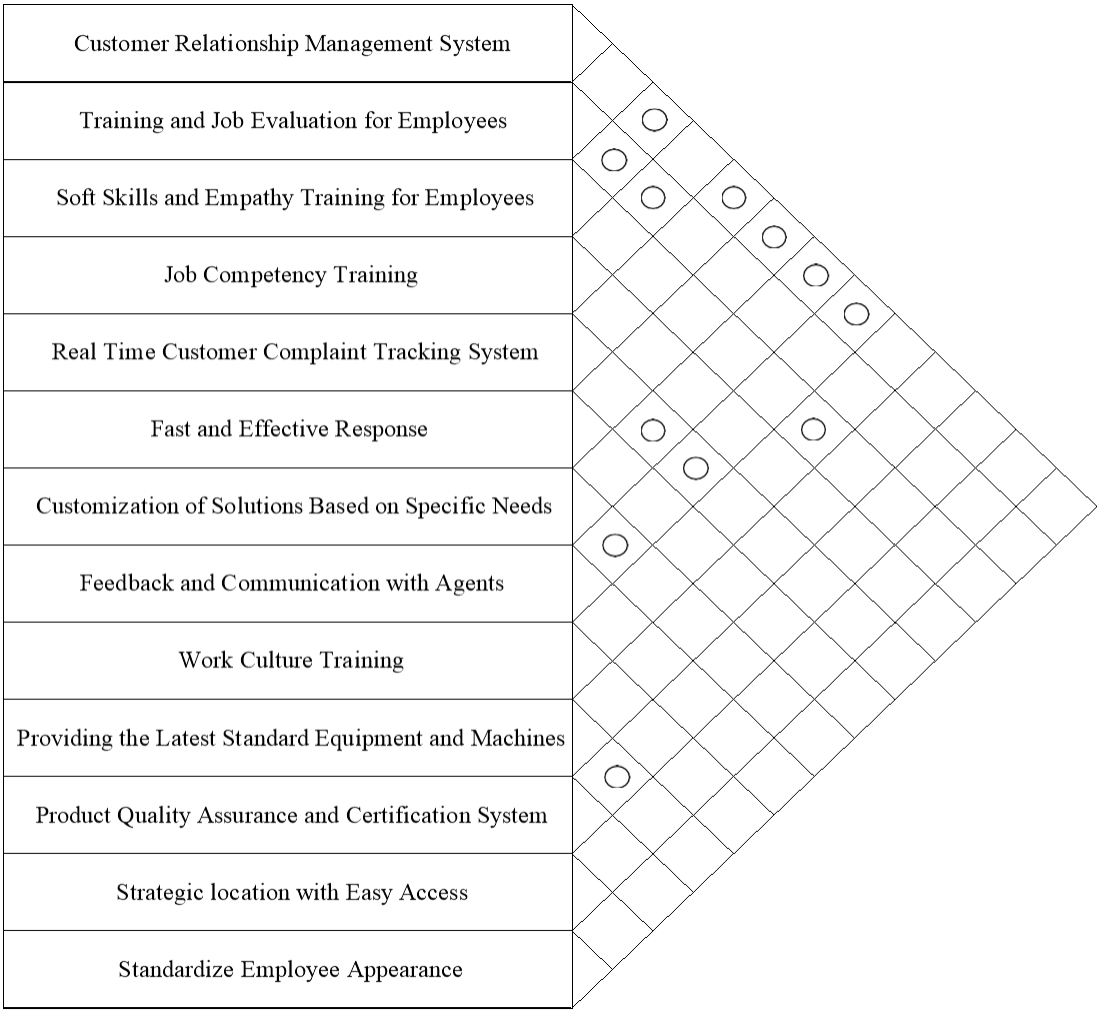
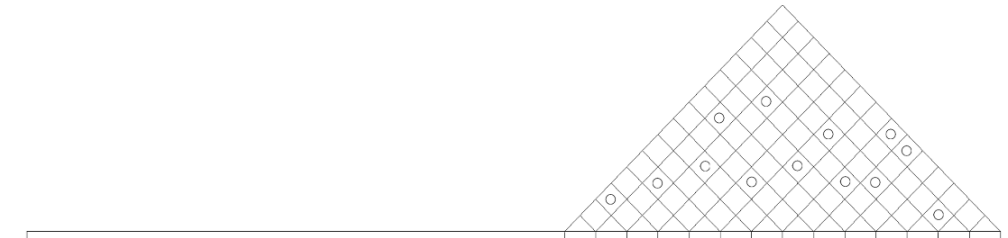


Figure 4.7. Synergy Relationship Between Technical Needs and Directions for Improvement



	Customer Requirement	Adjusted Importance Atribut	Training and Job Evaluation for Employees	Customer Relationship Management System	Strategic location with Easy Access	Providing the Latest Standard Equipment and Machines	Work Culture Training	Standardize Employee Appearance	Real Time Customer Complaint Tracking System	Job Competency Training	Product Quality Assurance and Certification System	Feedback and Communication with Agents	Soft Skills and Empathy Training for Employees	Fast and Effective Response	Customization of Solution Based on Specific Needs	GAP SCORE	IMPORTANCE LEVEL	CSS	PRIORITY
1	The location of PT Narmada Awet Muda is easy for customers to reach. (1)	88,7		△	●											-1,96	4	-88,748	1
2	The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology. (2)	61,6				●										-1,35	4	-61,614	9
3	Employee appearance is neat and dressed politely when on duty. (6)	66	○	△			●	●								-1,72	3	-66,048	3
4	Service that is fast, precise and responsive in responding. (10)	41,1	○	●					●				●	○		-1,11	3	-41,125	12
5	The company's ability to provide solutions to complaints or problems faced. (11)	53,3	●						●	●		○	△	●		-1,18	4	-53,336	11
6	The information provided by company staff is always accurate and reliable. (12)	39,8	●							●			●			-0,93	4	-39,766	19
7	The company fulfills the commitments or promises that have been mutually agreed upon. (13)	39,9	●								△	○				-1,06	3	-39,94	13
8	PT Narmada Awet Muda staff work quickly in serving customers. (14)	36,8	●	●			△		○	●				●		-1,01	3	-36,753	17
9	PT Narmada Awet Muda staff are easy to contact when you need help or clarification. (17)	63,7	●	●			△		●				○			-1,38	4	-63,7	7
10	How quickly the company resolves problems or complaints you raise. (18)	44,1	●	●					●	●		○		○		-1,02	4	-44,145	16
11	How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product. (19)	39,4		●		●					●					-1,06	3	-39,432	14
12	Guarantee that PT Narmada Awet Muda employees are able to carry out their work well. (23)	63,7	●							●						-1,47	4	-63,68	6
13	How confident are you that the company will be held responsible if an error or problem occurs with the product. (24)	44,1									●					-1	4	-44,8	18
14	The company always understands my needs and expectations as an agent. (25)	51,2		●								●	●			-1,36	3	-51,244	8
15	Company staff always takes the time to listen attentively to questions or concerns. (26)	73,5	○	●			○						●			-1,61	4	-73,48	4
16	The company always strives to provide solutions that suit my specific situation and needs. (27)	77,1		●						●		○			●	-1,54	4	-77,123	5
17	I feel valued as a business partner by this company. (28)	42,1		●								△	●			-1,06	3	-42,103	15
18	The company's staff always communicates in a friendly and empathetic manner. (29)	76,7	●	●									●			-1,74	4	-76,699	2
19	When there is a problem or challenge, I feel like the company is always by my side to help find a solution. (30)	57,8		●					●				●	●	●	-1,26	4	-57,758	10
	Target		Regular training and evaluations are held	Maximized	Ease of access	Availability of modern equipment	Guidance is provided	Neat and uniform	Fulfilled	Learning was held	Guaranteed	Effective	Implemented	Maximized	Improved				
	Absolute Importance		4304	5587	798,7	909	915,3	594,4	2451	2833	798	1147	3684	1586	1214				
	Relative Importance		16,04	20,82	2,97	3,38	3,41	2,21	9,13	10,56	2,97	4,27	13,73	5,91	4,52				
	Priority		2	1	12	10	9	13	5	4	11	8	3	6	7				

Figure 4.8 House of Quality of PT Narmada Awet Muda

4.3.6 Part Deployment Matrix

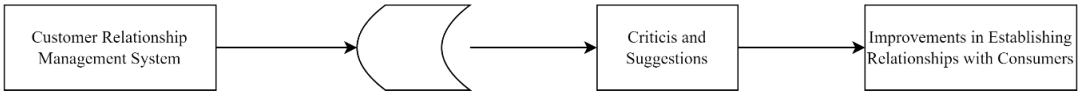
Requirements selected from the House of Quality matrix, in the part of deployment matrix will change to requirements to be listed as a row on the left of the house. Meanwhile, the column which is part of the roof is an identification of the part or component used to fulfill this technical requirement.

One way to identify critical parts is with fault tree analysis. With fault tree analysis, we will look for elements that are thought to be the cause of the target's non-conformity with technical requirements. The failure tree analysis can be seen in Figure 4.7, while the part of deployment matrix can be seen in Figure 4.8. The part specification in the part of deployment matrix contains specifications for the part to be developed which comes from the technical requirements selected from the first house. Column weights are the product of the importance rating and the relationship between technical requirements and critical part requirements. There are three relationships between technical requirements and critical part requirements, namely strong (scored 9), medium (scored 3) and weak (scored 1).

Before determining critical parts, a concept analysis is first made in which there are criteria which form a detailed formulation of PT Narmada Awet Muda service needs, namely:

1. Consumer needs, based on the House of Quality, technical needs can be determined that can be improved, namely:
    a. Customer Relationship Management System
    b. Training and job evaluation for employees
    c. Soft skills and empathy training for employees
    d. Real time customer complaint tracking system
    e. Standardize employee appearance
    f. Fast and effective response
2. Needs in terms of service, in this case there are several things that can be considered, namely all the service attributes in the House of Quality

However, these needs still need to be selected again, namely, needs that are important and related to consumers and the ability of the management or company to fulfill them.



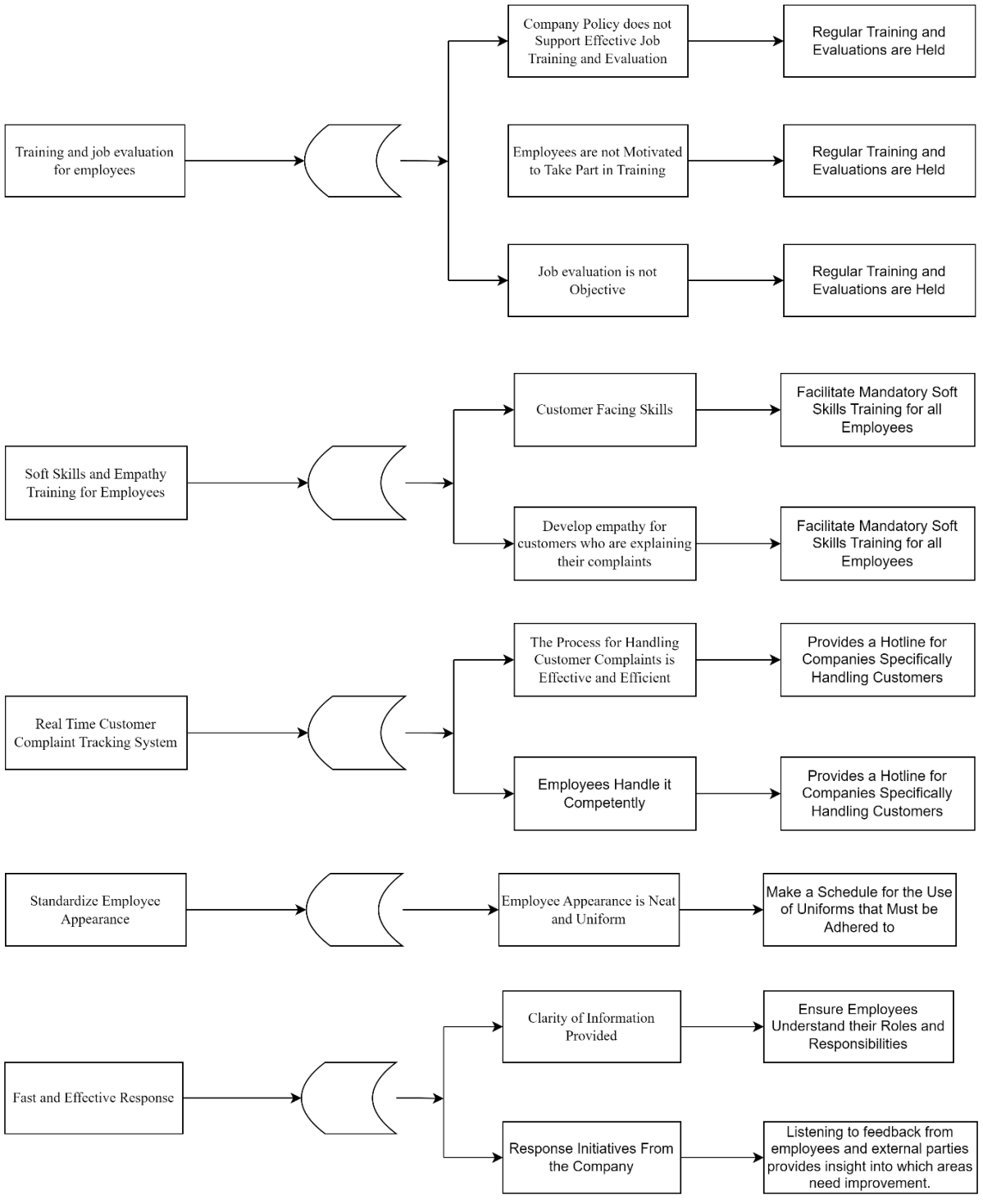


Figure 4.9 Fault Tree Analysis of PT Narmada Awet Muda

	Technical Requirements	Target	Importance Rating	Improvements in Establishing Relationships with Customer	Regular Training and Evaluations are Held	Facilitate Mandatory Soft Skills Training for all Employees	Provides a Hotline for Companies Specifically Handling Customers	Make a Schedule for the Use of Uniforms that Must be Adhered to	Ensure Employees Understand their Roles and Responsibilities	Listening to feedback from employees and external parties provides insight
1	Customer Relationship Management System	Maximized	8	●			●			○
2	Training and job evaluation for employees	Regular training and evaluations are held	9		●					
3	Soft skills and empathy training for employees	Implemented	9			●	○			
4	Real time customer complaint tracking system	Fulfilled	7				●			●
5	Standardize employee appearance	Neat and uniform	7					●		
6	Fast and effective response	Maximized	8						●	●
	Row Weights			72	81	81	162	63	72	159

Figure 4.10 Part Deployment Matrix of the Company

The weight value for each critical part deployment above can be determined using the same formula as the formula used to find the absolute importance value of the technical requirements contained in the initial section, namely as follows:

$$Kt = \sum_{i=1}^{n} BtixHi$$

Kt : absolute importance value for each attribute

Bti: weight of the relative importance of consumer desires (which has a relationship with existing technical needs attributes)

Hi: relationship value for consumer desires that have a relationship with existing technical needs attributes

The following is an example of calculating column weights for the critical part deployment "Regular Training and Evaluations are Held":

Kt = (8 x 9) = 72

Complete results can be seen in table 4.21

Table 4.21 Weight of Critical Part Deployment

No	Critical Part Deployment	Column Weight	Priority
1	Improvements in Establishing Relationships with Customer	72	5

2	Regular Training and Evaluations are Held	81	3
3	Facilitate Mandatory Soft Skills Training for all Employees	81	4
4	Provides a Hotline for Companies Specifically Handling Customers	162	1
5	Make a Schedule for the Use of Uniforms that Must be Adhered to	63	7
6	Ensure Employees Understand their Roles and Responsibilities	72	6
7	Listening to feedback from employees and external parties provides insight into which areas need improvement	159	2

CHAPTER V

DISCUSSION

5.1 Identify Service Attributes

After conducting interviews and observations at PT Narmada Awet Muda, we identified 30 service criteria that were considered important by consumers. These criteria are prepared based on 5 aspects of service quality, namely: tangibles, reliability, responsiveness, empathy and assurance. The following is a further explanation regarding each of the service criteria.

1. Tangibles, consisting of 7 service attributes, namely:
    1. The location of PT Narmada Awet Muda is easy for customers to reach.
       An easy-to-reach location not only makes interaction easier but also reflects the company's commitment to customer convenience.
    2. The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology.
       The provision of modern and sophisticated machines improves the quality of products and the Company's productivity.
    3. Vehicles delivering mineral water products are always in good condition and clean.
       Vehicles in prime condition affect the speed of product delivery, cleanliness is necessary to maintain product quality.
    4. The waiting room or area for receiving guests at this company office is clean, neat, comfortable and representative.
       The comfort of the service room must also be carefully considered by PT Narmada Awet Muda in order to create a positive impression and increase customer trust.
    5. The quality and packaging design of mineral water products provided by the Company is very good.
       High quality packaging with attractive designs reflects the company's dedication to ensuring customer satisfaction.
    6. Employee appearance is neat and dressed politely when on duty.
       Demonstrate professionalism and company concern in building good relationships with customers.
    7. Your assessment of the cleanliness and maintainability of the mineral water company office facilities.

2. Reliability, consisting of 6 service attributes, namely:
    8. PT Narmada Awet Muda is consistent in sending mineral water orders on time.
    9. The mineral water products received always comply with the specifications and quality promised.

       The company has high standards and ensures that customers get what they expect.
    10. Service that is fast, accurate and responsive in responding.
    11. The company's ability to provide solutions to complaints or problems faced.
    12. Information submitted by company staff is always accurate and reliable.
    13. The company fulfills the commitments or promises that have been mutually agreed upon.

3. Responsiveness, consisting of 5 service attributes, namely:
    14. PT Narmada Awet Muda staff work quickly in serving customers.
    15. PT Narmada Awet Muda staff work quickly in serving customers.
    16. PT Narmada Awet Muda staff responds quickly to handling customer complaints.
    17. PT Narmada Awet Muda staff are easy to contact when you need help or clarification.
    18. How quickly the company resolves the problems or complaints you raise.

       Speed and efficiency in resolving problems shows that the company has good procedures and a strong commitment to maintaining customer trust.

4. Assurance, consisting of 6 service attributes, namely:
    19. How confident are you that this mineral water company has the knowledge and expertise necessary to provide a quality product.
    20. How confident you are that the company will handle your personal information and business data with confidentiality and security.
    21. How do you assess the company's ability to provide guarantees for the quality of the products supplied.
    22. Do you feel that the company has high standards of ethics and integrity in running its business.

       Related to employee courtesy and company integrity towards customers.
    23. Guarantee that PT Narmada Awet Muda employees able to carry out their work well.

The company has competent staff who can be trusted to provide quality services or products.

24. How confident are you that the company will be held responsible if an error or problem occurs with the product.

5. Empathy, consisting of 5 service attributes, namely:
    25. The company always understands my needs and expectations as an agent.
    26. Company staff always take time to listen attentively to questions or concerns.
    27. The company always strives to provide solutions that suit my specific situation and needs.
    28. I feel valued as a business partner by this company.
    29. Company staff always communicate in a friendly and empathetic manner.
    30. When there is a problem or challenge, I feel like the company is always by my side to help find a solution.

5.2 Servqual and Neutrosophic Analysis

The quality performance of service attributes is basically service quality, namely how far existing services can satisfy the needs of service users or consumers. To determine the quality performance of PT Narmada Awet Muda service attributes, it is carried out using the Servqual method, namely dividing service attributes into 5 dimensions, namely Tangibles, Reliability, Responsiveness, Empathy and Assurance. Furthermore, the five service attributes with each question attribute will be measured using neutrosophic AHP by dividing it into 3 assessment criteria, namely measuring Correctness (perception), Incorrectness (expectations) and Uncertainty. The assessment of these three criteria totals 1 or here we use percentages to make it easier for customers to fill out the questionnaire, by integrating the Neutrosophic AHP assessment into servqual, vague, inconsistent and incomplete information regarding the statements given by considering the degree of truth, uncertainty and falsity in detail. the whole can be interpreted accurately.

Next, you can find out the gap score or Servqual score (gap score) for each attribute. The gap score is obtained from the Correctness score minus the Incorrectness score. From the 30 service attributes, the priority attributes for improvement were then selected based on the average gap score, namely service attributes that had a gap value below -0.853. 19 service attributes were selected, namely:

1. The location of PT Narmada Awet Muda is easy for customers to reach (strategic with easy access) (Gap score -1.96).
2. Company staff always communicate in a friendly and empathetic manner (employee ethics and politeness) (Gap score -1.74).
3. Employee appearance is neat and dressed politely when on duty (Gap score -1.72).
4. Company staff always take the time to listen to questions or concerns attentively (Gap score -1.61).
5. The company always tries to provide solutions that suit my specific situation and needs (Gap score -1.54).
6. Guarantee that PT Narmada Awet Muda employees able to carry out their work well (Gap score -1.47).
7. PT Narmada Awet Muda staff are easy to contact when you need help or clarification (Gap score -1.38).
8. The company always understands my needs and expectations as an agent (Gap score -1.36).
9. The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology (Gap score -1.35).
10. When there is a problem or challenge, I feel like the company is always by my side to help find a solution (Gap score -1.26).
11. The company's ability to provide solutions to complaints or problems faced (Gap score -1.18).
12. Service that is fast, accurate and responsive in responding (Gap score -1.11).
13. The company fulfills the commitments or promises that have been mutually agreed upon (Gap score -1.06).
14. How confident are you that this mineral water company has the knowledge and expertise necessary to provide quality products (Gap score -1.06).
15. I feel valued as a business partner by this company (Gap score -1.06).
16. How quickly does the company resolve the problem or complaint you raised (Gap score -1.02).
17. PT Narmada Awet Muda staff work quickly in serving customers (Gap score -1.01).
18. How confident are you that the company will be responsible if an error or problem occurs with the product (Gap score -1).
19. Information submitted by company staff is always accurate and reliable (Gap score -0.93).

The data obtained shows that the gap score for 19 service attributes is still negative. This indicates that in general (overall), the services provided by the company have not satisfied

consumers. Service can be said to be satisfactory if the gap score is positive. If the gap score is negative, it means that the quality of service has not been able to satisfy user needs. Meanwhile, if the gap score is zero, it means that the quality of service is in line with consumer expectations. For the Gap score which has the highest value, namely, the location of PT Narmada Awet Muda which is easily accessible to customers at –1.96 gets the main attention because the factor of ease of access is very determining in terms of consumer assessment of services at PT Narmada Awet Muda.

5.3 Analysis of Priority Improvements to PT Narmada Awet Muda Service Quality Attributes

Determining the Importance rating in the House of Quality (HOQ) using the Servqual and Neutrosophic methods can provide priority results for improving service quality attributes that are closer to consumer desires, because it takes into account the level of uncertainty and the gap between Correctness and Incorrectness in the service perceived by consumers.

5.4 Service Quality Improvement Analysis

5.4.1 House of Quality Analysis

In general, the House of Quality consists of 2 (two) main parts. First, the horizontal side, which contains information related to customers. The second is the vertical side which contains engineering information that responds to input from customers.

The parts placed on the horizontal side include:

a. Characteristics of consumer needs attributes, which are the basic input for building QFD
b. The level of consumer interest is indicated by the scale value.
c. PT Narmada Awet Muda performance level and customer expectations

Meanwhile, the parts placed on the vertical side include:

a. Engineering needs designed to meet consumer needs
b. The relationship between consumer needs and engineering needs
c. Relationship between engineering requirements
d. Target engineering needs
e. Absolute importance and relative importance

From figure 4.6 House of Quality or house of quality it can be seen what consumer needs are as well as their importance values, the performance of the company's technical needs and their expectations, the values of absolute importance and relative importance, the technical

needs required and their relationship to consumer needs as well as the relationship between each -each technical need, priority technical needs, are all reflected in the quality house. By looking at the quality house, it will make it easier for the company, especially management, to analyze the things needed for improvement efforts.

5.4.2 Discussion on Translating Consumer Needs into Technical Needs

When translating/determining technical needs, it is necessary to consider the capabilities and resources owned by the company. Determination of technical needs was obtained from interviews with PT Narmada Awet Muda. Technical Response is the translation of service attributes into organizational language. From the interview process with PT Narmada Awet Muda, there were 13 technical responses, namely:

1. Customer Relationship Management System

   A Customer Relationship Manager system that is running well will make it easier for customers to obtain satisfactory service. PT Narmada Awet Muda needs to improve the current Customer Relationship Manager System in order to increase consumer satisfaction.

2. Training and Job Evaluation for Employees

   PT Narmada Awet Muda realizes the importance of ensuring employees have the skills and knowledge necessary to carry out their duties. Therefore, the company provides regular training to improve employee competence, both in terms of technical and interpersonal skills. Additionally, regular evaluation sessions are conducted to identify areas of improvement and provide constructive feedback. This evaluation is not only about assessing performance, but also about listening to employees' concerns, giving praise for achievements, and helping them with career development. This creates a supportive and motivating work environment, where employees feel valued and play an important role in the company's success.

3. Soft skills and empathy training for employees

   Although hard skills are an important aspect of employee training, PT Narmada Awet Muda also recognizes the importance of soft skills. Skills such as communication, teamwork, and problem solving are often as important as technical expertise. Therefore, soft skills training is an integral part of employee development programs. One of the soft skills that is highly emphasized is empathy. In the service industry, the ability to understand and feel what customers feel is essential. With empathy training, employees are equipped with the tools they need to listen better, respond with more care, and overall provide better service.

4. Job Competency Training

   To ensure high quality products and superior customer service, PT Narmada Awet Muda provides intensive job competency training to employees. This training is designed to provide an in-depth understanding of production processes, quality standards, and the latest techniques and tools used in the industry. With regular job competency training, the company ensures that employees are always updated with the latest developments and best practices in the industry. This not only increases productivity but also ensures that customers get the best products and services that meet or even exceed their expectations.

5. Real Time Customer Complaint Tracking System

   PT Narmada Awet Muda implements a real time customer complaint tracking system to ensure that every complaint or problem submitted by customers is handled immediately. This system allows companies to monitor complaints from the point of entry, through the handling process, to resolution, ensuring that no complaint is missed or ignored. Using the latest technology, this system also provides analytical reports that allow companies to identify areas that need improvement. This helps in continuous improvement and increases customer satisfaction in the Long term.

6. Fast and Effective Response

   Speed and effectiveness of response is one of the pillars of PT Narmada Awet Muda customer service. The company realizes that in the competitive business world, responding quickly and precisely to customer needs is the key to building lasting relationships. Therefore, the company trains its staff to provide immediate and accurate solutions. Whether it's via phone call, email, or social media, every communication channel is optimized to provide fast and responsive service.

7. Customize Solutions Based on Specific Needs

   Every customer has unique needs and expectations. PT Narmada Awet Muda recognizes the importance of approaching each case or question with a deep understanding of the specific context. Therefore, the company strives to provide customized solutions to meet customers' specific needs. This reflects the customer-centric approach adopted by the company, where customer satisfaction and a deep understanding of their needs are put at the heart of every decision and action.

8. Feedback and Communication with Agents

   Feedback from agents is a valuable asset for PT Narmada Awet Muda. Agents, who are on the front lines of the business, provide critical insights into the market, trends and

customer needs. Therefore, the company maintains regular communication with agents to get feedback and ensure that they are well supported. In addition, the company holds regular meetings and special training sessions for agents, keeping them up to date on the company's products and strategies, as well as giving them the opportunity to share experiences and challenges.

9. Work Culture Training

   Work culture influences every aspect of an organization, from day-to-day employee interactions to the way a company handles problems. PT Narmada Awet Muda provides work culture training to ensure that every employee understands and applies the company's values, principles and norms in their daily actions.

10. Provision of Latest Standard Equipment and Machinery

    Latest technology has an important role in increasing efficiency and product quality at PT Narmada Awet Muda. By investing in technologically advanced equipment and machines, companies can ensure that their production processes run smoothly, precisely and consistently. In addition to increasing productivity, state-of-the-art equipment also minimizes errors and waste. This commitment reflects the company's dedication to innovation and excellence. By continuously updating technology, PT Narmada Awet Muda shows that they strive to provide the best for customers and remain at the forefront of the industry.

11. Product Quality Assurance and Certification System

    Product quality and safety is PT Narmada Awet Muda main priority. Therefore, the company has implemented a strict quality assurance system to ensure each product meets established standards. This process involves routine testing, inspection, and monitoring throughout the production cycle. In addition, to increase customer trust, the company also obtained certification from external institutions that recognize the quality standards of their products. This shows that the products produced not only meet the company's internal standards, but also recognized industry standards.

12. Strategic Location with Easy Access

    The company's location in a strategic place makes it easier for customers, business partners and suppliers to access it. By being located in commercial centers or main transportation access, PT Narmada Awet Muda ensures that they are easy to reach and efficient in logistics. Strategic locations also provide competitive advantages, allowing companies to respond quickly to market demands, reduce delivery times, and provide better customer service.

13. Standardize Employee Appearance

    Employee appearance is a visual representation of the company in the eyes of the public and customers. PT Narmada Awet Muda sets appearance standards to ensure that all employees appear professional, neat and in line with the company's image. This standardization reflects the company's identity and values, creating a strong first impression on customers and business partners. It also promotes a sense of pride and unity among employees, showing that they are part of a united and dedicated team.

5.4.3 Analysis of Service Quality Improvement

In this research, the research focus is on service quality in companies which will lead to customer satisfaction, but it cannot be denied that to lead to the best service quality, companies need to also consider the costs that will be incurred. With the number of technical requirements that have been found and are quite large, the company will of course choose which ones to apply to the company considering that the large costs that will be incurred will also have an impact on the price of the product that will be sold. Good service quality will of course be directly proportional to the price of the products offered by the Company. In this research, consideration of costs is indeed important, but here further discussion regarding costs is not discussed further due to limited research topics that only discuss customer satisfaction at PT Narmada Awet Muda Lombok.

5.5 Part Deployment Matrix Analysis

Based on the Fault Tree Analysis and Part Deployment Matrix, there are several alternative corrective actions that can be taken. However, the researcher chose between corrective actions that were very technical in nature and could be carried out directly by management and corrective actions that were considered important and needed to be researched or studied further so that they were included in the Critical Part Deployment.

The corrective actions, which in this case are very technical in nature and can be carried out directly by management, are as follows:

a. Customer Relationship Management System
b. Training and job evaluation for employees
c. Soft skills and empathy training for employees
d. Real time customer complaint tracking system
e. Standardize employee appearance
f. Quick and effective response

The engineering requirements obtained from the House of Quality matrix in the Part Deployment matrix change to requirements to be listed as a row on the left side of the house of quality.

Meanwhile, the column which is the bottom of the roof of the house is an identification of the part used to meet technical needs which will be used as a proposal for the company and management to improve services, namely:

1. Improvements in Establishing Relationships with Customer

   Quality customer relationships define business success in the long term. In today's digital era, these relationships are not only built through direct interaction, but also through digital platforms. PT Narmada Awet Muda, by implementing a sophisticated CRM system, enables deeper interactions with customers, from getting to know customer preferences to understanding their purchasing patterns. This way, every communication with customers can be more personal and relevant, ensuring that customers feel valued and cared for. Additionally, with available data, companies can be more proactive in offering solutions or products that match customer needs, increasing the opportunity for retention and repeat business.

2. Regular Training and Evaluations are Held

   Education and continuous learning are at the heart of growth and innovation. PT Narmada Awet Muda, realizing this, must build a training culture that is integrated into the work routine of its employees. Conducting regular training not only improves employee skills but also ensures that the team is always up to date with the latest industry trends. Evaluations conducted after each training session provide a holistic picture of the training's effectiveness, allowing HR and management to make adjustments based on feedback. Apart from that, performance evaluations also encourage employees to continue to hone their skills and knowledge, ensuring that they always provide the best for the company and customers.

3. Facilitate Mandatory Soft Skills Training for all Employees

   Beyond technical skills, soft skills play an important role in creating a collaborative and productive work environment. Soft skills training for employees, such as communication, conflict management, and leadership, allows teams to work more synergistically and handle challenging situations more effectively. For a company like PT Narmada Awet Muda that relies heavily on customer interaction, employees who have empathy and good communication skills can make a big difference in service quality.

4. Provides a Hotline for Companies Specifically Handling Customers

   In serving customers, responsiveness is key. With a special hotline, PT Narmada Awet Muda shows its dedication to always being there for its customers. This hotline not only handles complaints but also serves as a channel for information and questions from customers. This ensures that customers always get answers or solutions quickly, increasing customer satisfaction.

5. Make a Schedule for the Use of Uniforms that Must be Adhered to

   Consistency in appearance is an important part of a company's brand image and identity. By establishing a uniform usage schedule, PT Narmada Awet Muda ensures that all employees represent the company in a uniform and professional manner in every interaction with customers. Neat and standard uniforms not only improve the company's image in the eyes of customers, but also improve employee morale because they feel part of a well-organized team.

6. Ensure Employees Understand their Roles and Responsibilities

   A deep understanding of roles and responsibilities is the main key to operational success in every company. PT Narmada Awet Muda must ensure that each employee is given adequate orientation and training related to their duties. Thus, employees can work more efficiently and effectively, reduce errors and increase productivity. This also ensures that customers receive consistent service that meets the company's quality standards at all times.

7. Listening to feedback from employees and external parties provides insight into which areas need improvement

   Constant learning is one of the keys to business sustainability. PT Narmada Awet Muda, by accepting and considering input from employees and external parties, has a golden opportunity to understand business aspects that can be improved. Employees, who are on the front lines, often understand operational challenges better, while external parties, such as customers or business partners, can provide new perspectives that the company may not have thought of yet. Every feedback is a valuable asset that can be used as a basis for innovation and continuous improvement.

CHAPTER VI

CONCLUSION & RECOMMENDATION

6.1 Conclusion

Based on the results of research regarding the level of performance and customer interests at PT Narmada Awet Muda, the following conclusions can be drawn:

1. Service attributes that are consumer needs to be developed by PT Narmada Awet Muda, namely: 1. Location of PT Narmada Awet Muda which is easy to reach by customers (strategic with easy access) (Gap score -1.96), 2. Company staff always communicate in a friendly and empathetic way (employee ethics and politeness) (Gap score -1.74), 3.Employees appear neat and dress politely when on duty (Gap score -1.72), 4.Company staff always give time to listen to questions or concerns attentively (Gap score -1.61), 5. The company always strives to provide solutions that suit my specific situation and needs (Gap score -1.54), 6. Guarantee that PT Narmada Awet Muda employees are able to carry out work well (Gap score -1.47), 7. PT Narmada Awet Muda staff are easy to contact when you need help or clarification (Gap score -1.38), 8. The company always understands my needs and expectations as an agent (Gap score -1.36), 9.The equipment and machines used by PT Narmada Awet Muda use the latest and most up-to-date technology (Gap score -1.35), 10.When there are problems or challenges, I feel the company is always by my side to help finding solutions (Gap score -1.26), 11. The company's ability to provide solutions to complaints or problems faced (Gap score -1.18), 12. Service that is fast, accurate and responsive in responding (Gap score -1.11), 13. The company fulfills the commitments or promises that have been mutually agreed upon (Gap score -1.06), 14. How confident are you that this mineral water company has the knowledge and expertise needed to provide quality products (Gap score -1.06) , 15.I feel appreciated as a business partner by this company (Gap score -1.06), 16.How quickly does the company resolve the problem or complaint you raised (Gap score -1.02), 17.The staff of PT Narmada Awet Muda work quickly in serving customers (Gap score -1.01), 18. How much confidence do you have that the company will be responsible if an error or problem occurs with the product (Gap score -1), 19. The information conveyed by company staff is always accurate and reliable (Gap score -0.93).

2. Service variables that are considered important by customers can be seen from the relative importance value (Adjusted Importance) from largest to smallest, namely: (1) Customer Relationship Management System (Adjusted Importance 20.8%), (2) Job training and evaluation for employees (Adjusted Importance 16.04%), (3) Soft skills and empathy training for employees (Adjusted Importance 13.7%), (4) Work competency training (Adjusted Importance 10.5%), (5) Real time customer complaint tracking system (Adjusted Importance 9.13%), (6) Fast and effective response (Adjusted Importance 5.91%), (7) Adjustment of solutions based on specific needs (Adjusted Importance 4.52%) , (8) Feedback and communication with agents (Adjusted Importance 4.27%), (9) Work culture training (Adjusted Importance 3.41%), (10) Provision of up-to-date standard equipment and machines (Adjusted Importance 3.38%) , (11) Product quality assurance and certification system (Adjusted Importance 2.97%), (12) Strategic location with easy access (Adjusted Importance 2.97%), (13) Standardization of employee appearance (Adjusted Importance 2.21%) .
3. Priority actions that need to be taken to improve the service quality of PT Narmada Awet Muda are: (1) Improvements in Establishing Relationships with Customers, (2) Regular Training and Evaluations are Held, (3) Facilitate Mandatory Soft Skills Training for all Employees, (4) Provides a Hotline for Companies specifically Handling Customers, (5) Make a Schedule for the Use of Uniforms that Must be Adhered to, (6) Ensure Employees Understand their Roles and Responsibilities, (7) Listen to feedback from employees and external parties provides insight into which areas need improvement.

6.2 Recommendation

In conducting research, there are several research limitations that can influence the research results and are expected to be corrected by future research. Therefore, more reliable results regarding this study could be improved if other variables were considered. So suggestions that can be used as a reference for further research that has a similar topic are expected to be able to develop this research with other variables so that we can look at conditions other than using the variables used in this research. The following suggestions that researchers can give based on the research results are:

1. For further research

For research that aims to determine the priority order for improvements, the integration of Servqual, Neutrosophic and QFD methods can be an alternative method for measuring customer satisfaction with service performance and providing suggestions for improvements that companies need to make to improve service quality. It is hoped that in future research, researchers can consider the costs, both the costs incurred by the company for better quality service to customers and the costs incurred by customers for products with optimal service obtained from the company. Apart from that, research may be able to use different servqual research variables such as credibility, competence, communication etc. In the hope of obtaining more reliable results regarding this research if other variables are considered.

2. For the company

PT Narmada Awet Muda must pay more attention to things that consumers consider important by continuing to improve services or maintain and improve the quality of its services. It is hoped that the results of this research can provide input and evaluation for companies to help determine strategies that are more oriented towards improving service quality and consumer satisfaction.

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APPENDIX

KUESIONER

Integration of Customer Satisfaction Measurement Model Using Service Quality and Quality Function Deployment with Neutrosophic AHP Methods
(Case Study at PT Narmada Awet Muda, Lombok)

Assalamualaikum Wr.Wb
Kepada Yth:
Bapak/Ibu/Sdr/Sdri Responden

Dengan hormat,

Sehubungan dengan penelitian yang dilakukan untuk menyelesaikan Tugas Akhir Program Strata-1 Teknik Industri di Universitas Islam Indonesia Yogyakarta, saya memohon kesediaan Bapak/Ibu/Sdr/Sdri Responden untuk meluangkan waktu dalam mengisi kuesioner. Mohon kuesioner diisi sesuai dengan apa yang diperoleh/dilihat di lapangan. Kuesioner ini digunakan untuk mendapatkan data tentang tingkat harapan dan persepsi dari PT Narmada Awet Muda selama ini dalam melayani customernya, guna meningkatkan kualitas pelayanan pada perusahaan, sehingga akan terpenuhi keinginan Bapak/Ibu/Sdr/Sdri sebagai konsumen PT. Narmada Awet Muda, Lombok.

Baca dengan teliti butir pertanyaan dan petunjuk-petunjuk lainnya. Setiap jawaban yang anda berikan merupakan bantuan yang tidak ternilai harganya bagi penelitian ini.
Atas kesediaan dan kerjasamanya, Saya ucapkan terima kasih.
Wassalamualaikum Wr.Wb

Hormat saya,
Peneliti

Sri Cempaka

I. Data Responden

Usia :

Pendidikan :

Pekerjaan :

II. Pernyataan Persepsi dan Harapan Pelanggan

Beri tanda silang (X) pada salah satu skala yang tersedia untuk Skala Layanan maupun Skala Harapan pada setiap pernyataan yang ada.

- Skala Persepsi = Tingkat penilaian pelanggan terhadap layanan yang telah dirasakan atau diperoleh
- Skala Harapan = Tingkat penilaian layanan ideal yang diinginkan atau diminta konsumen (harapan)

Keterangan:

Skala Jawaban

Angka	Keterangan
1	Tidak Puas
2	Kurang Puas
3	Cukup Puas
4	Puas
5	Sangat Puas

No.	Pernyataan	Pilihan Jawaban Anda									
I	Tangible	Skala Persepsi					Skala Harapan				
		TP	KP	CP	P	SP	TP	KP	CP	P	SP
1	Lokasi PT Narmada awet muda yang mudah dicapai oleh pelanggan.	1	2	3	4	5	1	2	3	4	5
2	Peralatan dan mesin yang digunakan PT Narmada awet muda menggunakan teknologi yang mutakhir dan terkini.	1	2	3	4	5	1	2	3	4	5
3	Kendaraan pengiriman produk air mineral selalu dalam kondisi yang baik dan bersih.	1	2	3	4	5	1	2	3	4	5
4	Ruang tunggu atau area menerima tamu di kantor perusahaan ini bersih, rapi, nyaman dan representative.	1	2	3	4	5	1	2	3	4	5

5	Kualitas dan desain kemasan produk air mineral yang disediakan oleh Perusahaan sangat baik.	1	2	3	4	5	1	2	3	4	5
6	Penampilan karyawan yang rapi dan berpakaian sopan saat bertugas.	1	2	3	4	5	1	2	3	4	5
7	penilaian Anda terhadap kebersihan dan keterawatan fasilitas kantor perusahaan air mineral.	1	2	3	4	5	1	2	3	4	5
II	**Reliability**										
8	PT Narmada awet muda konsisten dalam mengirimkan pesanan air mineral tepat waktu.	1	2	3	4	5	1	2	3	4	5
9	Produk air mineral yang diterima selalu sesuai dengan spesifikasi dan kualitas yang dijanjikan.	1	2	3	4	5	1	2	3	4	5
10	Pelayanan yang cepat tepat dan tanggap dalam merespons.	1	2	3	4	5	1	2	3	4	5
11	Kemampuan perusahaan dalam memberikan solusi atas keluhan atau masalah yang dihadapi.	1	2	3	4	5	1	2	3	4	5
12	Informasi yang disampaikan oleh staf perusahaan selalu akurat dan dapat diandalkan.	1	2	3	4	5	1	2	3	4	5
13	Perusahaan memenuhi komitmen atau janji yang telah disepakati bersama.	1	2	3	4	5	1	2	3	4	5
III	**Responsiveness**										
14	Staf PT Narmada awet muda bekerja dengan cepat dalam melayani pelanggan.	1	2	3	4	5	1	2	3	4	5
15	Staf PT Narmada awet muda selalu bersedia memberikan bantuan kepada pelanggan jika pelanggan memerlukan bantuan.	1	2	3	4	5	1	2	3	4	5
16	Staf PT Narmada awet muda merespon cepat tanggap terhadap penanganan keluhan pelanggan.	1	2	3	4	5	1	2	3	4	5
17	Staf PT Narmada awet muda mudah dihubungi saat Anda membutuhkan bantuan atau klarifikasi.	1	2	3	4	5	1	2	3	4	5
18	Seberapa cepat perusahaan menyelesaikan masalah atau keluhan yang Anda ajukan.	1	2	3	4	5	1	2	3	4	5

IV	Assurance										
19	Seberapa yakin Anda bahwa perusahaan air mineral ini memiliki pengetahuan dan keahlian yang diperlukan untuk menyediakan produk berkualitas.	1	2	3	4	5	1	2	3	4	5
20	Seberapa percaya Anda bahwa perusahaan akan menangani informasi pribadi dan data bisnis Anda dengan kerahasiaan dan keamanan.	1	2	3	4	5	1	2	3	4	5
21	Bagaimana Anda menilai kemampuan perusahaan dalam memberikan jaminan atas kualitas produk yang disuplai.	1	2	3	4	5	1	2	3	4	5
22	Apakah Anda merasa bahwa perusahaan memiliki standar etika dan integritas yang tinggi dalam menjalankan bisnisnya.	1	2	3	4	5	1	2	3	4	5
23	Jaminan karyawan PT Narmada awet muda mampu melaksanakan pekerjaan dengan baik.	1	2	3	4	5	1	2	3	4	5
24	Seberapa besar keyakinan Anda bahwa perusahaan akan bertanggung jawab jika terjadi kesalahan atau masalah dengan produk.	1	2	3	4	5	1	2	3	4	5
V	Empathy										
25	perusahaan selalu memahami kebutuhan dan harapan saya sebagai agen.	1	2	3	4	5	1	2	3	4	5
26	Staf perusahaan selalu memberikan waktu untuk mendengarkan pertanyaan atau kekhawatiran dengan penuh perhatian.	1	2	3	4	5	1	2	3	4	5
27	Perusahaan selalu berupaya memberikan solusi yang sesuai dengan situasi dan kebutuhan spesifik saya.	1	2	3	4	5	1	2	3	4	5
28	Saya merasa dihargai sebagai mitra bisnis oleh perusahaan ini.	1	2	3	4	5	1	2	3	4	5
29	Staf perusahaan selalu berkomunikasi dengan cara yang ramah dan empatik.	1	2	3	4	5	1	2	3	4	5
30	Saat ada masalah atau tantangan, saya merasa perusahaan selalu berada di sisi saya untuk membantu menemukan solusi.	1	2	3	4	5	1	2	3	4	5

III. Penilaian Neutrosophic

Petunjuk Pengisian Kuesioner:

Isilah kolom table pada table dibawah ini dengan total keseluruhan dari nilai True, False dan Ketidakpastiannya menjadi 100%

True = menggambarkan derajat kebenaran dari suatu pernyataan

False = menggambarkan derajat ketidakbenaran atau kebohongan dari suatu pernyataan

Ketidakpastian (I) = mewakili derajat ketidakpastian atau ambiguitas dari pernyataan

No.	Pernyataan	True	False	Ketidakpastian
I	***Tangible***			
1	Lokasi PT Narmada awet muda yang mudah dicapai oleh pelanggan.			
2	Peralatan dan mesin yang digunakan PT Narmada awet muda menggunakan teknologi yang mutakhir dan terkini.			
3	Kendaraan pengiriman produk air mineral selalu dalam kondisi yang baik dan bersih.			
4	Ruang tunggu atau area menerima tamu di kantor perusahaan ini bersih, rapi, nyaman dan representative.			
5	Kualitas dan desain kemasan produk air mineral yang disediakan oleh Perusahaan sangat baik.			
6	Penampilan karyawan yang rapi dan berpakaian sopan saat bertugas.			
7	penilaian Anda terhadap kebersihan dan keterawatan fasilitas kantor perusahaan air mineral.			
II	***Reliability***			
8	PT Narmada awet muda konsisten dalam mengirimkan pesanan air mineral tepat waktu.			
9	Produk air mineral yang diterima selalu sesuai dengan spesifikasi dan kualitas yang dijanjikan.			
10	Pelayanan yang cepat tepat dan tanggap dalam merespons.			
11	Kemampuan perusahaan dalam memberikan solusi atas			

	keluhan atau masalah yang dihadapi.			
12	Informasi yang disampaikan oleh staf perusahaan selalu akurat dan dapat diandalkan.			
13	Perusahaan memenuhi komitmen atau janji yang telah disepakati bersama.			
III	***Responsiveness***			
14	Staf PT Narmada awet muda bekerja dengan cepat dalam melayani pelanggan.			
15	Staf PT Narmada awet muda selalu bersedia memberikan bantuan kepada pelanggan jika pelanggan memerlukan bantuan.			
16	Staf PT Narmada awet muda merespon cepat tanggap terhadap penanganan keluhan pelanggan.			
17	Staf PT Narmada awet muda mudah dihubungi saat Anda membutuhkan bantuan atau klarifikasi.			
18	Seberapa cepat perusahaan menyelesaikan masalah atau keluhan yang Anda ajukan.			
IV	***Assurance***			
19	Seberapa yakin Anda bahwa perusahaan air mineral ini memiliki pengetahuan dan keahlian yang diperlukan untuk menyediakan produk berkualitas.			
20	Seberapa percaya Anda bahwa perusahaan akan menangani informasi pribadi dan data bisnis Anda dengan kerahasiaan dan keamanan.			
21	Bagaimana Anda menilai kemampuan perusahaan dalam memberikan jaminan atas kualitas produk yang disuplai.			
22	Apakah Anda merasa bahwa perusahaan memiliki standar etika dan integritas yang tinggi dalam menjalankan bisnisnya.			
23	Jaminan karyawan PT Narmada awet muda mampu melaksanakan pekerjaan dengan baik.			
24	Seberapa besar keyakinan Anda bahwa perusahaan akan bertanggung jawab jika terjadi kesalahan atau masalah dengan produk.			

V	*Empathy*			
25	perusahaan selalu memahami kebutuhan dan harapan saya sebagai agen.			
26	Staf perusahaan selalu memberikan waktu untuk mendengarkan pertanyaan atau kekhawatiran dengan penuh perhatian.			
27	Perusahaan selalu berupaya memberikan solusi yang sesuai dengan situasi dan kebutuhan spesifik saya.			
28	Saya merasa dihargai sebagai mitra bisnis oleh perusahaan ini.			
29	Staf perusahaan selalu berkomunikasi dengan cara yang ramah dan empatik.			
30	Saat ada masalah atau tantangan, saya merasa perusahaan selalu berada di sisi saya untuk membantu menemukan solusi.			

Appendix 1. Validity Test Output with SPSS 23 for Windows

Case Processing Summary

		N	%
Cases	Valid	50	100.0
	Excluded[a]	0	.0
	Total	50	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.861	30

This means that Cronbach's above is = That the variation formed is 86% of the true value and 14% error

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
X01	106.0200	68.469	.364	.857
X02	106.2400	67.900	.292	.860
X03	105.9400	68.588	.294	.859
X04	106.0400	68.243	.361	.857
X05	106.1200	67.985	.310	.859
X06	105.9200	66.851	.602	.851
X07	106.0200	67.693	.342	.858
X08	106.0200	68.591	.297	.859
X09	106.2200	68.420	.318	.858
X10	106.0400	66.692	.537	.852
X11	106.1000	69.153	.307	.858
X12	106.4800	69.071	.340	.858
X13	106.0600	68.915	.335	.858
X14	106.0200	67.326	.478	.854
X15	105.9200	69.340	.351	.857
X16	105.8600	68.164	.449	.855
X17	106.2400	68.553	.423	.856
X18	105.9000	68.704	.372	.857
X19	105.9600	68.570	.393	.856
X20	106.0000	69.347	.325	.858
X21	106.0400	67.672	.439	.855
X22	105.9600	68.733	.329	.858
X23	105.9400	68.343	.460	.855
X24	105.8800	68.802	.344	.857
X25	106.2600	67.584	.317	.859
X26	105.9800	68.020	.418	.856

X27	105.8600	67.837	.424	.855
X28	105.9600	67.264	.578	.852
X29	105.8600	67.102	.568	.852
X30	105.8600	67.919	.416	.856

Appendix 2. Correlation Table of Cage Moments between Attribute 1 (X1) Scores and Factor Scores

N	X	Y	XY	X^2	Y^2
1	4	115	460	16	13225
2	4	115	460	16	13225
3	3	115	345	9	13225
4	4	110	440	16	12100
5	4	121	484	16	14641
6	4	119	476	16	14161
7	3	117	351	9	13689
8	3	114	342	9	12996
9	4	116	464	16	13456
10	4	113	452	16	12769
11	3	107	321	9	11449
12	4	114	456	16	12996
13	4	116	464	16	13456
14	3	112	336	9	12544
15	4	114	456	16	12996
16	5	117	585	25	13689
17	4	107	428	16	11449
18	4	115	460	16	13225
19	5	117	585	25	13689
20	3	106	318	9	11236
21	4	117	468	16	13689
22	4	117	468	16	13689
23	4	113	452	16	12769
24	5	117	585	25	13689
25	3	112	336	9	12544
26	4	115	460	16	13225
27	3	113	339	9	12769
28	3	109	327	9	11881
29	3	114	342	9	12996
30	4	115	460	16	13225
31	3	95	285	9	9025
32	3	92	276	9	8464
33	4	96	384	16	9216
34	3	92	276	9	8464
35	4	92	368	16	8464
36	3	102	306	9	10404
37	4	104	416	16	10816
38	4	98	392	16	9604
39	3	96	288	9	9216
40	3	105	315	9	11025
41	4	105	420	16	11025
42	3	101	303	9	10201
43	4	120	480	16	14400
44	3	119	357	9	14161
45	4	123	492	16	15129

46	3	102	306	9	10404
47	5	117	585	25	13689
48	3	102	306	9	10404
49	3	96	288	9	9216
50	4	105	420	16	11025
Total	183	5484	20183	689	605044

Appendix 3. Total Score for All Attributes for Reliability Test

Res	X1	$X1^2$	X2	$X2^2$	X3	$X3^2$	X4	$X4^2$	…	X28	$X28^2$	X29	$X29^2$	X30	$X30^2$
1	4	16	4	16	4	16	4	16	…	4	16	4	16	4	16
2	4	16	4	16	4	16	4	16	…	4	16	4	16	4	16
3	3	9	4	16	4	16	3	9	…	4	16	4	16	4	16
4	4	16	4	16	3	9	4	16	…	3	9	4	16	4	16
5	4	16	4	16	4	16	4	16	…	5	25	4	16	5	25
6	4	16	3	9	4	16	4	16	…	4	16	4	16	5	25
7	3	9	4	16	5	25	4	16	…	4	16	4	16	4	16
8	3	9	4	16	4	16	3	9	…	4	16	4	16	4	16
9	4	16	5	25	4	16	4	16	…	4	16	4	16	4	16
10	4	16	4	16	3	9	4	16	…	4	16	4	16	4	16
11	3	9	3	9	4	16	3	9	…	4	16	3	9	4	16
12	4	16	3	9	4	16	4	16	…	4	16	4	16	4	16
13	4	16	4	16	4	16	4	16	…	4	16	4	16	4	16
14	3	9	3	9	4	16	4	16	…	4	16	4	16	4	16
15	4	16	5	25	4	16	4	16	…	3	9	4	16	4	16
16	5	25	3	9	4	16	3	9	…	4	16	4	16	4	16
17	4	16	3	9	3	9	4	16	…	4	16	4	16	4	16
18	4	16	3	9	4	16	4	16	…	4	16	4	16	4	16
19	5	25	4	16	5	25	4	16	…	4	16	4	16	4	16
20	3	9	2	4	4	16	2	4	…	4	16	4	16	4	16
21	4	16	3	9	4	16	4	16	…	4	16	3	9	4	16
22	4	16	3	9	5	25	4	16	…	4	16	4	16	4	16
23	4	16	3	9	3	9	3	9	…	4	16	4	16	4	16
24	5	25	4	16	4	16	4	16	…	4	16	4	16	5	25
25	3	9	3	9	4	16	4	16	…	4	16	4	16	4	16
26	4	16	5	25	4	16	4	16	…	4	16	4	16	4	16
27	3	9	4	16	4	16	3	9	…	3	9	4	16	4	16
28	3	9	3	9	5	25	4	16	…	4	16	3	9	4	16
29	3	9	3	9	3	9	4	16	…	4	16	4	16	4	16
30	4	16	3	9	4	16	4	16	…	4	16	4	16	4	16
31	3	9	3	9	5	25	3	9	…	3	9	3	9	4	16
32	3	9	4	16	3	9	3	9	…	3	9	3	9	3	9
33	4	16	3	9	3	9	3	9	…	3	9	3	9	3	9
34	3	9	2	4	3	9	4	16	…	3	9	3	9	3	9
35	4	16	3	9	3	9	4	16	…	3	9	3	9	3	9
36	3	9	2	4	4	16	5	25	…	3	9	3	9	3	9
37	4	16	3	9	4	16	4	16	…	3	9	3	9	2	4
38	4	16	5	25	4	16	3	9	…	3	9	3	9	5	25
39	3	9	3	9	3	9	2	4	…	3	9	4	16	3	9
40	3	9	3	9	4	16	3	9	…	3	9	4	16	3	9
41	4	16	5	25	4	16	3	9	…	3	9	4	16	3	9
42	3	9	3	9	4	16	3	9	…	3	9	4	16	3	9
43	4	16	5	25	3	9	4	16	…	3	9	4	16	3	9
44	3	9	4	16	5	25	4	16	…	4	16	5	25	4	16
45	4	16	4	16	3	9	4	16	…	4	16	5	25	3	9
46	3	9	3	9	2	4	2	4	…	4	16	5	25	3	9

47	5	25	3	9	3	9	5	25	…	5	25	5	25	5	25
48	3	9	2	4	3	9	4	16	…	4	16	4	16	4	16
49	3	9	3	9	2	4	3	9	…	4	16	3	9	4	16
50	4	16	2	4	3	9	4	16	…	4	16	3	9	4	16
Total	183	689	172	626	187	725	182	684	…	186	706	191	745	191	749
JKx	19,22		34,32		25,62		21,52		…	14,08		15,38		19,38	

Appendix 4. R-table

n	Taraf Signifikan		n	Taraf Signifikan		n	Taraf Signifikan	
	5%	1%		5%	1%		5%	1%
3	0,997	0,999	27	0,381	0,487	55	0,266	0,345
4	0,950	0,990	28	0,374	0,478	60	0,254	0,330
5	0,878	0,959	29	0,367	0,470	65	0,244	0,317
6	0,811	0,917	30	0,361	0,463	70	0,235	0,306
7	0,754	0,874	31	0,355	0,456	75	0,227	0,296
8	0,707	0,834	32	0,349	0,449	80	0,220	0,286
9	0,666	0,798	33	0,344	0,442	85	0,213	0,278
10	0,632	0,765	34	0,339	0,436	90	0,207	0,270
11	0,602	0,735	35	0,334	0,430	95	0,202	0,263
12	0,576	0,708	36	0,329	0,424	10	0,195	0,256
13	0,553	0,684	37	0,325	0,418	12	0,176	0,230
14	0,532	0,661	38	0,320	0,413	15	0,159	0,210
15	0,514	0,641	39	0,316	0,408	17	0,148	0,194
16	0,497	0,623	40	0,312	0,403	20	0,138	0,181
17	0,482	0,606	41	0,308	0,398	30	0,113	0,148
18	0,468	0,590	42	0,304	0,393	40	0,098	0,128
19	0,456	0,575	43	0,301	0,389	50	0,088	0,115
20	0,444	0,561	44	0,297	0,384	60	0,080	0,105
21	0,433	0,549	45	0,294	0,380	700	0,074	0,097
22	0,423	0,537	46	0,291	0,376	800	0,070	0,091
23	0,413	0,526	47	0,288	0,372	900	0,065	0,086
24	0,404	0,515	48	0,284	0,368	000	0,062	0,081
25	0,396	0,505	49	0,281	0,364			
26	0,388	0,496	50	0,279	0,361			