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Analysis of Identifying Company Operational System Development Utilizing the Quality Function Deployment

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ABSTRACT

Objectives*: Performance is a key part in management's work in managing an organization. Employee performance is impacted by a variety of factors, both internal to the workforce and external to the government, firm, or organizational environment. One of the firms in Indonesia that felt the impact complained about performance issues, making it impossible to grow the company's management system. The majority of the issues arise from employee performance and a lack of knowledge about the company's operational management system, which limits the scope of optimizing the company operational.*
Methodology*: The research method used qualitative research, data with questionnaire and brainstorming with respondents. for processing data with QFD method.*
Finding*: The QFD calculations revealed and produces conclusions regarding the main identify priorities that must be taken by the company, including that employees must be able to offer good output/results for the organization, increase technical abilities in running work facilities while working, and be time disciplined.*
Conclusion*: The QFD calculation's results showed that, for the respondent's level of interest, employees' ability to produce high-quality work products was the company's top priority, next motivate to apply time management finish tasks on schedule, and advance their technical proficiency and mental skills. In the meantime, the company's top focus in assisting staff members in meeting performance standards all.*

Keywords*: Quality Function Deployment; House OF Quality; Employee performance; Company Operational Performance.*

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INTRODUCTION

Industrial rivalry is presently encountering increased hurdles in both manufacturing and services. Customer wants for products and services have been discovered over time in terms of both quantity and quality. As a result of this occurrence, prioritizing quality will give a competitive edge in the battle for market supremacy. Not every firm can reach high quality. There are several challenges associated with high-quality items that businesses must overcome and manage in order to develop and preserve company continuity, (Amelikeh Confidence E. N., 2020), (Ornicha Anuchitchanchai Phathinan Thaithatkul,Punyaanek Srisurin,Saksith Chalermpong, 2021), (Amelikeh Confidence E. N., 2020). Human resources play a significant role in achieving an organization's goals. As a result, an organization's attempts to sustain its existence or development are becoming increasingly dependent on human resource management. Performance is a key part in management's work in managing an organization, hence it is critical for management to recognize and comprehend many significant aspects of employee performance, both in terms of causes and effects. Performance is the work outcome that a person or group of individuals in a firm may produce in line with their particular authority and duties in order to meet organizational goals in a legal, ethical, and morally sound manner. Enhancing employee performance is essential for the firm to thrive in a volatile competitive environment, (Third et al., 2023), (Kosasih, 2022), (Amelikeh Confidence E. N., 2020).

Numerous factors, including those pertaining to the workforce and the government, business, or organizational environment, have an impact on employee performance. Aside from human impact on an individual's ability to perform their job, there are additional elements that support the production of acceptable work outcomes that meet the standards set by an organization's or agency's leadership. Information that promotes job happiness is also a component to consider, as each employee is expected to be able to take the initiative to fulfill all of their tasks, (Graduate Management Admission Council, 2020). Systems, databases, and networks that make up information capital readiness are elements that can provide value in the modern business. As a result, businesses ought to start creating and focusing especially on information as a resource that offers a way to gather and apply knowledge efficiently. Since enterprises will benefit from the ever-accelerating digital advancements that shape information technology today, (Lenny & Kridanto, 2019), (Erick Frick, 2019).

One of the affected organizations in Indonesia was complaining about performance issues, which made it extremely challenging to build the management system for the organization. Producers have a long list of procedures to follow, which include ordering raw materials, going through several production steps, checking for quality, and finally, and often very slowly, making delivery. The subsequent production process will be hindered if one is, (Tarunokusumo et al., 2022), (Syahputra & Andriani, 2021), (Mufti et al., 2020), (Sistem et al., 2019).

Based on the issues mentioned above, it is evident that the majority of issues are related to employee performance and the less-than-ideal implementation of information systems in relation to the business's operational management system, which affects the extent to which the operational performance of the business can be optimized, (Syahputra & Andriani, 2021), (Indraswari & Martono, 2020), (Sistem et al., 2019), (Muliadi, 2019). Therefore, it is necessary to know and identify priority problems to be corrected according to information from various source related to company problems, both information from the employee opinion and from the company opinion so that the information does not burden either party.

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LITERATURE REVIEW

1. Quality of Service

Service quality must start from customer needs and end with the customer's perception of the service quality and superiority of a service as a whole. Kotler and Keller's (Kotler et al., 2018) five main dimensions of service quality include: a). Physical evidence (Tangibles), namely a form of actual physical actualization that can be seen or used by employees and can be felt by consumers: b). Reliability, namely the ability to provide promised services promptly, accurately and satisfactorily; c). Responsiveness, namely the confidence of employees to help customers and provide responsive service; d). Guarantee (Assurance), covers the knowledge, abilities, politeness and trustworthiness of employees; d). Empathy, includes ease of relationships, good communication, personal attention, and understanding the needs of customers.

2. Data Collection Techniques

Data collection was carried out by interviews and distributing questionnaires to company employees directly related to the employee's work processes, the aim was to determine the level of performance satisfaction that occurred in the company.

The data collection techniques used in this research are:

a. Interview: Interviews are a data collection technique carried out face to face and direct question and answer between researchers and sources. In this research, direct interviews were conducted with company owners to obtain technical response data, relationship matrices and technical response correlations.

b. Questionnaire: A questionnaire is a data collection technique where respondents fill in questions or statements on a questionnaire. Determining the sources in this study used a probability sampling technique, with sample determination using a simple random sampling technique. The number of respondents was obtained using the Slovin method with the following formula:

$$n = \frac{N}{1 + N(e)^2}$$

Information:

n = Sample size/number of respondents
N = Population size
e = Percentage of allowance for sampling error accuracy: e = 0.1

c. Documentation: Documentation is a data collection technique carried out by studying notes, archives and collecting references originating from literature studies and documents originating from previous research that are relevant and related to the problem to be researched or analyzed.

3. Data Quality Test

a. Validity test: The validity test is used to prove that respondents are given the opportunity to give answers that disagree, quite agree, agree, and strongly agree to the statements in the questionnaire with various answers. The reliability test of the questionnaire results instrument using the product moment correlation method is declared valid if the corrected item-total correlation value is greater than 0.30, as follows:

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$$r_{xy} = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{\{n\sum x^2 - (\sum x)^2\}\{n\sum y^2 - (\sum y)^2\}}}$$

Information:

rxy	=	Correlation Coefficient between variable x and variable y
∑xy	=	The number of multiplications between variables x and y
∑x2	=	The sum of the squares of the x values
∑y2	=	The sum of the squares of the y values
(∑x)2	=	The sum of the x values is then squared
(∑y)2	=	The sum of the y values is then squared
n	=	Number of respondents

b. Reliability Test: Reliability testing is used to ensure that respondents provide answers that are fixed, consistent, and do not change when answering questions in the questionnaire whether asked yesterday, today or tomorrow. Testing variable values using the Cronbach alpha method is declared reliable if the Cronbach alpha value is above 0.6, as follows:

$$r_{11} = \left(\frac{n}{n-1}\right)\left(1 - \frac{\sum \sigma_t^2}{\sigma_t^2}\right)$$

Information:

r11	=	Alpha reliability coefficient
n	=	Number of question items
∑σ2t	=	Number of item variants
σ2t	=	Total variance

4. Quality Function Deployment (QFD)

One approach to service quality that is often used as a reference in research on customer satisfaction is the QFD model developed by Yoji Akao (1972), (Budianti et al., 2019). QFD is a structured product or service planning and development, which allows the development team to clearly determine the respondents' wants and needs and then carry out a systematic evaluation of their ability to produce products or services to satisfy the respondents, (Kasus & Taman, 2023). (Dara, 2023), (Ginting & Riski Satrio, 2020), (Ekasari et al., 2019). The aim of developing the QFD concept is to provide customer satisfaction, by improving the maximum level of quality and conformity at each stage of product or service development. Because basically a product that has been produced perfectly does not mean it has provided customer satisfaction. The most important thing is whether the customer needs a product or service according to his wishes, (Asadabadi et al., 2023), (Bahia et al., 2023), (Ginting et al., 2020), (*DETERMINING SERVICE IMPROVEMENT PRIORITIES USING THE KANO AND QFD METHOD*, 2019). QFD attempts to translate what customers need into what the company produces. This is done by involving customers in the product or service development process as early as possible. Thus, QFD allows a company to prioritize customer needs, find innovative responses to these needs, and improve processes until maximum effectiveness is achieved, (Hariri et al., 2023), (Nurmianto, 2022), (Dian & Sucipto, 2021), (Jaqin et al., 2020), (Ririh & Nugroho, 2019). The QFD structure is usually described in the House of Quality.

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a. Relationship Matrix Preparation Procedure

- Customer Needs (WHATs) Collection Process: Voice of customer is obtained using two methods, namely by direct interviews and giving questionnaires to respondents. The questionnaire was prepared based on questions related to the satisfaction felt by respondents and their desire for productivity and performance motivation. The sampling method uses simple random sampling.
- Preparation of Technical Requirements (HOWs): The company identifies technical needs that match the respondents' desires and needs. These conditions show how the company will respond to what respondents want.

b. Procedure for Preparing QFD Data Analysis (House of Quality Matrix/Planning Matrix)

The next stage is to prepare a planning matrix containing important information, data about the attributes of the problem, namely:

- Respondent's level of interest (Importance to Customer/ITC): Used to determine the extent to which respondents provide an assessment of the respondents' existing needs. Identification of respondents' level of importance is carried out through questionnaires and rankings to find out which variables are important to respondents.
- Measurement of respondents' level of satisfaction with company support (Customer Satisfaction Performance/CSP): Used to measure the level of satisfaction of respondents after the support and facilities that will be analyzed. Calculated by the formula:

$$CSP = \frac{\sum_i (Number\ of\ respondent\ at\ performance\ value\ i)}{(Total\ Number\ of\ respondent)}$$

- Target (Goal): This target value is determined by the company to achieve the level of satisfaction desired by respondents.
- Improvement Ratio (IR): The improvement ratio is a comparison between the company's expected value and the respondent's level of satisfaction with a product. Calculated by the formula:

$$IR = \frac{Goal}{CSP}$$

- Selling Point (Sales Point): Selling point is the contribution of a respondent's needs to the product's selling power. The assessment of selling points consists of:
  1 = No selling point
  1.2 = Intermediate selling point
  1.5 = Strong selling point (Cohen, 1995: 112)
- Raw Weight: Raw Weight is the overall value of the data included in the planning matrix for each respondent's needs for further improvement processes in product development efforts. Calculated by the formula:

$$Raw\ Weight = (ITC)\ x\ (IR)\ x\ (Sales\ Point)$$

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– Normalized Raw Weight: Normalized Raw Weight is the value of Raw Weight which is made on a scale between 0 – 1 or made in percentage form. Calculated by the formula:

$$Normalized\ Raw\ Weight = \frac{Raw\ Weight}{\sum Raw\ Weight}$$

METHOD

The actions that will be taken in research to accomplish the intended aims are referred to as research methodology. The research method used qualitative research, data with questionnaire and brainstorming with respondents. for processing data with QFD method. This study makes use of. The following image illustrates the steps of the research:

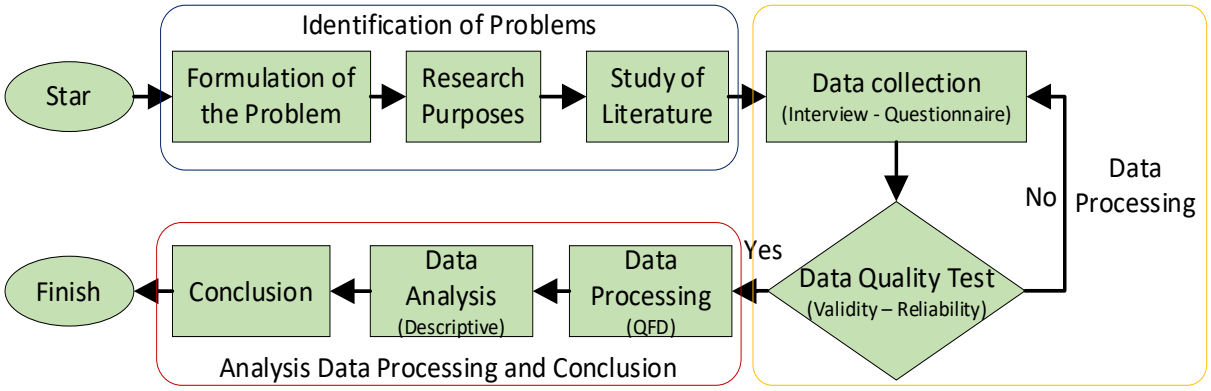

Figure 1: Research Methodology

An explanation of the work stages of the research methodology in the picture above is as follows:

1. Problem identification consists of problem formulation, research objectives, and literature study.
2. Data processing consists of data collection using interviews, questionnaires and documentation methods as well as data quality testing measured by validity and reliability tests.
3. Analysis data processing and conclusion consists of QFD data processing which aims to determine customer needs (WHATs) and technical requirements (HOWs) as well as QFD/HoQ data analysis with the following steps: ITC, CSP, Goal, IR, Sales Point, Raw Weight, Normalized Raw, and data analysis were carried out using descriptive methods, (Nurhayati, 2022), (Andhika W, 2021), (Dewi et al., 2020), (Maligan et al., 2020), (Tjaja et al., 2020).
4. The conclusion aims to determine decisions regarding the research results.

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RESULTS AND DISCUSSION

Results

1. Data Collection Techniques

   The data collection techniques used in this research are:

   a. To gather technical response data, relationship matrices, and technical response correlations, in-person interviews with business owners were undertaken.
   b. The total number of employees is 81 people. Because the number of employees was less than 1000 people, the sample was determined using the Slovin formula, with a confidence level of 90%, 45 respondents were randomly obtained to fill out the research questionnaire. The following is the total number of participants in this study:

$$n = \frac{81}{1 + 81(0{,}1)^2} = 44{,}75 \approx 45\ responden$$

   c. The process of gathering information and obtaining references from literature reviews and pertinent papers pertaining to research on the issue under investigation or analysis is the documentation for this study.

2. Methods for Compiling and Analysing QFD Data

   Organizations can use QFD to prioritize customer demands, identify creative ways to meet those needs, and keep improving processes until they reach optimal performance. Determining the Needs of Respondents Preliminary research on the company's goods and services was done in order to determine the demands of the respondents in this study. It is evident from the observational data that the respondents require improved service.

   a. The Method of Gathering Customer Feedback via Surveys
      Two techniques are used to gather customer voice: conducting in-person interviews and providing respondents with questionnaires. The following information about respondents' degree of interest has been gathered to be provided to respondents (what): 1. Mental capabilities, such as problem-solving and decision-making; 2. Education and training relevant to responsibilities and job; 3. Technical proficiency in using workplace equipment; 4. Effective communication while engaging with coworkers, supervisors, and responders; 5. Technical proficiency to finish the task; 6. Decision-making and problem-solving skills; 7. Knowledge of assisting jobs and businesses; 8. Production of goods in the amounts specified by the business; 9. Delivering quality output or outcomes for the business; 10. Timely completion of work; 11. Time management; and 12. Teamwork and pressure-filled work.
   b. How to Prepare Technical Interests
      The business determines what the respondents want and need in terms of technology. This instance demonstrates how the business satisfies the desires of its respondents. The degree of technological significance that the company provided is as follows: 1. Education and training; 2. Business practices in every division; 3. Consumers are guaranteed a product; 4. Infrastructure facilities facilitate duties and work; 5. Regular audits to monitor the company's progress; 6. Work facility inventory; 7. Hardware support and assistance; 8. Data bank to store work results data; 9. Software support and assistance; 10. Standard operating procedures (SOP) in every department; 11. Customer commitment and service targets; and 12. Specified product standards

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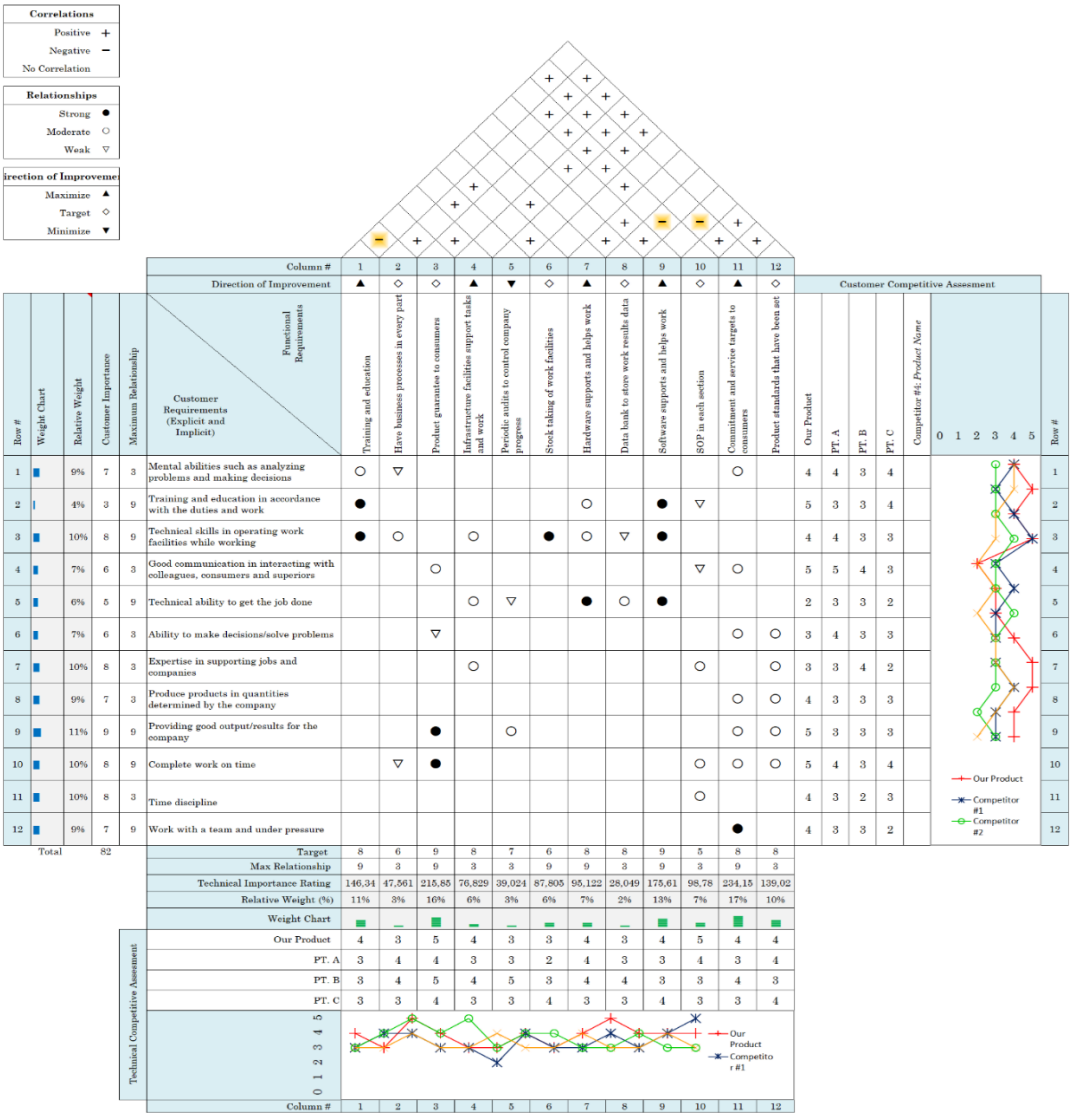
c. Test of Data Quality
The outcomes of data processing with SPSS version 25 software for reliability testing with the Cronbach alpha method and validity testing with the Product Moment method, both of which produced test value results above the regulatory criteria, namely 0.6 and 0.3, respectively. Thus, all of the inferences drawn from the available facts are accurate and legitimate.

d. Creating a Planning Matrix for the House of Quality
Following receipt of the customer's voice, the following data from the QFD table is included in a planning matrix:



Row #	Customer Requirements (Explicit and Implicit)	Weight Chart	Relative Weight	Customer Importance	Maximum Relationship	Training and education	Have business processes in every part	Product guarantee to consumers	Infrastructure facilities support tasks and work	Periodic audits to control company progress	Stock taking of work facilities	Hardware supports and helps work	Data bank to store work results data	Software supports and helps work	SOP in each section	Commitment and service targets to consumers	Product standards that have been set	Our Product	PT. A	PT. B	PT. C	Competitor #4: *Product Name*	Row #
	Direction of Improvement					▲	◇	◇	▲	▼	◇	▲	◇	▲	◇	▲	◇						
	Column #					1	2	3	4	5	6	7	8	9	10	11	12						
1	Mental abilities such as analyzing problems and making decisions		9%	7	3	○	▽									○		4	4	3	4		1
2	Training and education in accordance with the duties and work		4%	3	9	●						○		●	▽			5	3	3	4		2
3	Technical skills in operating work facilities while working		10%	8	9	●	○		○		●	○	▽	●				4	4	3	3		3
4	Good communication in interacting with colleagues, consumers and superiors		7%	6	3			○							▽	○		5	5	4	3		4
5	Technical ability to get the job done		6%	5	9				○	▽		●	○	●				2	3	3	2		5
6	Ability to make decisions/solve problems		7%	6	3			▽								○	○	3	4	3	3		6
7	Expertise in supporting jobs and companies		10%	8	3				○						○		○	3	3	4	2		7
8	Produce products in quantities determined by the company		9%	7	3											○	○	4	3	3	3		8
9	Providing good output/results for the company		11%	9	9			●		○						○	○	5	3	3	3		9
10	Complete work on time		10%	8	9		▽	●							○	○	○	5	4	3	4		10
11	Time discipline		10%	8	3										○			4	3	2	3		11
12	Work with a team and under pressure		9%	7	9											●		4	3	3	2		12
	Total			82																			
	Target					8	6	9	8	7	6	8	8	9	5	8	8						
	Max Relationship					9	3	9	3	3	9	9	3	9	3	9	3						
	Technical Importance Rating					146,34	47,561	215,85	76,829	39,024	87,805	95,122	28,049	175,61	98,78	234,15	139,02						
	Relative Weight (%)					11%	3%	16%	6%	3%	6%	7%	2%	13%	7%	17%	10%						
	Weight Chart																						
	Our Product					4	3	5	4	3	3	4	3	4	5	4	4						
	PT. A					3	4	4	3	3	2	4	3	3	4	3	4						
	PT. B					3	4	5	4	5	3	4	4	3	3	4	3						
	PT. C					3	3	4	3	3	4	3	3	4	3	3	4						
	Column #					1	2	3	4	5	6	7	8	9	10	11	12						

Figure 2: House of Quality

e. Evaluation
The order of companies to immediately carry out improvement is known based on determining the priority of customer responses as shown in the table 1 below:

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Table 1: Respondent's Level of Interest Value

No.	Respondent's Level of Interest	Customer Importance
1	Mental abilities such as analyzing problems and making decisions	3
2	Training and education in accordance with the duties and work	6
3	Technical skills in operating work facilities while working	2
4	Good communication in interacting with colleagues, respondents and superiors	4
5	Technical ability to get the job done	5
6	Ability to make decisions/solve problems	4
7	Expertise in supporting work and companies	2
8	Produce products in quantities determined by the company	3
9	Providing good output/results for the company	1
10	Complete work on time	2
11	Time discipline	2
12	Work with a team and under pressure	3

Three priority conclusions from the customer importance from table 1 which represent the main objectives are as follows:

1. Providing good output/results for the company.
2. a. Technical skills in operating work facilities while working.
   b. Expertise in supporting work and companies.
   c. Complete work on time.
   d. Time discipline
3. a. Mental abilities such as analyzing problems and making decisions.
   b. Produce products in quantities determined by the company.
   c. Work with a team and under pressure.

Furthermore, the order of companies for immediate improvement is known based on respondent priorities from the most important, as shown in the table 2 below:

Table 2: Level of Engineering Importance Value

No.	Level of Engineering Importance	Technical Importance Rating
1	Training and education	4
2	Have business processes in every part	7
3	Product guarantee to consumers	2
4	Infrastructure facilities support tasks and work	6
5	Periodic audits to control company progress	7
6	Stock taking of work facilities	6
7	Hardware supports and helps work	6
8	Data bank to store work results data	8
9	Software supports and helps work	3
10	SOP in each section	6
11	Commitment and service targets to consumers	1
12	Product standards that have been set	5

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Three inferences that represent the top priorities improvement of the company's according to the respondent's degree of interest from the table 2 above:

1. Commitment and service targets to consumers.
2. Product guarantee to consumers.
3. Software supports and helps work.

Discussion

There were 81 employees who werw used as targets for collecting information in thes research. From there 81 employees, based on the slovin formula, 45 respondents were taken to be used as sources of information to fill out the questionnaire, then obtained using the QFD method so that conclusions could be drawn based on the opinions of the employees and the company. From of the three main points that must be improved by the company, namely 1). Commitment and service targets to consumers; 2). Product guarantee to consumers; 3). Software supports and helps work. can contribute to better changes in employee performance, both in terms of work quality such as working time discipline, increasing skills in using work facilities, being able to solve problems and also collaborating in team work so that company targets and goals can be achieved. In this research, we aonly identify the most priority ones for improvement, then in implementing improvements can use a more technical approach.

CONCLUSION

The novelty of this research is using the QFD method to identify employee responses in increasing work productivity, QFD calculation's results showed for the respondent's level of interest, employees' ability to produce high-quality work products was the company's top priority. Thus, the workers at this company take their jobs very seriously. The employee's aspirations that they will be motivated to apply time management, finish tasks on schedule, and advance their technical proficiency in using workplace equipment rank second in importance. The third priority is that workers want to improve their mental skills, such as problem-solving and decision-making, in order to be able to collaborate with others and perform under pressure in order to produce goods in the amounts that the business specifies. In the meantime, the company's top focus in assisting staff members in meeting technical performance standards is their dedication to and service delivery to customers. The ability of the business to offer customers warranties for its items comes in second. The provision of software by employers to facilitate and support staff members' work so they may finish tasks and obligations on time is the third top priority. The recommendation for further research is to make improvements using other methods that are in accordance with the identification results.

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