

## **Analysis of quality Cost Optimization at PT. XYZ in Gresik Regency**

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### **ABSTRACT**

Quality is one of the main keys for the company's products, quality is also one of the hopes and desires of consumers. Companies will always try to maintain product quality before they fall into the hands of consumers, for this reason companies need to pay attention to the quality of each product. The company incurs quality costs in the hope that the products sent to consumers will not have defects or damage, but the company must also take into account the total quality costs so that there is no over budget, an efficient calculation of quality costs is 2.5% of total sales. This study aims to determine whether PT. XYZ has issued quality costs according to predetermined standards. The analysis used is descriptive analysis with a qualitative approach with the method of presenting quality cost ratios to assess the efficiency of quality costs. Based on the results of the analysis of PT. XYZ, PT. XYZ can see that the quality control costs carried out by the company in 2018 & 2019 are good, namely around 1.02% in 2018 and 1.03% in 2019, but in 2020 the quality costs do not meet the predetermined standards, namely 4.40% while the standard efficient cost of quality to sales of only 2.5%. This states that quality cost control in 2020 has not been carried out efficiently.

**Keywords:** Cost Quality, Efficiency.

### **1. INTRODUCTION**

Technological developments are rapidly increasing and have an impact on the world order of life. The freedom to interact between lives in the world without recognizing national borders makes rapid changes. Changes in the world towards globalization make a shift in perspective in the implementation of international trade towards global trade. This resulted in the emergence of a world free market which in turn would lead to increased competition in the international market.

According to Hastari and Henny (2018) Quality is an important thing related to a product, be it goods or services, and is the basis of competition in the modern business environment that applies to a product, whether it is goods or services, and is the basis of competition in the modern business environment. current business.

The quality of a product or service is realized if the orientation of all the activities of the company or organization is oriented towards customer satisfaction. Consumers tend to choose good products, so at this point businesses must pay more attention to product quality before marketing it.

Quality costs are costs that arise because there may be products that are of poor quality or even have products that are of poor quality (Made 2019:106). Quality costs are grouped into 4 categories, namely prevention costs, technical costs, internal failure costs and external failure costs. Quality costs must be carefully managed to have a quality product manufactured to conform to specifications and without defects or problems that would affect appearance or performance, as measured by meeting customer requirements.

Based on previous research conducted by Candra (2021: 9) which analyzed the role of the right price to make a good product at Baker's Queen Sekayu company, it was not the right price in 2017. Indeed, the right price was 2.5% of sales. Baker's Queen Sekayu produces a good rate of 5.88%, meanwhile, the results of research by Heriyansyah, et al (2019) conducted on Sweet Roti Mederen Samarinda show that quality cost control at Sweet Roti Modern Samarinda in 2017 and 2018 has not been carried out efficiently . The results of a similar study were also conducted by Queen (2017) which showed that PT Gemah Ripah Loh Jinawi Industri's quality costs were inefficient. Low quality costs indicate that the company's improvement program is improving. The better the quality produced, the more market share and increased sales and reduced costs will certainly increase the company's profitability.

PT XYZ is one of the companies that applies quality costs. PT XYZ is a multi-national company engaged in the food industry, as a company in charge of the food industry, agro-industry as well as retail and distribution, as a company engaged in the food industry, of course PT XYZ must maintain the quality of the products it produces, because there is a lot of competition with similar products from other well-known companies in Gresik.

**Table 1. Quality Cost Report PT. XYZ**

Years	Prevention Cost	Appraisal Cost	Internal failure Cost	Eksternal failure Cost	Total Quality Cost
2018	Rp3.955.403.695	Rp1.695.173.012	Rp5.085.519.036	Rp1.699.176.221	Rp12.435.262.964
2019	Rp3.966.257.574	Rp1.680.024.674	Rp5.099.474.023	Rp1.699.824.674	Rp12.447.580.946
2020	Rp3.996.228.300	Rp1.733.869.271	Rp5.138.007.814	Rp1.712.669.271	Rp12.580.774.657
<b>TOTAL</b>	<b>Rp11.917.889.569</b>	<b>Rp5.109.066.958</b>	<b>Rp15.323.000.874</b>	<b>Rp5.113.661.167</b>	<b>Rp37.463.618.567</b>

Source: Data processed in 2022

Table 1 shows the cost of quality in 2018 – 2020, it can be seen that in the table of quality costs there has been an increase in quality cost improvement expected by the company as a form of increasing profit or the company in 2018 and 2020 the cost of quality has been very good but in 2020 it has occurred conditions where the covid-19 pandemic emerged resulted in companies not being able to export and import abroad, which caused the company's profits to drop dramatically.

**Table 2.** Total Sales of PT. XYZ

Years	Sales
2018	Rp1.224.586.000.000
2019	Rp1.205.743.000.000
2020	Rp 285.666.000.000

Source: Data processed in 2022

Table 2 shows that there was a very drastic decrease in total sales in 2020, this was due to the Covid-19 pandemic occurring at the beginning of 2020 which resulted in companies having difficulty exporting and importing, besides that there was damage to products that consumers had received so that products that had been sent to consumers return to the company, in which case the company also experiences a decline in sales.

According to Nasution (2010: 132) that "a company with a quality management program that goes well, the cost of quality is not greater than 2.5% of sales". Quality control plays an important role before the production process because it checks whether the product is in accordance with the quantity and quality. In addition, quality control is needed after production to check the products produced, whether there are products that do not match the company's classification or do not comply with consumer demand. It should be understood that quality control activities require costs that are sometimes not determined by the manufacturer. This is based on the costs that must be incurred by the company to prevent errors before production, as well as the possibility of records occurring on the product after production is complete, because more and more must be spent to maintain product quality.

Determining the cost of an item allows a company to determine how much it will cost to produce that item. Due to product quality, it may affect the company's production. To overcome this, companies need to use production costs as efficiently as possible. Therefore, quality cost analysis is needed to estimate quality costs and can be used as a decision for managers. On the basis of the brief description of the problems above, the author wants to analyze the efficiency of quality costs at PT XYZ which aims to increase production efficiency at PT XYZ.

## **2. METHOD**

### **Literature review**

#### **a. Quality Cost**

Quality Costs according to Made (2019: 103) are costs that arise because there may be products that are of poor quality or even have products that are of poor quality, whereas according to Bambang (2016: 12) Quality Costs are costs that arise because of resulting in poor quality or defects so that the product produced is in accordance with consumer expectations. Bloncher (2000) and Lia (2021) argue that quality costs are costs associated with preventing, identifying, repairing and maintaining defective products as well as lost production and sales opportunities for bad reasons. Through the definitions above, it can be concluded that quality costs are costs that arise due to possible or bad results and are not in accordance with consumer expectations. Related to quality costs, companies also incur failure costs in an activity called failure costs. According to Hansen and Mowen (2009) in Nabila et al (2020) Activities related to quality itself show that there are four categories of quality costs, namely:

a. Prevention Cost

Prevention costs are costs incurred to prevent poor quality of the product produced. With the existence of prevention costs, it is expected to be able to reduce the failure rate.

b. Appraisal Cost

Appraisal Costs are costs incurred to determine whether products and services are in accordance with the requirements or customer needs.

c. Internal Failure Costs

Internal Failure Costs are costs incurred as a result of not conforming the products produced to specifications or customer needs.

d. External Failure Cost

External failure costs are costs incurred due to the failure of the product produced to meet the requirements or needs of the customer after the product is delivered to the customer concerned himself.

Quality Cost Measurement

The company has an initial step in measuring the cost of quality to determine the actual cost of quality. According to Kaplan and Atkinson (2017) measurement of quality costs can be carried out in two stages:

a. Financial Measures

Measurement method by calculating all the good costs brought by the company to avoid the appearance of a bad product or service.

b. Non-Financial Measures

The process of measuring the performance of suppliers, factories and consumers. Supplier performance for the company must fulfill several conditions such as being able to send raw materials on time according to the quality and quantity that has been agreed from the start and prices that can be responsible. Factory performance is seen from the company, reworking failed or damaged products, machine damage, work accidents and timely delivery of goods to consumers. Meanwhile, consumer performance can be seen from the number of complaints that occur.

**Prevention Classification**

According to Adam (2019), there are 3 types of prevention classifications, which are as follows:

- a. Preventive controls are intended to prevent problems before they actually occur.
- b. Detective controls to find problems as soon as they occur
- c. Corrective controls are intended to solve problems discovered by detective controls.

**Relationship between Types of Quality**

The relationship between quality, prevention and appraisal costs is “voluntary” whereas internal and external failure costs are “non-voluntary” because companies often use these costs to pay. Compliance costs are prevention and evaluation costs, ie. all costs that arise from ensuring that products and services meet consumer needs. Meanwhile, internal and external failure costs are called non-conformance costs. The price of kindness is equal to the sum of the price of the agreement and the price of disagreement. reduce the cost of internal

and external failure, which is the cost of non-compliance, is to increase the cost of compliance. Finally, the total cost of quality will be low.

### **A Look at the Cost of Quality and the Number of Errors**

Many business operators O think that X increases Oquality with X increases X costs, so a higher X quality means higher costs. This question was asked by quality pioneers. There are 3 categories of views that emerge among practitioners regarding the cost of quality, including:

- a. Higher quality means higher costs, quality attributes such as performance and additional characteristics incur greater costs in terms of labor, raw materials, design and other human resources. The added benefits of improved quality do not cover the additional costs.
- b. Quality improvement costs are lower than the resulting savings. This view was first put forward by Deming and embraced by Japanese manufacturers. The savings result from reduced rates of rework, defective products, and other direct damage-related costs.
- c. The cost of quality is a cost that exceeds the costs incurred if a good or service is produced right from the first time it is produced. This view is held by proponents of the TQM philosophy. Costs are not only related to direct material costs, but also include lost customers, lost market share and many other hidden costs and missed opportunities that cost accounting systems cannot find.

### **Quality Cost Performance Report**

Allows management to plan, control and make decisions about quality costs. In quality improvement programs, performance reports are very important. Management requires periodic quality cost reports in the form of comparisons between periods. According to Supriyono (2010) in Evan (2017) there are 4 types of progress that can be measured and reported, namely:

#### **a. Interim Standard Report**

This report is used to compare actual costs for the period with the budget, which will show progress against standards or targets for the current period.

#### **b. One Period Trend Report**

This report compares this year's performance with the actual quality costs incurred in the previous year. This report aims to show the development of quality performance last year.

#### **c. Multiple Period Trend Report**

This report shows the progress from the beginning of the quality improvement program to its end. This report is usually presented in graphical form, the vertical axis showing the cost of quality as a percentage of sales, the horizontal axis showing the number of years the quality program has been implemented.

#### **d. Long Term Report**

This report compares the actual cost of an item for a period with the expected cost of achieving zero defects, assuming that the selling price is the same as the selling price for the period. The purpose of this report is to report progress towards a standard or long term goal.

### **Definition of Quality Cost Control**

According to Montgomery, D.C (in Irwan & Didi Haryono, 2015) suggests that quality control is an activity related to engineering and management, where with this activity you can measure the quality characteristics of a product by comparing it to requirements, then taking action to provide rejuvenation of products that experience differences from predetermined standards.

There is a decomposition of the production system into a system with a smaller scale, so that quality can be improved by controlling along the production line. The types and quantities at each production point need to be inspected, after that the new management department determines who is in charge of carrying out the inspection. As for those who can carry out inspections are inspectors at related organizations, inspectors from outside the company or joint inspectors. So that it can make a complete design based on a quality control system that is expected to guarantee continuous improvement. Quality control activities are a very broad and complex field of work because all the variables that affect quality must be considered. Broadly speaking, quality control can be classified as follows:

- a. Material quality control
- b. quality control by processing
- c. final product quality control

### **Relationship between Quality Cost and Production Cost Efficiency**

Relationship between Quality Cost and Production Efficiency Quality improvement can increase productivity and vice versa. This is because an increase in quality is usually accompanied by a decrease in the amount of economic resources needed in production, and therefore usually an increase in quality will be reflected by an increase in productivity. But it is still possible for the company to produce without any damage but it is still not efficient in the process. Therefore, if a quality control activity for production goes well without any production defects. Then the repetition of work is reduced due to decreased units of defective products. Quality costs are attached to production costs, thus requiring control so as not to affect production costs that must be incurred by Blocher (2007). One of the causes of higher quality costs is the result of product reproduction that fails due to poor product quality control or because the quality standards of the products produced do not meet established standards. Based on Hansen and Mowen (2009: 265) in Mustika (2017) stated that if there is a decrease in defective products, of course there will be less labor and materials used in producing similar products. Reducing the number of defective units improves quality, while reducing the number of inputs used increases production efficiency.

$$\text{Quality Cost Efficiency} \\ (\text{Total Cost of Quality} : \text{Total Sales}) \times 100\%$$

### **Research Approach**

This research uses a descriptive quantitative method with a case study approach. According to Sugiyono (2017) descriptive research is research to find out individual differences without comparison or association with other differences. Meanwhile, another understanding stated by Zuchri (2021) Qualitative research is an approach to conducting research that is oriented towards natural phenomena or symptoms. So it can be concluded that Qualitative Research is research that investigates a natural phenomenon that produces descriptive data in the form of written or spoken words from people and observable behavior.

### **Data collection technique**

The data collection techniques in this study are:

- a. Interview (interview). Researchers conducted interviews with informants to obtain more information. (Sugiono, 2017). Interview with Mr. Abi as the financial manager
- b. Observation (observation). Observations were made on the recording of the company's quality costs. (Sutrisno, 2016)

### **Data Type**

This study uses 2 types of data, namely:

- a. The primary data of this research is in the form of interviews conducted with competent informants.
- b. Secondary data in this study obtained written documents, both from within the company and from outside the company related to the issues discussed.

### **Data source**

The data source used for this research was obtained directly from PT. XYZ with the help of management and employees within the company. Thesis from previous research as a previous researcher and the books used as guidelines.

### **Research sites**

This research was conducted at PT. XYZ which is in Gresik Regency, while the time of this research was carried out from September - November 2022

### **Data Testing**

After the data is collected, it is necessary to test the data with the following stages:

1. Editing. Checking all the completeness of the data that has been obtained from PT. XYZ and will be used as the data source.
2. Organizing. In this technique the author compiles documents or information that has been obtained at PT. XYZ core technology in order to answer the problem formulation.
3. Anakyzing. In this technique aims to analyze the data obtained by PT. XYZ with a theory that has become a reference for analysis.

### **Analysis Techniques**

Analyzing the data so that a conclusion can be drawn, then there are several steps taken, namely:

- a. Identification and classification of quality costs, produce data - data related to the cost of quality from the object or source being studied.
- b. Calculation analysis based on financial reports includes quality cost reports, company profit reports.
- c. The results of the analysis are compiled on the basis of facts that are specifically used to solve problems and can provide solutions at PT. XYZ as a research object.

### 3. RESULT AND DISCUSSION

#### Quality Cost Analysis

Company to assist in planning, problem solving and decision making in corporate financial management. Companies that carry out financial management have the goal of increasing their business continuity, growth and profitability.

Financial management is an action the company needs to incur some costs to maintain good quality and reduce production damage. With the help of monitoring, the company tries to ensure that the implementation of the production plan is in accordance with what has been set and then takes corrective action for deviations that may occur so that improvements can be made in the future. Quality costs are a series of costs incurred by an organization including prevention costs, evaluation costs, internal failure costs and external failure costs. Classification of costs which are quality costs at PT. XYZ from 2018 to 2020 are as follows

#### 1. Prevention costs

These prevention costs arise due to preventing errors or problems that occur in the quality of a product. Included in prevention costs are as follows:

- a. Labor costs incurred for maintenance and repair of machines are costs incurred to pay salaries of workers related to maintenance and repair of machines that support the production process. Labor costs for maintaining and repairing machines in 2018 amounted to Rp. 2,412,796,253. In 2019 it was Rp. 2,419,417,119 while in 2020 it was Rp. 2,437,699,263.
- b. Prevention costs also include the cost or cost of repairing machines that support production processes that are expensive to maintain, will be charged with maintenance and repair costs if the machine is damaged. The quality costs incurred for this in 2018 amounted to Rp. 1,542,607,441., in 2019 it was Rp. 1,546,840,453. and in 2020 Rp. 1,558,529,037.

#### 2. Appraisal Fee

These costs are incurred when a product does not comply with the quality standards set by the company. The costs included in the appraisal fee are as follows:

- a. Production supervisor labor costs are the cost of supervisor salaries for the ongoing production process. Costs incurred in 2018 amounted to Rp. 898,411,696, in 2019 Rp. 1,192,817,519 and in 2020 Rp. 1,215,995,183
- b. Cost of inspection of raw materials and auxiliary. These costs are costs that are indeed incurred for workers who inspect raw and auxiliary materials during the production process. Costs incurred during 2018 Rp. 796,713,316, in 2019 Rp. 487,207,156 and in 2020 it is Rp. 502,822,089

#### 3. Internal failure costs

This cost occurs because the product is defective, this causes lagoon costs to be incurred because the product produced is not in accordance with the quality standards set by the company. Rework costs are included in the internal failure costs. Quality costs incurred in 2018 amounted to Rp. 5,085,519,036, in 2019 Rp. 5,099,474,023 and in 2020 Rp. 5,138,007,814

#### 4. External failure costs

These costs arise when the product is of poor quality, but the product is already in the hands of the customer, in other words, this product passes the quality control selection carried out by the company.

The costs included in the cost of external failure are the costs of customer complaints that have occurred if there are customer complaints due to products that do not conform to orders. The cost of quality in 2018 is Rp. 1,699,167,221 in 2019 of Rp. 1,701,824,674, while in 2020 it is Rp. 1,712,699,271.



**Table 3.** Percentage of Quality Costs

TYPE OF COST	Years					
	2018	%	2019	%	2020	%
Prevention cost	Rp3.955.403.695	31,81%	Rp3.966.257.574	31,86%	Rp3.996.228.300	31,76%
Appraisal cost	Rp1.695.173.012	13,63%	Rp1.680.024.674	13,50%	Rp1.733.869.271	13,78%
Internal failure cost	Rp5.085.519.036	40,90%	Rp5.099.474.023	40,97%	Rp5.138.007.814	40,84%
External failure cost	Rp1.699.167.221	13,36%	Rp1.701.824.674	13,67%	Rp1.712.669.271	13,61%
<b>TOTAL</b>	<b>Rp12.435.262.964</b>	<b>100%</b>	<b>Rp12.447.580.946</b>	<b>100%</b>	<b>Rp12.580.774.657</b>	<b>100%</b>

Source: Data processed in 2022

It can be seen from Table 3 that there is a large comparison of quality costs that occur at PT. XYZ, internal failure costs are greater, namely around 40% of other costs, in 2018 amounting to Rp. 5,085,519,036 or 40.90%, in 2019 amounting to Rp. 5,099,44,023 or 40.97% and in 2020 Rp. 5,138,007,814 or 40.84% of the external failure cost. This was explained by Mr. Abi as an informant saying that:

"Before sending to consumers, the company re-checks the products sent, and that is where the point is, when it is checked, it turns out that many products do not pass quality control so that they are required to rework in production, apart from being caused by human error, this happens because there are several machines that really need to be repaired. continuously"

Based on the results of in-depth interviews with Mr. Abi as the FA Manager, it can be concluded that these costs were incurred due to product damage that was wrongly targeted that occurred in the production process so that the damaged product had to be reworked, for this reason a greater failure cost was needed for rework (rework) before the product reaches the consumer, the company takes this step in order to reduce external failure costs. Apart from that, Mr. Abi also mentioned that because there are machines that are old since the founding of the company, they are still being repaired.

### **Analysis of Optimizing Quality Costs**

Quality cost optimization analysis is carried out by comparing quality costs to sales. The goal is to find out if the cost of quality has a large percentage of sales, the profit that should be achieved by the company will be slightly reduced. To analyze the optimization of quality costs using the ratio of the percentage of quality costs to required sales, the total sales budget in 2018 is Rp. 1,224,586,000,000, in 2019 Rp. 1,205,743,000,000, whereas in 2020 it is only Rp. 285,666,000,000. after getting the calculation of the ratio of the quality cost budget to sales illustrates the calculation below:

**Table 4.** Quality Cost Report on Sales

YEARS	QUALITY COST	SALE	PERSENTASE
2018	Rp12.435.262.964	Rp1.224.586.000.000	1,02%
2019	Rp12.447.580.946	Rp1.205.743.000.000	1,03%
2020	Rp12.580.774.657	Rp 285.666.000.000	4,40%

Source: Data processed in 2022

**Quality Cost Efficiency in 2018**

$$(Rp\ 12,435,262,964 / 1,224,586,000,000) \times 100\% = 1.02\%$$

**Quality Cost Efficiency in 2019**

$$(Rp\ 12,447,580,946 / 1,205,743,000,000) \times 100\% = 1.03\%$$

**Quality Cost Efficiency in 2020**

$$(Rp\ 12,580,774,657 / 285,666,000,000) \times 100\% = 4.40\%$$

As seen in Xtable 4, it can be seen that in 52018 to 2019 the percentage of quality costs to sales is only around 1%, i but in 2020 the percentage of quality costs is 4.40% of total sales of Rp. 258,666,000,000. From the results of Xanalysis X already X it can be seen that the control of S quality costs in 2020 is not yet efficient because the large quality costs do not meet the standard costs that have been set. As seen in table 3, the cost of internal failure is greater than the cost of prevention, therefore additional costs are needed in the category of prevention and assessment costs to be able to reduce XcostsXXinternal failure. will also decrease.

PT. XYZ requires improvement steps to achieve XcostW-quality goal of 2.5% of total sales. The company must also determine the optimal quality cost level and determine the relative amount used in each quality cost category. When companies use more costs on prevention and assessment activities, the percentage of failed products will be lower. This results in lower internal and external failure costs.

**4. CONCLUSION**

**Conclusion**

Based on the research results it can be concluded that quality cost control by PT. XYZ in 2020 has not been effective because the effective cost of quality is 2.5% of sales, while the cost of quality for PT. XYZ of 4.40% of total sales of RP. 258,666,000,000 consisting of 32% prevention costs, 14% appraisal fees, 41% internal failure costs and 14% external failure costs. Although the cost of internal failure is higher than the cost of external failure, this does not reduce the occurrence of damaged products before they reach consumers.

**Suggestion**

1. PT. XYZ should identify and report quality costs separately because quality costs are still part of the production cost report. This means that Qa can know the Q quality costs incurred by the company so that better quality cost management can be implemented.
2. It is expected that the company pays more attention to prevention which aims to control product quality so that it does not cause damage and there is no external failure for the company.
3. Companies must continue to improve training, so that workers can carry out the production process correctly and suppress defective products due to worker negligence, and plan periodic machine maintenance

## REFERENCES

- Abdussamad, Zuchri. Buku Metode Penelitian Kualitatif. Buku Metode Penelitian Kualitatif, 2021
- Adam, Fitriyani, et al. "Analisis Efisiensi Pengendalian Biaya Kualitas pada Aksan Bakery Manado." vol. 11, 2016.
- Bawon,dkk.(2013).Penerapan Biaya Kualitas Untuk Meningkatkan Efisiensi Biaya Produksi : Studi kasus pada PT. Pertani (Persero) Cabang Sulawesi Utara. Jurnal Riset Akuntansi Going ConcernFEB UNSRAT.Universitas Sam Ratulangi Manado.
- Edy, Sutrisno, (2016), Manajemen Sumber Daya Manusia, Kencana Prenada Media Group, Jakarta.
- Hansen, Don R. dan Maryanne M. Mowen.(2009).Akuntansi Manjerial EdisiKedelapan Jilid 1.Jakarta:Salemba Empat.
- Hansen, Don R., Maryanne M. Mowen. (2006). Cost Management: Accounting and Control. Fifth Edition. South Western College Publishing. Australia.
- Heriyansyah, et al. "Analisis Efisiensi Pengendalian Biaya Kualitas Pada Sweet Roti Modern Samarinda." vol. 3, 2017.
- Kasih, Ayyunda Mahabbah, and Wasti Reviandani. "Analisis Optimalisasi Biaya Kualitas Pada PT. Inspira Furnexindo." vol. 11, 2022.
- Narsa, I. M. (2019). Akuntansi Manajemen. 8. Banten: Universitas Terbuka
- Nasution, M.N. 2010. Manajemen Mutu Terpadu. Edisi 2. Bogor : Ghalia Indonesia.
- Nurrofiah, et al. "Penerapan Biaya Kualitas untuk Meningkatkan Efisiensi Biaya Produksi pada CV. Ulung Baureno." vol. 3, 2020.
- Queen, Haq. "Analisis biaya kualitas untuk meningkatkan efisiensi biaya produksi pada PT Gemah Ripah Loh Jinawi Industri." 2017.
- Romanda, Candra. "Analisis Penerapan Biaya Kualitas Untuk Meningkatkan Efisiensi Produksi Pada Baker's Queen Sekayu." vol. 8, No 1, 2019.
- S. Kaplan, Robert, and Anthony A. Atkinson. Advanced Management Accounting. New Jersey : Prentice Hall, 1998 Prentice Hall, 1998, 2017.
- Sugiono. 2017. Metode Penelitian Kuantitatif, Kualitatif, R&D. Bandung – Alfabeta.