

## THE EFFECT OF QUALITY COSTS ON DAMAGED PRODUCTS IN CV. ANEKA ILMU OF PEMATANGSIANTAR

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### ABSTRACT

Every company is required to participate in competition. One of the efforts made by companies to remain competitive is by improving the quality of their production results. Improved quality will reduce the occurrence of defective products, thereby increasing profits. This study aims to determine whether there is an influence of quality costs on defective products at CV. Aneka Ilmu Pematangsiantar. The object of this research is CV. Aneka Ilmu Pematangsiantar. The variables examined are quality costs (prevention costs and appraisal costs) and defective products. Data were collected using the documentation method, and the obtained data were analyzed descriptively and quantitatively. Based on the results of the study, it can be concluded that quality costs are a valuable investment in minimizing defective products at CV. Aneka Ilmu Pematangsiantar. The significant relationship between quality costs and defective products should be considered by company management to achieve overall better product quality, thus reducing the occurrence of defective products.

*Keywords: Quality Costs, Defective Products*

### ABSTRAK

Setiap perusahaan dituntut untuk berpartisipasi dalam persaingan. Salah satu upaya yang dilakukan perusahaan agar tetap kompetitif adalah dengan meningkatkan kualitas hasil produksinya. Peningkatan kualitas akan mengurangi terjadinya produk cacat, sehingga meningkatkan laba. Penelitian ini bertujuan untuk mengetahui ada tidaknya pengaruh biaya kualitas terhadap produk cacat pada CV. Aneka Ilmu Pematangsiantar. Objek penelitian ini adalah CV. Aneka Ilmu Pematangsiantar. Variabel yang diteliti adalah biaya kualitas (biaya pencegahan dan biaya penilaian) dan produk cacat. Data dikumpulkan menggunakan metode dokumentasi, dan data yang diperoleh dianalisis secara deskriptif dan kuantitatif. Berdasarkan hasil penelitian, dapat disimpulkan bahwa biaya kualitas merupakan investasi yang berharga dalam meminimalisir produk cacat pada CV. Aneka Ilmu Pematangsiantar. Hubungan yang signifikan antara biaya kualitas dan produk cacat perlu diperhatikan oleh manajemen perusahaan untuk mencapai kualitas produk yang lebih baik secara keseluruhan, sehingga mengurangi terjadinya produk cacat.

**Kata Kunci: Biaya Kualitas, Produk Cacat**

### I. INTRODUCTION

The increasing intensity of competition and the number of competitors also require every company to always pay attention to the needs and desires of consumers and try to meet what they expect in a more satisfying way than competitors do. With quality production, it is hoped that customers or consumers will be interested and buy the products offered by the company. Products that lead to consumer satisfaction are the company's strategy to focus more on what consumers want as the key to competitive success. The continuous effort made by everyone in the organization to understand, meet, and exceed customer expectations is called Total Quality Management (TQM). This is based on the current era which is the consumer era, where the position of consumers or customers is becoming increasingly important and determines the survival of the company. Companies that value quality as a

tool to compete will have 12 competitive advantages over their competitors in dominating the market, therefore all companies are able to achieve quality superiority. Products that have higher quality at a more competitive price will be the target of consumers, so that companies that have quality products will easily make a profit because their products are sold. With high quality, an organization or company will grow with a market on a national or international scale. As a company engaged in printing, publishing, and bookstores, CV.Aneka Ilmu has a very close relationship with the world of education. This is one of the company's goals that receives special attention, where the company feels that it has a moral responsibility in its participation in the problem of improving public intelligence. Thus, the company must be able to produce products in the form of really quality books. This can be seen from the existence of the quality control section which is in charge of supervising the quality of the products produced. The products produced by CV. Aneka Ilmu are scientific books, animal husbandry, and dictionaries. such as textbooks for elementary, junior high, high school, and university level students, general scientific books, skills books, agriculture, production processes, CV. There are still various deviations, namely in the form of damaged products. From the results of the preliminary survey conducted by the researcher, the number of damaged products that occur always fluctuates every month. The percentage of damaged products that occur in CV. Aneka Ilmu is between 3%-4%. An alternative that companies can use in controlling the number of damaged products is to incur quality costs consisting of prevention costs and assessment costs. According to this company, the type of product can be categorized as damaged based on the number of damaged book units which usually occur in part 7 of the finishing, namely in the folding part, the cut part, and during the binding process. CV. Aneka Ilmu has spent a number of costs that are used to improve quality, but in reality there are still products that are of poor quality (damaged products). The formulation of the problem is that there is an effect of quality costs which include prevention costs and assessment costs simultaneously on the number of damaged products in CV. Aneka Ilmu in 2022 - 2024?, Is there an effect of partial prevention costs on the number of damaged products on CV.Aneka Ilmu in 2022 - 2024 ? , Is there an effect of partial appraisal costs on the number of damaged products on CV. Aneka Ilmu in 2022 - 2024?

## II. THEORETICAL FOUNDATION

### Quality

#### Definition of Quality

In the modern business environment, quality has an increasingly strategic role because it is the main factor in meeting consumer needs and expectations. Quality not only determines customer satisfaction, but is also one of the foundations of the company's competitiveness, both in the domestic and international markets. Along with the rapid development of technology, companies are required to maintain the reputation and image of the product by ensuring that the goods produced meet the standards expected by customers.

A product is said to be of quality if it is able to provide benefits according to its purpose of use and is considered superior to similar products. Consumers generally consider the durability, performance, and reliability of products as the basis for purchasing decisions. When a product has a good perception of quality in the eyes of consumers, the added value will increase the product's ability to compete and expand the company's market share. In general, quality can be understood as the level of suitability of a product to the needs of users. In a modern perspective, quality is defined as the ability of a product or service to meet customer requirements and expectations, both expressed and undisclosed (ISO 9001:2015; Evans & Lindsay, 2020).

The contemporary view states that quality is determined by customer perception based on real experiences of the product, measured by its functional attributes, aesthetics, reliability, ease of use, and overall benefit to the user (Garvin, 2019; Feigenbaum in Juita, 2005). A product is considered quality if it is able to meet customer needs within the set specifications. In industry practice, not all items that are considered defective by manufacturers are automatically rejected by consumers, and conversely, some products that are considered good by manufacturers may be rejected by consumers because they do not conform to the user's specifications or preferences.

Quality also includes all product characteristics, from the selection of raw materials, the production process, to the maintenance of the product after use. The two main criteria for assessing product quality are:

1. Quality of design, which is the suitability of product design and specifications with user needs.
2. Quality of conformance, which is the level of the product's ability to meet specifications and design standards when produced (Monica, 1994; Evans & Lindsay, 2020).

#### **Factors That Determine Quality**

The quality of a good or service is influenced by several main factors that determine the product's ability to fulfill its purpose. These factors include:

1. Product Function  
A quality product must be able to carry out its main function effectively. The design and production process must be directed to ensure that the function is in accordance with the needs of the user.
2. Appearance or Outward Appearance  
Physical aspects such as aesthetics, shape, and visual appearance are often the main indicators for consumers in assessing the quality of a product.
3. Product Cost  
In many cases, the cost or price of the product reflects the quality. Products with higher production costs usually use better raw materials and a more controlled production process, resulting in higher quality (Fitrianingsih, 2004).

#### **Quality Dimension**

Referring to modern theory, quality can be explained through eight main dimensions (Garvin, 2019; Hansen & Mowen, 2020), namely:

1. Performance  
Describe how well the product or service meets or exceeds customer expectations.
2. Aesthetics  
Relating to the visual and sensory appeal of the product.
3. Ease of Maintenance and Repair (Serviceability)  
Refers to the ease of the product to maintain, repair, and the speed of service handling.
4. Keunikan (Features)  
Additional characteristics that distinguish the product from its competitors.
5. Reliability  
The probability that the product can perform its functions consistently over a certain period.
6. Durability  
Describe the product's lifespan and its durability against long-term use.
7. Conformance Level  
How far the product meets the standards and specifications that have been set.
8. Usability/Perceived Quality  
A user's subjective assessment of the quality of the product based on experience and perception.

#### **Quality Cost**

Quality costs are all costs that arise to ensure that the products or services produced by the company meet the quality standards that have been set. According to quality management theory, quality costs are divided into four main groups:

1. Prevention Costs  
Costs incurred to prevent defects or damage to the product. For example: employee training, quality planning, machine maintenance, and production process improvement.
2. Appraisal Costs  
Costs associated with measurement, evaluation, and product quality checks. For example: raw material inspection, product testing, and quality audit.
3. Internal Failure Costs

The costs incurred when a defective product is discovered before it is shipped to the customer. For example: rework (repair), scrap (discarded products), engine downtime due to defects, and damage analysis.

4. External Failure Costs

The cost of product damage detected after reaching the customer. For example: product returns, warranty claims, replacements, and loss of company reputation.

**Main Concept of Quality Cost**

1. Increased prevention and assessment costs typically lower the cost of failure.
2. Investment in quality costs results in increased production efficiency and reduces the number of defective products.

In the modern accounting literature, costs are understood as the sacrifice of economic resources that can be valued in monetary units and incurred to meet a specific purpose. According to Carter & Usry (2019), costs are the value of resources released by companies to obtain economic benefits both in the short and long term. Horngren, Datar, and Rajan (2021) also emphasized that costs are cash or cash equivalent values that organizations use to obtain goods or services that are expected to provide operational benefits in the future. This definition emphasizes the existence of an element of sacrifice, measurement in units of money, and a clear economic purpose.

Based on this view, it can be concluded that costs are all forms of economic sacrifice determined in monetary value to obtain goods or services that will provide benefits and support the organization's operational processes in the present and future.

The classification of costs in modern companies has evolved following the needs of reporting and managerial decision-making. According to Hansen & Mowen (2020), costs can be grouped based on various points of view, one of which is the object of expenditure, which is the type of resource used. Based on this approach, each type of expenditure is classified according to its object, for example fuel costs, electricity costs, or raw material costs.

In addition, costs are also classified based on the main functions within the company, especially in manufacturing companies. Horngren et al. (2021) divide costs into three main groups, namely:

1. Production costs

This cost is related to all activities in the process of converting raw materials into finished products. The latest literature still divides production costs into direct raw material costs, direct labor costs, and factory overhead costs (Drury, 2018; Hansen & Mowen, 2020). The cost of raw materials and direct labor is called *prime cost*, while direct labor together with factory overhead is a *conversion cost* because it functions to convert raw materials into final products.

2. Marketing costs

This cost includes all expenses needed to support marketing, promotion, distribution, and consumer service activities. The role of marketing costs is increasingly prominent in modern management because it is directly related to customer value enhancement strategies.

3. Administrative and general costs

These costs relate to internal control activities, managerial functions, and coordination between the various units of the company. These expenses are usually not directly related to the production process, but are necessary to maintain the overall smooth operation.

The next classification is based on the relationship of costs to the object being financed, which is divided into:

1. Direct cost

It is a cost that can be clearly identified and traceable directly to a specific product or activity. The main examples are direct raw materials and direct labor (Garrison et al., 2022).

2. Indirect cost

These costs cannot be traced directly to one specific cost object, and in the context of production are referred to as factory overhead costs. These costs include various elements such as factory electricity, machine shrinkage, and maintenance of production facilities.

Judging from the behavior of costs to activity volume, costs are grouped into:



1. Variable costs, i.e. costs that change proportionally to activity levels.
2. Semi-variable costs, which are costs that change with changes in activity but are disproportionate.
3. Semifixed costs, which are costs that remain at a certain range of activities but increase gradually after passing a certain volume limit.
4. Fixed costs, which are costs whose total amount does not change within a range of a given volume of activities (Horngren et al., 2021).

Finally, costs can be classified based on their benefit period, namely:

1. Capital expenditures  
These expenses provide benefits over one accounting period and are recorded as assets. The allocation of the charge is carried out through a depreciation, amortization, or depletion mechanism, according to the type of asset and its useful life (Maher et al., 2020).
2. Revenue expenditures  
It is a cost whose benefits are only felt in the period of occurrence, so it must be recognized as an expense in that period and met with income in the same period.

### **Defective Product**

In the production process, every manufacturing company has the potential to produce products that do not comply with the quality standards that have been set. Products that do not meet this specification can be defective *products* or defective units (*nonconforming units*). This phenomenon can occur in various cost systems, both *process costing* and *job order costing*.

The company tries to avoid the occurrence of damaged products because units that fail to meet standards will reduce efficiency and have an impact on reducing profits. Defective products generally cannot be repaired to normal conditions, so the unit has absorbed raw materials, labor, and plant overhead costs without providing any return on value—causing direct losses for the company. Therefore, many companies apply a *continuous improvement approach* and involve all employees in an effort to maintain quality to reduce the number of damaged products (Putra & Darma, 2021).

Defective products need to be analyzed from two important aspects:

1. The nature and cause of damage, to find out the technical and non-technical factors that affect the failure of the product.
2. Accounting aspects, which are related to recording damage costs, grouping damaged units, and reporting to management for follow-up repairs (Rahmawati, 2022).

In the context of modern quality management, defective products are a key indicator of the effectiveness of a quality system, and are often used as a measure in *cost of quality reports*. Companies that ignore defect rate analysis often find that the proportion of quality costs to total production costs becomes very significant (Siregar & Hutabarat, 2023).

A defective product is defined as a unit that is unacceptable to the customer and economically unfit for repair. The product fails to meet the quality standards or tolerance limits that have been determined. In today's *quality control* approach, products are declared defective if they are outside the limits of the technical specifications required to be able to function as designed (Wijaya, 2021).

Researchers in *quality management* argue that companies with effective quality control systems are generally able to reduce quality costs to less than 3% of total sales. This can only be achieved if the level of product damage and failure is close to zero through a strong prevention system (Ardani, 2020). Products that are categorized as defective are generally non-reworkable or the repair cost is higher than their economic value. Therefore, rapid identification of the cause of the damage is necessary to prevent the recurrence of the damage in the following period.

Broadly speaking, defective products differ from:

1. Defective goods, which are products that can still be repaired to meet specifications and can be resold.
2. Residual materials (*scrap*), which are residues from the production process that still have a low selling value but are not the main product unit.

In modern manufacturing, residual materials and production waste can arise from various sources such as processing processes, damaged components, long storage, product refinement, or

machine malfunction (Ismail & Sugiarto, 2022). Waste and waste management is an important part of production quality and efficiency

Defective products are products that do not meet the quality standards or specifications set by the company so that they cannot be sold or must be repaired.

Characteristics of Defective Products

1. Not in size or shape.
2. Physical defects (breaking, tearing, uneven).
3. Process errors (misprint, wrong colors, incomplete components).
4. Does not meet the safety or functional standards of the product.

Factors Causing Defective Products

1. Human error: lack of operator skills, fatigue, or lack of training.
2. Bad material: the raw material is not up to standard.
3. Engine malfunction or lack of maintenance.
4. Work processes are not standard (SOPs are not implemented).
5. Production environment: unfavorable temperature/humidity.

### **Total Quality Management (TQM)**

#### **Definition and Principles of Total Quality Management**

Procter and Gamble explain that Total Quality Management (TQM) is a continuous effort by all members of the organization to understand, meet, and exceed customer expectations (Blocher, 2000). From this understanding, there are three main principles in TQM, namely that TQM is a process that:

1. Customer-oriented

TQM starts by recognizing who the company's customers are and what their needs are. Every individual involved in a process, whether within or outside the organization, is a customer of another individual. The implementation of TQM begins with identifying the needs and expectations of external customers. This information is then used as the basis for determining the specifications needed for the success of internal customers. The company can provide good service to external customers if the needs of internal customers are also met properly.

2. Strive for continuous improvement

In the face of global competition and changing customer expectations, organizations must continuously improve quality and try to reduce costs. Continuous improvement is the main requirement to maintain competitiveness.

3. Engage the entire workforce

Fulfilling the needs of external customers can only be achieved if every internal process runs well and every internal customer is satisfied. Imperfections at one stage of the process can result in defective products or services, resulting in customer dissatisfaction. Therefore, the full involvement of all employees in every work process is indispensable to realize total quality.

Fandy and Anastasia stated that TQM is an approach in business management that aims to maximize organizational competitiveness through continuous improvement in products, services, human resources, processes, and the work environment. Gaspersz (2005:) also defines TQM as a method to continuously improve performance at every level of operations or processes in all functional areas of the organization by utilizing all human resources and capital owned.

Based on these various definitions, it can be concluded that Total Quality Management is a continuous effort in the organization to improve the quality of products, services, human resources, processes, and the environment by utilizing available resources, in order to meet what customers need and expect.

### **The Theory of the Relationship Between Quality Cost and Defective Products**

Based on the theory of Total Quality Management (TQM), there is a strong relationship between quality cost management and the rate of defective products.

The Principles

1. The more the company invests in prevention costs (e.g. training or machine repair), the smaller the potential for defective products to appear.

2. The cost of the assessment helps detect defects early thus preventing defects from entering the next stage.
3. If the cost of prevention and assessment is low, then the cost of failure—including the rate of defective products will be even higher.
4. Management must prioritize *cost-benefits* to achieve optimal quality costs.

#### **Model Kausal (Cause–Effect)**

Quality cost → Effectiveness of the production process → The defect rate of the product → The number of defective products.

Means:

1. Quality costs affect damaged products because each component of quality costs plays a role in quality control.
2. Proper quality investment will reduce the number of defective products.

#### **The Effect of Quality Costs on Defective Products**

The cost used to improve the quality of an item is referred to as quality cost. Quality costs are divided into four categories, namely prevention costs, assessment or detection costs, internal failure costs, and external failure costs (Tjiptono and Diana, 2003). Of the four types of costs, prevention costs and assessment costs are costs that can directly affect the number of damaged products. Meanwhile, the cost of internal and external failures actually arises as a result of the existence of defective products.

According to Hansen and Mowen (2005), the increasing cost of prevention and assessment costs indicate that the number of spoiled products is decreasing. Conversely, if both costs decrease, then the number of damaged units tends to increase. On the other hand, the cost of internal and external failures will increase as the number of defective products increases, and decreases when defective products decrease. This confirms that prevention costs and assessment costs affect the rate of damaged products, while failure costs are influenced by the number of units that are damaged.

Feigenbaum (1992) also stated that increasing the cost of prevention will reduce the rate of product defects. The reduction in defects then has an impact on lowering assessment costs, as there is less need to conduct regular examinations and tests. From this opinion, it can be concluded that the cost of prevention has a negative influence on the number of damaged products, while the cost of assessment has a positive influence on the reduction of defects.

Based on the above description, it can be concluded that quality costs especially prevention costs and assessment costs play a role in determining the amount of defective products. Prevention costs have a negative influence on defective products (the higher the cost of prevention, the less product is defective), while assessment costs have a positive influence on controlling the rate of product damage.

#### **Frame of Mind**

Theoretically, the framework of this research is:

#### **Quality Cost(X):**

1. Prevention costs
2. Assessment fees
3. Internal failure costs
4. External failure costs

→ **Affects**

#### **Defective Product (Y)**

The better the quality cost management, the lower the rate of product defects in CV. Aneka Ilmu of Pematangsiantar.

### **III. RESEARCH METHODS**

This research is a quantitative research with an associative approach. The purpose is to determine the effect of the free variable (quality cost) on the bound variable (defective product) on the CV. Aneka Ilmu of Pematangsiantar. The research was carried out on CV. Aneka Ilmu Pematangsiantar, with the research time starting from the data collection stage to analysis carried out in the 2025 period. The population in this study is all quality cost data and defective product data in CV. Aneka Ilmu of

Pematangsiantar in the period 2021 – 2024. The sampling technique uses saturated sampling (census) because all quality cost data and damaged product data in the research period are used as samples. Types of quantitative data, in the form of quality cost figures and the number of damaged products.

Data Source is Primary Data: Interview with quality management or production. Direct observation of the production process. And Secondary data: Quality cost reports (prevention, appraisal, internal failure, external failure). Data on defective product reports (scrap, rework). Company documents related to production quality. Data collection techniques include: Documentation Collect data on quality cost reports and quantity of defective products. Interview Conducted with the head of production or quality control staff. Observation Observing the production process to see the cause of the product being damaged.

#### **IV. RESULTS AND DISCUSSION**

##### **Discussion**

**Descriptive Analysis of Independent Variables** The research carried out is more of a research on quality costs consisting of prevention costs and assessment costs for damaged products. The results of the data analysis showed that the cost of prevention (X1) and assessment cost (X2) had a negative effect on damaged products. It is partially shown that the quality cost consisting of the most influential prevention cost and assessment cost is the cost of prevention. While the results of the descriptive analysis are as follows:

##### **The relationship between prevention costs and defective products**

Based on the results of the study, it is known that the cost of prevention is influenced by damaged products. This is because prevention costs are costs that reduce or eliminate quality problems and are the only value-added costs among other quality costs. Prevention costs include product planning and supervision costs, machine maintenance costs, and labor or employee costs. Planning and supervision costs are intended to plan, maintain or improve product quality. The cost of maintaining the machine is used for maintenance or replacement when necessary for the machines used in the production process so that they can run smoothly according to the target. Labor costs The costs incurred for training are intended so that employees (especially production employees) can work as much as possible, so as to minimize the occurrence of damaged or defective products caused by employees who are less competent in their fields.

The results of this study are in accordance with the research of Hansen and Mowen (2005: 15) which stated that increased prevention costs will reduce damaged products. This opinion is in accordance with the research of Ika Puspita Ayu Kumala Sari (2006) and May Puguh (2007) stating that 83 there is a significant influence between prevention costs on damaged products.

##### **The relationship between appraisal costs and defective products**

Based on the results of the study, it is known that the assessment cost is influenced by defective products. Assessment fees are activities that only detect defective product units before they are sent to consumers. The company's valuation cost consists of the cost of testing raw materials, and the cost of inspection of the production process. Prevention costs will eliminate or reduce quality problems and are the only cost-added costs between quality costs and assessment costs are activities that only detect defective product units before they are shipped to consumers.

The results of this study are in accordance with the research of Hansen and Mowen (2005: 15) which states that increasing the cost of differentiation will reduce damaged products. According to Ika Puspitasari (2006) stated that there is a significant influence between the cost of repairing damaged products. In contrast to the research according to Feigenbaum (1992: 104), the increase in assessment costs, which in turn has a positive effect because the decrease in damage means a decrease in the need for routine inspection and testing activities. This opinion is in accordance with the research of May Puguh (2007).

From the results of the research conducted, it can be seen that CV. Aneka Ilmu has spent a lot of money in improving the quality of its products. One of them is the quality cost incurred to suppress damaged products. Quality costs in this case consist of two types of costs, namely prevention costs and



assessment costs. Prevention costs and assessment fees incurred affect defective products. Based on the results of the research conducted, CV. Aneka Ilmu Semarang has spent a lot of money in improving the quality of its products, namely quality costs. The quality cost incurred is to minimize product damage that occurs or is close to zero defects. However, this company has not done any quality cost classification and reporting separately. These costs are still spread out in production costs and general administrative costs.

In this study, the researcher identified these costs to be grouped according to the type of quality cost. As for the quality costs incurred by CV. Aneka Ilmu Semarang is the cost of prevention and assessment costs. The cost of the assessment on the CV. Various Semarang Sciences include. raw material testing, and production process inspection costs. The cost of testing raw materials incurred is to handle the receipt of raw materials, ranging from monitoring raw materials that come from suppliers, monitoring the number of auxiliary materials (chemicals) to the process of testing raw materials in the laboratory to maintain product quality. The cost of 85 production process inspections on CV. Aneka Ilmu Semarang includes the costs incurred to provide book covers, wages for workers who do product sorting and packaging, salaries of employees involved in the process of product supervision and assessment and costs related to controlling during the production process until the product is ready for market.

Based on the results of the regression test that has been carried out, it can be seen that the quality cost, which consists of prevention costs and assessment costs, has a significant influence on damaged products both simultaneously (F test) and partially (t test). The results of the SPSS 12.0 calculation in Table obtained the multiple regression equation  $Y = 74060.454 - 0.0010 X_1 - 0.0009 X_2$ , which means that the prevention cost ( $X_1$ ) and the assessment cost ( $X_2$ ) have a negative effect on the defective product ( $Y$ ). This means that if the cost of prevention ( $X_1$ ) and assessment cost ( $X_2$ ) increases, then the defective product ( $Y$ ) will decrease and vice versa if the cost of prevention ( $X_1$ ) and the cost of assessment ( $X_2$ ) decrease, then the defective product ( $Y$ ) will increase. This is in accordance with the theory according to Hansen and Mowen (2005:13) that prevention costs and assessment costs increase means that the percentage of defective product units decreases and vice versa if the prevention costs and assessment costs decrease indicate that the defective product units increase.

Simultaneous testing using the F test showed that the quality cost, consisting of prevention costs and assessment costs, had a significant influence on damaged products. This test was carried out by looking at the SPSS 12.0 output results which resulted in an F significance number of 7.763. This value is compared to  $\alpha$  (0.05), which is a probability of  $0.002 < \alpha$  (0.05). With these results, it means that a hypothesis that there is a significant influence between the cost of prevention and the cost of assessing the defective product is acceptable.

The amount of contribution incurred by quality costs to damaged products is indicated by a determination coefficient of 0.279 or 27.9%. So it can be said that 27.9% of defective product changes are caused by changes in prevention costs and assessment costs, while 72.1% of defective product changes are caused by other variables outside of the quality cost components (prevention costs and assessment costs,). The amount of contribution of each independent variable can be seen from the results of  $r^2$  (Table 4.11)  $r^2$  partial variable  $X_1$  (Prevention Cost) of 0.264,  $r^2$  partial variable  $X_2$  (Assessment Cost) of 0.151. This means that the partial contribution of each variable is 26.4% for prevention costs, and 15.1% for assessment costs.

Partial testing (t-test) aims to determine the effect of quality costs (prevention costs and assessment costs) on partially damaged products. The SPSS output results for the t-test show that the probability of  $0.002 < 0.05$  for  $X_1$  (prevention cost), means that there is a significant influence of prevention costs on defective products. Probability  $0.021 < 0.05$  for  $X_2$  (valuation cost), means that there is a significant influence of valuation costs on defective products. In addition to conducting regression tests, the researcher also conducted an econometric evaluation (classical assumption test) which included normality tests, multicollinearity tests, heteroscedasticity, and autocorrelation tests. The test results show that the normal probability plot graph is spread around and along the 450 line. This indicates that the variable is normally distributed. In the multicollinearity test, the tolerance value of the prevention cost was 0.9770 and the assessment cost was 0.9770. This indicates that no variable has a

tolerance value greater than 1 (one). Meanwhile, the VIF value of prevention costs is 1.024 and assessment costs are 1.024. This shows that the VIF value  $< 10$ . Therefore, it can be said that the resulting regression model does not cause symptoms of multicollinearity. The SPSS output results also show that the residual spread is irregular, the scattered plot spread does not form a specific pattern, as well as random scattered points that are spread both above and below the zero value on the Y axis. This means that there is no heteroscedasticity, i.e. there are no different variants of an observation in this study. The autocorrelation test uses the Durbin Watson test. (DW). Based on the calculation with SPSS, the DW test value was obtained of 2.432, where this value was compared with the value in the Durbin Watson autocorrelation test criterion with  $n = 36$ ,  $\alpha = 5\%$ ,  $k = 2$ , as shown in table 4.10. The test value of DW 2.432 is in the area of no autocorrelation, so it can be said that in the resulting regression model there is no autocorrelation.

## V. CONCLUSIONS AND SUGGESTIONS

### Conclusion

1. Together the cost of prevention and assessment costs in CV. Various sciences have a negative effect on damaged products with a Fcal value of 7.763 and a determination value coefficient ( $R^2$ ) of 0.279 or 27.9% and the remaining 72.1% of damaged products are influenced by other factors that are not explained in this study.
2. There is a negative influence between. Prevention costs of damaged products with value thitung - 3,439 signifikansi  $(0,002) < \alpha (0,05)$  maka ( $H_0$ ) ditolak, artinya ada pengaruh yang signifikan dari biaya pencegahan terhadap produk rusak. Biaya pencegahan mempunyai pengaruh terhadap produk rusak dengan kontribusi  $r^2$  sebesar 26,4%.
3. There is a negative influence between the valuation cost of the damaged product with a tcal value of -2.424 mean  $(0.021) < \alpha (0.05)$  then ( $H_0$ ) is rejected, meaning that there is a significant influence of the valuation cost on the damaged product. The assessment fee has an effect on the defective product with a contribution of  $r^2$  of 15.1%.

### Suggestion

Based on the above conclusion, it is recommended as follows:

1. Increase the budget for prevention costs, especially employee training costs and machine maintenance costs to minimize the occurrence of 86 87 machine damage which will hinder the production process and possibly increase the budget for machine repair and purchase of new machines.
2. The assessment cost budget still needs to be increased, because the percentage of damage is still above the tolerance limit of 2% as happened in 2004 the level of damaged products is still very high above 4%.
3. It is necessary to increase the budget for raw material inspection costs, especially paper and ink raw materials which will greatly affect product quality.

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