

THE ANALYSIS OF QUALITY COST ON LEVEL OF PRODUCT DAMAGE

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Abstract

This study analyzes the influence of quality costs (prevention costs, appraisal fees, and the cost of internal failure) on the level of damage to tobacco products SKM PR. GAGAK HITAM. The population in this study is the entire cost of quality PR. GAGAK HITAM samples the period 2013-2015 with the techniques used are saturated or census sample. Methods of data analysis in this study are used multiple regression analysis. The results of this study indicate that there is a significant influence of quality costs (prevention costs), appraisal costs and the cost of internal failure) simultaneously on the level of product damage and prevention costs and appraisal fees partially have a significant negative effect on the level of damage to the product. As the most influential variable is the cost of prevention.

Keywords: the cost of quality, prevention costs, appraisal costs, internal failure costs, the level of product damage

1. Introduction

The development of the business world is always followed by the growing level of competition is getting tighter. The company continues to develop its ability to continue to survive in this competition. Healthy competition will be responded by business world by doing development strategy based on consumer need. The emergence of this world competition provides an alternative to consumers to make choices that fit their needs. The consumer orientation with this competition always tends to be based on the quality produced. Good quality is able to fulfill what the consumer needs, for that the business world must continue to develop strategies to be able to survive to face similar competitors, without having to turn off competitors in an unusual way. One strategy that can be developed is to improve product quality. Product quality is one of the main considerations made by consumers in deciding the purchase of the product. Joseph Juran in Prawirosentono (2007: 5), states that quality is quality is a fitness for use which, when freely translated means, quality (product quality) relates to the delicacy of the goods used. Quality products are products that can meet the needs of consumers. Quality products can be achieved with the company must always do supervision and improvement of product quality. The quality of a good is the fitness of purpose of the goods. Sofjan Assauri (2008: 293) explains that the quality is determined by several factors namely the function of a good, the outward form, the cost of the goods. Almost every manufacturer wants to try to improve the quality of the goods it produces. Efforts to improve quality will always cost. Therefore entrepreneurs or producers should look at the costs incurred and the results and benefits that can be expected. Heizer & Render (2006: 255) mentions four major categories of cost associated with quality, called cost of quality, ie prevention costs, appraisal/ valuation costs, internal failure costs and external failure costs. Quality costs incurred to improve product quality are expected to reduce the level of product damage that often occurs in the company. The level of damage to the product must always be suppressed because if left unchecked it will adversely affect the company.

This research was conducted on PR. GAGAK HITAMMaesan Bondowoso. The company is engaged in the cigarette industry which consists of two types of cigarettes ie hand-rolled cigarettes and machine clove cigarettes. This company performs its production activities every day and always found the

existence of broken products. Research conducted by Ade (2013) also found that the implementation of control in cigarette production process conducted by tobacco company Gagak Hitam did not run well enough, this is because the number of deviations that occurred, from the production plan target of 18,000,000 stems, only realized An average of 15,000,000 cigarettes, so about 4000 stems per month average damage, caused by deviations during the production process takes place. The category of broken products according to the company on the production of cigarettes GAGAK HITAM is the cigarette lintingan is too hard, too soft (kempes), porous, the diameter of the cigarette is too large, paper cigarettes are not straight. The tobacco cigarette company produces two kinds of clove cigarette cigarettes namely Hand Kretek Cigarettes and Cigarettes Kretek Machine. Hand-rolled clove cigarettes or commonly referred to as SKT are cigarette products that are processed traditionally by using human power and using traditional rolling tools also made of wood. SKT produces two brands of cigarettes, namely Gagak Kuning Lama (GKL) and GOLD, while machine-made clove cigarettes or often called SKM are cigarette products whose production process uses high-speed engine power. In SKM cigarette products there are filters made from sponges, while SKT does not exist. This SKM only produces one brand of cigarettes ie Filter. This research will be conducted on the type of SKM cigarettes because the proportion of damage is most often found that occurs in products manufactured by the machine or SKM. One alternative that can be used by companies in controlling the number of damaged products is by spending the cost of quality. Here are the quality expenses that companies have spent on SKM products .

Tabel 1. Product's Quality Costof SKM in 2013-2015

Years	Quality Cost	Proportion of Damage (%)
2013	Rp 115.890.280,00	0,36%
2014	Rp 155.705.400,00	1,00%
2015	Rp. 96.216.544,00	0,41%

Source: PR. GAGAK HITAM, 2015

Table 1 explains that the company's quality cost in 2013 is greater than 2015 but the proportion of damage in 2013 is smaller compared to 2015. This is supported by previous research conducted by Gustin (2009) indicating that quality costs consisting of Of prevention costs, assessment costs, internal failure costs and external failure costs simultaneously have a significant negative effect on the damaged product. Another study was also conducted by Kiki (2013) which resulted in that the cost of quality is significant although not significantly to the damaged product. This means that the cost of quality affects the damaged product, but by 2014 the quality cost incurred by the company is the most expensed cost over the last three years but the proportion of product damage is the greatest for the last three years.

Based on this background and the results of previous research, it becomes interesting to investigate further whether the cost of quality affects the level of product damage and whether in the present study with different objects and similar characteristics will give consistent or different results on PR. GAGAK HITAM .

Based on the description so that the problem formulation on the article significantly simultaneously and partially to the damaged product and which is the most influential.

The purpose of this article is to analyze whether there are significant effects of quality costs simultaneously and partially to the level of product damage and analyze which variables are most influential

2. Research Method

This research is a replication research where this research has often been done before. This study re-examined whether the results obtained by previous researchers but with different objects and similar characteristics will produce the same results (consistent). This research is classified as an explanatory research that is test based on theory and implication study. This study examines the effect of X variables (X1: prevention cost, X2: assessment cost, and X3: internal failure cost) to variable Y ie product damage level.

The population in this study is the overall cost of quality issued PR. GAGAK HITAM in order to improve product quality and reduce the level of product damage, and report the number of products

produced and data on the number of damaged products in the company in 2013-2015 with the type of machine clove cigarettes (SKM).

Sample technique in this research is saturated sample or other term that is census. This technique is a sample determination technique when all members of the population are used as a sample (Sugiono, 2014: 85). This is often done when the population is relatively small. The sample in this study is the cost of public relations in PR. GAGAK HITAM in order to improve product quality and reduce the level of product damage, and report the number of products produced and data on the number of damaged products in the company in 2013-2015 with the unit of the month, then the amount of data collected by 36 or $n = 36$.

This research is a quantitative type research. This type of research is a research that is more emphasis on data analysis in the form of numbers, which then from the results of the analysis will be obtained a description of a condition that exists, as a basis for solving problems that have been formulated Sources of data from this study is secondary data that is data Has already existed previously and is obtained indirectly, through intermediaries or other parties, usually in the form of evidence, records, and historical reports compiled in the archives. The data from this research is the cost data issued by PR. GAGAK HITAM in order to improve product quality and reduce the level of product damage, and report the number of products produced and data on the number of damaged products in the company in 2013-2015. Data collection method that done in this research is documentation. The data obtained by this method is the product data in the production, the damaged product, and the cost incurred by the company to maintain the quality of the product and suppress the occurrence of product damage.

This research uses two variables:

A. Dependent Variable (DependenVariable) is a variable that is influenced by independent variables, in this research symbolized by Y is the level of product damage.

B. Independent Variable (Independent Variable) is a variable that affects the dependent variable, in this research symbolized by X namely:

- X1 = prevention cost

- X2 = assessment cost
- X3 = internal failure cost

The data normality test is used to determine whether the data is normally distributed or not. This test is done by Shapiro-Wilk test The steps are:

A. Formulate hypotheses

$H_0 = 0$, meaning the data is normally distributed

$H_a \neq 0$, meaning data is not normally distributed

B. Determining Level of Significant

The significance level used is 5%. Selection of the significance level is based on the level of significance appropriate to the research interests and objectives.

C. Draw a conclusion

1. If $p\text{-value} > \alpha$, then H_0 is accepted which means the data is normally distributed.
2. If $p\text{-value} < \alpha$, then H_0 is rejected which means the data is not normally distributed.

If the data used is not normally distributed, then the next step that must be done to normalize the data is data transformation, that is by converting the data value into Z-score form. Multiple Linear Regression Analysis is used to know how far the influence of free variable (X) which amount more than 1 (one) that is quality cost (prevention cost, assessment cost, cost and internal failure) to dependent variable (Y) that is broken product.

Multiple Regression Equation:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + e$$

Where:

Y = level of product damage

A = constants

$b_1b_2b_3$ = Regression coefficients

X1 = Prevention cost

X2 = Assessment cost

X3 = Cost of internal failure

E = F error

The classical assumption test is used to obtain the appropriate linear regression model that meets the standard, that is, the regression parameter estimator must meet the Best Linear Unbiased Estimator (BLUE) requirement. The result of BLUE coefficient must meet assumption of no heterokedastistas, no multicollinearity and no autocorrelation. Hypothesis test is to know whether X1, X2, and X3 with Y have significant effect. Simultaneous test (F test) for testing the first hypothesis. This test is used to determine whether all independent variables together affect the dependent variable. While the partial test (t test) for testing the second hypothesis to determine whether each independent variable has an effect on the dependent variable.

3. Results

Multiple Linear Regression Analysis is used to know the effect of free variable (X) quality cost ie prevention cost (X1), assessment cost (X2), and internal failure cost (X3) to dependent variable (Y) that is damage level of product. Here are the results of multiple linear regression test using SPSS 20.00.

Tabel 2. Multiple Linear Regression Result

VARIABLE	Koefisien	T _{value}	Sig
constant	-4,272	0,000	
Preventive Cost	-0,953	12,514	0,000
Assesment Cost	-0,252	-3,310	0,002
Internal failure cost	<i>Excluded variable</i>	0,866	0,393
Durbin Watson	1,988		

Source: appendix 4

Table 2 explains that the variable cost assessment and variable cost prevention have significant value $< \alpha$, while the cost of internal failure costs and the cost of external failure entered into the excluded variable table. Excluded variable is a variable that automatically exits the analysis. The excluded variable is used to see the value of t for the variable declared unfit to be included in the equation, so that the regression equation is obtained as follows:

$$Y = -4,272 - 0,953X_1 - 0,252X_2$$

Based on the equation obtained $b_1 = -0.953$ and $b_2 = -0.252$. Prevention costs (X_1) have a significant negative effect on the level of product damage (Y) with a significance value of 0.000, meaning that if the prevention cost increases, the level of product damage will decrease. The cost of the assessment has a significant effect negatively on the level of product damage (Y) with a significance value of 0.002, meaning that if the assessment cost increases then the level of product damage (Y) will decrease.

The results of multiple linear regression hypothesis testing showed that the cost of quality (prevention cost, assessment cost and internal failure cost) simultaneously significantly influence the level of product damage. It is known from the result of F test which shows the probability $0.000 < \alpha (0,05)$ then H_0 is rejected, meaning there is significant influence between prevention cost, appraisal cost, and internal failure cost simultaneously to product damage level. The results of this study in accordance with the results of previous research conducted by Gustin (2009) on the Effect of Quality Costs on Damaged Products on UD Barokah Unggaran Year 2004-2006. Therefore quality cost is an important thing that should be considered by the company in order to prevent and decrease the larger damaged product.

The result of t test showing the effect of quality cost (prevention cost, internal cost, and internal failure cost) partially to the level of product damage from this research can be seen in the following description:

1. Effect of prevention costs on the level of product damage

Prevention costs have a significant negative effect on the level of product damage which means that if the cost of prevention issued by the company is increased then it will reduce the level of product damage otherwise if the prevention cost is lower it will increase the damage level of the product. The hypothesis is accepted because the result of t test (-12,514) is smaller From α (0.05) about the effect of prevention cost on the level of product damage, indicating that the prevention cost has a significant negative effect on the level of product damage. This is because the cost of prevention is a cost that reduces or eliminates quality issues and is one of the value added costs among other quality costs. Costs spent PR. GAGAK HITAM in an effort to prevent the occurrence of product damage is the cost of machine maintenance and training costs of employees.

The results of this study in accordance with the results of previous studies conducted by Gustin (2009) which states that the cost of prevention has a significant negative impact on the level of damage to the product. This study also supports the theory of Hansen & Mowen (2009: 13) which states that prevention costs affect the level of product damage.

2. The effect of the assessment cost on the level of product damage

The appraisal cost has a significant negative effect on the level of product damage which means that if the valuation cost incurred by the company is increased then it will reduce the level of product damage otherwise if the valuation cost is lower it will increase the level of product damage. This result is known from t-test is (-3,310) smaller than α (0,05) and in accordance with hypothesis proposed that there is significant influence of assessment cost to level of product damage. Appraisal costs that have been issued PR. GAGAK HITAM includes, sorting fees, equipment checking fees, and worker supervision.

The results of this study in accordance with the results of previous studies conducted by Gustin (2009) which states that the cost of valuation significantly negative impact on the level of damage to the product. This study also supports the theory of Hansen & Mowen (2009: 13) which states that the cost of assessment negatively affect the level of product damage.

3. Influence of internal failure cost to product damage level.

This research states that the internal failure variable is in the excluded variable table, which the variable is not feasible to put into the equation, in other words the variable cost of internal failure has no effect whatsoever on the level of product damage.

The contribution simultaneously is indicated by the Adjusted R Square value in the summary model table, while the r^2 value can be known through the partial column coefficient table which then the value is squared. The following calculation results coefficient of determination:

TABLE 3 coefficient of determination result

Coefficient of Determination	Value
R^2	0,816
r^2 Prevention Cost $(-0,909)^2$	0,826
r^2 Assesment Cost $(-0,499)^2$	0,249

Source : Appendix 4

Table 3 test results coefficient of determination simultaneously shows that (R^2) of 0.816. This means that there is a contribution of 81.6% in predicting the level of product damage described by the quality cost (prevention cost, appraisal cost, internal failure cost) simultaneously, while the remaining $(100\% - 81.6\% = 18,4\%)$ is explained by other variables outside the variables studied.

The determination coefficient test partially indicates that (r^2) the prevention cost is 0.826 which means that the partial contribution of prevention cost to the damage level of the product is 82.6% and (r^2) the valuation cost is 0.249 which means that the partial contribution of the appraisal cost to the level of product damage is 24.9%.

4. Conclusion

4.1. Conclusion

Prevention costs, assessment costs, and internal failure costs simultaneously have a significant effect on the extent of product damage. Quality cost is an important thing that companies should consider in preventing and lowering larger damaged products. Partial deterrence costs have a significant negative

impact on the level of product damage, if prevention costs increase then the level of damage to the product will decrease. Partial valuation costs have a significant negative influence terhadap level of damage to the product, if the cost assessment increased the level of damage to the product will decrease. The most influential variable on the level of product damage is the variable cost prevention

5.2 Suggestion

For a company it is better to make a detailed cost report of quality in order to facilitate the identification of costs incurred in order to maintain and improve the quality of the product which is then compared with the level of product damage, but also serves to avoid the occurrence of waste of costs. Companies should pay attention to SKM products whose proportion of damage is higher than that of SKT products, especially on machines used for production because product damage is most commonly found when the production process is also expected to pay more attention to pegendalian costs ie prevention costs and assessment fees so that it can Suppress the level of product damage and reduce the cost of failure. Companies are expected to be able to control the cost of prevention and assessment costs so that the costs incurred by the company is not greater than the benefits obtained.

Reference (TNR 11, Bold)

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