Effect of Production Volume on Prevention Costs, Valuation Costs, and Damaged Products in the Seafood Processing Industry

Ardiansyah[1]*, Barus Umarella[2]
1. Business Administration, Politeknik Negeri Ambon
2. Accounting, Politeknik Negeri Ambon
*corresponding author email: ardi4n.1410@gmail.com

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Abstract
The purpose of this study was to determine the effect of production volume on prevention costs, the effect of production volume on appraisal costs, the effect of production volume on damaged products, the Effect of prevention costs on damaged products, and the effect of appraisal costs on damaged products. This type of research is quantitative. The type of research data is secondary data for 2019-2020 which consists of reports on production volume, prevention costs, appraisal fees, and damaged products. The analytical method uses the Smart Partial Least Square (SmartPLS) software 3. The results of this study indicate that production volume has a positive and significant effect on prevention costs, production volume has a positive and significant effect on appraisal costs, production volume has a positive and significant effect on damaged products, prevention costs have a negative but not significant effect on damaged products, and appraisal costs have a positive but not significant effect on damaged products. All hypotheses put forward in this study were declared accepted. The implications of the results of this study can be taken into consideration for companies by comparing data on handling costs, appraisal costs, production volume.

1. Introduction

Import activity is a consequence of the economy itself so it can be a threat to some local products that are unable to compete (Listiawati, 2020). Imported goods in Indonesia cover almost all aspects of life needs. Imported products are not only those that do not exist in the country but imported products compete strictly with products in which almost all of these products are also produced domestically and have the same function for the customer. Domestic producers must be able to compete to show the best quality and competitive prices with imported products. So that domestic producers can survive and develop. Business competition not only displays the superiority of a product but the process of maintaining product quality is the foundation (Chopra & Singh, 2015; Dzakiyyah & Ishak, 2022; Hilmi & Cevik, 2013). This is forcing business people to immediately improve both internally and externally to improve the company's performance on an ongoing basis (Jawa et al., 2020; Safuan, 2017). Efforts to improve the company internally by increasing the ability of the accounting division to be professional and reliable. Especially the treatment of cost accounting in manufacturing companies. Cost accounting is often interpreted as the whole activity in the manufacturing accounting system (Hilmi & Cevik, 2013; Sadkowski, 2019). The cost accounting cycle handles starting from the purchase of direct raw materials and complementary materials, storage in the warehouse, distribution process from warehouse to the production department, storage in finished goods warehouse, determination of cost of goods

manufactured and cost of goods sold up to the process of selling finished goods including making calculations direct labor costs and factory overhead costs. "Accounting documents, accounting records, defect cards, error reports, and complaint reports are the most important sources of information on quality costs" (Sadkowski, 2019).

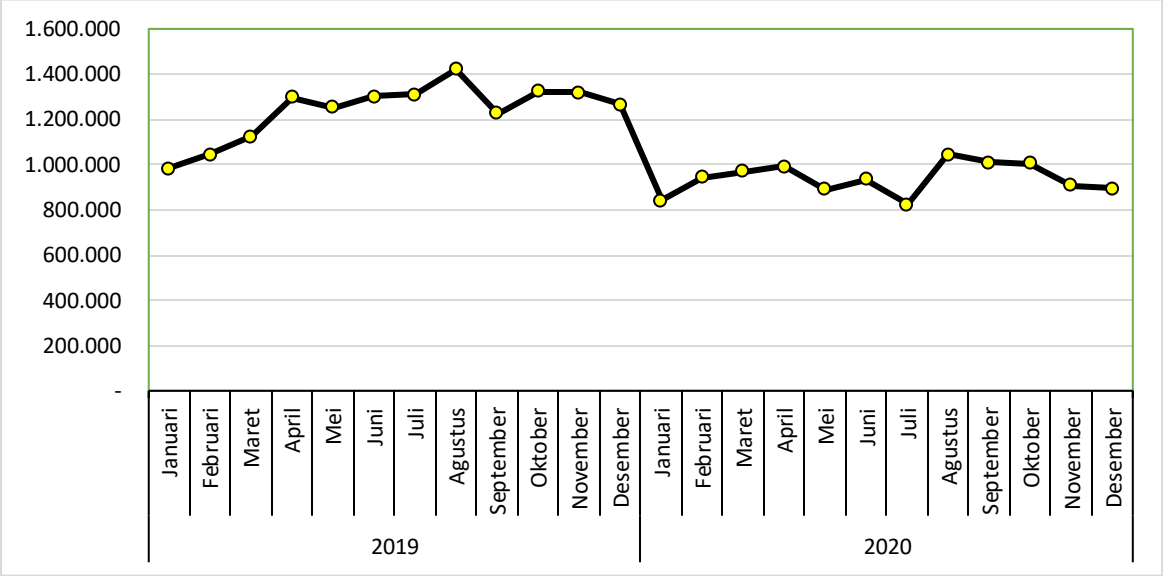
Cost accounting specifically concentrates on overseeing and compiling all the information a company needs in the production process (Wulandari et al., 2016). This includes maintaining alignment between the costs incurred and the quality of the products resulting from the production process carried out by the company. One proof of a professional accounting division is that the production process goes according to plan so that product handling and evaluation can minimize the occurrence of damaged products. The occurrence of damaged products is a consequence of the production activity itself. Damaged products are normal as long as they are under control and do not burden the main capital of the company. Handling and evaluating a product as part of maintaining product quality has become a regular procedure regardless of the number of damaged products. Whether or not a damaged product is found for manufacturing companies, quality costs are still incurred to ensure the production process and all related matters, run according to the SOP (Standard Operating Procedure) of the company, especially companies that produce food products. The implementation of minimum quality costs consists of prevention costs and mandatory assessment costs for food producers because they involve the body and health of the customer.

According to Jaaron (2022) and Yuniastuti (2020), implementation of quality costs is something that must be done for companies engaged in the manufacturing industry sector. Therefore, the company's accounting division periodically certainly makes production reports for management purposes. Quality reports are sourced from quality accounting data so that they can be taken into consideration in making quality decisions to produce quality products (Haug et al., 2011). In general, production reports consist of production volume, the number of damaged products, and quality costs which at a minimum consist of prevention costs and appraisal costs (Chopra & Singh, 2015). The results of this study indicate that companies in Portugal require detailed data on the number of costs incurred for handling and evaluating the resulting product so that quality is guaranteed as well as material for decision-making (Pires et al., 2017). It is also useful in determining the selling price of a product and the extent to which the cost of quality contributes to the company (Hilmi & Cevik, 2013). So that the products produced can be sold with prime quality (Martínez & Selles, 2015). With more competitive product prices. Many studies have been conducted to determine the impact of implementing prevention costs and appraisal costs for companies engaged in the manufacturing sector.

According to research results of Hadijah et al. (2019), Safitri et al. (2021), Ulfah & Hastuti (2018) and Yuniastuti (2021) shows that prevention costs have a negative and significant effect on damaged products, which means that each increase in prevention costs will reduce the occurrence of damaged products. While the research results of Hadijah et al. (2019) show that appraisal costs have a positive and significant effect on damaged products, meaning that the amount of appraisal costs incurred by the company is directly proportional to damaged products because the costs of testing and identifying damaged products are recognized as appraisal costs. Therefore, the greater the valuation cost means the greater the product damage that occurs as a result of production activities. Meanwhile, research results of Safitri et al. (2021), Ulfah & Hastuti (2018), Yuniastuti (2021) shows the opposite that the cost of appraisal has a negative and significant effect on damaged products, which means that every time the appraisal fee increases, it will reduce the occurrence of damaged products. This happens because the inspection of raw materials, laboratory testing, and internal quality audits are recognized by the company as an appraisal fee. Meanwhile, research results of Hasanuddin et al. (2021) show that, the cost of prevention and cost of appraisal partially positive and significant impact on damaged products. This can be due to the research data used being primary data through the distribution of questionnaires to employees.

The difference in the results of these studies is caused by differences in SOP (Standard Operating Procedures) and the nature of the products produced by each company. This can be known through a review of the object of research that has been carried out by each researcher. Research conducted to Wahyono & Susanto (2017) in tobacco cigarette manufacturers. As for research of Ulfah & Hastuti (2018) sheet leather manufacturers. A study of Hadijah et al. (2019) was carried out in an industry engaged in the production of pulp and paper products. Meanwhile, the research conducted to Safitri et al. (2021) in companies engaged in the mining and asphalt material industry. Yuniastuti (2021) conducting research with the object of the home industry of making peanut crackers which is a traditional food. Research of Hasanuddin et al. (2021) done in the furniture industry. Differences in the products produced can cause differences in SOP and methods of implementing quality costs for companies (Daunoriene & Staniskiene, 2016). Thus, the application of prevention and valuation costs is influenced by the environment.

This research was conducted at companies engaged in the processing and storage of marine products that produce frozen tuna products in the form of Tuna Loin Co; Center Cut Tuna; Tuna Slices; Tuna Burgers; Pocket Tuna; Tuna Steaks; and Tuna Cubes. The products produced by the company are included in the food category, which of course has a different SOP (Standard Operating Procedure) from manufacturers of clothing, materials, ATK (office stationery), and other non-food products. The following is a report on production volume, number of damaged products, prevention costs, and quality costs incurred by the company to maintain product quality standards so that customers can consume them properly and healthily.



Picture 1. Graph of 2019-2020 Prevention Costs
Source: Processed data, 2022.

Based on Figure 1 it can be seen that prevention costs have fluctuated for 2 (two) years. The highest prevention costs occurred in August 2019 at IDR 1,420,400.

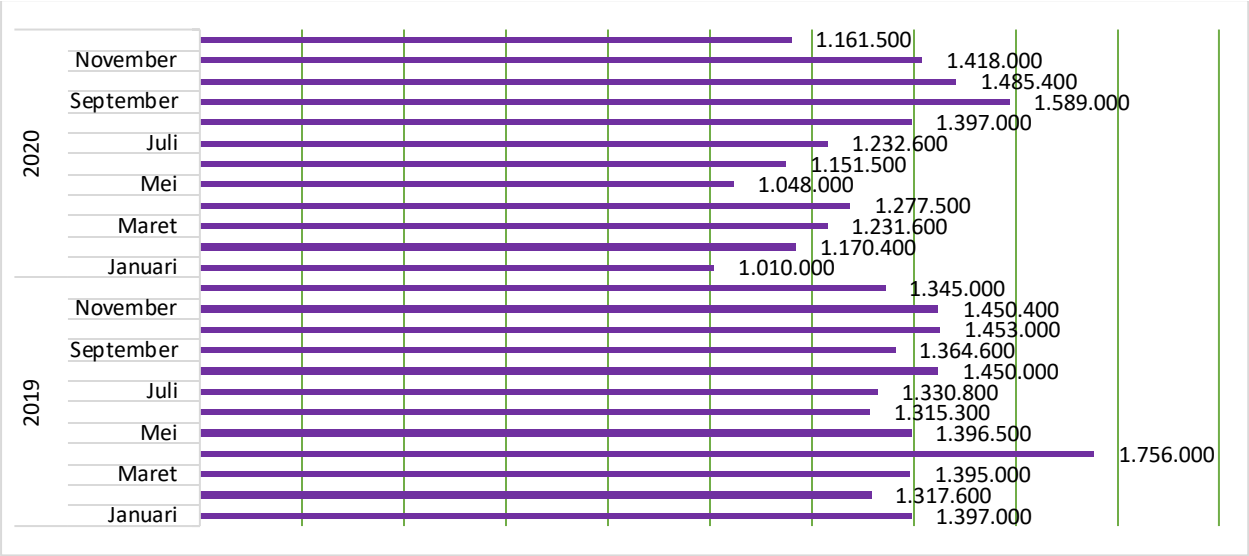


Figure 2. Graph of Appraisal Fees for 2019-2020
Source: Processed data, 2022.

Based on picture 2 it can be seen that production appraisal costs have fluctuated for 2 (two) years. The highest appraisal fee occurred in April 2019 at IDR 1,756,000.

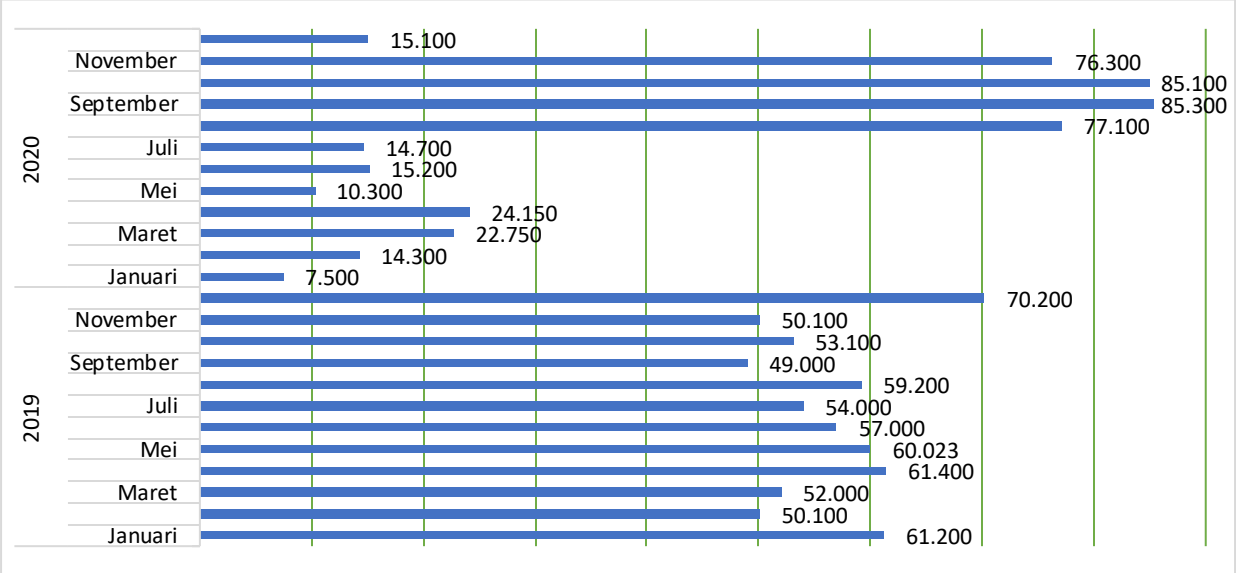


Figure 3. Graph of Production Volume for 2019-2020
Source: Processed data, 2022.

Based on picture 3 it can be seen that production volume has fluctuated for 2 (two) years. The highest production volume occurred in September 2020 of 85,300 pieces (pcs).

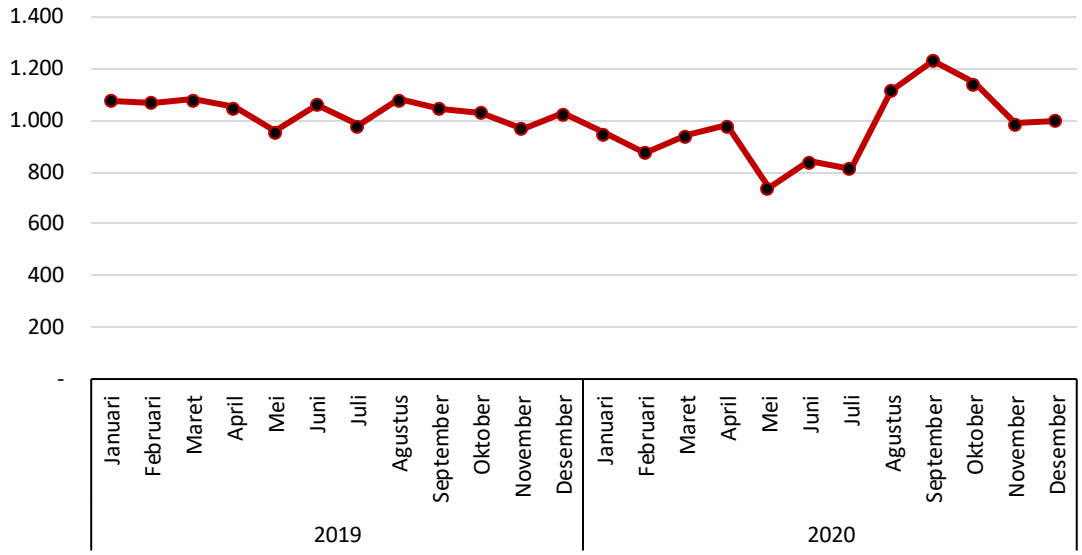


Figure 4. Broken Product Graph 2019-2020
Source: Processed data, 2022.

Based on figure 4 shows that damaged products have fluctuated for 2 (two) years. The highest damaged product occurred in September 2020 with 1,231 pieces (pcs).

Several factors are the novelty of this research, namely: (1) This study does not only use quality costs which consists of prevention costs and appraisal costs but places production volume as an independent variable; (2) This study examines 3 dependent variables through path analysis, namely prevention costs, appraisal costs, and damaged products; (3) This research was conducted in a seafood processing manufacturing industry which is included in the food category, which of course has a different SOP (Standard Operating Procedure) from manufacturers of clothing, materials, ATK (office stationery), and other non-food products. Therefore,

Substantial factors which are important reasons for this research being conducted are: (1) There are differences in the treatment of prevention costs and appraisal costs in each company which is influenced by operational differences and the nature of the products produced. According to Chatzipetrou & Moschidis (2016), Glogovac & Filipovic (2018), and Sadkowski (2019), Quality costs are not only found in the manufacturing industry but also in the service and retail industries. Each company has different criteria for classifying quality costs because the sources adopted are also different entities so the quality cost calculation model applied can cause misunderstandings (Ayach et al., 2019; Daunoriene & Staniskiene, 2016; Sadkowski, 2019). Research of Chatzipetrou & Moschidis (2016) revealed that there are differences in the implementation of quality costs in supermarkets in Greece. This proves that quality costs are very complex. "The completed scientific research showed that there is no uniform definition of quality costs in the scientific literature" (Daunoriene & Staniskiene, 2016, p. 133); (2) There are differences in operational definitions between the research results of Safitri et al. (2021) which state that a damaged product is a product that cannot be repaired and has no economic value, meanwhile, the results of the study Juwita & Fajaryanti (2021) damaged products are products that can still be repaired by increasing production costs. In research of Juwita & Fajaryanti (2021) classifying quality costs into production costs; (3) In 2021-2022 the object of this research has decided to stop independently handling quality costs consisting of prevention costs and appraisal costs by transferring them to third parties in handling these quality costs. In research of Dzakiyyah & Ishak (2022) companies whose sales have tended to decline for 5 (five) consecutive years have succeeded in providing recommendations for improvements to the company that the company needs commitment to prevention costs and appraisal costs to increase sales.

Production Volume

Production volume is the number of products produced from the production process carried out by companies engaged in the manufacturing sector (Maesaroh et al., 2021; Purwoko et al., 2022). Units for calculating production volume are in the form of units, pieces (pcs), boxes (boxes), pieces, kilograms (kg), and other units determined by the company. The period for classifying production volume can be in the form of time units, namely months, quarters, semesters, or annually according to the provisions of the accounting division in a company. Production volume is the total quantity of finished products, which is the result of the collaboration of raw material costs, direct labor costs, and factory overhead costs (Maulida & Tholibin, 2021; Trisnadewi, 2022). A study of Badriah (2016) revealed that the volume of clean water in cubic meters (m^3) that can be produced by PDAM (Regional Water Supply Company) at a certain time is also called production volume. Research of Trisnadewi (2022) states that the unit of production volume is a unit of furniture that has been successfully made. While research by Safuan (2017) further broadens the scope of production volume which is not only limited to visible products but the quantity of services provided by service providers is also called production volume such as the number or quantity of container loading and unloading services at the port in an annual period.

Study of Kusuma & Pebrianti (2020) and Maulida & Tholibin (2021) there is a similarity in the production volume unit in the form of the number of sheets or pieces produced in the garment business and sarong weaving craft. While research by Jawa et al. (2020) in the brick production business classifies production volume in units resulting from the production process. Therefore, it can be concluded that the production volume is a product or service unit resulting from the collaboration of direct material costs, direct labor costs, and factory overhead costs within a certain period or through a cycle that does not include elements of production costs that are still under development. efforts to change the physical or non-physical form of a product or service significantly to meet customer needs.

Damaged Product

A damaged product means that the quality of the goods that have been processed from production activities is not perfect or does not meet the specifications set before the production activities are carried out. According to Hadijah et al. (2019) and Safitri et al. (2021), damaged product is a defective product that does not meet the quality standards set by the company before production. The treatment of damaged products in every company is of course not always the same. Even so, every company tries to make efforts so that defective products can still be of value by maintaining the handling so that they have the proper selling value. According to Safitri et al. (2021), defective products can still be repaired with the same quality. The existence of a damaged product will cause additional costs to the cost of goods sold set by the company. The damaged product is a product that can no longer be repaired so the damaged product is considered not of economic value and its treatment is destroyed (Safitri et al., 2021). Meanwhile, according to Juwita & Fajaryanti (2021) a damaged product is a defective product so corrective action can still be taken by increasing production costs because a damaged product can only be known after the production process is complete.

According to Daunoriene & Staniskiene (2016) and Yuniastuti (2020), damaged product is a product that is physically damaged so that it does not meet the eligibility criteria for the product to be sold, although repairs can still be made which will result in increasing the cost of quality improvement so that it meets the product quality eligibility standards for certain products.

Prevention Cost

Prevention costs are due to the supervision carried out by the company against production failures (Sadkowski, 2019). Prevention costs relate to the design, implementation, and maintenance of a manufacturing company's operational management system (Hilmi & Cevik, 2013). The greater the spending on prevention costs, the less the number of damaged products that

are the result of production failures (Safitri et al., 2021). Included in prevention costs are product quality planning, new product review, production process control, material inspection, machine maintenance, and employee training. According to Daunoriene & Staniskiene (2016), Hilmi & Cevik (2013), and Ulfah & Hastuti (2018), prevention costs are costs incurred to prevent the standard quality of products or services produced from decreasing. Generally, companies recognize production machine maintenance costs as prevention costs. Equipment and equipment testing, sample measurement and evaluation costs, and other related measurements (Hilmi & Cevik, 2013; Jaaron, 2022). The scope of prevention cost activities shows that prevention costs incurred can be caused by 2 (two) factors within the company, namely: (1) Done before production and during production, meaning that prevention costs are incurred even though the company does not know whether or not the product is damaged; (2) It is carried out after production, meaning that the company already knows that damaged products have occurred due to the production process so that the prevention costs incurred will be directly proportional to the number of damaged products.

Appraisal Fee

Appraisal costs are costs incurred by the company to ensure the products produced are under the standards and specifications set by the company (Safitri et al., 2021; Sulistiyowati et al., 2022). Achieving a product with good quality is of course to avoid damaged products which can result in greater losses for the company compared to spending appraisal costs. The cost of assessment includes inspection of raw materials, field testing, verification of suppliers and suppliers, assessment of production processes, and product quality audits (Hilmi & Cevik, 2013; Sulistiyowati et al., 2022). According to Daunoriene & Staniskiene (2016) and Ulfah & Hastuti (2018) Appraisal costs are costs incurred to ensure products and services have been produced by the needs and quality expected of customers.

Appraisal costs are the same as prevention costs which in implementation can occur in 2 (two) different conditions within the company, namely: (1) Done before production and during production, meaning that the appraisal costs are incurred even though the company does not know whether or not there is a damaged product; (2) Performed after production means that the company already knows there has been a damaged product as a result of the production process so that the valuation costs incurred by the company will be directly proportional to the number of damaged products.

Hypothesis Development

Effect of Production Volume on Prevention Costs

Production activities as the primary activity of companies engaged in the manufacturing industry sector, of course, the company's accounting division will be involved in determining the volume of each production activity (Badriah, 2016; Jawa et al., 2020; Kusuma & Pebrianti, 2020). The greater the production volume, the greater the prevention costs (Purwoko et al., 2022; Safuan, 2017) therefore, production volume has a strong influence on the number of prevention costs that will be incurred by companies engaged in the manufacturing industry.

Research result of Badriah (2016) shows that the cost of maintaining and repairing fixed assets has a significant effect on production volume at regional drinking water companies (PDAM). The research results by Maulida & Tholibin (2021) states that the quality of production equipment has a significant effect on production volume. Although, there are differences in the position of the dependent variable in this study and research by Badriah (2016) and Maulida & Tholibin (2021) but have similar characteristics regarding production volume and prevention costs, namely: (a) Research (Badriah, 2016) using the account name for maintenance and repair of fixed assets at the regional drinking water company (PDAM); (b) Research (Maulida & Tholibin, 2021) which uses the name of the production equipment quality account in the sarong weaving industry. Based on previous research studies and business characteristics the object of this research that

treats prevention costs starting from pre-production to the production process so that the greater the production volume, the greater the prevention costs incurred by the company so that the pre-production and production processes run optimally. Therefore, the hypothesis proposed in this study is:

H_1 = Production volume has a positive and significant effect on prevention costs

Effect of Production Volume on Appraisal Costs

Production activities as the main activity of companies engaged in the manufacturing industry sector, of course, the company will determine the volume of each production activity. The greater the production volume, the greater the costs incurred to prevent product damage. In this study, one of the costs of quality that serves to prevent the occurrence of damaged products is an appraisal fee. Therefore, production volume has a strong influence on the number of appraisal costs that will be incurred by companies engaged in the manufacturing industry, meaning that the greater the production volume, the greater the appraisal costs incurred by the company. Appraisal costs function to assess products that have gone through the production process and handle these products so that they comply with the quality standards set by the company. Therefore, the hypothesis proposed in this study is:

H_2 = Production volume has a positive and significant effect on valuation costs

Effect of Production Volume on Damaged Products

Production activities are the main activities of companies engaged in the manufacturing industry sector, including clothing, food, beverages, and pharmaceuticals. The risk from production activities is that the product is damaged or defective. The greater the production activities carried out, the greater the threat of damaged products. Therefore, the amount of production has a strong relationship with damaged products in a company engaged in the manufacturing industry sector. So, the hypothesis proposed in this study is:

H_3 = Production volume has a positive and significant effect on damaged products

Effect of Prevention Costs on Damaged Products

Prevention costs are one element of quality costs as costs incurred by the company to prevent damaged or defective products from occurring. Of course, the cost of prevention has a relationship with the number of damaged products. The greater the prevention costs incurred by the company, the smaller the number of damaged products. Although, this does not apply equally to every type and form of company. Research result by Hadijah et al. (2019), Safitri et al. (2021), Ulfah & Hastuti (2018), Wahyono & Susanto (2017), and Yuniastuti (2021) shows that prevention costs have a negative and significant effect on damaged products, which means that each increase in prevention costs will reduce the occurrence of damaged products. Meanwhile, research results by Hasanuddin et al. (2021) show that prevention costs have a positive and significant effect on damaged products. This can be due to the research data used being primary data through the distribution of questionnaires to employees.

There are differences in the results of these studies that can be caused by differences in SOP (Standard Operating Procedures) and the nature of the products produced by each company. According to Chatzipetrou & Moschidis (2016), Glogovac & Filipovic (2018), and Sadkowski (2019), quality costs are not only found in the manufacturing industry but also in the service and retail industries. Each company has different criteria for classifying quality costs because the sources adopted are also different entities so the quality cost calculation model applied can cause misunderstandings (Ayach et al., 2019; Daunoriene & Staniskiene, 2016; Sadkowski, 2019). This can be known through a review of the object of research that has been carried out by each researcher. Research conducted by Wahyono & Susanto (2017) in tobacco cigarette manufacturers. As for research by Ulfah & Hastuti (2018) sheet leather manufacturers. A study by Hadijah et al. (2019) was carried out in an industry engaged in the production of pulp and paper products. Meanwhile, the research conducted by Safitri et al. (2021) in companies engaged in the

mining and asphalt material industry. Yuniastuti (2021) conducting research with the object of the home industry of making peanut crackers which is a traditional food. Research by Hasanuddin et al. (2021) done in the furniture industry. Of course, the SOP (Standard Operating Procedure) for each company differs between food manufacturers and manufacturers of clothing, building materials, ATK (office stationery), and other non-food products. The manufacturing industry consistently incurs quality costs which include prevention costs and appraisal costs even though there are no problems in production activities because they include SOP (Standard Operating Procedures) to ensure that the food products produced are good and do not harm consumers (Jaaron, 2022). The completed scientific research showed that there is no uniform definition of quality costs in the scientific literature (Daunoriene & Staniskiene, 2016).

As for this research, based on the company's SOP it can be seen that the company incurs prevention costs not only when a product is damaged but carried out since the fish is received from the catch from the sea until it becomes a frozen tuna product. Thus, it can be seen that the company incurs prevention costs before the production process, during production, and after production is complete, meaning that prevention costs are incurred even though the company does not know whether or not the product is damaged. The treatment of prevention costs like this can cause a disproportionate relationship between prevention costs and damaged products. Based on previous research and studies of business characteristics in the object of this research, it can be concluded that there are differences in the results of this study, regardless of the type and form of each company. As for this study the hypothesis proposed is:

H_4 = Prevention costs have a negative but not significant effect on damaged products

The Effect of Appraisal Fees on Damaged Products

Appraisal costs are one element of quality costs as costs incurred by the company with the aim of not causing damaged or defective products. Of course, appraisal costs have a relationship with the number of damaged products. The greater the valuation costs incurred by the company, the smaller the number of damaged products. Although, this does not apply equally to every type and form of company. Research result by Hadijah et al. (2019) shows that appraisal costs have a positive and significant effect on damaged products, meaning that the amount of appraisal costs incurred by the company is directly proportional to damaged products because the costs of testing and identifying damaged products are recognized as appraisal costs. Therefore, the greater the valuation cost means the greater the product damage that occurs as a result of production activities. Meanwhile, research results by Safitri et al. (2021), Ulfah & Hastuti (2018), Wahyono & Susanto (2017) and Yuniastuti (2021) shows the opposite that the cost of appraisal has a negative and significant effect on damaged products, which means that every time the appraisal fee increases, it will reduce the occurrence of damaged products. This happens because the inspection of raw materials, laboratory testing, and internal quality audits are recognized by the company as an appraisal fee. Meanwhile, research results of Hasanuddin et al. (2021) show that prevention costs have a positive and significant effect on damaged products. This can be due to the research data used being primary data through the distribution of questionnaires to employees.

There are differences in the results of these studies that can be caused by differences in SOP (Standard Operating Procedures) and the nature of the products produced by each company. According to Chatzipetrou & Moschidis (2016), Glogovac & Filipovic (2018) and Sadkowski (2019) quality costs are not only found in the manufacturing industry but also in the service and retail industries. Each company has different criteria for classifying quality costs because the sources adopted are also different entities so the quality cost calculation model applied can cause misunderstandings (Ayach et al., 2019; Daunoriene & Staniskiene, 2016; Sadkowski, 2019). This can be known through a review of the object of research that has been carried out by each researcher. Research conducted by Wahyono & Susanto (2017) in tobacco cigarette manufacturers. As for research by Ulfah & Hastuti (2018) sheet leather manufacturers. A study of Hadijah et al. (2019) was carried out in an industry engaged in the production of pulp and paper

products. Meanwhile, the research conducted by Safitri et al. (2021) in companies engaged in the mining and asphalt material industry. Yuniastuti (2021) conducting research with the object of the home industry of making peanut crackers which is a traditional food. Research by Hasanuddin et al. (2021) done in the furniture industry. Of course, the SOP (Standard Operating Procedure) for each company differs between food manufacturers and manufacturers of clothing, building materials, ATK (office stationery), and other non-food products. The manufacturing industry consistently incurs quality costs which include prevention costs and appraisal costs even though there are no problems in production activities because they include SOP (Standard Operating Procedures) to ensure that the food products produced are good and do not harm consumers (Jaaron, 2022). The completed scientific research showed that there is no uniform definition of quality costs in the scientific literature (Daunoriene & Staniskiene, 2016).

As for this research, Based on the company's SOP, it can be seen that the company incurs an appraisal fee when a damaged product occurs so that it can still be salvaged or sold at a lower price. Thus, it can be seen that the company incurs appraisal costs after production is complete, meaning that appraisal costs are incurred when the company finds out that there is a damaged product. Treatment of valuation fees like this can cause a direct proportion between the valuation costs and damaged products. Based on previous research and studies of business characteristics in the object of this research, it can be concluded that there are differences in the results of this study, regardless of the type and form of each company. As for this study the hypothesis proposed is:
H_5 = Appraisal costs have a positive but not significant effect on damaged products

Framework

The following is a research framework.

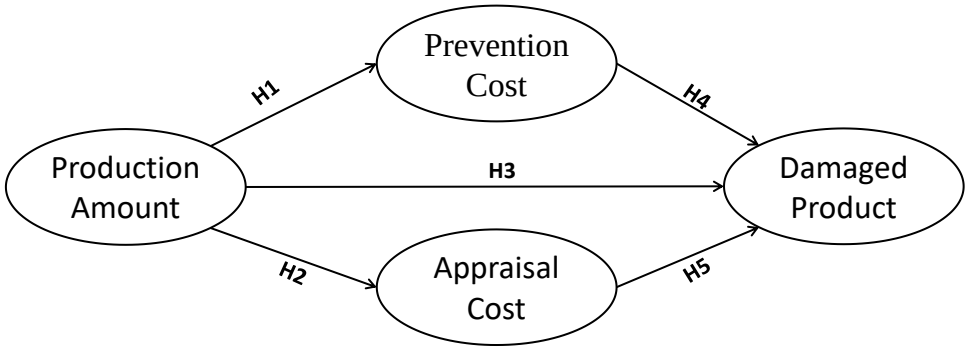


Figure 5. Mindset
Source: Processed data, 2022.

The purpose of this research is to find out: (1) the Effect of production volume on prevention costs; (2) the Effect of production volume on appraisal costs; (3) the Effect of production volume on damaged products; (4) the Effect of prevention costs on damaged products; and (5) Effect of valuation costs on damaged products.

2. Research methods

This type of research is quantitative. The type of data in this research is secondary data for 2019-2020. This research was conducted at PT. CLA runs its operations in Ambon City, Maluku Province, Indonesia. The company is engaged in the processing and storage of marine products which produces frozen tuna products in the form of Tuna Loin Co; Center Cut Tuna; Tuna Slices; Tuna Burgers; Pocket Tuna; Tuna Steaks; and Tuna Cubes. Secondary data used in this study are company reports related to production volume and quality costs which include prevention costs and appraisal costs, as well as reports of damaged products. The reason for choosing 2019-2020 is because in 2021-2022 the company has decided to stop independently handling quality costs which consist of prevention costs and appraisal costs by transferring to a third party in handling

these quality costs. Therefore, the research data was taken based on company reports for the last 2 (two) years before the handling of prevention costs and appraisal costs was transferred to a third party. In the period from 2019 to 2020 the data used is monthly data from January to December for each variable in this study so that the total data used is 96 research data.

Variable Operational Definitions

The operational definitions of the variables in this study can be seen in table 1, as follows:

Table 1. Variable Operational Definitions

Variable	Definition	Indicator	Scale	Source
Production Volume	The number of products produced by the company as a result of production activities within a predetermined period. For example monthly, quarterly, semester, or yearly. Generally, the period used in calculating the total product produced is monthly.	Total Production in a monthly period	Ratio	(Badriah, 2016; Jawa et al., 2020; Kusuma & Pebrianti, 2020; Maesaroh et al., 2021; Maulida & Tholibin, 2021; Purwoko et al., 2022; Safuan, 2017; Trisnadewi, 2022)
Damaged Product	Products that are defective because they are not perfect or do not meet the specification standards for product quality that have been set before production activities are carried out so that they are not suitable for sale.	Total Damaged Products in a monthly period	Ratio	(Daunoriene & Staniskiene, 2016; Hadijah et al., 2019; Juwita & Fajaryanti, 2021; Yuniastuti, 2021)
Prevention Cost	Costs incurred to prevent product damage from pre-production and during the production process include factory overhead costs.	Total Prevention Cost in a monthly period	Ratio	(Daunoriene & Staniskiene, 2016; Hilmi & Cevik, 2013; Jaaron, 2022; Sadkowski, 2019; Ulfah & Hastuti, 2018)
Appraisal Fee	Costs incurred to assess the feasibility of products that have been completed in the production process according to standard specifications set by the company before production is carried out.	Total Appraisal Fee in a monthly period	Ratio	(Daunoriene & Staniskiene, 2016; Hilmi & Cevik, 2013; Sulistiyowati et al., 2022; Yudiana & Lastanti, 2017)

Source: Processed data, 2022.

Data Analysis Method

The research data was analyzed quantitatively using the Smart Partial Least Square (SmartPLS) 3 software. The stages of testing the data in this study were:

1. Variable Descriptive Statistics
2. Measurement Model (Outer Model)
   - 2.1. Analysis of Reliability and Validity Factor
   - 2.2. Convergent Validity Test
   - 2.3. Discriminant Validity Test
   - 2.4. Reliability Test
3. Structural Model (Inner Model)
   - 3.1. R-Square Coefficient of Determination
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   - 3.3. Goodness Of Fit (GoF) Test
   - 3.4. Q-Square

4. Evaluation of the Relationship between Latent Variables
   4.1. Hypothesis Test and T-Statistics Test

Research Model Framework

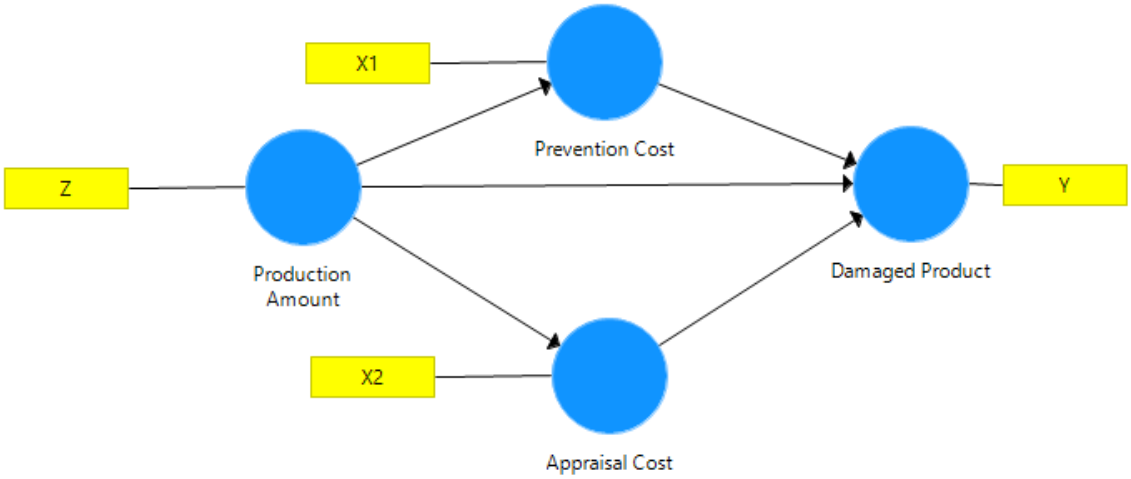

Figure 6. Research Model Framework
Source: Data processed from SmartPLS 3, 2022.

3. Results and Discussion

Variable Descriptive Statistics

Variable descriptive statistics in this study were used to describe a data statistically with the help of Smart Partial Least Square (SmartPLS) software 3. Statistical data were observed at the mean and standard deviation, minimum and maximum values of all variables in this study consisting of: X1 (Prevention Cost); X2 (Appraisal Cost), Z (Production Amount), and Y (Damaged Product) during this study period consisted of 24 research data (24 months/2 consecutive years). The variable descriptive statistics in this study can be seen in the following table:

Table 2. Variable Descriptive Statistics

Variable	N	Mean	Median	Min	Max	Standard Deviation
X1	24	1.088.025.000	1.043.600.000	825.600.000	1.420.400.000	179.419.781
X2	24	1.339.320.833	1.364.600.000	1.010.000.000	1.756.000.000	162.196.432
Z	24	46.880.125	53.100.000	7.500.000	85.300.000	24.445.107
Y	24	1.002.667	1.026.000	740.000	1.231.000	106.949

Source: Data processed from SmartPLS 3, 2022.

Based on table 2 above it is known that:

a. Variable X1 has a mean value of 1,088,025,000 and a standard deviation of 179,419,781. The results of this test show that the mean value is greater than the value of the standard deviation so that it can be stated that it has good test results. This is because the standard deviation value is a reflection of a very high deviation, so if the mean value is greater than the standard deviation value, the data distribution shows normal results and does not cause bias. The minimum value is 825,600,000 and the maximum value is 1,420,400,000.
b. Variable X2 has a mean value of 1,339,320,833 and a standard deviation value of 162,196,432. The results of this test show that the mean value is greater than the value of the standard deviation so that it can be stated that it has good test results. This is because the standard deviation value is a reflection of a very high deviation, so if the mean value is greater than the

standard deviation value, the data distribution shows normal results and does not cause bias. The minimum value is 1,010,000,000 and the maximum value is 1,756,000,000.

c. Variable Z has a mean value of 46,880,125 and a standard deviation value of 24,445,107. The results of this test show that the mean value is greater than the value of the standard deviation so that it can be stated that it has good test results. This is because the standard deviation value is a reflection of a very high deviation, so if the mean value is greater than the standard deviation value, the data distribution shows normal results and does not cause bias. The minimum value is 7,500,000 and the maximum value is 85,300,000.
d. Variable Y has a mean value of 1,002,667 and a standard deviation value of 106,949. The results of this test show that the mean value is greater than the value of the standard deviation so that it can be stated that it has good test results. This is because the standard deviation value is a reflection of a very high deviation, so if the mean value is greater than the standard deviation value, the data distribution shows normal results and does not cause bias. The minimum value is 740,000 and the maximum value is 1,231,000.

Measurement Model (Outer Model)

Analysis of Reliability and Validity Factor

The indicator correlation value is said to be valid if it is above 0.70. However, the loading scale of 0.50 to 0.60 at the development stage is still acceptable (Ghozali & Latan, 2015). In Figure 7, you can see the value of the outer model loading factor.

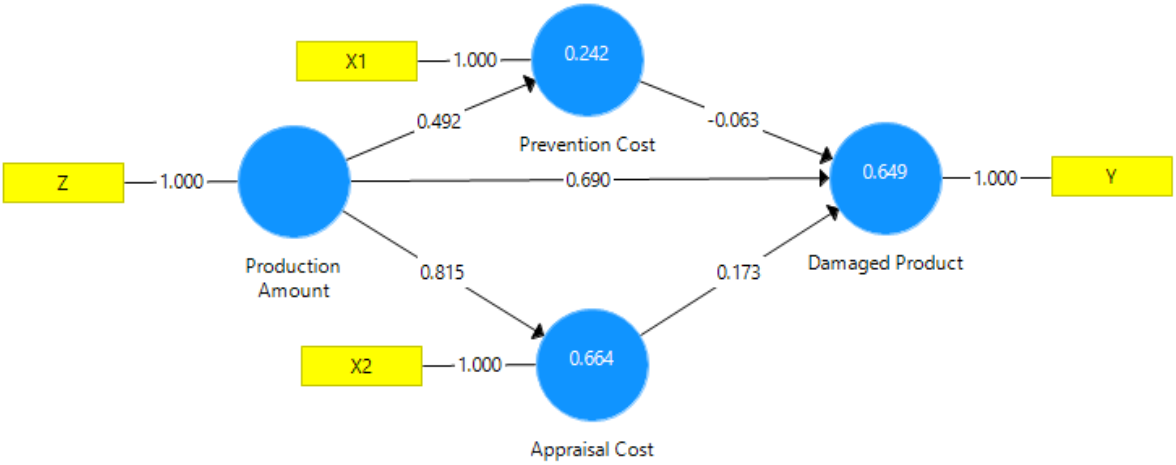

Figure 7. Outer Model Loading Factor Value
Source: Data processed from SmartPLS 3, 2022.

Based on the outer model loading factor value, it is known that the model in this study meets the correlation value requirements.

Convergent Validity Test

The following values in the table are the loading factors for each indicator.

Table 3. Outer Factor Model

	Prevention Cost	Appraisal Cost	Production Amount	Damaged Product
X1	1,000			
X2		1,000		
Z			1,000	
Y				1,000

Source: Data processed from SmartPLS 3, 2022.

Based on the table 3 it is known that the loading factor produces a value of> 0.50. The variables prevention cost, appraisal cost, production amount, and damaged product each have a loading factor value of 1,000. Thus all variables are declared valid, which means that the convergent validity test is by the requirements in testing the data in this study.

Discriminant Validity Test

In the discriminant validity test to meet the requirements so that it can be said to be valid, all constructs must have a value of> 0.50 (Ghozali & Latan, 2015). In the table, it can be seen that the construct contained in this research model has an AVE value > 0.50.

Table 4. Average Variance Extracted (AVE)

	Average Variance Extracted (AVE)
Production Amount	1,000
Prevention Cost	1,000
Damaged Product	1,000
Appraisal Cost	1,000

Source: Data processed from SmartPLS 3, 2022.

The instrument of the indicators in this study is valid.

Reliability Test

Requirements for reliable performance are composite reliability and Cronbach's alpha is > 0.7 (Ghozali & Latan, 2015). The results of testing reliable data in this study can be seen in table 5, namely, as follows:

Table 5. Reliability Test Results

	Cronbach's Alpha	Composite Reliability
Production Amount	1,000	1,000
Prevention Cost	1,000	1,000
Damaged Product	1,000	1,000
Appraisal Cost	1,000	1,000

Source: Data processed from SmartPLS 3, 2022.

Based on the test results in the table, all variables in this study are very reliable for each construct or research data for each variable. This also means that it is consistent and stable so that all constructs meet the reliability test.

Structural Model (Inner Model)

The structural model (inner model) is carried out by looking at the R-Square, F-Square, GOF, and Q-Square values.

R-Square Coefficient of Determination

The coefficient of determination test (R2) aims to determine the relationship between the independent variables and the dependent variable which is the justification for the strength of the model in expressing the dependent variable expressed in decimal or percentage (Ghozali & Latan, 2015). The value of R2 has a range between 0-1. The greater R2 indicates the greater the ability of the independent variables to reveal/explain the dependent variable.

Table 6. R Square Test (Coefficient of Determination)

	R Square	R Square Adjusted
Appraisal Cost	0.664	0.649
Damaged Product	0.649	0.597
Prevention Cost	0.242	0.208

Source: Data processed from SmartPLS 3, 2022.

Table 6 shows that the R Square value is 0.664, which is the squared result of the correlation coefficient, which means that 66.4% or 66% of the appraisal cost (dependent) variable can be explained by the independent variable, namely the production amount. The R Square value of 0.649 is the squared result of the correlation coefficient which means that 64.9% or 65% of the damaged product (dependent) variable can be explained by the independent variables, namely production amount, prevention cost, and appraisal cost. While the R Square value of 0.242 is the squared result of the correlation coefficient which means that 24.2% or 24% of the prevention cost (dependent) variable can be explained by the independent variable, namely the production amount.

F-Square

The results of the f-square test are used to understand how much the independent latent constructs affect the dependent latent constructs (Ghozali & Latan, 2015). The categories of f-square values are (1) an f-square value of 0.02 means that the influence of the independent latent construct on the dependent latent construct is small; (2) The f-square value of 0.15 means that the effect of the independent latent construct on the dependent latent construct is moderate and; (3) The f-square value of 0.35 means that the effect of the independent latent construct on the dependent latent construct is large; (4). An f-square value of less than 0.02 can be ignored or considered to have no effect (Hair et al., 2018). The F2 value has a range between 0-1. The greater the F2 indicates the greater the ability of the independent latent construct to influence the dependent latent construct.

Table 7. F Square test

	Damaged Product	Appraisal Cost	Prevention Cost	Production Amount
Damaged Product				
Production Amount	0.455	1979	0.320	
Prevention Cost	0.007			
Appraisal Cost	0.025			

Source: Data processed from SmartPLS 3, 2022.

Based on table 7 f-square (f2) it can be seen that: (1) the relationship between production amount and a damaged product is 0.455, which means that the relationship between the two is strong; (2) the relationship between prevention costs and damaged products is 0.007, which means that the relationship between the two is small and is not even considered to have an effect; (3) the relationship between the appraisal cost and damaged product is 0.025 or 0.03, which means that the relationship between the two is small; (4) the relationship between production amount and appraisal cost is 1.979, which means that the relationship between the two is very strong; and (5) the relationship between production amount and prevention cost is 0.320, which means that the relationship between the two is large.

Goodness Of Fit (GoF) Test

The goodness of fit (GoF) test in this study was based on the Fornel and Larcker methods, namely using the average value of R2 and the average root value of communality (Ghozali & Latan, 2015; Paramita et al., 2020). The purpose of the GoF test is to validate the combined performance of each model being measured (outer model) and model structure (inner model). The GoF value is stretched between 0-1. According to Cohen, the communality value category is divided into several categories, namely: (1) The recommended value is 0.50; (2) Small of 0.02; and (3) Moderate = 0.13; and (4) Large = 0.26 (Ghozali & Latan, 2015). So, for the GoF value which consists of three categories, namely, as follows:

$$\text{Small GoF} = \sqrt{0.5x0.02} = 0.10$$
$$\text{Moderate GoF} = \sqrt{0.5x\ 0.13} = 0.25$$
$$\text{Large GoF} = \sqrt{0.5x\ 0.26} = 0.36$$

Based on the results of calculating the GoF value in this study, it was obtained at 0.719, which means that the GoF value in this research model has a large value. This is because the greater the GoF value, the greater the GoF will describe the appropriate research sample. For more details, you can see the commonality value in table 8 and the GoF value based on the GoF calculation, as follows:

$$GoF = \sqrt{\overline{communality}\,\overline{yx}\ R2}$$
$$GoF = \sqrt{1{,}000x0.518}$$
$$GoF = \sqrt{0.518}$$
$$GoF = 0.719$$

Table 8. Communality

	Communality
Production Amount	1,000
Prevention Cost	1,000
Damaged Product	1,000
Appraisal Cost	1,000

Source: Data processed from SmartPLS 3, 2022.

Q-Square

The Q-Square test in this study aims to test the structural model so that the parameters of the research model used can be identified. If the Q-square value shows results > 0 then, it is declared as a model that has predictive relevance. The Q-Square value < 0 means that the model lacks predictive relative (Ghozali & Latan, 2015; Paramita et al., 2020). The Q-Square calculation formula is Q2 = 1– (1 – R2)(1 – R2) … (1 – R2). Where R12, R22 … R2 are the R-Square of the endogenous variables in the research model. Value range 0 < Q2 < 1. According to Ghozali & Latan (2015) and Paramita et al. (2020) that the value of Q2 which is getting closer to number 1 means the model structure is getting better.

The Q-Square calculations in this study are as follows:

Table 9. Q Square test

Q Square		
Appraisal Cost	Damaged Product	Prevention Cost
1-(1-R2)	1-(1-R2)	1-(1-R2)
1 - (1-0.664)	1 - (1-0.649)	1 - (1-0.242)
1-(0.336)	1-(0.351)	1-(0.758)
0.664	0.649	0.242

Source: Data processed from SmartPLS 3, 2022.

Based on the calculation results above, it is known that: (1) the value of the Q square appraisal cost is 0.664, which means it is in the range 0 < Q2 < 1. So it can be stated that the model in this study which positions the appraisal cost as the dependent variable is very good because it is close to the number 1; (2) the Q square value of the damaged product is 0.649 which means it is in the range 0 < Q2 < 1. So it can be stated that the model in this study which positions the damaged product as the dependent variable is very good because it is close to number 1; (3) the Q square prevention cost value is 0.242, which means it is in the range 0 < Q2 < 1. So it can be stated that the model in this study which has prevention cost as the dependent variable is quite good.

Evaluation of the Relationship between Latent Variables

Hypothesis Test and T-Statistics Test

The results of the hypothesis test and the T-Statistics test in this study can be seen in the table, namely, the column original sample (O) which shows the coefficient value of the path analysis in testing between variables, namely, as follows:

Table 10. Result of Path Analysis Coefficient Value

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values	Information
Production Amount -> Appraisal Cost	0.815	10,731	0.000	Significant
Production Amount -> Prevention Cost	0.492	2,955	0.003	Significant
Production Amount -> Damaged Products	0.690	3,006	0.003	Significant
Prevention Cost -> Damaged Products	-0.063	0.367	0.714	Not significant
Appraisal Cost -> Damaged Product	0.173	0.705	0.481	Not significant

Source: Data processed from SmartPLS 3, 2022.

Based on the results of the path analysis coefficient test in table 10, it can be seen that the relationship between variables is: (1) the original sample value (O) production amount to appraisal cost is 0.815 with p values of 0.000 which means a positive and significant effect; (2) the original sample value (O) production amount to damaged product is 0.690 with p values of 0.003 which means a positive and significant effect; (3) the original sample value (O) production amount to prevention cost is 0.492 with p values of 0.003 which mean a positive and significant effect; (4) the original sample value (O) appraisal cost to damaged product is 0.173 with p values of 0.481 which means a positive effect but not significant; (5) original sample value (O) prevention cost to damaged product is -0.063 with a p-value of 0.714 which means a negative effect but not significant.

Discussion

Effect of Production Volume on Prevention Costs

The results of the partial significance test (statistical T-test) in the table show that the significance value production amount to the appraisal cost of 0.000 which is less than 0.05 and the original sample value (O) is 0.815. Thus the first hypothesis proposed in this study is accepted. This means that the production amount positive and significant effect on the appraisal cost. The results of this study indicate that the greater the production volume, the greater the prevention costs that will be incurred by the company. Each time the production volume increases, the prevention costs incurred by the company also increase. The results of this study have characteristics similar to the research of Badriah (2016) and Maulida & Tholibin (2021). Although, there are differences in the position of the dependent variable in this study and research by Badriah (2016) and Maulida & Tholibin (2021) but have similar characteristics regarding production volume and prevention costs, namely: (a) Research of Badriah (2016) using the account name for maintenance and repair of fixed assets at the regional drinking water company (PDAM); (b) Research of Maulida & Tholibin (2021) which uses the name of the production equipment quality account in the sarong weaving industry. This research implies that companies need to monitor the comparison of production volume with prevention costs so as not to result in waste and not experience production process failures because the prevention costs incurred are not able to offset or are not proportional to the production volume according to the comparison determined by the company based on the history of production activities.

Effect of Production Volume on Damaged Products

The results of the partial significance test (statistical T-test) in the table show that the significance value production amounttodamaged product of 0.003 is smaller than 0.05 and the original sample value (O) is 0.690. Thus the 3rd hypothesis proposed in this study is accepted. This means that production amount positive and significant effect on damaged products.

The results of this study indicate that the greater the production volume, the greater the number of damaged products. The results of this study imply that companies can increase the effectiveness of prevention costs and appraisal costs to minimize the number of damaged products as a result of production activities.

Effect of Prevention Costs on Damaged Products

The results of the partial significance test (statistical T-test) in the table show that the significance value appraisal costtodamaged product of 0.481 is greater than 0.05 and the original sample value (O) is 0.173. Thus the 4th hypothesis proposed in this study is accepted. This means that appraisal cost is negative but does not significant effect on the damaged product. The results of this study indicate that the greater the prevention costs incurred by the company, the smaller the number of damaged products caused by the production process. Although, in 2 years, namely 2019-2020, the prevention costs incurred by the company did not significantly affect the reduction in damaged products. It can be seen that the cost of prevention as an effort to implement the company's SOP either occurs or does not occur when the product is damaged because prevention efforts have been carried out since the beginning of pre-production.

The findings in this study can add to the treasury of study materials on the application of preventive costs to manufacturing industries that produce food products. Differences in the findings in this study with research conducted by Hadijah et al. (2019), Safitri et al. (2021), Ulfah & Hastuti (2018), Wahyono & Susanto (2017) and Yuniastuti (2021) caused by differences in the resulting product to the SOP (Standard Operating Procedure) for each company also differs between food manufacturers and manufacturers of clothing, building materials, ATK (office stationery), and other non-food products. According to Chatzipetrou & Moschidis (2016), Glogovac & Filipovic (2018) and Sadkowski (2019) quality costs are not only found in the manufacturing industry but also in the service and retail industries. Each company has different criteria for classifying quality costs because the sources adopted are also different entities so the quality cost calculation model applied can cause misunderstandings (Ayach et al., 2019; Daunoriene & Staniskiene, 2016; Sadkowski, 2019). Therefore, this study which proves empirically that prevention costs do not significantly affect the decrease in the quantity of damaged products does not mean that companies do not need to pay for prevention. It will have a worse impact if the company decides to write off prevention costs because it does not significantly affect the decline in damaged products. This finding is also supported by research results of Kerfai et al. (2016) that the risk of production failure is lower for manufacturing companies in Tunisia that apply quality costs.

The implications of this finding are for companies to be able to increase the role of prevention costs because it is proven that their effect in the 2019-2020 period is not significant. However, the company's decision to stop handling prevention costs by transferring to third parties can be reviewed in the 2021-2022 period regarding its influence and significance in suppressing damaged products and comparing the efficiency and effectiveness of prevention costs paid to third parties in carrying out handling.

The results of this study are supported by Jaaron (2022) which states that the company's SOP (Standard Operating Procedure) functions to ensure that the food products produced are good and do not harm consumers. The completed scientific research showed that there is no uniform definition of quality costs in the scientific literature (Daunoriene & Staniskiene, 2016).

The Effect of Appraisal Fees on Damaged Products

The results of the partial significance test (statistical T-test) in the table show that the significance value prevention costtodamaged product of 0.714 is greater than 0.05 and the original sample value (O) is -0.063. Thus the 5th hypothesis proposed in this study is accepted. This means that prevention costs a positive but not significant effect on damaged products. The results of this study indicate that the greater the valuation costs incurred by the company, the greater the number of damaged products caused by the production process. Although, in 2 years, namely 2019-2020, the appraisal costs incurred by the company did not significantly affect damaged products. It can be seen that the appraisal fee is an effort to implement the company's SOP when a damaged product occurs because the appraisal effort is carried out after going through the production process.

The findings in this study can add to the treasury of study material on the application of valuation costs to manufacturing industries that produce food products. Differences in the findings in this study with research conducted by Hadijah et al. (2019), Safitri et al. (2021), Ulfah & Hastuti (2018), Wahyono & Susanto (2017) and Yuniastuti (2021) caused by differences in the resulting product to the SOP (Standard Operating Procedure) for each company also differs between food manufacturers and manufacturers of clothing, building materials, ATK (office stationery), and other non-food products. According to Chatzipetrou & Moschidis (2016), Glogovac & Filipovic (2018) and Sadkowski (2019) quality costs are not only found in the manufacturing industry but also in the service and retail industries. Each company has different criteria for classifying quality costs because the sources adopted are also different entities so the quality cost calculation model applied can cause misunderstandings (Ayach et al., 2019; Daunoriene & Staniskiene, 2016; Sadkowski, 2019). Therefore, this study which proves empirically that appraisal costs do not significantly affect damaged products does not mean that companies do not need to pay appraisal costs. It will have a worse impact if the company decides to write off the appraisal fee because it does not significantly affect the damaged product. This finding is also supported by research results of Kerfai et al. (2016) that the risk of production failure is lower for manufacturing companies in Tunisia that apply quality costs.

The implications of this finding are for companies to be able to increase the role of appraisal costs because it is proven that their effect in the 2019-2020 period is not significant. However, the company's decision to stop handling appraisal costs by transferring to third parties can be reviewed in the 2021-2022 period regarding the impact and significance of damaged products and comparing the efficiency and effectiveness of appraisal fees paid to third parties in handling them.

The results of this study are supported by Jaaron (2022) which states that the company's SOP (Standard Operating Procedure) functions to ensure that the food products produced are good and do not harm consumers. The completed scientific research showed that there is no uniform definition of quality costs in scientific literature (Daunoriene & Staniskiene, 2016).

4. Conclusion

The results of this study indicate that: (1) production volume has a positive and significant effect on prevention costs; (2) production volume has a positive and significant effect on appraisal costs; (3) production volume has a positive and significant effect on damaged products; (4) Prevention costs have a negative but not significant effect on damaged products; (5) Appraisal costs have a positive but not significant effect on damaged products. All hypotheses put forward in this study were declared accepted. The difference in the resulting product has an impact on the SOP (Standard Operating Procedure) for each company, which also differs between food manufacturers and manufacturers of clothing, building materials, ATK (office stationery), garments, furniture, and other non-food products. Therefore, this study proves empirically that although prevention costs and appraisal costs do not significantly affect damaged products, it does not mean that companies do not need to pay for prevention and appraisal costs. It will have a worse impact if the company decides to write off quality costs because it does not significantly affect damaged products.

The implication of the results of this research for the company is that the costs of prevention and appraisal costs that are handled by the company itself in the 2019-2020 period do not have a significant effect on damaged products. This means that maximum effort is still needed in handling it so that the quality costs incurred can have a significant effect. The company's move to transfer the handling of quality costs to third parties is considered good enough to be used as a comparison in its management. Therefore, the company's accounting division should compile a report comparing aspects of effectiveness and efficiency on data on prevention costs, appraisal costs, production volumes, and the number of damaged products handled independently in 2019-2020 with those handled by third parties in 2021-2022.

Recommendations for further research can use one of the following research alternatives: (1) Add the quality cost variable and use all the quality cost variables together which consist of prevention costs; appraisal costs; internal failure costs; external failure costs; (2) Using the SWOT analysis research method; (3) Using the mixing method so that the in-depth treatment of quality costs can be carried out in the companies studied; (4) Using primary data collected using a questionnaire to determine the perceptions of production employees about the cost of quality and damaged products.

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