# PRODUCT PRICING USING ACTIVITY-BASED COSTING (ABC) METHOD (STUDY CASE: PT. XYZ)

**UNDERGRADUATE THESIS**

**Submitted to International Undergraduate Program in Industrial Engineering in Partial Fulfilment of the Requirement for the Degree of Sarjana Teknik Industri –Faculty of Industrial Technology**


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**INTERNATIONAL UNDERGRADUATE PROGRAM IN**

**INDUSTRIAL ENGINEERING**

**FACULTY OF INDUSTRIAL TECHNOLOGY**

**UNIVERSITAS ISLAM INDONESIA**

**YOGYAKARTA**

**2023**

# AUTHENTICITY STATEMENT

In the name of Allah, I hereby certify that this research is based on my own work except for citations and summaries in which of those is explicit knowledge. If in the future, this statement is proved not right and violates the legal regulation of papers and intellectual property rights, I agree Universitas Islam Indonesia revoke my bachelor certificate.

Yogyakarta, August 7th 2023


Mohammad Yanuar Rizki

16522191

# LETTER OF THESIS COMPLETION

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No : 009/Dir/IBM/I/2022
Re : Approval for Internship Proposal
To :

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**Faculty of Industrial Technology, Univerisitas Islam Indonesia**
Gedung KH. Mas Mansur, Kampus Terpadu UII
Jl. Kaliurang km. 14,5 Yogyakarta

We wish you in healthiness and wellbeing together with your team and management.

As the follow up for proposal written with no. 97/Head IP/IP IE/01/VI/2022 related research proposal for student of International Program, Industrial Engineering, Universitas Indonesia,

Name : Mohammad Yanuar Rizki
Student No. : 16 522 191
We are gladly to give our **approval for his research proposal** and welcome your student to start doing observation with some remarks:

1. He may choose any date or period of observations suitable for him.
2. Refers to your student research proposal, he plans to do research in production and costing field which require a financial and other confidential data of our company, so we do not permit you and/or your student to publish our company name and address in the paper except our general information. In exchange, you may use word **PT. XXX** or **PT. ABC** when publish your paperwork and use **Yogyakarta only** when mention our location.

We do hope you agree with our request and please sign this document to show your agreement.

Yogyakarta, June 26, 2022
On Behalf of PT. Indobel Bamboo Merapi

PT.Indobel Bamboo Merapi
Sentolo, Kulon Progo, Yogyakarta

**Rizal Razib Abdillah**
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*On Behalf of Faculty of Industrial Technology, Universitas Islam Indonesia*

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**PRODUCT PRICING USING ACTIVITY-BASED COSTING (ABC) METHOD (STUDY CASE: PT. XYZ)**

**Yogyakarta, April 14th 2023**

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**EXAMINERS' APPROVAL PAGE**

**PRODUCT PRICING USING ACTIVITY-BASED COSTING (ABC) METHOD (STUDY CASE: PT. XYZ)**

**UNDERGRADUATE THESIS**

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## DEDICATION PAGE

This undergraduate thesis which I spent a lot of effort on is dedicated to my Family. Without my family, I am nothing but a mere human being. All my friends in the International Program Industrial Engineering, who have accompanied me since the beginning of university life. Friends, who gave advice and supported me along the process of making this thesis. Also, the loved one who keeps on track of my health, mentally and motivates me continuously. I sincerely cannot thank you guys enough.

## MOTTO

“Barang siapa melakukan perbuatan yang menyebabkan kesengsaraan bagi orang lain, akhirnya nanti ia akan mendapatkan pembalasan dari perbuatannya sendiri”

- Soeharto

# PREFACE

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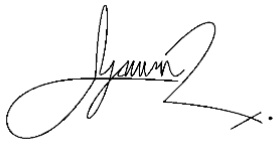
*Wassalamualaikum Warahmatullaahi Wabarakatuh*

Yogyakarta, April 2023



Mohammad Yanuar Rizki

# ABSTRACT

PT. XYZ is one of the companies that engaged in bamboo manufacturing. In determining the cost of its products, the company uses the conventional method, in which is suspected to be less accurate and impacts on less optimal profit gained. Therefore, the purpose of this research is to re-calculate the cost of PT. XYZ products using the Activity Based Costing method then propose new product prices and compare it to the costing method and price used by PT. XYZ. Two PT. XYZ's product cost and pricing were analyzed as a sample for this research, which are Bamboo Strips and Bamboo Panel. The analytical methods used in this study are both quantitative and qualitative method. Moreover, the data collection techniques are observation and interviews. The analysis results showed that the calculation using Activity Based Costing gave different results with PT. XYZ calculation. It shows that costs are set by PT. XYZ for Bamboo Strip is under-cost, while Bamboo Panel is over-cost. The difference between these two methods is caused by the imposition of overhead costs on each product. Therefore, it is suggested that the company changes the cost calculation method to the Activity Based Costing method and adjust a new price for both products accordingly to maximize its profit.

**Keywords:** Activity Based Costing, Cost of Goods Manufacture, Factory Overhead Cost, Profit, Bamboo.

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# CHAPTER I
# INTRODUCTION

## 1.1 Background

Entering the era of globalization and free trade brought changes to the business sector at both global and national levels. At the national level like in Indonesia, one of the impacts of those changes is the unavoidable increasing competition between businesses. Companies are competing to formulate strategies in order to excel from their competitors, especially when they enter the industrial business. Moreover, the competition in the industrial-type market is quite sensitive to price changes that fluctuate over time, in which impacts their sales level. Therefore, it is important to pay special attention to pricing and profit calculation when the company developing its strategy.

The main goal of the company is to achieve maximum profit. In achieving this goal, the company should calculate all the cost and product prices correctly. By calculating operational and product costs to the selling price correctly, the company can generate an ideal and competitive selling value to its customers. The product price should not be too low in order to cover production costs and gain profits, and should not be too high in order to compete with other competitors in the same industry. Furthermore, regarding the production cost, the calculation in determining the cost of goods manufactured must be right in accordance with the cost of consumption so that the decision-making in determining the cost of goods is precise. If the costs incurred are classified and allocated appropriately, then a good understanding of the various activities carried out will have a good impact on the company in determining the cost of products in production.

The cost of the product can be determined based on traditional cost accounting or using the Activity Based Costing method. Compared to the traditional method, the Activity Based Costing method has more advantages. Determination of the cost of production calculated with traditional costs is considered less precise if applied to manufacturing companies that sell a wide range of product types. The value of the results calculated by conventional cost systems can provide distorted information value, resulting in the company having a higher chance of making an inappropriate decision related to product pricing. Meanwhile, in the Activity Based Costing method, once the cost drivers are identified, the cost of each activity can be determined and then the costs can be allocated to activities based on the cost drivers. Therefore, it is unable for the company to generate more precise cost calculations and appropriate product prices.

PT. XYZ is a bamboo manufacturing business located in Yogyakarta. PT. XYZ started to develop its business in 2015. Based on the observations, in running its business, PT. XYZ has faced some 2

challenges. The main challenges that have been identified are regarding the determination of the selling price of products that generate a small profit, which is influenced by the determination of the cost of goods sold of the products produced by this company. PT. XYZ produces variants of products and in determining its product price, the company uses a combined competitive below-the-market pricing and cost-plus pricing for their product pricing methods. It is suggested as the main cause of the company's profit to be less optimal.

PT. XYZ intended to achieve a margin-sales for their products at least equal to 50% while product prices were still below the market. Therefore, a good and precise calculation is needed in determining the cost of production so that the company's goal can be achieved. So based on this, this study aims to recalculate the cost of goods manufacturer on several products sold by the company using the Activity-Based Costing method to determine the product prices accordingly, and compare it to PT. XYZ's cost calculation and pricing.

## 1.2 Problem Formulation

Based on the background above, the problem can be formulated as below:

1. How big is the difference between the cost of goods set by the company and the cost calculated by the Activity Based Costing method?
2. Which Product Pricing method is best to be assigned as product prices?

## 1.3 Research Objectives

The following are the objectives of the research based on the formulation of the problems that have been obtained:

1. To compare the cost of goods set by the company with the cost of goods calculated using the Activity Based Costing method.
2. To determine the best product pricing method to assign a product pricing.

## 1.4 Research Limitation

In this research, there are several limitations implemented to focus the observation as planned, which are:

1. This research only focuses on production activity, labor work hours and production volume on PT. XYZ.
2. The calculation of production costs using the method used by the company has been given and correctly identified by the company's management.
3. The analysis of the calculation of the cost of products carried out only uses the traditional accounting system or conventional and the Activity-Based Costing system.

4. The calculation of costs is limited only to the costs incurred by the product (*product-driven*), not including service activities (*customer-driven*).
5. All the data given by the company is already displayed in this research. Other supporting data that are not displayed in this research are not given by the company as it is included as highly confidential data.
6. The research was conducted on two products (Bamboo Strip and Bamboo Panel).

## 1.5 Benefit of Research

The result of this research will benefit the company, researcher, and reader.

1. For the company.
    a. All methods applied can be proposed for making decisions on cost production of specific items where it will become more accurate.
    b. It will provide a reference for cost decisions to improve the efficiency in production activity.
    c. The company could apply the suggestions from this research to improve the efficiency of production activity related to the internal finance of the company.

2. For the researcher and reader.
    a. Researchers are able to implement the knowledge and skills of industrial engineering realistically.
    b. Both the researcher and reader are able to gain a clear understanding of the company's production activity.
    c. As a comparison between theory in lectures and practice in real situations.
    d. It will give new insight related to the cost production calculation and how to assign a specific overhead to improve efficiency.
    e. Re-introduce the Activity-Based Costing method to calculate the production cost to decrease inefficient related to the internal finance cycle for manufacturing scale enterprise.

# CHAPTER II
# LITERATURE REVIEW

## 2.1 Inductive Study

An inductive Study is a study that discusses previous research to help determine the direction of research. Below is a table of previous studies regarding performance measurement in Activity-Based Costing. Based on the table below, it will be identified the difference between previous research and the current research that will be conducted.

Table 2. 1 Inductive Study

| No | Title | Author (Year) | Method | Result |
|---|---|---|---|---|
| **1** | ANALYSIS OF ACTIVITY-BASED COSTING SYSTEM IMPLEMENTATION WITH TWO DEPARTMENTS TO CALCULATE COST OF PRODUCTS (Case Study of CV. New Prambanan Furniture, Cilacap) | Fatimah (2007) | Activity-Based Costing (ABC), Conventional Costing | From the calculations and analyzes that have been carried out on the two products, it can be concluded that the conventional single-tariff system for one factory sets the cost of over-costing products for wardrobe products of Rp. 74,004,236; for a bed product of Rp. 36,993,062; while the two-department system sets the cost of over-costing for wardrobe products at Rp. 61,535.56; for a bed product of Rp. 8,805,805. |
| **2** | APPLICATION OF ACTIVITY-BASED COSTING IN THE CALCULATION OF COST OF GOODS SOLD AT PT. PABRIK GULA TAKALAR | Nur Insani (2016) | Activity-Based Costing (ABC) | The calculation result using the Activity Based Costing Method show greater result than using traditional methods. The cost of goods sold using ABC is lower with the differences of Rp. 21.107.320.111,35 in 2013, Rp. 21.893.699.999,84 in 2014, and Rp. 19.394.050.557,86 in 2015. |
| **3** | Analysis of Activity-Based Costing (ABC) in Determining Inpatient Service Rates (Case Study at AL dr. | Jainuddin Unsale, Hustianto Sudarwadi, Anik Wuriasih (2023) | Activity-Based Costing (ABC) System | The result of calculations using the Activity Based Costing system compared to the rates determined by the hospital provide more expensive results in all types of classes. Namely: VIP which was previously Rp. |

| | | | | |
|---|---|---|---|---|
| | Azhar Zahir Manokwari Hospital | | | 550.000 become Rp. 1.195.904, Class 1 from Rp. 350.000 become Rp. 1.099.957, Class 2 from Rp. 200.000 become Rp. 1.128.962 and Class 3 from Rp. 125.000 become Rp. 1.122.418. The differences between the traditional method and Activity Based Costing method are due to the overhead costs of each of these products. |
| **4** | Analysis of Cost of Goods Sold at Hidayah Tofu Factory in Bengkulu City | Tri Wahyu Ningsih, Wagini, Iswidana Utama Putra (2023) | Activity-Based Costing (ABC) | The result of the analysis using the traditional method of cost of goods sold for fried tofu products is Rp. 283.000.000, which is lower than the Activity Based Costing method at Rp. 285.837.500. Meanwhile the cost of goods sold for white tofu products is Rp. 138.000.000, which is lower than the Activity Based Costing method at Rp. 140.536.760. This shows that calculations using the Activity Based Costing method are more accurate than traditional methods. In the Activity Based Costing method, all costs incurred in production activities are included in the calculation component, namely the cost of depreciation of factory machine assets. |
| **5** | IMPLEMENTATION OF ACTIVITY-BASED COSTING SYSTEM IN DETERMINING THE COST OF ROOMS AT SEJAHTERA FAMILY HOTEL & APARTMENTS | Rismawati (2004) | Activity-Based Costing (ABC) | Sejahtera Family Hotel & Apartment Yogyakarta still uses the traditional cost accounting system in calculating the cost of its products, so the resulting cost information is inaccurate and decision-making is not appropriate. Determining the cost of products using the Activity Based Costing System offers accurate information about the cost of products and provides accurate cost information for various activities. By implementing the ABC system, the |

| | | | | |
|---|---|---|---|---|
| | | | | company can control and measure efficiency and cost-effectiveness. |
| **6** | The Implementation of Activity-Based Costing Method in Determining Selling Prices | Muhtarudin, Tuti Sulastri, Eti Suprihatin (2017) | Activity-Based Costing (ABC) | The result of this study indicates that there is a significant difference between the shoe production cost calculated using the traditional method and that calculated using the Activity-Based Costing method. After applying the latter cost-determining method, there turned out to be a significant difference in the shoe production cost resulting from the inaccurate price calculation in the former method, as here a selling price is fixed by marking-up efforts aiming to cover the production cost. Determining a selling price in this way causes the selling price to be too low; thus, it cannot optimize the profit. |
| **7** | Adoption of Activity-Based Costing System in Selected Countries A review of the literature | Hamfri Djajadikerta (2007) | Activity-Based Costing (ABC) | Research on ABC adoption suggests that one of the major perceived benefits of implementing ABC is the more accurate cost information for product costing. Other reasons that justify ABC adoption are improved cost control, cost causation, identification of activity costs, and improvement of operational efficiency. |
| **8** | Utilization of Activity-Based Costing Method to Calculate the Cost of Production and Evaluate Profit (Case Study at PT. Ionuda Sidoarjo) | Yustrida Bernawati, Laylia Fatmawati (2021) | Activity-Based Costing (ABC) | The results of this research show that first, the use of the Activity-Based Costing method in calculating the cost of production imposes overhead costs based on the activity needs of each product resulting in a more accurate and informative cost of production. Second, the calculation of the cost of production with the Activity-Based Cost Calculation method does not change the profit obtained by the |

| | | | | |
|---|---|---|---|---|
| | | | | company, only the profit contribution of each product becomes different. |
| **9** | Activity-Based Costing (ABC) – An Effective Tool for Better Management | Ishter Mahal, Md. Akram Hossain, Ph.D (2015) | Activity-Based Costing (ABC), Time-Driven ABC, Theory of Constraints | In the analysis of journals, the author focused on different eras of business like the service sector, technology business, manufacturing sector, and many more. Implementing ABC in these different sectors is a little bit different. ABC has to be implemented considering the characteristics of that sector. In total ABC has been proven to be successful in almost all sectors. There have been some modifications in ABC also. Some other concepts have also been discussed here like a theory of constraints, time-driven ABC, and many more. |
| **10** | The activity-based costing model trajectory: A path of lights and shadows | M. Angels Fito, Joan Llobet, Natalia Cuguero (2017) | Activity-Based Costing (ABC), Balance Scorecard (BSC) | The analysis of the implementation process and the factors that can determine its success and failure have also been subject to study. These doubts surrounding its virtues have been the trigger for other works that have analyzed its patterns of dissemination, as well as its effectiveness in other geographic or sectorial contexts. Finally, works should be highlighted that have analyzed the latest version of the model, which simplifies its design and implementation. In the end, in light of the diminishing academic interest in the model and its scarce presence in business contexts, the author concludes that the ABC model has not been able to overcome the conceptual and operational shortcomings referred to by authors throughout its more than thirty-year history. |

Based on the journal review above, the Activity-Based Costing (ABC) method showed that the results of calculation using the ABC are significantly accurate and given a company related with a higher value

and precision finance data. Thus, the researcher wanted to perform and implement the Activity-Based Costing (ABC) method to re-calculate the financial distribution based on the activity in the production department in PT. XYZ.

## 2.2 Deductive Study

### 2.2.1. Cost Definition

Cost can be classified into two parts, namely: Assets and Expenses. Cost will be recorded as an asset if they provide benefits for more than one accounting period. Meanwhile, cost will be categorized as an expense if they give benefits in the current accounting period. (Akbar, 2011). Costs are cash or cash equivalents that are sacrificed to obtain expected goods or services that are expected to provide current or future benefits to the organization (Hansen, Mowen, 2006).

It is said to be a cash equivalent because non-cash sources can be exchanged for the desired goods or services. For example, exchanging equipment with materials used for production. In an effort to generate current and future benefits, the management of an organization must make various efforts to minimize the cost required to achieve certain benefits. Reducing the costs required to achieve certain benefits means that the company becomes more efficient. Cost do not have to be suppressed, but must also be managed strategically (Akbar, 2011).

### 2.2.2. Production Cost

Production costs are costs incurred by the company during the manufacturing or management process with the aim of producing products that are ready to be sold. This production cost calculation will be carried out from the beginning of processing to finished or semi-finished goods. Production Cost can be classified as follow:

1. Raw material

   Costs paid to purchase the main raw materials used to produce goods. Example: cost of purchasing bamboo poles from the farmer.
2. Direct labor

   Cost is used to pay for labor that is directly related to the product being produced from raw materials into finished goods. Example: Cost to pay the labor who make the bamboo panels.
3. Factory overhead costs

   Cost incurred to produce goods, other than raw material costs and direct labor costs. Factory overhead costs consist of:

   a. Indirect materials

      Costs incurred to purchase materials that are needed to complete a product, but are used sparingly. Example: Purchase of ropes to tie the panels.

   b. Indirect labor

A labor is spent to pay the salaries of laborers but the laborers indirectly affect the manufacture of finished goods. Example: Cost to pay for lab tests.

c. Other indirect cost

Costs incurred to produce goods that are indirectly related to the production of the goods. Example: When making t-shirts, electricity is needed to power the machine. So, electricity costs fall into these categories.

### 2.2.3. Cost of Goods Manufacture (COGM)

1. Cost of Goods Manufacture Definition

Cost of goods manufactured is a term used in managerial accounting that refers to a schedule or statement that shows the total production costs for a company during a specific period of time. COGM refers to all the costs involved in producing a product, including direct labor, indirect labor, raw materials, and overhead costs. Cost of goods manufacture is the cost of goods purchased for processing until done, both before and during the time of accounting run (Horngren, 2006). The costs of goods manufacture are an overall production cost associated with orders to be completed (Garrison, 2006).

2. Cost of Goods Manufacture Purposes

COGM represents the total costs incurred in the process of converting raw materials into finished goods.

### 2.2.4. Cost of Goods Sold (COGS)

1. Cost of Goods Sold Definition

There are several definitions of the cost of goods sold expressed by a number of academics. The cost of goods sold is the cost purchased for processing to completion, either before or during the current accounting period (Datar, Forster, 2006). The cost of goods sold is the cost of production related to the goods that are completed in one period (Garrison, Noreen, and Brewer, 2006).

Based on some of these opinions, it can be concluded that the cost of goods sold is all the production costs used to process a raw material into finished goods in a certain period of time. The calculation of the cost of goods sold is used for the calculation of the company's profit or loss which will be reported to the external parties of the company. The cost of goods sold has a role in making company decisions for several things such as accepting or rejecting orders, making or buying materials, etc. Information about the cost of goods sold is the basis for management in making decisions regarding the selling price of the product concerned. Therefore, the costs incurred by the company to produce a finished product can be calculated to determine the right selling price for the products.

2. Cost of Goods Sold Purposes

Determination of the cost of goods sold aims to find out how much the amount of costs sacrificed in connection with processing raw materials into finished goods and ready for use and sale. Determination of the cost of goods sold is very important in a company because it is one of the elements that can be used as guidelines and sources of information for leaders to make decisions.

### 2.2.5. Product Pricing

Product pricing is a process companies follow to determine the cost of the products they are selling to the customers. There are many pricing strategies companies can choose from, depending on their needs and the perceived value of their products. The main goal of these strategies is to set a price that is higher than the product production cost but is still appealing to the customers to encourage them to make a purchase. The most common product pricing methods are as follows:

1. Value-Based Pricing

   A strategy that considers the customer loyalties and customer perceived value to set the price. It involves market research to determine what company's target audience is currently spending on similar products. Companies may use marketing techniques that highlight the value of their product to justify a higher price point.
2. Competitive Based Pricing

   Known as market pricing, involves market research to determine a fair price for a product. Companies look at the current market rate of similar products to determine how much to charge for theirs. Using this method, companies may choose to price their product below the market, match the average market price, or put a price above the market.
3. Cost Plus Pricing

   Known as cost plus profit pricing, focuses on the cost of goods sold of a product to set its price. Companies typically determine how much they spend to manufacture a product, and then add a price markup to earn a specific profit.
4. Dynamic Pricing

   This strategy is able to be adjusted their price according to the current market rates and trends. Companies may change their prices multiple times throughout the day or a week rather than choosing a fixed price for the season. This strategy mostly used by companies that sell their product online or through a marketplace, as they can easily update their prices.
5. Price Skimming

   When a company introduces a new product to the market at a high price. When company competitors enter the market, companies then lower the price of their products to attract more customers.
6. Penetration Pricing

This method is the opposite of price skimming as it involves companies introducing a new product to the market at a low price. This is an acceptable strategy if there are a lot of competitors in their market. It allows the company to attract customers with their low prices to increase brand awareness. When the customers see the value of company products, then they may raise their prices to be more competitive

### 2.2.6. Activity-Based Costing (ABC)

Activity is the fundamental cost object in the product ABC costing is based on the cost driver that links activities performed with products or services charges the activity directly on the product or service and assigns costs to the activity directly on the product or service by using the cost drivers.
Cost management experts provide the following definition of ABC:

1. Lane K. Anderson and Harold M. Sollen Berger [16]
   In Managerial Accounting (1992), page 97, Lane K. Anderson and Harold define as follows:
   *"An accounting system that focuses on the activities performed to produce a product. Activities become the fundamental point of accumulation of costs. Costs are traced to activities, and activities are traced to products. Based on the usage activity of each product".*

2. L Gayle Rayburn [17]
   In the book Cost Accounting Using Cost Management Approach (1993), page 117, Gayle defines ABC as follows:
   *"ABC recognizes that the performance of activities leads to resource consumption" data that is recorded as a fee "Transaction-based fee calculation" is the another name for ABC. ABC's goal is to allocate transaction costs from activities carried out within an organization, and then apply these costs exactly to the activities of each product".*

3. Wayne J. Morse, James R. Davis, and AL. L. Hartgraves [18]
   In Management Accounting (1991), page 605, Wayne and friends define ABC as follows:
   *"Allocate and reallocate costs to cost objects on the basis of activities that cause costs. ABC is based on the premise or rationale that activities cause costs and costs must be allocated to objects' costs on an activity basis those costs are consumed. ABC tracing costs to products on the basis of the activities used to produce the product".*

ABC works as follows, ABC assigns costs to products or to customers based on the resources consumed. Activity consumes resources and products or customers consume activities. This system identifies the cost of activities such as running a machine, receiving raw materials, and scheduling a job. ABC then traces this activity to a specific product or customer-generated activity.

Of course, product costs include all the costs of these activities. Cost overhead is traced to specific products rather than being spread arbitrarily with respect to all products. With this, management can learn to ride'-right occurrence of activities and therefore learn to control costs. The ABC System debunks the myth of fixed costs. Using the current cost accounting system, accountants consider many costs to be fixed, because they don't understand how to control these costs. However, costs are fixed over the horizon and at a certain time.

In the long run, all costs are variable if someone understands what creates costs. This is the essence of strategy effort, namely to cut costs. This is the essence of business strategy, namely making all costs work for profit (advantage). The ABC system allows one to identify policies, systems, or processes that give rise to activities, thereby creating costs. By discovering what exactly is causing the cost, it is possible we address or reduce, where necessary, so-called fixed costs, such as labor costs, engineering planning, and depreciation. In the long run, a firm may sell its factory, move to another country, or even leave its business overall. ABC system, by identifying what activities incur costs and what factors create the activity, enables a firm to exercise cost control.

The formula for activity-based costing is the cost pool total divided by the cost driver, which yields the cost driver rate. The cost driver rate is used in activity-based costing to calculate the amount of overhead and indirect costs related to a particular activity.

The Activity-Based Costing process is as follows:

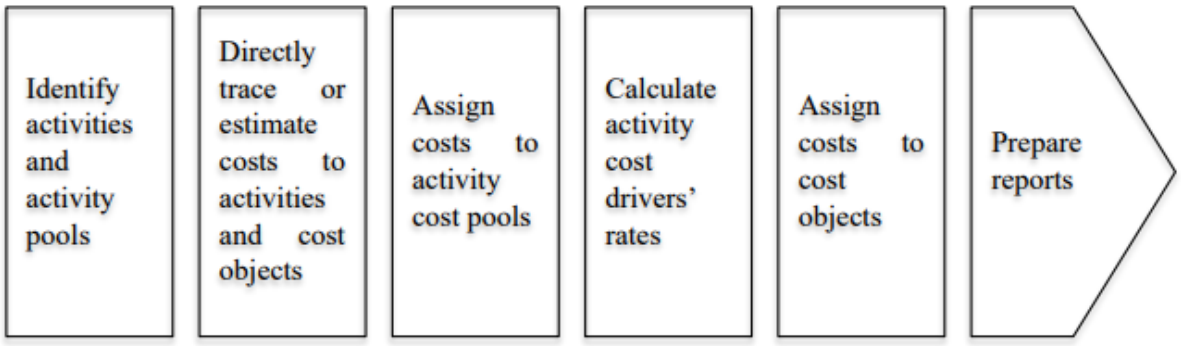


Figure 2. 1 Activity-Based Costing Process

The advantages of Activity-Based Costing are as follows:

- Provides realistic costs of manufacturing for specific products.
- Allocates manufacturing overhead more accurately to products and processes that use the activity.
- Identifies inefficient processes and targets for improvements.
- Determines product profit margins more precisely.
- Discovers which processes have unnecessary and wasted costs.

- Offers better understanding and justification of costs in manufacturing overhead.

The Disadvantages of Activity-Based Costing is as follows:

- The collection and preparation of data is time-consuming.
- Costs more to accumulate and analyze information.
- Source data isn’t always readily available from normal accounting reports.
- Reports from ABC don't always conform to generally accepted accounting principles and can't be used for external reporting.
- Data produced by ABC may conflict with managerial performance standards previously established from traditional costing methods.
- May not be as useful for companies where overhead is small in proportion to total operating costs.

ABC produces more accurate costing of products by essentially converting broad indirect costs into direct costs of production. It determines the costs of the various sources of indirect costs and allocates these expenses to the specific activities that use them. Setting up an ABC system is time-consuming and expensive to maintain, but it provides management with valuable information that can be used to improve the efficiency of processes and increase product profit margins.

# CHAPTER III
# RESEARCH METHODOLOGY

## 3.1 Research Subject

This research was conducted in PT. XYZ at Yogyakarta, Indonesia. The measurement of the company cost activity aims to assess company performance from 2020 until 2021. The results of the cost activity measurements will be a reference for improving the costing decision at PT. XYZ.

## 3.2 Research Object

The object of this research is to identify the activity that costs the most among other activities inside the production and perform the best costing decision in order to improve the efficiency of the production in the company.

The data gathered from the company related to the financial distribution of production cost will be re-calculated using the Activity-Based Costing (ABC) method and compared with the production cost that the company already has. The result of this research will be a reference to the company regarding costing decisions that could obtain maximum profit from the production activity.

## 3.3 Type of Research Data

Primary data are data obtained from original sources by researchers, the data used in this research are:

a. Observation.

   Direct observation will be carried out on the PT. XYZ. The observation was carried out to directly observe the location and condition of the company in order to obtain the newest condition, an overview of the overall production activities of the company needed for the calculation of the Activity-Based Costing (ABC) method.

b. Interview.

   Interviews will be conducted with the parties involved, such as the Director of PT. XYZ, and Production Department Manager in order to obtain actual data to support data processing of COGM (Cost of Goods Manufacture).

## 3.4 Data Processing

In this study, the result is presented in quantitative and qualitative. The quantitative data is the COGM (Cost of Goods Manufacture) using the Activity-Based Costing (ABC) method, and the qualitative data will be a decision based on the cost gap of ABC calculation and the company calculation. In this study too, the research was carried out continuously from the start of the study to the end of the study or until the data were sufficient.

## 3.5 Conclusion and Recommendation

The conclusion will be about answering the proposed questions in the problem formulation part elaborated in Chapter I. This part will also give a few recommendations that may be used to improve or to elevate further research.

## 3.6 Research Flowchart

This research flowchart is to show how this research is conducted. These steps are important to display because it portrays the concept of how the author moves from the beginning until the conclusion of the research, so that the readers may easily understand. This research flowchart is displayed in Figure 3.2 below:

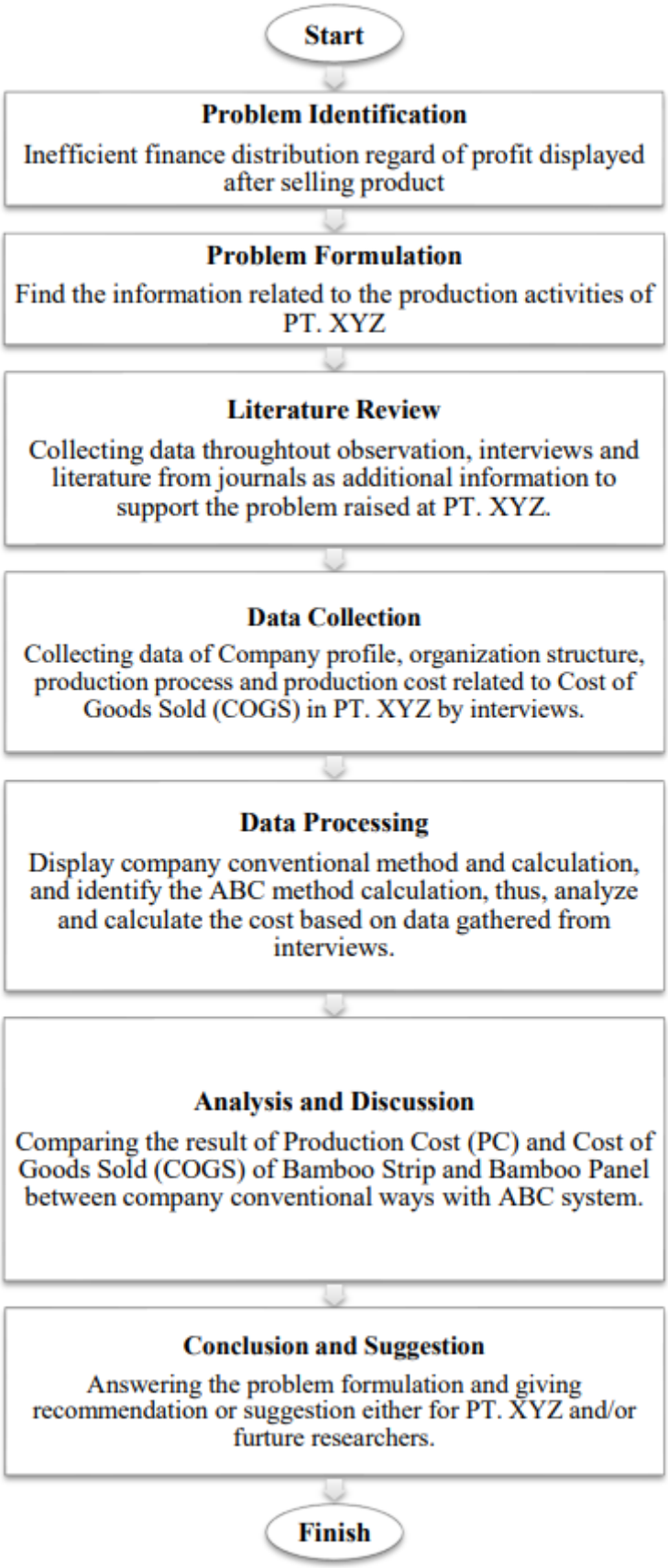


Figure 3. 1 Research Flowchart

# CHAPTER IV
# DATA COLLECTING AND PROCESSING

## 4. 1 Data Collecting

Retrieval of data at PT. XYZ (Yogyakarta) is carried out through direct observation and interviews. The data taken are company profile data, organization structure, production activity, company production conventional cost, and cost of COGM (Cost of Goods Manufacture) data for processing Activity-Based Costing (ABC) method starting from fixed cost, variable cost, and factory overhead cost (FOC). The data on markup price and sales margin are gathered from the administrative department.

### 4. 1. 1 Company Profile

PT. XYZ is a manufacturing company, which mainly sells bamboo poles and bamboo craftsmanship. This company is one of the largest bamboo companies in Yogyakarta, Indonesia which was established in 2015, namely PT. XYZ. To maximize their profit and efficiency, PT. XYZ only distributes its products to the foreign country included four continents in the world.

### 4. 1. 2 Company Organizational Structure

PT. XYZ has an organizational structure to facilitate an effective and efficient management system and work system. Below is a picture of the organizational structure of PT. XYZ.

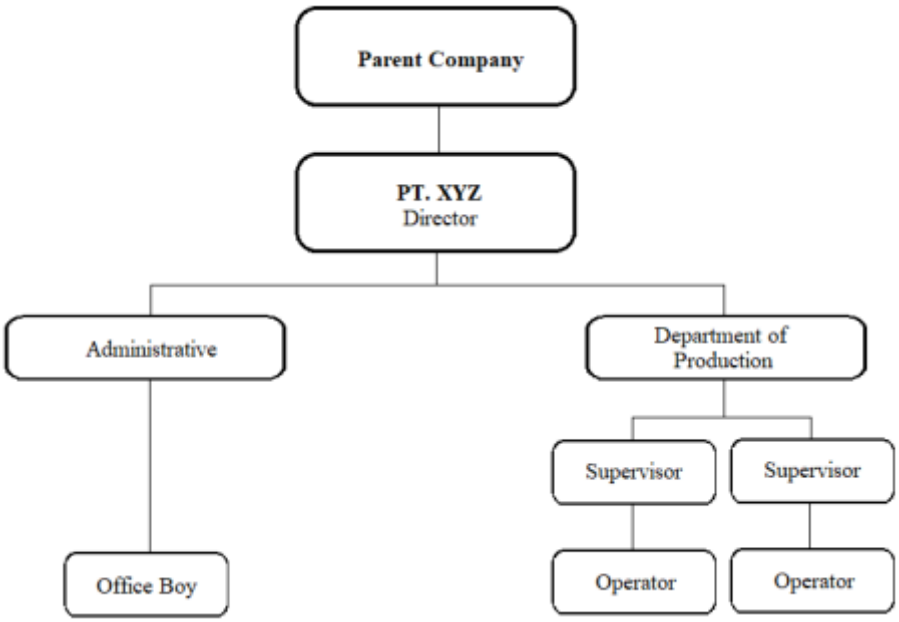


Figure 4. 1 Company Organizational Structure

### 4. 1. 3 Job Description

Every position in PT. XYZ has a different job description. Following is the job description of PT. XYZ:

1. Parent Company

   The parent company of PT. XYZ is responsible for establishing general regulations within the company.

2. Director of PT. XYZ

   Establish general decisions inside PT. XYZ and also controlling the cycle of finance and marketing. The director also became the one who made decisions regarding production along with Managers production in the department of production and future planning of this bamboo manufacturing company.

3. Department of Administrative

   Responsible for carrying out and controlling the administration of PT. XYZ. This responsibility included legalities of law, finance recapitulation data, company internal needs, and receiving invoices from customers.

4. Department of Production

   Responsible for producing the product demanded by the customer or invoice as needed by the director. This department is headed by the Manager of Production and also controls the quality of supplied raw materials, processes, and finishes the goods before and after stored in the warehouse.

5. Supervisor

   Responsible for controlling the flow of production in the field, quality control over product, and helping the manager with receiving supplies from the supplier.

6. Operator

   Responsible for carrying on the production plan given by the manager of production and meeting with the daily production of each product, and cleaning the production floor daily.

7. Office Boy

   Responsible for cleaning the office building inside-out, sometimes helping the operator to clean the production floor of remaining debris and useless materials, and also worked as a waitress in the office canteen.

### 4. 1. 4 Production Process

The process of making products at PT. XYZ from raw materials to finished products to storage processes are as follows:

1. Bamboo Strip Product Workmanship

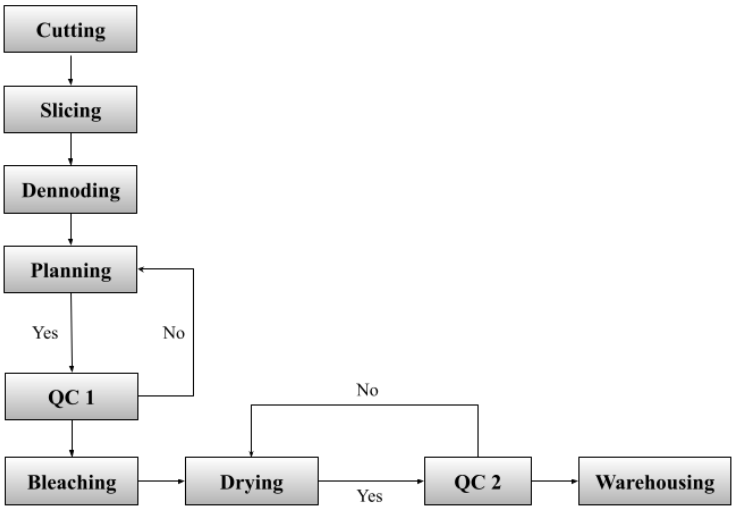


Figure 4. 2 Bamboo Strip Production Process

Based on the flow, the production process of Bamboo Strip can be described as follows:

a. Cutting

The cutting process is done manually using a table saw. The operator for this process is variant, they are going to cut the bamboo into different sizes and dimensions, especially the length of the bamboo.

b. Slicing

The slicing process is where the bamboo is going to be sliced into smaller widths, mostly the bamboo is sliced into 6 to 12 pieces.

c. Dennoding

Dennoding is a process of cutting the side or sub-branch bamboo from the outer and inner sides. This process also makes the bamboo look like a wooden stick.

d. Planning

Once the process of dennoding is done, then the bamboo is going to be placed in a planning machine where the bamboo thickness will be decreased for both sides. From curved shape bamboo, into wooden sticks like shapes bamboo.

e. Quality Control 1 (Dimension)

Quality control 1 for this product are inspection of dimensions as ordered by the customer. Length and width must be perfectly the same as ordered. If the dimension is bigger than it should be, then the operator must do re-planning again to match the invoice.

f. Bleaching

Bleaching is a process of semi-finished good treatment. It sounds like, the bamboo is going to be bleached using the chemical product to ensure the bamboo color is brightened.

g. Drying

After the bleaching procedures, the bamboo must be dried out under the sun bright or using a *Kiln Dryer*.

h. Quality Control 2 (Moisture)

Quality control 2 is about moistness, checking the bleached bamboo after the drying process, and the moisture must meet the SOP. Once it meets the SOP required, then the product is finished and entering the warehouse.

i. Warehousing

The warehousing is a process once the bamboo product is finally finished to be produced and stored in the warehouse and wait for the delivery schedules.

2. Black Bamboo Panel Product Workmanship

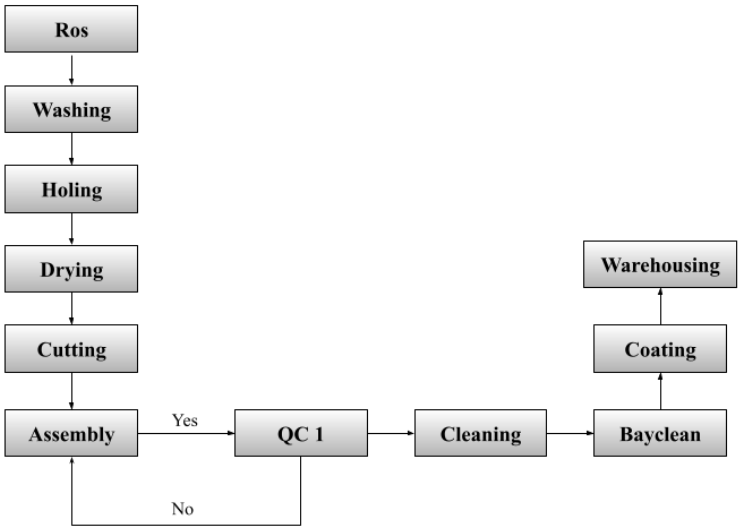


Figure 4. 3 Bamboo Panel Production Process

Based on the flow, the production process of Bamboo Panels can be described as follows:

a. Ros/Sides Rounding

This is the first process for bamboo panel products, which is cutting the sub-branch from the round side of the bamboo until it is cleaned.

b. Washing

The washing process is a process to clean the bamboo from the debris after the round side bamboo is cut.

c. Holing

This process breaks the structure of bamboo from the inside using a metal round-stick. This is mainly done to make sure the bamboo is less difficult for the cutting process.

d. Drying

After the bleaching procedures, the bamboo must be dried out under the sun bright or using a Kiln Dryer.

e. Cutting

The cutting process is done manually using a table saw. The operator for this process is variant, they are going to cut the bamboo into different sizes and dimensions, especially the length of the bamboo. For bamboo panel products, the bamboo is going to be cut half-rounded.

f. Assembly

The bamboo needs to be lined up and tied using rope, then locked by nailing it on the bamboo that is placed horizontally on the backside. The assembly process included supporting materials such as nails, rope, and glue.

g. Quality Control 1 (Dimension)

Quality control 1 for this product is to inspect the length dimension of the semi-finished panel. If it meets the SOP required then it will continue to the next process.

h. Cleaning

The cleaning process is mainly to clean the debris or glue. This process also ensures the panels are ready to be treated and coated.

i. Baycleaning

Baycleaning is a process of semi-finished good treatment. As it sounds like, the bamboo is going to be treated using Bayclean product to ensure the bamboo is less decayed/rotted for long-term use.

j. Coating

In this process, the panel is going to be treated with different techniques, some are going to be sprayed with chemicals to strengthen its particles inside, and others are being coated with color and clear paint. This process ensures that the product is strong enough for long-term use in varied environments and seasons.

k. Warehousing

The warehousing is a process once the bamboo product is finally finished to be produced and stored in the warehouse and wait for the delivery schedules.

3. Warehousing

Products that pass Quality Control 2 are stored in the warehouse and later waiting for the delivery process.

## 4. 2 Data Processing of Conventional Method (PT. XYZ)

The data was processed in PT. XYZ using the conventional method. In order to compare the differences between company Cost of Goods Manufacture (COGM) and Activity-Based Costing (ABC) cogs, PT. XYZ gives various data to support this research. Therefore, the data provided to calculate the cost of goods sold using the conventional method can be seen below:

Table 4. 1 Conventional Factory Overhead Cost Tariff (FOCT)

| Point | Total Cost | Bamboo Strip | Bamboo panel |
|---|---|---|---|
| Factory Overhead Cost Tariff | Rp. 24.455.118,63 | Rp. 6.584.070,40 | Rp. 17.871.048,23 |

(Source: Internal Data of PT. XYZ, 2022)

The first data is the Overhead cost of factory scale from the company. As seen above, the Total Cost both came from the bamboo strip and bamboo panel products. This cost is already being calculated and given by the Production Managers directly with no details given to the researcher of how to calculate it. Then, the supporting data including material, labor, and such are described below:

Table 4. 2 Conventional Cost of Goods Manufacture (COGM) of Bamboo Strip

| Types of Cost | Production Cost | Total Production | Cost/Unit | PC |
|---|---|---|---|---|
| Cost of Materials | Rp. 1.768.800 | | Rp. 67 | |
| Cost of Direct Labors | Rp. 13.860.000 | 26.400 | Rp. 525 | Rp. 841,4 |
| Cost of FOCT | Rp. 6.584.070,40 | | Rp. 249,4 | |

(Source: Internal Data of PT. XYZ, 2022)

Table 4. 3 Conventional Cost of Goods Manufacture (COGM) of Bamboo Panel

| Types of Cost | Production Cost | Total Production | Cost/Unit | PC |
|---|---|---|---|---|
| Cost of Materials | Rp. 97.846.320 | | Rp. 57.020 | |
| Cost of Direct Labors | Rp. 37.620.000 | 1716 | Rp. 21.923 | Rp. 89.357,44 |
| Cost of FOCT | Rp. 17.871.048,23 | | Rp. 10.414,3 | |

(Source: Internal Data of PT. XYZ, 2022)

The production cost (PC) for both products is divided into 2 tables. The production cost (PC) for both products is summarized as *Cost per Unit*. To get the Cost per Unit, all the costs including Materials, Direct Labor, and Factory Overhead Cost Tariff or FOCT are divided by the total production. Where the cost of goods sold for Bamboo Strip is Rp. 841 and from Bamboo Panel product is Rp. 89.357.

Table 4. 4 Margin Sales and Product Price over COGM per Unit

| Point | Bamboo Strip | | Bamboo Panel | |
|---|---|---|---|---|
| | Margin Sales | Product Price | Margin Sales | Product Price |

| | | | | |
|---|---|---|---|---|
| **M-Price** | - | *Rp. 1.300,00* | - | *Rp. 125.000,00* |
| **Default** | Rp. 358,60 (42,62%) | Rp. 1.200,00 | Rp. 30.642,56 (34,29%) | Rp. 120.000,00 |

(Source: Processed Data, 2023)

According to PT. XYZ, the minimum Product Price set by the competitor on the market for Bamboo Strips is Rp. 1.300,00 while the bamboo panel is Rp. 125.000,00. Which makes PT. XYZ set the default Product Price of the bamboo strip and bamboo panel as Rp. 1.200,00 and Rp. 120.000,00 respectively, thus their markup is about Rp. 358,60 or equal to 42,62% and Rp. 30.642,56 or 34,29%.

Therefore, we could calculate the total revenue per month for both products according to the default Product Price, which we get:

$$Monthly\ Revenue = Production\ x\ Sales\ Price$$

$$MPstrip = 26400\ x\ 1.200 = Rp.31.680.000$$

$$MPpanel = 1716\ x\ 120.000 = Rp.205.920.000$$

Based on the calculation, Bamboo Strip Monthly Revenue is Rp. 31.680.000 while Bamboo Panel is Rp. 205.920.000.

While monthly profit calculations are as follows:

$$Monthly\ Profit = Revenue\ x\ COGS$$

$$MPstrip = 31.680.000\ x\ 22.212.960 = Rp.9.467.040$$

$$MPpanel = 205.920.000\ x\ 158.337.367{,}04 = Rp.52.582.632{,}96$$

Based on the calculation, Bamboo Strip's monthly profit is Rp. 9.467.040 while Bamboo Panel is Rp. 52.582.632,96.

## 4. 3 Data Processing of Activity-Based Costing (ABC)

The products are finished products manufactured to meet consumer demand. The raw materials are bamboo with various dimensions and colors. In addition to the main raw materials, the production process is also supported by supporting materials for its product.

Since the company did not give any data regarding marketing and/or advertising costs, then this research will not be able to display the data and exclude the marketing cost from the ABC system calculation. Thus, this research assumes that the Cost of Goods manufactured (COGM) is equal to the Cost of Goods Sold (COGS).

Therefore, there are several lists of costs for this research to be able to identify the Overhead Cost for factory scales that are described in the tables below. Since the Activity-Based Costing (ABC) method

is based on its activities, this research divided the FOC into 2 levels including *Unit Level* and *Facility Level*. The activities level affects the *Cost Pool* and *Cost Driver* to calculate the Production Cost.

Table 4. 5 Identifying Factory Overhead Cost into Activities Categories with Total Cost

| No | Factory Overhead Costs | Activities Category | Total Cost (RP) |
|---|---|---|---|
| 1 | Cost of Supporting Material (Bamboo Panel) | Unit Level | Rp. 9.321.312 |
| 2 | Cost of Indirect Labors | Unit Level | Rp. 3.750.000 |
| 3 | Cost of Electricity (3 Pass) | Unit Level | Rp. 893.163 |
| 4 | Cost of Water | Facility Level | Rp. 200.967 |
| 5 | Cost of Electricity (1 Pass) | Facility Level | Rp. 422.813 |
| 6 | Cost of Building | Facility Level | Rp. 3.951.147 |
| 7 | Cost of Taxes | Facility Level | Rp. 607. 726 |
| 8 | Cost of Pantry | Facility Level | Rp. 1.709.033 |
| 9 | Cost of Land | Facility Level | Rp. 3.598.958 |

(Source: Internal Data of PT. XYZ, 2022)

Table 4. 6 Types of Cost with Product Produces

| Type of Cost | Cost Object | | Total |
|---|---|---|---|
| | Bamboo Strip | Bamboo Panel | |
| Cost of Materials | Rp. 1.768.800 | Rp. 97. 846.320 | Rp. 99.615.120 |
| Cost of Direct Labors | Rp. 13.860.000 | Rp. 37.620.000 | Rp. 51.480.000 |

(Source: Internal Data of PT. XYZ, 2022)

Once the cost already described above, then the allocation calculation of product produces, labor working hours, and area for the production for both products Bamboo Strip and Bamboo Panel are shown below:

Table 4. 7 Allocation Calculation for Activity-Based Costing System

| Point | Bamboo Strip | Bamboo Panel | Total |
|---|---|---|---|
| Total of Production (Unit) | 26400 | 1716 | 28116 |
| Labor Working Hour (Hours) | 1232 | 3344 | 4576 |
| Square Area ($m^2$) | 3000 | 7000 | 10000 |

(Source: Internal Data of PT. XYZ, 2022)

As seen above, both products have different unit produces, labor working hours and area usages. Thus, the differences are going to be summarized in total to calculate the *Cost Pool* in order to get the factory overhead cost tariff for each *Cost Pool*.

Table 4. 8 Cost of Goods Manufacture (COGM) Activities

| Cost Pool | Factory Overhead Cost | Cost Driver |
|---|---|---|
| | Cost of Indirect Labors | Total of Production |

| | | |
|---|---|---|
| I (Bamboo Strip) | Cost of Electricity (3 Pass) | Total of Production |
| I (Bamboo Panel) | Cost of Indirect Labors | Total of Production |
| | Cost of Electricity (3 Pass) | Total of Production |
| | Cost of Supporting Material | Total of Production |
| II (Variable Facility Cost) | Cost of Water | Labor Working Hour |
| | Cost of Electricity (1 Pass) | Labor Working Hour |
| | Cost of Pantry | Labor Working Hour |
| III (Fixed Facility Cost) | Cost of Building | Square Area |
| | Cost of Taxes | Square Area |
| | Cost of Land | Square Area |

(Source: Processed Data, 2023)

Based on the ABC method, the Cost Pool is divided into three stages which are Cost Pool I is the cost consumed by each product, Cost Pool II is a variable facility cost and Cost Pool III is a fixed facility cost. Cost Pool I is affected by Unit Level and for each product as it is. Cost Pool II and Cost Pool III are affected by Facility Level and scale for the whole product produced.

$$Cost\ Tariff\ Factory\ Overhead = \frac{Total\ Cost}{Activity\ Driver}$$

(Source: Kaplan and Bruns (1987)

Activity Driver for Cost Pool I is Total Production, Cost Pool II is Working Hour, while Cost Pool III is Square Area.

$$Bamboo\ Strip\ Cost\ Tariff = \frac{4.074.787}{28.116} = Rp.145$$

$$Bamboo\ Panel\ Cost\ Tariff = \frac{13.639.688}{28.116} = Rp.485$$

Table 4. 9 Group Tariff for Factory Overhead Cost (Cost Pool I)

| **Cost** | **Cost Pool I Bamboo Strip** | **Cost Pool I Bamboo Panel** |
|---|---|---|
| Cost of Indirect Labors | Rp. 3.750.000 | Rp. 3.750.000 |
| Cost of Electricity (3Pass) | Rp. 324.787 | Rp. 9.321.312 |
| Total Cost | Rp. 4.074.787 | Rp. 13.639.688 |
| Total of Production (Unit) | 28.116 | |
| Cost of Tariff FOC | Rp. 145 | Rp. 485 |

(Source: Processed Data, 2023)

Table 4. 10 Group Tariff for Factory Overhead Cost (Cost Pool II)

| **Cost Pool II** |
|---|

| | |
|---|---|
| Cost of Water | Rp. 200.967 |
| Cost of Electricity (1 Pass) | Rp. 422.813 |
| Cost of Pantry | Rp. 1.709.033 |
| Total Cost | Rp. 2.332.813 |
| Total of Labor Working Hours (Hour) | 4.576 |
| Cost of Tariff FOC | Rp. 510 |

(Source: Activity-Based Costing Processed Data, 2023)

Table 4. 11 Group Tariff for Factory Overhead Cost (Cost Pool III)

| | **Cost Pool III** |
|---|---|
| Cost of Building | Rp. 3.951.147 |
| Cost of Taxes | Rp. 607.726 |
| Cost of Land | Rp. 3.598.958 |
| Total Cost | Rp. 8.157.831 |
| Total of Area (square meter) | 10.000 |
| Cost of Tariff FOC | Rp. 816 |

(Source: Processed Data, 2023)

Once each Cost Tariff Factory Overhead is calculated, each result will be inputted on the ABC formula which is:

$$Activity - Based\ Costing = \frac{Cost\ Pool\ in\ Total}{Cost\ Driver}$$

(Source: Kaplan and Bruns (1987)

$$COGM = \frac{Total\ COGM}{Total\ Product\ Manufactured}$$

$$COGM = \frac{Cost\ of\ Material + Direct\ Labor + Cost\ Pool\ I + Cost\ Pool\ II + Cost\ Pool\ III + Total\ FOC}{Total\ Product\ Manufactured}$$

$$Bamboo\ Strip = \frac{1.768.800 + 13.860.000 + (26400\ x\ 145) + (1232\ x\ 510) + (3000\ x\ 815{,}5) + 6.901.505}{26400} = Rp.\ 853$$

As a result, COGM per Unit for Bamboo Strip is Rp. 853.

Table 4. 12 Cost of Goods Manufacture (COGM) using Activity-Based Costing (ABC) Method

| **Cost** | **Bamboo Strip** | | **Bamboo Panel** | |
|---|---|---|---|---|
| Cost of Material | | Rp. 1.768.800 | | Rp. 97.846.320 |
| Cost of Direct Labor | | Rp. 13.860.000 | | Rp. 37.620.000 |
| Cost Pool I | 26400<br>Rp. 145 | Rp. 3.826.091 | 1716<br>Rp. 485 | Rp. 832.469 |
| Cost Pool II | 1232<br>Rp. 510 | Rp. 628.065 | 3344<br>Rp. 510 | Rp. 1.704.748 |
| Cost Pool III | 3000 | Rp. 2.2447.349 | 7000 | Rp. 5.710.482 |

| | | | |
|---|---|---|---|
| | Rp. 815,8 | Rp. 815,8 | |
| Total FOC | | Rp. 6.901.505 | Rp. 9.247.699 |
| Total of COGM | | Rp. 22.530.305 | Rp. 143.714.019 |
| Total of products manufactured | | 26400 | 1716 |
| **COGM per Unit** | | **Rp. 853,42** | **Rp. 83.749,43** |

(Source: Processed Data, 2023)

Once the production cost has been determined, then based on PT. XYZ regulation of setting up Product Prices with a Mark-Up price reach Rp. 1.200 for Bamboo Strip and Rp. 120.000 for Bamboo Panels.

$$Margin = \frac{\frac{Sales\ Price}{COGM}}{COGM} x\ 100$$

$$Bamboo\ Strip\ Margin = \frac{\frac{1.200}{853}}{853} = \frac{347}{853} x100 = 40{,}6\%$$

Based on this calculation, the Mark-Up set by PT. XYZ for the Bamboo Strip Product Price set is 40,6% which detailed number can be seen in the table below:

Table 4. 13 Margin Sales and Product Price over COGM per Unit

| **Point** | **Bamboo Strip** | | **Bamboo Panel** | |
|---|---|---|---|---|
| | **Margin Sales** | **Product Price** | **Margin Sales** | **Product Price** |
| **M-Price** | - | *Rp. 1.300,00* | - | *Rp. 125.000,00* |
| **Default** | Rp. 346,58 (40,61%) | Rp. 1.200,00 | Rp. 36.250,57 (43,3%) | Rp. 120.000,00 |

(Source: Processed Data, 2023)

PT. XYZ's default Product Price for bamboo strips and bamboo panels is Rp. 1.200,00 and Rp. 120.000,00 respectively, thus their Mark-up based on ABC System Cost of Goods Manufactured (COGM) is about Rp. 346,58 or equal to 40,61% and Rp. 36.250,57 or 43,28%.

Therefore, we could calculate the total revenue per month for both products according to the default Product Price, which we get:

$$Monthly\ Revenue = Production\ x\ Sales\ Price$$

$$MPstrip = 26400\ x\ 1.200 = Rp.31.680.000$$

$$MPpanel = 1716\ x\ 120.000 = Rp.205.920.000$$

Based on the calculation, Bamboo Strip Monthly Revenue is Rp. 31.680.000 while Bamboo Panel is Rp. 205.920.000.

While monthly profit calculations are as follows:

$$Monthly\ Profit = Revenue - COGM$$

$$MPstrip = 31.680.000 - 22.539.288 = Rp.9.147.712$$

$MPpanel = 205.920.000 - \ 143.714.021{,}88 = \ Rp.62.205.978.12$

Based on the calculation, Bamboo Strip's monthly profit is Rp. 9.149.712 while the Bamboo Panel is Rp. 62.205.978.12.

## 4. 4 Product Pricing

According to PT. XYZ pricing method, they still use combined competitive below-market pricing and cost-plus pricing, where both products have a set of prices below the minimum competitor prices for similar products. Competitive below-market pricing is a strategy to put a price for a product below the market rate. This is to ensure that the product has a spotlight that might catch a customer's attention. Where cost-plus pricing method is implemented by the company to ensure they have a proper margin at the time. At the current condition, PT. XYZ intended to raise its product margin up to 50%. At present market rates, the bamboo strip has a price of Rp. 1.300,00 and Rp. 125.000 for a bamboo panel. Meanwhile, PT. XYZ set a product price for bamboo strips with Rp. 1.200,00 and bamboo panel with Rp. 120.000,00. With these kinds of pricing approaches, PT. XYZ has less profits including distorted cost of goods using the conventional method.

This research proposed a combination of two pricing methods, namely: value-based pricing and competitive average-market pricing. Value-based pricing is a method that considers a customer's loyalties and customer perceived value to set the price. The data of production in 2021 for bamboo strips is equal to 26400 units/month while bamboo panel production is equal to 1716 units/month. Selling these much of products unit is one of the hugest achievements made by PT. XYZ. This shows how the customer was attracted by the product's value which significantly matches with value-based pricing method. If both product prices are equal to the market rates which is Rp. 1.300,00 for bamboo strip and Rp. 125.000,000 for the bamboo panel, then it is also one step closer to reaching a 50% margin for both products. If it is calculated, then it may result as follows:

$Profit = Product\ Price - COGM$

$Margin\ rates = \frac{Profit}{COGM} x100$

$Bamboo\ Strip\ Product\ Price = 1.300{,}00 - 853{,}42 = 446{,}58$

$Bamboo\ Strip\ Margin\ rates = \frac{446{,}58}{853{,}42} x100 = 52{,}33\%$

$Bamboo\ Panel\ Product\ Price = 125.000{,}00 - 83.749 = 41.250{,}57$

$Bamboo\ Panel\ Margin\ rates = \frac{41.250{,}57}{83.749} x100 = 49{,}25\%$

Based on this calculation, using the cost of manufacturing from the Activity-Based Costing method combined with the competitive average-market pricing method, it shows that bamboo strip has reached a margin above 50% which is 52.33%, and bamboo panel products almost reach it with 49,25%. The

value-based pricing is reasonable when the company has succeeded in making sales and has a good response from the consumer. Therefore, we also could calculate the total revenue/month for both products according to the proposed Product Price, which we get:

$Monthly\ Revenue = Production\ x\ Sales\ Price$

$MPstrip = 26400\ x\ 1.300 = \ Rp.34.320.000$

$MPpanel = 1716\ x\ 125.000 = \ Rp.214.500.000$

Based on the calculation, Bamboo Strip Monthly Revenue is Rp. 34.320.000 while the Bamboo Panel is Rp. 214.500.000.

While monthly profit calculations are as follows:

$Monthly\ Profit = Revenue\ x\ COGM$

$MPstrip = 34.320.000 - \ 22.530.304{,}90 \ = \ Rp.11.789.695{,}10$

$MPpanel = 214.500.000 - \ 143.714.018{,}63 = \ Rp.70.785.981{,}37$

Based on the calculation, Bamboo Strip's monthly profit is Rp. 11.789.695,10 while the Bamboo Panel is Rp. 70.785.981,37.

## 4. 5 Break Event Point (BEP)

A Break Event Point in a manufacturing company is a capabilities standard of product to return the investment after selling numerous pieces of one or more products. Break Event Point known as BEP in PT. XYZ is shown in the table below including Fixed Cost and Variable Cost data:

Table 4. 14 Fixed Cost and Variable Cost Data

| **Products** | **Fixed Cost (FC)** | **Variable Cost (VC)** |
|---|---|---|
| **Bamboo Strip** | Rp. 8.157.831 | Rp. 604,30 |
| **Bamboo Panel** | | Rp. 27.743,24 |

(Source: Internal Data of PT. XYZ, 2022)

Break Event Point Formula:

$$BEP = \frac{Fixed\ Cost}{Sales\ Price - Variable\ Cost}$$

Example:

$BEP.Conventional.BS = \frac{8.157.831}{1.200 - 604{,}30} = 13.694{,}5 \sim 13.695$ pieces

$BEP.Conventional.BP = \frac{8.157.831}{120.000 - 27.743{,}23} = 88{,}4 \sim 89$ pieces

$BEP.Proposed\ ABC.BS = \frac{8.157.831}{1.300 - 604{,}30} = 11.726{,}0 \sim 11.726$ pieces

$BEP.Proposed\ ABC.BP = \frac{8.157.831}{125.000 - 27.743,23} = 83{,}8 \sim 84$ pieces

Based on the calculation above, it means that PT. XYZ must sell 13.695 pieces of Bamboo Strip and 88 pieces of Bamboo Panel in a month to cover their investment and cost of the product. BEP result is divided into two tables which are based on the Conventional method Product Prices and also ABC method Product Prices. The result is shown in table below:

Table 4. 15 Break Even Point (BEP) Comparison

| **Margin** | **Products** | |
|---|---|---|
| | **Bamboo Strip** | **Bamboo Panel** |
| **Conventional Method** | 13695 | 89 |
| **Default ABC Method** | 13695 | 89 |
| **Proposed Product Price** | 11726 | 84 |

(Source: Activity-Based Costing Processed Data, 2023)

Based on the table above, it shows whether using the conventional method or the default ABC method, BEP will demonstrate the same result since the product price for both products are exactly the same, thus, the proposed product price has a different result which decreased BEP since the product prices is higher. Therefore, there is another way to calculate BEP, which counts the break event in cash. To calculate the Break Event Point for both product in Cash, and not quantity the formula is as follow:

$BEPcash = BEP\ quantity\ x\ Sales\ Price$

$Bamboo\ Strip = 13695\ x\ 1.200 = Rp.16.434.000$

$Bamboo\ Panel = 88\ x\ 120.000 = Rp.10.560.000$

$Bamboo\ Strip = 11726\ x\ 1.300 = Rp.15.243.898{,}90$

$Bamboo\ Panel = 84\ x\ 125.000 = Rp.10.848.915{,}30$

Based on the calculation using the default product price invented by PT. XYZ, BEP in Cash of Bamboo Strip equal to Rp. 16.434.000 and BEP Cash for Bamboo Panel is Rp. 10.560.000. While calculating using the proposed product pricing, the BEP Cash of Bamboo Strip is equal to Rp. 15.243.898,90 and BEP Cash for Bamboo Panel is Rp. 10.848.915,30.

# CHAPTER V
# DISCUSSION

## 5. 1 Cost of Goods Manufacture and Product Price of Default PT. XYZ Method

In order to calculate the Cost of Goods Manufacture (COGM) of both bamboo strips and bamboo panels, PT. XYZ currently using the conventional method. Which results in having Factory Overhead Cost (FOC) Rp. 249 and Rp. 10.414 for bamboo strips and bamboo panels respectively. Thus, to acquire the cost of goods manufacture, FOC is added with the cost of material and cost of direct labor, resulting in bamboo strip COGM equal to Rp. 841, and bamboo panel COGM equal to Rp. 89.357.

After COGM per unit for both products acquired, in default PT. XYZ uses Mark-Up prices to determine their product price into the minimum market price. This market price is the minimum price set by the company itself, Rp. 1.200 for bamboo strip product price which acquired 42,6% or equal to Rp. 358,6 profit and Rp. 120.000 for bamboo panel product price which acquired 34,3% or Rp. 30.642,56 equals profit.

## 5. 2 Implementation of Activity-Based Costing (ABC)

To acquire factory overhead cost (FOC), the ABC method is quite complex. The first process is to obtain the Cost of Tariff FOC for each cost pool (I, II, and III), which is cost pool I Rp. 145 (bamboo strip), and Rp. 485 (bamboo panel), cost pool II is Rp. 510, and cost pool III is Rp. 816. Then cost pool I x total production per month, cost pool II x total working hours, and cost pool III x square area. Resulting in a Total FOC for bamboo strips equal to Rp. 6.901.505, and bamboo panel equal to Rp. 8.247.699. Then, each total FOC is divided by total production (26400 and 1716), resulting in the factory overhead cost per unit for bamboo strips equal to Rp. 261 and for bamboo panels equal to Rp. 4.806.

To calculate the Cost of Goods Manufactured (COGM) per unit of each product using the ABC method it needs to *SUM* every cost related to the product corresponding to an acquired total production cost or total COGM. Total COGM is then divided by the total production or product manufactured per month, as a result, COGM per unit. Bamboo strip total COGM is Rp. 22.530.305 and total production of 26400, then Rp. 22.530.305 / Rp. 26400 resulting Rp. 853 as bamboo strip COGM per unit. As for the bamboo panel, it total COGM is Rp. 143.714.019 and a total production of 1716, resulting in Rp. 83.749 COGM per unit.

After COGM per unit for both products was acquired, the implementation of Value-Based pricing combined with the Competitive Average-Market pricing method was used instead following the default pricing method PT. XYZ uses proposed product prices to determine the product price for both products. Therefore, the bamboo strip acquired 52,33% or equal to Rp. 446,58 profits with a product price of Rp.

1.300. Bamboo Panel acquired 49,25% or equal to Rp. 41.250,57 profits with a product price of Rp. 125.000.

## 5. 3 Comparison of Conventional COGM and ABC Method COGM

After the calculation has been done with both products of bamboo strip and the bamboo panel, there are some differences in cost between the PT. XYZ calculation and Activity-Based Costing method calculation. Those differences are shown in the table below:

Table 5. 1 Factory Overhead Cost Comparison

| **Point** | **Bamboo Strip** | **Bamboo Panel** | **Total** |
|---|---|---|---|
| Conventional System | Rp. 249 | Rp. 10.414 | Rp. 10.664 |
| ABC System | Rp. 261 | Rp. 4.806 | Rp. 5.068 |
| Differences (Rp) | Rp. 12 | Rp. 5.608 | Rp. 5.596 |
| Differences (%) | - 4,82% | 53,58% | 49,03% |

(Source: Activity-Based Costing Processed Data, 2023)

The cost of both bamboo strips and bamboo panels comes from the Total factory overhead cost (FOC) divided by total production.

Table 5. 2 Cost of Goods Manufacture Comparison

| **Point** | **Bamboo Strip** | **Bamboo Panel** | **Total** |
|---|---|---|---|
| Conventional System | Rp. 841 | Rp. 89.357 | Rp. 90.199 |
| ABC System | Rp. 853 | Rp. 83.749 | Rp. 84.603 |
| Differences (Rp) | Rp. 12 | Rp. 5.608 | Rp. 5.596 |
| Differences (%) | - 1,43% | 6,28% | 4,85% |

(Source: Activity-Based Costing Processed Data, 2023)

Table 5. 3 Default Product Price Profit per Unit Comparison

| **Point** | **Bamboo Strip** | **Bamboo Panel** |
|---|---|---|
| Default Product Prices | Rp. 1.200,00 | Rp. 120.000,00 |
| Proposed Product Prices | Rp. 1.300,00 | Rp. 125.000,00 |
| | | |
| Conventional System | Rp. 358,60 | Rp. 30.642,56 |
| ABC System | Rp. 446,58 | Rp. 41.250,57 |
| Differences (Rp) | Rp. 87,98 | Rp. 10.608,01 |
| Differences (%) | 19,70% | 25,72% |

(Source: Activity-Based Costing Processed Data, 2023)

As shown in the table above, profit generated using proposed product prices has a better result. Bamboo strip profit increased by 19,70% or equal to Rp. 87,98 with product price differences up to Rp. 1.000

while Bamboo Panel product profit increased by 25,72% or equal to Rp. 10.608,01 were the product price differences only Rp. 5.000,00.

Table 5. 4 Product Price Comparison

| Point | Default Product Price | | Proposed Product Price | |
|---|---|---|---|---|
| | **Bamboo Strip** | **Bamboo Panel** | **Bamboo Strip** | **Bamboo Panel** |
| Price | Rp. 1.200,00 | Rp. 120.000,00 | Rp. 1.300,00 | Rp. 125.000,00 |

(Source: Processed Data, 2023)

Since the default product price uses competitive below-market pricing and cost-plus pricing method, the product price set is smaller than the market rates which Rp. 1.300 for bamboo strips and Rp. 125.000 for the bamboo panel. Meanwhile, the proposed product price uses value-based pricing combined with the competitive average-market pricing method, resulting in the product prices having a similar price to the market rates put by the competitor. This is genuinely affected by high product sales that PT. XYZ has done so far, which PT. XYZ's price and product value could compete with the competitor even though they have the same price for both products.

Table 5. 5 Monthly Revenue Comparison

| Point | Default Product Price | | Proposed Product Price | |
|---|---|---|---|---|
| | **Bamboo Strip** | **Bamboo Panel** | **Bamboo Strip** | **Bamboo Panel** |
| Revenue | Rp. 31.680.000,00 | Rp. 205.920.000,00 | Rp. 34.320.000,00 | Rp. 214.500.000,00 |
| **Total** | Rp. 237.600.000,00 | | Rp. 248.820.000,00 | |
| Profit | Rp. 9.467.040 | Rp. 52.582.632,96 | Rp. 11.789.695,10 | Rp. 70.785.981,37 |
| **Total** | Rp. 62.049.672,96, | | Rp. 82.575.673,22 | |

(Source: Processed Data, 2023)

Based on the calculation, the Conventional method default product price total revenue per month was Rp. 237.600.000,00, instead ABC method proposed product prices showing higher total revenue which is Rp. 248.820.000,00. Then, the Profit generated by default product price is only Rp. 62.049.672,96 while proposed product prices is up to Rp. 82.575.673,22. This means that calculating the cost of goods sold using the Activity-Based Costing method plus using a combination of value-based and competitive average-market pricing method for both products increase PT. XYZ profit by 31% or equal to Rp. 20.526.000,26.

Table 5. 6 Break Even Point (BEP) Comparison

| Sales Margin | Default Product Price | | Proposed Product Price | |
|---|---|---|---|---|
| | **Bamboo Strip** | **Bamboo Panel** | **Bamboo Strip** | **Bamboo Panel** |
| Default | 13695 | 88 | 11726 | 84 |

(Source: Activity-Based Costing Processed Data, 2023)

Based on the BEP table comparison, the conventional method and ABC method for default margin have an exact quantity of BEP, due to the default product price set for both products which is Rp. 1.200 for bamboo strip and Rp. 120.000 for the bamboo panel.

It means that the proposed product pricing is much better at reducing the Break Event Point of each product where the significant one can be seen on bamboo strip BEP Cash reduced by more than 1 million rupiahs. Therefore, once the quantity sold surpasses the BEP product quantity, all the income gathered is regarded as profit. Currently PT. XYZ monthly production is 26400 pieces for bamboo strips and 1716 pieces for bamboo panels. Which indicates PT. XYZ already surpassed their monthly BEP with product price.

## 5. 4 Advantages of Activity-Based Costing (ABC) Method Implementation

Based on the calculation in Chapter IV, by using the ABC method to calculate the COGM (Cost of Goods Manufacture) it is concluded that it has a better and more accurate calculation than the default COGM from PT. XYZ. Calculation using the ABC results in proper base cost and specifies the consumption of sources more accurately; thus, it shows the precision of cost weight since this system is based on the activities it consumes. Overall, in monthly production, the ABC method showed significant results, a proper cost weight for each product, higher profit, less production cost, and standard BEP.

# CHAPTER VI
# CONCLUSION AND SUGGESTION

## 6. 1 Conclusion

1. Cost of goods manufactured per unit set by PT. XYZ is Rp. 841 for bamboo strip and Rp. 89.357 for the bamboo panel. While based on Activity-Based Costing calculation, the cost of goods manufactured per unit is Rp. 853 and Rp. 83.749 for bamboo strips and bamboo panels respectively. Resulting in the costs set by PT. XYZ for the bamboo strip is *Under-Cost*, while bamboo panels are *Over-Cost*.
2. The best product pricing method to be assigned as product pricing is a combination of Value-Based and Competitive Average-Market pricing methods along with the cost of goods manufactured calculated using the Activity-Based Costing method. This is proven by the calculation of the cost of goods manufactured of each product, in which bamboo strip COGM is increased by Rp.12 while bamboo panel COGM is decreased by Rp. 5.608 from the default COGM calculated by PT.XYZ.

## 6. 2 Suggestion

1. The company is suggested to consider using the Activity-Based Costing method while calculating production cost or cost of goods manufactured, since the conventional method is less accurate and has distorted information value while determining overhead cost, and other supporting costs for each product.
2. The company is suggested to include the cost of marketing and advertising of each product to acquire a proper cost of goods sold in order to prevent miscalculation before arranging the product into product prices in the market.
3. The company suggested using another product pricing method to increase their revenue or profit and might also consider the proposed product pricing method by this research which is a combination of Value-Based and Competitive Average-Market pricing methods.
4. For further research, the Activity-Based Costing method is still relevant nowadays, this is proven by the result of this research. Therefore, further research suggested adding another cost variable and cost-driven activities that are not included in this research, for example, the activities of machine work hours and/or the time spent for labor to finish one or more products from the beginning until becoming a finished product.

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# APPENDIX

**PT. XYZ Product Used in Research**

| No | Name | Photo | Description |
|---|---|---|---|
| 1 | Bamboo Panel |  | A panel made of black bamboo or bamboo wulung. It is eco-friendly and get a treatment for longer live usage. Finished using black palm rope. |
| 2 | Bamboo Strip |  | A beam made from bamboo petung that has a rectangular shape similar to battens (wood). This product is limited and selected from bamboo petung which has the best thicknesses. |

## Data Collected

The data given by both the director and the production manager of PT. XYZ while the researcher conduct an observation on field on August until September 2022.

| | Data | Price | Unit | Desc. |
|---|---|---|---|---|
| Fixed Cost | **Land Rental Fee** (*Biaya Sewa*) | Rp 43.187.500 | Annual | *4000m2 Land Rental* |
| | **Building Costs** (*Biaya Pembuatan Bangunan)* | Rp 1.422.412.779 | One Time | *Initial Building Cost for 10 Years* |
| | **Taxes** (Pajak) | Rp 7.292.714 | Annual | *Manufacturer Taxes* |
| Variable Cost | **Slat/Strip Direct Material Cost** | Rp 67 | unit | *1/12 from 30cm bamboo* |
| | **Panel Direct Material Cost** | Rp 57.020 | unit | *7 pieces of Bamboo 180cm* |
| | **Direct Labor Fee** | Rp 90.000 | Daily | *Production labor fee* |
| | **3 Pass Electricity Fee (Machine)** | Rp 893.163 | Monthly | *Electricity usage for machine* |
| | **Supporting Material** | Rp 5.432 | Unit | Ijuk and Screw |
| Overhead | **Water Usage Fee** | Rp 200.967 | Monthly | *Daily usage of Water* |
| | **Pantry** (*Coffe, Tea, Sugar, water and gas)* | Rp 1.709.033 | Monthly | *Daily usage of pantry* |
| | **1 Pass Electricity Fee (Daily)** | Rp 422.813 | Monthly | *Daily usage electricity* |

| No | Aktivitas | Labor | Machine | Tools |
|---|---|---|---|---|
| 1 | Ros / Rounded Side | 1 | 1 | |
| 2 | Washing | 2 | | |
| 3 | Holing | 1 | | 1 |
| 4 | Drying | 3 | | |
| 5 | Cutting | 1 | 1 | |
| 6 | Assembly | 6 | 1 | |
| 7 | Cleaning | 2 | 2 | |
| 8 | Baycleaning | 1 | | 1 |
| 9 | Coating | 2 | 2 | |
| Total | | 19 | 7 | 2 |

| No | Aktivitas | Labor | Machine | Tools |
|---|---|---|---|---|
| 1 | Cutting | 1 | 1 | |
| 2 | Slicing | 1 | 1 | |
| 3 | Denoding | 1 | 1 | |
| 4 | Planning | 1 | 1 | |
| 5 | QC 1 (Dimension) | 1 | | 1 |
| 6 | Bleaching | | | 1 |
| 7 | Drying | 1 | | |
| 8 | QC 2 (Moisture) | 1 | | 1 |
| 9 | Warehousing | | | 1 |
| Total | | 7 | 4 | 4 |

| Production | P/Day | Working day | Unit/Month | Labor Working Hour |
|---|---|---|---|---|
| Panel | 78 | 22 | 1716 | 3344 |
| Slat/Strip | 1200 | 22 | 26400 | 1232 |

**Scene on Field**