Preliminary study on cost analysis estimation and production Yield of SMEs convection in Banyumas, Indonesia

Fauzan Romadlon[1],*, Firdayanthi Lestiana[2], Tsalsa Audrey[3] , Putri Rahmania[4] , Putri Nur Faizah[5]

Department of Industrial Engineering, Industrial Engineering and Design Faculty, Institut Teknologi Telkom Purwokerto, Indonesia

Corresponding author E-mail: fauzan@ittelkom-pwt.ac.id

Abstract

This preliminary study aims to compare the production capacity of the convection SMEs in Banyumas. The method used is quantitative, namely the cost estimation analysis and the Analysis of Variance (ANOVA) test, to calculate the statistical significance of production among the three SMEs. Based on the cost estimation analysis calculation, SME C has the highest production cost compared to SMEs A and B. The ANOVA test results significantly differ between the three convection SMEs' production capacity. The production capacity of SME B is higher than SME A and SME C. In practice, SME convection requires increasing production capacity, optimizing marketing strategies, and a product innovation approach to maintain business sustainability.

Keywords: *ANOVA, Cost estimation, Preliminary study, Production, SME convection.*

1. Introduction

Small and Medium Enterprises (SMEs) are one of the backbones of the Indonesian economy. SMEs are spread in almost all corners of the country. In Central Java Province, the number of SMEs registered with the cooperative and MSMEs offices is 15,000, and in Banyumas Regency alone, the number is around 2,712 SMEs (cooperatives office). In the digital era and the Industrial Revolution 4.0, MSMEs face many challenges, including a lower level in the Rate of Investment (RoI) [1]. In addition, the impact felt is very large except for a small number of main resources and channel value propositions, especially for SMEs that have changed their business model based on Industry 4.0 [2]. In addition, some SMEs lack planning, budgeting control, and strategic planning in developing their businesses [3]. Therefore, this study aims to explore a cost management approach to identify and control the costs that arise in SME activities.

The purpose of cost management in SMEs is an essential resource in building a culture of competition and prioritizing priority strategies and capabilities in entrepreneurship-based activities [4]. In addition, several derivatives of cost management are full costing, which is one method that is suitable to be applied in analyzing production costs [5], and standard costing, which is a method that correlates with production costs and net profit margins [6]. Another method is job order costing, which usually differs from the manual calculation of the cost of production [7]. Job order costing shows a higher sales price than factory calculations [8]. Another example is SMEs which use a technology approach in distribution and transportation using the analysis-based costing (ABC) method as one of the calculation methods [9].

Another purpose of cost management is to determine a company's income in terms of its production costs. Cost management has a positive relationship between production costs and the income of an SME [10]. In addition, the development of good cost management will provide relevant and accurate cost information to influence an SME [11] positively. Calculating raw materials and labor costs in an SME activity should be efficient to get a competitive price [12]. The objective is to maintain the production costs that arise affect the company's profits, and the sales achieved will affect the profits earned by SMEs [13]. Production costs are essential in a production process, especially for SMEs [14].

Therefore, researchers focus on SMEs in Banyumas, Central Java, especially convection SMEs. This preliminary study took a sample of convection SMEs to provide a new perspective on preparing production costs. In addition, it is necessary to compare the estimated production capacity of convection SMEs in a year to find differences in production estimates. The sample of their product can be seen in Figure 1.

Fig 1. T-shirt product from a SME in Banyumas
Source: [15]

2. Methods

This research was conducted in three SMEs Convection as Regency, Central Java, Indonesia and used a preliminary survey to the research object. This preliminary survey was used to determine the initial description of the production capacity process of convection SMEs. The approach was a quantitative approach, including measuring the estimated cost of production and comparing production capacity. This quantitative data included raw material cost estimation data per unit, overhead cost estimation data per unit, and salary or wage estimation data per unit. In addition, estimated production capacity data was observed monthly within one year. The method was direct observation and interviews.

Moreover, the calculation for the estimated raw material costs, salary/wages expense estimates, and overhead costs estimates could be seen in Equation 1. In general, the total cost of production could be obtained from the sum of the estimated raw material costs, wage estimates, and estimated overhead costs per production (Equation 2).

$$\text{Estimated Total production cost} = P+Q+R \tag{1}$$

Where,

P = Estimated Cost of Raw Materials

Q = Estimated Expense Salaries/wages of employees.

R = Estimated Overhead Cost

Furthermore, the estimated production cost per unit can be calculated by Equation 2.

$$\text{Estimated production cost per unit} = E/C \tag{2}$$

Where,

E = Estimated total cost of production

C = Quantity or production capacity

In addition, the production capacity data were analyzed using ANOVA (Analysis of Variance) to find out if there are differences in production capacity between convection SMEs using Minitab 19 software.

3. Result and Discussion

3.1. Estimated Production Cost

The manufacturing process in these three MSMEs is the same. First, the screen printing will be designed according to what the customer wants. After the design on the screen printing is complete, then the design will be printed onto the fabric that has been shaped according to the t-shirt pattern. The printed pattern is then heated so that the paint on the shirt dries quickly. After that, the shirt goes into the maturation process. The maturation process is a process to make the screen printing on the shirt not rough. After the screen-printing process is completed, the next step is to sew the t-shirt pattern so that it becomes a t-shirt that is ready to sell. The calculation of the estimated production costs of the three convection SMEs is shown in Table 1.

Table 1. Estimated Convection Production Cost of the three SMEs

Fee Type	SMEs A	SMEs B	SMEs C
Raw Material (IDR)	4,000,000	4,600,000	4,075,000
Labor (IDR)	9,000,000	11,000,000	7,000,000
Overhead (IDR)	700,000	3,400,000	675,000
COGS per unit (IDR)	56,000	38,000	69,118

Based on the information from Table 1, it is calculated that SME C has a higher estimated cost of production per unit than SMEs A and B (IDR 69,118). Furthermore, the COGS of SME A is higher than that of SME B (IDR 56,000), and SME B has the lowest cost of IDR 38,000. The ANOVA calculation based on Table 2 shows that the p-value is less than 0.05 and it shows a significant difference between the estimated production capacity of the three SMEs (Table 3).

Table 2. Estimated production for a year

Period (month)	SMEs A	SMEs B	SMEs C
1	100	480	170
2	80	460	165
3	75	450	160
4	90	460	175
5	270	1,000	350
6	300	1,500	420
7	120	500	160
8	150	600	180
9	175	555	190
10	100	475	175
11	115	490	165
12	90	480	170

Table 3. ANOVA test result

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	2	1634204	817102	21.83	0.000
Error	33	1235465	37438		
Total	35	2869669			

The results of the ANOVA test are then further elaborated to produce an interval plot, as shown in Figure 2. The results of the interval plot show that SME B has the highest production capacity compared to SME A and SME C. Meanwhile, SME C is more elevated than SME A.
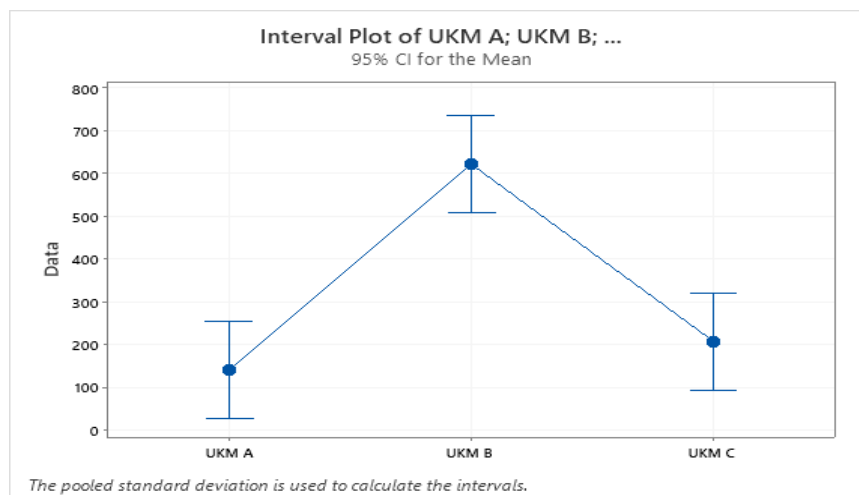
Fig 2. Interval Plot calculation results ANOVA

3.2. Calculation implications for convection SMEs

This research is a preliminary study mapping the condition of convection SMEs in Banyumas. The experimental conditions include the business processes of convection SMEs, estimated production costs, and production comparisons between convection SMEs. These three criteria are considered to define the initial requirements of convection SMEs and their sales strategies.

The production process of convection SMEs starts from suppliers of raw materials such as cloth, yarn, etc. Convection SMEs then produce clothing based on customer requests. Based on the calculation of the cost of production, the three SMEs have varied unit costs. Meanwhile, based on demand or orders, SME B, with lower production costs per unit, has higher demand than the others, followed by SME C (with the highest production cost) and SME A. This is probably due to the different strategy marketing. In addition, there is an anomaly: in certain months, the demand is high, and demand decreases at the end of the year.

Meanwhile, in SME C, the market tends to be stable because the orders are fixed. This will vary the number of orders during the pandemic. In this pandemic period, SMEs should consider online or e-commerce strategies to maintain business continuity [16]. One alternative solution to the problems of small SMEs in the marketing sector is the lack of financial access [17]. In addition, SMEs also need an innovation in the distribution chain that gives significance to distribution efficiency so that it can improve overall performance [18].

Based on these calculations, SMEs need to increase productivity to increase revenue. SME productivity can be applied with various sales strategies. In addition, some of the obstacles faced by SMEs are aspects of the culture they have built, the market environment, and the influence of the presence of multinational companies in a country [19]. Therefore, the government's role is needed in overcoming several SME problems such as ease of access to credit, providing counseling related to suitable marketing strategies, innovation, increasing productivity, and understanding the business vision of an SME, especially convection SMEs [20]. Ease of access to credit can be done by providing soft loans. Marketing strategy counseling can be done through cooperative service. At the same time, innovation can be done by bringing universities closer to SMEs so that they are able to offer solutions that are collaborative and structured. In addition, the increase in SME productivity can be seen from an SME's ability to develop the research and development side so that it can excel and compete with competitors. Lastly, the business vision can also be assisted by mapping the business concepts and business processes of an SME so that they are able to maintain the sustainability of a business.

4. Conclusion

This research is a preliminary study to determine how convection SMEs manage a business. Researchers took convection products as a sample because these SMEs are rarely found in Banyumas Regency. Based on the calculation of the cost estimation analysis and unit cost or COGS, SME B has the most negligible unit cost compared to the others. The three convection SMEs have significant differences in their monthly production scale based on statistical measures. The highest production capacity is SME B, followed by SME C and finally, SME A. Suggestions that can be given to convection SMEs are to increase their production capacity by optimizing their marketing strategy. Further research can measure whether there is a correlation between productivity and marketing strategy so that it impacts the continuation of an SME-based convection business.

Acknowledgment

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