

Effective Operational Management for Traditional Clothes Industries in Special Region of Yogyakarta Province

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Abstract. The study aims to analyse the effects of Financial Capital, labor, raw materials, technology, competition from other companies, employee loyalty on the production of Javanese production traditional clothing industry in the Special Region of Yogyakarta Province. Quantitative research methods with 400 respondents have been collected to answer the research aim. The sampling design uses simple random sampling which spread into 5 regencies and city. Questionnaire has been utilized with 4 Likert scale. The dependent variable is production and independent variables are Financial Capital, human capital, input, technology, competitors and loyalty. Most of the traditional clothes industries has between 11-20 years of business (38.5%) and consists of type for traditional industries such as batik (85.8%); *blangkon*/traditional hat (11.5%); *kebaya* (2.0%) and *surjan* (0.8%). It has been validated (Rms >0.098) and reliable (Cronbach alpha=0.806). The analysis technique uses ordinary least squares with adj. R² is 51.6%. Based on the analysis, Financial Capital (2.891*); human capital (2.155*); input (4.272**); technology (5.258**); competitors (-3.485**); and loyalty (11.356**).

Keywords: operational management, traditional clothes, production.

1 Introduction

Effective operational management is vital for the traditional clothing industry to stay competitive in an ever-evolving market landscape. This industry faces unique challenges due to the intricacies of production processes, diverse product lines, and a reliance on skilled craftsmanship. To address these challenges, integrating advanced inventory management systems and leveraging technology to gain real-time visibility into stock levels, demand patterns, and sales performance is essential. These systems enable informed decision-making regarding purchasing, allocation, and replenishment, minimizing risks such as overstocking or stockouts, ultimately enhancing overall efficiency [1][2].

Sustainability has become a significant priority in the fashion industry, with consumers increasingly demanding environmentally responsible products. Traditional clothing businesses must adopt sustainable practices, including lean manufacturing principles, optimized supply

chain processes, and the use of eco-friendly materials. Companies like Zara have successfully implemented just-in-time manufacturing and vertical integration, allowing them to swiftly respond to market changes and reduce their environmental footprint [3][4]. Emphasizing sustainability not only meets consumer expectations but also contributes to long-term operational efficiency. Supply chain management is another critical component of effective operational management in the traditional clothing industry. Adopting a mix of push, pull, and push-pull strategies allows businesses to balance production with market demand effectively. Accurate demand forecasting and flexible production schedules ensure timely product delivery while avoiding the pitfalls of overproduction or underproduction. The integration of digital tools and data analytics further enhances these capabilities, enabling businesses to remain agile and responsive to market trends [5][6].

The traditional clothing industry must evolve by adopting comprehensive operational management strategies that leverage technology, promote sustainability, and optimize supply chains. These strategies improve productivity, reduce costs, and meet changing consumer demands. Embracing these practices ensures competitiveness in the modern market and paves the way for sustainable growth and innovation [7][8]. By staying ahead of technological advancements and prioritizing sustainability, traditional clothing businesses can thrive in an increasingly dynamic and demanding environment.

Production theory describes the relationship between maximum production output and input with certain technology. Production is the activity to merge the production factors to increase the utility [9]. Managers find it crucial to break down the organizational lifecycle into several stages in order to clarify the pattern, features, difficulties, and problems associated with each stage. Small and medium-sized enterprises (SMEs) have a different organizational lifecycle compared to larger organizations. The limited resources of SMEs impede their progress from one stage to the next. Small and medium-sized enterprises (SMEs) are often linked to a high likelihood of initial failure, with over 50% of newly established businesses ceasing operations within a five-year period. Similar to other types of enterprises, small and medium-sized enterprises (SMEs) encounter several internal and external challenges during their growth, which managers must address before progressing to the next phase [10]. Loyalty is affected by two types of sources: internal sources, such as competence, professionalism, and disciplinary behaviour that demonstrates compliance, and external ones, such as career development policies, organizational culture, and work environment. The internal element represents the calibre of the workforce, whereas the external factor pertains to the company's managerial policies in resource management. Therefore, these elements can be enhanced by strategic initiatives aimed at fostering enduring ties between employees and the organization [11].

Indonesia has successfully transformed its locally produced traditional fabrics into industrial products with great promise. Traditional textile production is a kind of artistic expression and cultural heritage that is prevalent in several regions of Indonesia. This product is handcrafted on a loom. The preservation and development of this ancestral heritage is crucial as it serves as a valuable aspect of the nation's culture. Traditional fabrics are textiles that are closely linked to the customs and culture of a certain region. They are created using traditional methods and techniques, with the aim of preserving and promoting local heritage. Currently, a wide range of traditional fabrics have been integrated into the economic operations of the community. The manufacture of traditional fabrics serves not only cultural but also industrial

objectives, contributing to their economic value. Batik, a traditional Indonesian fabric, has undergone industrial development [12][13]. The transformation of traditional fabrics into industrial products has broadened the scope of significance, principles, and objectives of traditional fabric manufacturing [14].

Industry of traditional clothes in Yogyakarta province, which is recognized as the culture city, have many benefits and challenges. The production level effected from internal and external factors. However, research to elaborate internal and external factors on production focussing on traditional clothes industry as the novelty of this study.

2 Research Objective

The resaeach has an aim as to analyse the effects of Financial Capital, labor, raw materials, technology, competition from other companies, employee loyalty on the production of Javanesse production traditional clothing industry in the Special Region od Yofgyakarta Province.

3 Research Methodology

The research object of this study is all traditional clothes industries in Special Yogyakarta Province. The researrch subjects is owner of the traditional clothes industries which distributed into 5 regencies/city. Data is acquired through questionnaire distributed to each respondents, as the industries' owners. The study is based on primary data with quantitative research methods which focussed in the total production, Financial Capital, human capital, input, technology, competitors and loyalty of the employee. Based on the Yogyakarta Province's statistical bureau, the total number of traditional clothes in Special Yogyakarta province is 1202 industries. Based on slovin sampling measurement, the sample size is 399.6 or equal to 400.

The data collection is utilize simple random sampling. The dependent variable is production and independent variables Financial Capital, human capital, input, technology, competitors, and loyalty of employee. The variable is measured with likert scale which consists of 4 scale, namely strongly agree, agree, disagree, strongly disagree. To answer the research aim, the study use Ordinary Least Square or Multiple Regression Statistics (MRS) analysis. To test the quality of data, validity, reliability and classical assumption test are carried out before the MRS analysis. The validity test is carried out through correlations product moment from the interval data scale. Reliability test analysed with Cronbach alpha test, which it could be reliable when the Cronbach alpha result is more than 0.60. The classical assumption test which consists of normality test, heteroscedasticity and multicollinearity are needed to be passed as the main assumption of the data qualtiy before analyse through MRS. The statistic analysis for the regression is carried out by the t-test (significancy test of individual parameter), F-test (coeficient test for simultaneously significancy) and R^2 test (determination coefficient).

$$Y = \alpha + \beta_1 \cdot \text{Cap} + \beta_2 \cdot \text{HC} + \beta_3 \cdot \text{Input} + \beta_4 \cdot \text{Tech} + \beta_5 \cdot \text{Compt} + \beta_6 \cdot \text{Loyalty} + e$$

Assumption:

Y is production; Cap is Financial Capital; HC is Human Capital; Input is Input; Tech is Technology; Compt is Competitors; Loyalty is Loyalty of the Employee

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ is the coefficient of the regression

e is the error term

The hypothesis for this study is described as follows:

H₁ = There is a positive significantly between Financial Capital and production on traditional clothes industries in Special Region Yogyakarta Province

H₂ = There is a positive significantly between human capital and production on traditional clothes industries in Special Region Yogyakarta Province

H₃ = There is a positive significantly between input and production on traditional clothes industries in Special Region Yogyakarta Province

H₄ = There is a positive significantly between technology and production on traditional clothes industries in Special Region Yogyakarta Province

H₅ = There is a positive significantly between competitors and production on traditional clothes industries in Special Region Yogyakarta Province

H₆ = There is a positive significantly between loyalty of employee and production on traditional clothes industries in Special Region Yogyakarta Province

4 Result and Discussion

The unit analysis in this research is the traditional clothes industry that produces traditional clothing of Yogyakarta namely *batik*, *Surjan*, *kebaya* and so on. The age of the owner is between 41 to 50 years old (38.0%) and more than 50 years old (25.8%) and 65.3% of the respondents are female. High school (76.8%) is mostly the educational background for the owners of traditional clothes industries. It is barrier of industries based on the education quality to increase the production and developed the industry. Batik is the largest number (85.8%) for traditional clothes industries. The length of business in between 11-20 years (38.5%) and 6-10 years (29.0%). If it is measured, the business has been suffered Covid 19 and still stood up until recent years.

Table 1. Frequency analysis of the owner of traditional clothes industries in Special Region Yogyakarta Province

| Age | N (percentage) |
|--------------------------------|----------------|
| 20-30 years old | 52 (13.0) |
| 31-40 years old | 93 (23.3) |
| 41-50 years old | 152 (38.0) |
| >50 years old | 103 (25.8) |
| Gender | |
| Male | 139 (34.8) |
| Female | 261 (65.3) |
| Education | |
| No education | 4 (1.0) |
| Primary schools | 20 (5.0) |
| Junior high school | 62 (15.5) |
| High School | 307 (76.8) |
| Diploma/Undergraduate and more | 7 (1.8) |

| Length of the business | |
|------------------------------|------------|
| <5 years | 109 (27.3) |
| 6-10 years | 116 (29.0) |
| 11-20 years | 154 (38.5) |
| >21 years | 21 (5.3) |
| Industries type | |
| Surjan – traditional T-shirt | 3 (0.8) |
| Kebaya – traditional clothes | 8 (2.0) |
| Blangkon – traditional hat | 46 (11.5) |
| Batik | 343 (85.8) |

Before the analysis of MRS, the quality data needed to be carried out by validity, reliability and classical assumption test. The questionnaire and data are validated and reliable based on the analysis. The R table based on the significance level 5% with sample size as 400, it found the 0.098. Based on the measurements, the correlation product moments as the R measurement have been found more than R table (> 0.098). It could indicate that the questionnaire is valid to be analyzed in further analysis. The reliability test defined that all variables are reliable in the level of medium and high. In conclusion, all the indicators and variables are valid and reliable to be assessed in further analysis using MRS.

Table 2. Reliability test of Item Research Variables

| Variables | <i>Cronbach's Alpha</i> | Test Result |
|--------------------------|-------------------------|-------------|
| Financial Capital (X1) | 0,653 | Reliable |
| Human Capital (X2) | 0,620 | Reliable |
| Inputs (X3) | 0,670 | Reliable |
| Technology (X4) | 0,681 | Reliable |
| Competitors (X5) | 0,745 | Reliable |
| Loyalty of Employee (X6) | 0,660 | Reliable |
| Production unit (Y) | 0,806 | Reliable |

Based on classical assumption test, the normality test, heteroscedasticity and multicollinearity are passed (see Table 3). The normality significance level needs to be more than 0.05, and the test result appears as 0.061. It means that the data has been distributed normally and the analysis could determine using parametric test, or MRS as include to be parametric analysis. Based on heteroscedasticity, the sig. level is more than the standard value (> 0.05), means there is no heteroscedasticity problems on the data. To summarize, there are no discrepancies in the variability or correlation of scattering among at least one independent variable in a specific sample. Based on multicollinearity assumption test, the VIF is less than 10.0 which means that there are no multicollinearity cases in the variables. Multicollinearity can result in inaccurate assumptions regarding an investment in technical analysis. It typically transpires because of the utilization of numerous indicators of the same type to evaluate the variables.

Table 3. Classics Assumptions Test for Variables

| Variables | Sig | Standard value | |
|---------------------------|------------------|----------------|-----------------------|
| Normality Test | | | |
| Unstandard Residual | 0,061 | >0,05 | Normal distributed |
| Heteroscedasticity | | | |
| Financial Capital (X1) | 0,984 | >0,05 | No Heteroscedasticity |
| Human Capital (X2) | 0,889 | >0,05 | No Heteroscedasticity |
| Input (X3) | 0,110 | >0,05 | No Heteroscedasticity |
| Technology (X4) | 0,647 | >0,05 | No Heteroscedasticity |
| Competitors (X5) | 0,928 | >0,05 | No Heteroscedasticity |
| Loyalty Employee (X6) | 0,810 | >0,05 | No Heteroscedasticity |
| Multicollinearity | | | |
| | Tolerance | VIF | |
| Financial Capital (X1) | 0,704 | 1,421 | No Multicollinearity |
| Human Capital (X2) | 0,711 | 1,406 | No Multicollinearity |
| Input (X3) | 0,845 | 1,184 | No Multicollinearity |
| Technology (X4) | 0,778 | 1,286 | No Multicollinearity |
| Competitors (X5) | 0,979 | 1,021 | No Multicollinearity |
| Loyalty Employee (X6) | 0,765 | 1,307 | No Multicollinearity |

The measurement quality of the data has been carried out and the result of the data are clarified to be in further analysis for MRS. Through the analysis of MRS, the independent variables are significantly affected by dependent variable (Table 4). Financial capital, human capital and competitors are significant at level 5%, in the other hand, input, technology and the loyalty of employees are significant in level to 1%.

Table 4. The Result of Multiple Regression Statistics

| Variables | t measurement | Sig t | |
|--------------------------|---------------|-------|-----------------------------|
| (Constant) | | | |
| Financial Capital (X1) | 2,891 | 0,004 | *) Significant in level 5% |
| Human Capital (X2) | 2,155 | 0,032 | *) Significant in level 5% |
| Input (X3) | 4,272 | 0,000 | **) Significant in level 1% |
| Technology (X4) | 5,258 | 0,000 | **) Significant in level 1% |
| Competitors (X5) | -3,485 | 0,001 | *) Significant in level 5% |
| Loyalty of Employee (X6) | 11,356 | 0,000 | **) Significant in level 1% |

H₁ = There is a positive significantly between Financial Capital and production on traditional clothes industries in Special Region Yogyakarta Province

Financial capital has positive significant to the production on traditional clothes industries (2.891*), means that to increasing the production on traditional clothes industries need to increase the financial capital. The results of the capital structure had a positive and significant effect on firm value, as determined by Hoque et al [15] and Handriani & Robiyanto [16]. The company's success in utilizing debt to expand its business and receiving a favourable response from investors demonstrates a positive effect. Investors are attracted to companies that exhibit consistent growth and increase stock demand, which in turn elevates share prices. An increased stock price suggests that the firm's value is increasing. Signal theory demonstrates that capital structure has a beneficial impact on firm value [17]. The findings of this study align with Cobb Douglas's theory, which posits that the level of capital has a direct impact on industrial output. Furthermore, according to Riza Fachrizal [18], capital has a substantial impact on the value of output.

H₂ = There is a positive significantly between human capital and production on traditional clothes industries in Special Region Yogyakarta Province

Innovation persistence is dependent on human capital, which is the skills, knowledge, and ability that are essential for enterprise development. This is because the learning process is the primary factor driving innovation persistence. The innovation process necessitates continuous input since the accumulation of new knowledge is not continuous [19]. The hypothesis positive significant between human capital and production on traditional of clothes industries is accepted (2.155*)

H₃ = There is a positive significantly effected between input and production on traditional clothes industries in Special Region Yogyakarta Province

Inputs has significant positive effect between input and production on traditional clothes industries in Special Region Yogyakarta Province (4.272**). In the production theory, production is influenced by a variety of factors, including capital, labor, basic materials, and the technology employed. In addition to validating Cobb Doughlas's production theory, this study's findings align with previous research on production, such as Prianata's [20] study, which demonstrates that raw materials have a positive and significant impact on the Furniture industry's production in the City of Denpasar. Akbar [21] has asserted that raw materials have an impact on production.

H₄ = There is a positive significantly between technology and production on traditional clothes industries in Special Region Yogyakarta Province

Technology has a significant positive effect to production on the traditional clothes industries in Special Region Yogyakarta Province (5.258**). The same as previous research, technology and human capital are crucial determinants of economic growth, alongside production elements such as financial capital and labor. Human capital and technology are intangible assets that significantly impact output [22]. Therefore, this hypothesis is significantly accepted.

H₅ = There is a positive significantly between competitors and production on traditional clothes industries in Special Region Yogyakarta Province

Competitors has significant negative effected to production on traditional clothes industries in Special Region Yogyakarta Province [-3.485*]. According to Nalebuff and Stiglitz [23], markets with less competition allow for the existence of management slack. In what manner does this managerial laxity manifest itself? It is possible that this occurs as direct wastage, such as in the ready-mix concrete industry, when solidified concrete accumulates inside a drum, which is expensive to remove. Alternatively, in more competitive markets, the decrease in productive labour hours may result in a reduction of management slack, leading to the dismissal of unproductive (but not nonproductive) employees. According to the findings presented here, it seems that this organizational emphasis is the appropriate path to pursue further study on the correlation between competitiveness and production. In conclusion, competitors bring less production since the sales size is decreasing. Therefore, the hypothesis is rejected.

H₆ = There is a positive significantly between loyalty of employee and production on traditional clothes industries in Special Region Yogyakarta Province

Loyalty employee is significant positive effect to production of traditional clothes industries in Special Region of Yogyakarta Province [11.356**]. The company's environment has encountered fierce competition and rapid advancements in technology, both locally and globally. As a result, ensuring high performance and fostering customer loyalty has become a paramount concern for most firms [24].

Table 5. R squared/Determination coefficient adjusted result

| Model | R Square | Adjusted R Square | Durbin-Watson |
|-------|----------|-------------------|---------------|
| 1 | 0,523 | 0,516 | 1,924 |

Table 5 presents the results of the R-squared (coefficient of determination) and adjusted R-squared for the regression model used to analyze the factors affecting production in the traditional clothes industries in the Special Region of Yogyakarta Province. Additionally, the Durbin-Watson statistic is provided to assess the presence of autocorrelation in the residuals. This value of R squares indicates that approximately 52.3% of the variance in the production of traditional clothes industries is explained by the independent variables included in the model. It reflects the proportion of variability in the dependent variable that can be accounted for by the model. The adjusted R-squared is slightly lower than the R-squared, at 51.6%. This metric adjusts the R-squared value for the number of predictors in the model, providing a more accurate measure of the model's explanatory power, especially when multiple predictors are involved. It accounts for the possibility of overfitting by penalizing the addition of unnecessary variables.

The Durbin-Watson statistic is used to detect the presence of autocorrelation (a relationship between the values of the residuals) in the regression residuals. The value of 1.924 is close to 2, indicating that there is no significant autocorrelation in the residuals. Values close to 2 suggest that the residuals are not correlated, which is a desirable property for the validity of the regression model. The model demonstrates a moderate level of explanatory power, with just over half of the variation in production explained by the variables included. The adjusted R-squared suggests that the model is appropriately specified with relevant predictors, as it does not decrease significantly from the R-squared value. The Durbin-Watson statistic indicates that the residuals do not exhibit significant autocorrelation, supporting the reliability of the

regression results. Overall, the findings from Table 5 suggest that the independent variables in the model provide a reasonably good explanation for the variation in production in the traditional clothes industries, and the model does not suffer from significant issues of residual autocorrelation.

5 Conclusion

In the study examining the traditional clothes industries in the Special Region of Yogyakarta Province, several hypotheses were tested to determine the factors influencing production. There is a significant positive relationship between financial capital and production in the traditional clothes industry. Increasing financial capital directly boosts production, aligning with the capital structure theories and Cobb-Douglas's theory of industrial output. Human capital, encompassing skills, knowledge, and abilities, significantly enhances production. The learning process and continuous input are crucial for innovation, thereby validating the positive relationship between human capital and production. The study confirms a significant positive impact of various inputs—capital, labor, raw materials, and technology—on production. This supports the production theory and previous research, such as the studies by Prianata and Akbar on the impact of raw materials on industrial output. Technology significantly enhances production in the traditional clothes industry. This finding is consistent with previous research highlighting the critical role of technology and human capital in economic growth and output. Contrary to the previous hypotheses, the study finds a significant negative effect of competitors on production. Increased competition reduces production by decreasing sales size and introducing managerial slack, which aligns with the theories of Nalebuff and Stiglitz. Employee loyalty significantly positively impacts production. High employee loyalty contributes to better performance and customer loyalty, essential in a competitive and technologically advancing environment. In summary, the study concludes that financial capital, human capital, inputs, technology, and employee loyalty positively influence production in Yogyakarta's traditional clothes industry. In contrast, increased competition negatively impacts production.

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