

## Financial Feasibility of Modification Workshop Case Studies: Be-Modified

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### ABSTRACT

The purpose of this study is to determine the location of the custom workshop business using the criteria of NPV, IRR, PBP, PI and B/C. This research method uses a field research model with the right procedure to use the net present value method, internal rate of return, payback period, profitability index and benefit cost ratio to determine the custom workshop business. The results of the criteria obtained are that NPV>0, IRR is 29.4%, PBP is 2.75 years, PI is 1.1.48 and B/C is 1.1. This level of achievement uses the world every day, there must be activities in the custom workshop to achieve the criteria. The criterion that becomes the dominant factor is the occurrence of an increase in the profitability index. This is a criterion that states there is an increase in the benefits of the specified investment value. What causes an increase in benefits is that assets and production facilities can experience functions that are more suitable for the way they are used.

## 1. INTRODUCTION

The business feasibility study is a conversation that deserves to be reviewed in more depth in the current era. The business feasibility study has concrete objectives, with the following: 1) profit as a measure of increasing profits; 2) business growth as a growth step from year to year as evidence of an increase from the previous year; and 3) increasing market share as a step to increase market share to compete with competitors. Business feasibility studies have an organized pace with achieving the targets and goals that have been planned. A business feasibility study determines that a business can reduce the risk of loss, prepare a planning model properly, plan work activities, facilitate control and monitoring activities. The components that become business feasibility studies play an important role covering aspects: market, financial, management, human resources, engineering and operations, business planning, environmental, legal, economic and social. Of these ten aspects, the discussion is the financial aspect.

The financial aspect deeply discusses business feasibility with the parameter used including: net present value, internal rate of return, payback period and profitability index. These four aspects, become parameters of the success of a business can stand decently and sustainably. According to Pradana et al. [1], assess business feasibility studies with financial aspects with proof that they are feasible. This feasibility is with evidence of a future value higher than the initial investment value, the rate of return is more than the set interest rate, the return on investment period is faster than planning and the value of the business development benefits is greater than the investment used. The role of financial aspects to strengthen in determining business feasibility studies. The case we used in this study was a custom workshop. The custom workshop

has activities about motor vehicle modification with a focus on spare parts modification. This custom workshop is located on Jl. Ir. Sutami, Sebelas Maret University area, Indonesia. Custom workshops are very prevalent in the area, causing this service to be in great demand, especially for actors who have hobbies or professions related to motor vehicle custom. The growth of vehicle customs is directly proportional to motorcycle events so that the demand for vehicle custom services is increasing. Vehicle custom services are a great opportunity, where it is necessary to know the feasibility side of the ongoing business. The obstacle that has been occurring in the custom workshop is that there is no known value of the increase in benefits based on the investment that has been used.

Daily custom workshop activities can reach a profit of more than 20% of the tariff set by the owner. Therefore, the great opportunity in establishing a custom workshop is an interesting topic to discuss. On the other hand, custom workshop service providers are not balanced with the level of needs of very enthusiastic customers. This problem requires an in-depth study of the financial aspect by determining the value of business feasibility using net present value, internal rate of return, payback period and profitability index [2-4]. The value of the investment has an influence on how much the price of the asset will be used for production. Assets require a depreciation assessment to determine depreciation costs at the facility. The greater the number of assets used, the greater the depreciation and investment value that must be budgeted [5]. Cash inflow is the gross receipt value of the proceeds from the sale of products. Cash inflow valuations can be recapitulated per month, as well as per year. Cash inflows will indirectly experience inflation. One of the causes of inflation is that the user needs in each period are not the same [5]. Cash out is all costs related to asset maintenance, experts, production materials, freelance labor and supporting costs in the process

of accumulating cash out. Earning before tax serves to find out the cash value before being charged interest. The calculation uses the value of reducing cash inflows with cash out and minus depreciation. Tax is the value of the tax that needs to be paid to the government. This tax every business is different, as it is adapted to the conditions of the business itself. Tax value in terms of research [6], is 10% per annum. Earning after tax serves to determine the value of income after the value of earning before tax is reduced by Tax. This value component will form Net Cash Flow with earnings after tax value plus depreciation. Of all the components of the value will be used to form the calculation of the financial analysis. The calculation of financial value will refer to the criteria of Net Present Value (NPV), IRR (Internal Rate of Return), PBP (Pay Back Period) and PI (Profitability Index).

NPV assesses that cash flow in the future profit must be greater than the capital that has been used, IRR assesses the percentage of expected profit, PBP assesses the time of the capital turning point and PI assesses that the benefit ratio must be greater than capital and B/C i.e. assesses the benefits must be greater than the value of the investment. These criteria are used in assessing the financial feasibility of a business [7]. Business feasibility study as a form of opportunity analysis and providing anticipation of risks to running or stopping business [8]. Achievements in business feasibility are financial management decisions that are in control of the business owner himself [9]. The scope of business feasibility discussed is the financial aspect [10]. According to Gamma et al. [11], states that any form of business requires a financial assessment, in order to find out the picture of the business being carried out in the future period. Preliminary findings with evidence that the role of feasibility studies largely determines the sustainability of an ongoing business [2, 12-15]. On the other hand, a business feasibility study by applying the financial aspect. This means that it is a challenge for the sustainability of custom workshops in increasing the role of business feasibility that runs.

Findings [16], states that the sustainability of the business feasibility study as evidence of interest in building a more dynamic business with financial aspects. Financial analysis plays an important role in proving how much the feasibility value of an ongoing business is. This finding states that in making motor vehicle investments, it produces a financial aspect value that is in accordance with the provisions with the NPV value of >0, IRR > MARR, PP less than the planning target. From these findings, it can be used as evidence that financial interests can support fundamentally the business being run. Therefore, in this study, it aims to assess business feasibility with the financial aspects of custom workshops by reviewing the parameters of net present value, internal rate of return, payback period, profitability index and benefit cost ratio.

## 2. MATERIAL AND METHODS

### 2.1 Financial viability

The evaluation of dominant financial aspects from NPV, IRR, PBP and PI [17]. Investing activities also need a knowledge to know the risks related to feasibility in establishing a business [18]. The stage of finding competing ideas provides advantages and adequate supporting resource [19]. The next step is an evaluation of finances [20]. The purpose of financial aspects is for financial analysis activities,

cost needs analysis, profit and loss projections, balance sheet projections and, facility planning.

### 2.2 Demand forecasting

Demand forecasting is based on the time when the data is used in demand forecasting materials referring to data in the past. Types of forecasting are, Short-term forecasting with data duration of less than 3 months, medium-term forecasting with data duration of 3 to 18 months, and long-term forecasting with data duration of more than 18 months. Forecasting aims to estimate the future product demand. Data in the past is used in the form of mathematical models for this basis [21]. Forecasting demand uses linear trend regression analysis method. The modeling method of forecasting linear regression trends is  $Y=a+bx$ .

The design of this study is with a field research model by collaborating the net present value method, internal rate of return, payback period, profitability index and benefit cost ratio to determine the feasibility of the custom workshop business. The selection of field research models because it has advantages with strong evidence of field data processed with in-depth theoretical studies. The selection of this research model with the aim of finding new things in the strategy of increasing business feasibility in a sustainable manner.

This study used primary data using observation methods. The observations made were made by visiting the custome workshop with observations of activities and recaps of fixed cost data needed to cover business assets. These business assets are business locations and tools for custom spare parts activities. The next data is variable data on the sale of spare parts, wifi networks, workers' wages, electricity and water needs. The data of this study with a period of 12 months for the verification and validation process. The collected research data is used for data analysis techniques with the following stages:

(a) Depreciation Expenses uses the straight-line method and the formula is:

$$\text{Depreciation} = \frac{\text{"Acquisition price – Residual value"}}{\text{"Economic age"}} \quad (1)$$

(b) Demand Forecasting uses the linear regression trend formulas, they are:

$$a = \frac{\sum Y_i}{n} \quad (2)$$

$$b = \frac{\sum X_i Y_i}{\sum X_i^2} \quad (3)$$

After the values a and b are calculated, the linear trend values is:

$$Y=a+bX \quad (4)$$

where,  $Y$ =trend value;  $a$ =intercept i.e. the value of  $Y$ , if the value  $X=0$ ;  $b$ =the slope of trend line, i.e. the change of variable  $Y$  for each change of one unit in variable  $X$ ;  $X$ =time period.

(c) The creation of Cash Flow uses following stages [22] below:

$$\text{Earning Before Tax} = (\text{Cash In} - \text{Cash Out}) - \text{Depreciation} \quad (5)$$

$$\text{Earning After Tax} = \text{Earning Before Tax} - \text{Tax} \quad (6)$$

$$\text{Net Cash Flow} = \text{Earnings After Tax} - \text{Depreciation} \quad (7)$$

(d) Benefit Cost Ratio uses formula [23] below:

$$B/C = \frac{B}{TC} \quad (8)$$

where,  $B$ =Total Income (total cash flow benefit);  $TC$ =Total Cost of Production (total cash flow cost).

(e) Net Present Value (NPV) uses the formula [22]:

$$NPV = \left( \frac{C_1}{(1+r)^1} \right) + \left( \frac{C_2}{(1+r)^2} \right) + \dots + \left( \frac{C_t}{(1+r)^t} \right) - C_0 \quad (9)$$

where, NPV=Net Present Value;  $C_t$ =cash flow for every period of  $-t$ ;  $C_0$ =initial investment in 0 year;  $r$ =interest rate (6%).

(f) Payback Period (PP) uses the formula [24] below:

$$\text{Payback Period (PP)} = n + \frac{a-b}{c-b} \times 1 \text{ year} \quad (10)$$

where,  $n$ =returning condition year;  $a$ =total amount of initial investment;  $b$ =total amount of cash flow investment in the  $n$ -th year;  $c$ =cumulative amount of cash flow in the  $n+1$  year.

(g) Internal Rate of Return (IRR) uses the formula [25] below:

$$IRR = i_1 + \frac{NPV_1}{NPV_1 - NPV_2} \times (i_2 - i_1) \quad (11)$$

where, IRR=Internal Rate of Return (IRR);  $i_1$ =discount rate<sub>1</sub> (10%);  $i_2$ =discount rate<sub>2</sub> (18%);  $NPV_1$ =NPV at interest rates  $i_1$ ;  $NPV_2$ =NPV at interest rates  $i_2$ .

(h) Profitability Index (PI) uses the formula [26] below:

$$\text{Profitability Index} = \frac{\text{Proceeds}}{\text{Outlays}} \quad (12)$$

where, Proceeds=current net cash value for the upcoming; Outlays=current investment value.

### 3. RESULTS AND DISCUSSION

The results of this study used data with fixed cost types and variable costs. Fixed costs are always used with a constant and dominant budget. Variable costs indicate the costs which are needed in supporting the operational process. The needs and processes of business during the first year related to the fixed costs and variable costs are as follows:

**Table 1.** Fixed cost recapitulation

Fixed cost	
Details	Values (Rp)
Location	43.000.000
tools	33.650.000
Sum	76.650.000

(Source: data processing, 2021)

Table 1 showed that the fixed cost which is required by the garage owner is Rp. 76,650,000. This fee consists of Rp. 43,000,000 for location fee and Rp. 33,650,000 for equipment costs.

Table 2 showed that the variable cost which is required by the garage owner is Rp. 26,525,000. This fee consists of Rp. 18,125,000 for spare parts costs, Rp. 7,500,000 for labor workers, Rp. 500,000 for Wi-Fi connections and electricity, and Rp. 400,000 for water. The initial cost in establishing a garage business is by reviewing the fixed costs and variable costs.

Table 3 showed the investment costs needed by the owner of costume garage are Rp. 103,175,000. This fee is an individual fee, it is not part from lending to a bank. The value of investments is to support the ongoing business processes. The initial stage for the research process is to calculate the depreciation value in the applied asset. The scope of depreciation covers the equipment which is used in garage operations.

**Table 2.** Variable cost recapitulation

Variable cost	
Details	Value (Rp)
Spare Parts Sales	18.125.000
Workers	7.500.000
Wi-Fi	500.000
Electricity and Water	400.000
Sum	26.525.000

(Source: data processing, 2021)

**Table 3.** Investment costs

Type of Cost	Value (Rp)
Fixed cost	76.650.000
Variable cost	26.525.000
Sum	103.175.000

(Source: data processing, 2021)

**Table 4.** Depreciation

Details	Purchase Price (Rp)	Economic Age (years)
Tools	16.000.000	5
Sum	16.000.000	5
Residual Value (Rp)	Depreciation per month (Rp)	Value per year (Rp)
300.000	240.000	2.880.000
300.000	240.000	2.880.000

(Source: data processing, 2021)

**Table 5.** Gross receipts for one year 2020

No	Month	Gross Receipts (Y)	X	XY	X <sup>2</sup>
1	1	18.750.000	-6	-112.500.000	36
2	2	18.750.000	-5	-93.750.000	25
3	3	30.000.000	-4	-120.000.000	16
4	4	30.000.000	-3	-90.000.000	9
5	5	18.750.000	-2	-37.500.000	4
6	6	40.500.000	-1	-40.500.000	1
7	7	12.750.000	1	12.750.000	1
8	8	18.750.000	2	37.500.000	4
9	9	18.750.000	3	56.250.000	9
10	10	58.000.000	4	232.000.000	16
11	11	18.750.000	5	93.750.000	25
12	12	60.000.000	6	360.000.000	36
Total		343.750.000		298.000.000	182

(Source: data processing, 2021)

Table 4 showed the depreciation value in one year is Rp. 2,880,000. The deprecation value functions to determine the benefit value of the equipment. The economic lifespan of the equipment based on the warranty period is 5 years. The remaining value is Rp. 300,000. It means that every year will shrink into Rp. 300,000 for the applied equipment. Depreciation value for one year is obtained Rp. 2,880,000. The first purpose of this study is applying the stage of demand forecasting using linear trend regression methods as the results shown in Table 5.

**Table 6.** First year demand forecasting results

Month -	X	Income (Rp)
1	7	40.107.372
2	8	41.744.734
3	9	43.382.097
4	10	45.019.460
5	11	46.656.822
6	12	48.294.185
7	13	49.931.548
8	14	51.568.910
9	15	53.206.273
10	16	54.843.636
11	17	56.480.998
12	18	58.118.361
<b>Total (Rp)</b>		<b>589.354.396</b>

(Source: data processing, 2021)

The calculation of demand forecasting values is  $\sum Y=343,750,000$ ,  $n=12$  (months),  $\sum XY=298,000,000$  and  $\sum X^2=182$ . Demand forecasting uses linear regression trends by firstly calculating intercept (a) and slope (b) values.

$$a = \frac{\sum Y}{n} = \frac{343.750.000}{12} = 28.645.833$$

$$b = \frac{\sum XY}{\sum X^2} = \frac{298.000.000}{182} = 1.637.363$$

After that, it resulted the trend value equations as follows:

$$Y=28.646.833+1.637.363X$$

Basic period: month  
 month X: month  
 Y: unit / month

So, demand forecasting is in the 1st month of 2021. In Y (the 1st month of 2021), with the value of  $X=7$ , because the data used for the basis of forecasting has an even scale of 12 months with the value of  $X=-6$  to  $+6$ , then the value of X for forecasting is 7. After calculating the forecasting equation model, it is multiplied by the value  $X=7$ , the result is:

$$Y=28.646.833+1.637.363(7)=40.107.372$$

So, income receipts forecasting on the installation of alloy

wheels spare parts in costume garages in the 1st month of 2021 is Rp. 40,107,372. Alloy wheels offered by the garage owners vary including the well-known brands. Demand forecasting for the 2nd month of 2021 to the 12th month is summarized as Table 6.

Demand forecasting for the year 2022, 2023, 2024, and 2025 uses 10% increase in value from the first year of demand forecasting results. Assumption of 10% as an increase in demand forecasting is recapitulated as follows:

**Table 7.** Demand forecasting results with a 10% increase per year

Year -	Demand Forecasting Results Demand Forecasting (Rp)
2020	589.354.396
2021	648.289.835
2022	713.118.819
2023	784.430.701
2024	862.873.771
<b>Total</b>	<b>3.598.067.521</b>

(Source: data processing, 2021)

Table 7 showed the value of demand forecasting for every year during the first year to the fifth year. Total results of forecasting demand is Rp. 3,598,067,521.

Figure 1 showed that a significant increase in forecasting can be viewed from the forecasting year chart 2020 to 2024. The forecasting improvement chart refers to Table 7.

Table 8 showed that Net Cash Flow which is formed functions as the base for assessing the criteria of NPV, IRR, PBP and B / C. Cash entry functions as income of value generated from costume garage services. Cash out functions as a need to use during the operation of costume garages. The value of earning before tax is the value of profits that have not been taxed from the local city government. Taxes which are provided by the local government is 20%. Therefore, the profit for every year is cut by 20%. The net income is in earning after tax. The assessment reaches the peak when the net cash in 2020 is Rp. 41,363,516, the net cash in 2021 is 53,024,835, the net cash in 2022 is 58,327,319, the net cash in 2023 is 64,160,051, and the net cash in 2024 is 70,576,056.

Table 9, the recapitulation uses the assumption of 6% discount rate. The result of Net Present Value is Rp. 107,229,752 and it is greater than the investment used which is Rp. 103,175,000. Therefore, this business is still worth running in the future.

Table 10 showed that the Internal Rate of Return from costume garage businesses uses discount rates in trial and error. Discount rate<sub>1</sub> is 10% and discount rate<sub>2</sub> is 18% to assess realistic investments. The Internal Rate of Return result is 29.4% and it is greater than the bank's assumed interest rate which is 10%. Consequently, the results are very realistic for costume garage businesses that are run without measuring the alternative investment options, because the entire value of calculations uses data from research observations.

**Table 8.** Recapitulation of net cash flow

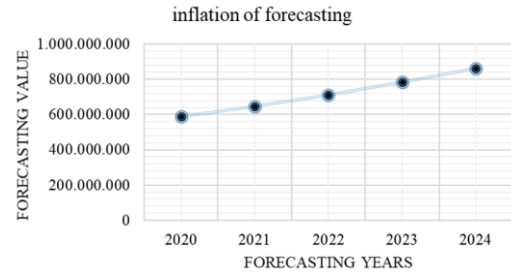
years-	Investments (Rp)	103.175.000					
	Cash In	Cash Out	Depreciation	Earning Before Tax	Tax (20%)	Earning After tax	Net Cash Flow
2020	589.354.396	541.150.000	2.800.000	48.204.396	9.640.879	38.563.516	41.363.516
2021	648.289.835	595.265.000	3.080.000	53.024.835	53.024.835	53.024.835	53.024.835
2022	713.118.819	654.791.500	3.388.000	58.327.319	58.327.319	58.327.319	58.327.319
2023	784.430.701	720.270.650	3.726.800	64.160.051	64.160.051	64.160.051	64.160.051
2024	862.873.771	792.297.715	4.099.480	70.576.056	70.576.056	70.576.056	70.576.056

(Source: data processing, 2021)

**Table 9.** Net present value

Years-	Net Cash Flow	Discount rate (6%)	Present Value
0	-103.175.000		
2020	41.363.516	0.9434	39.022.341
2021	53.024.835	0.8900	40.494.883
2022	58.327.319	0.8396	42.021.858
2023	64.160.051	0.7921	43.608.939
2024	70.576.056	0.7473	45.256.730
	NPV		107.229.752

(Source: data processing, 2021)



**Figure 1.** Increasing demand forecasting

**Table 10.** Recapitulation of internal rate of return

Years-	Net Cash Flow	Discount Rate <sub>1</sub> (10%)	Present Value <sub>1</sub>	Discount Rate <sub>2</sub> (18%)	Present Value <sub>2</sub>
0	-103.175.000				
2020	41.363.516	0.9091	37.603.573	0.8475	35.055.580
2021	53.024.835	0.8264	37.601.091	0.7182	32.678.005
2022	58.327.319	0.7513	37.602.456	0.6086	30.460.342
2023	64.160.051	0.6830	37.602.456	0.5158	28.397.287
2024	70.576.056	0.6209	37.601.905	0.4371	26.470.918
	NPV I		84.836.481	NPV II	84.836.481
			<i>Internal Rate of Return</i>		29.4%

(Source: data processing, 2021)

**Table 11.** The calculation result of payback period

Years-	Net Cash Flow	Cumulative
	103.175.000	103.175.000
2020	41.363.516	41.363.516
2021	45.499.868	86.863.385
2022	50.049.855	136.913.240
2023	55.054.840	191.968.080
2024	60.560.324	252.528.404
	Payback Period	2.75

(Source: data processing, 2021)

**Table 12.** Profitability index

Years-	Discount rate 18%	Net Cash Flow -103.175.000	Present Value
2020	0,8475	41.363.516	35.055.580
2021	0,7182	45.499.868	32.678.005
2022	0,6086	50.049.855	30.460.342
2023	0,5158	55.054.840	28.397.287
2024	0,4371	60.560.324	26.470.918
	Profitability Index		1.48

(Source: data processing, 2021)

Table 11, to assess the return on capital of the payback period value, it needs 2.75 units with the result of conversion to 2.75 years. The return for Rp. 103,175,000 capital spends 2.75 years, and it is not a problem. This is because the business owners do not assume the expected return on capital.

Table 12, Profitability Index is the value of the present ratio with investment of 1.48. The value shows that the business can be run because it has a profit opportunity in the future for about 1.48 times greater than the current investment nominal of Rp. 103,175,000.

Table 13 showed the benefits ratio from the expenses including operations with a value of B / C is 1.1 units. It means that there is a benefit, 1.1 times for every operation of the running costume garage.

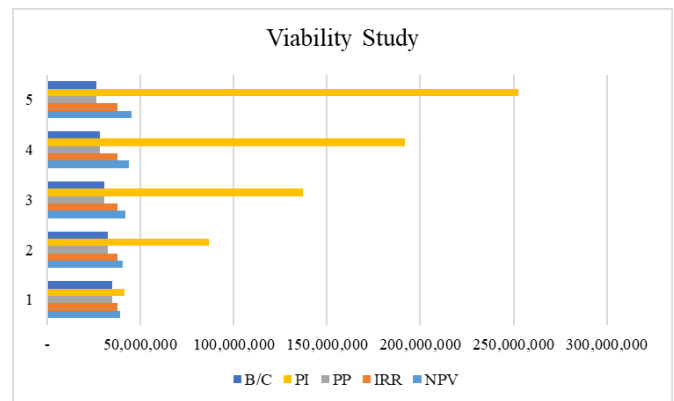
Based on a business feasibility study that has determined the results of net present value, internal rate of return, payback period, profitability index and benefit cost ratio to get the appropriate value. The value obtained is feasible to state that

the modification workshop business can be carried out.

**Table 13.** B/C

Years-	Benefit	Cost	B/C
2020	589.354.396	541.150.000	1.09
2021	648.289.835	595.265.000	1.09
2022	713.118.819	654.791.500	1.09
2023	784.430.701	720.270.650	1.09
2024	862.873.771	792.297.715	1.09
	Sum of B/C		1.1

(Source: data processing, 2021)



**Figure 2.** Viability study

Figure 2 states that the dominant factor is the increase in the profitability index. This becomes the stated criterion there is an increase in the benefits of the specified investment value. The thing that causes an increase in benefits is that assets and production facilities can experience excessive function according to the way they are used. However, indirectly, it is also natural to have this depreciation rate, because an asset will experience a constituency where there is a decrease in value over a period of use. Therefore, the benefits of this costume workshop business are reviewed which can provide a sustainability role. The statement that assets will experience a decline or depreciation is indeed the case of the development

of a business. The value of the profitability index which is very significantly increased from the period of year 1 to year 5 makes proof, that the profit index greatly determines the role of feasibility studies, in addition to the net present value, internal rate of return and payback period.

#### 4. CONCLUSION

Based on the criteria of financial analysis that has been done. Costume workshop is declared viable on an NPV basis of Rp. 107,229,752 > from an investment of 103,175,000. The 29.4% IRR value means that investments in establishing costume garages can provide a profit of 29.4% annually based on investment. Payback period value as the return for capital for 2.75 years. The profitability index is 1.1 times greater than the level of generated opportunity. The value for benefits is 1.1 times from the operational activities. The implications of this study require the design of determining strategies in dealing with future risks related to similar competitors. The assessment of business feasibility studies in this costume workshop can be used as a strength in the financial aspect. Where the role of the financial aspect is very useful in supporting the success of the sustainability of the costume workshop business.

#### 5. RECOMMENDATIONS

Recommendations that can be given for this study are to review aspects of technology that have not been discussed in this article. Recommendations on technological aspects, then analyzing in depth can support as full value research.

#### 6. LIMITATIONS AND FURTHER RESEARCH

This research is limited to the assessment of financial aspects. This research includes the assessment of NPV, IRR, PBP, PI and B/ Cas financial analysis achievements. Future research can review aspects of the technology used in costume workshops. So, it can be innovated as an upcoming research development.

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