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Original Article

The Effect of Material Flow Cost Accounting on Company Sustainability: Moderating Role of Green Accounting in Consumer Goods Industry Companies

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Abstract: This study analyzes the influence of material flow cost accounting in improving company sustainability. Material flow cost accounting. This research uses proxies for production costs, factory area, and output or production value. The population used in this research is all goods and consumption companies listed on the IDX for the 2015-2021 period. Through Purposive sampling, the samples obtained were 6 companies in that period, so 42 data were obtained. Data processing in this research was carried out using multiple regressions and moderated regression methods with an absolute difference value approach. This research concludes that MFCA (production costs) negatively and significantly affects company sustainability. This means that reducing production costs to get higher profits will increase the company's sustainability. Meanwhile, MFCA (factory area and output or production value) positively and significantly influences company sustainability. This shows that the wider the company's area and every time there is an increase in production results, the company's sustainability can increase. Besides, green accounting cannot moderate material flow cost accounting on company sustainability.

Keywords: Material flow cost accounting; Company sustainability; Green accounting, Consumer goods industry companies.

1. Introduction

Business sustainability is a condition where a company/ industry/ business actor can still maintain its business operations, including continuously increasing the achievement of business profits (Hartomo & Cahyadin, 2013). A company's main goal is to ensure its business can survive, which is closely related to how it can manage its business well. The consumer goods industry is growing daily, creating various products to support the business entity's business. Nowadays, people don't only think about their consumption needs. However, people are starting to understand the importance of the environment for survival by maintaining the environment well. However, some people do not care about environmental pollution (Taufiq, 2016). Currently, environmental pollution is an alarming condition that has a negative impact on the balance of nature (Akhirul et al., 2020). The negative impacts that arise are water pollution, air pollution, land pollution caused by the activities of companies that want to seek the highest possible profits without

paying attention to the impact on the environment. However, the development of industrial infrastructure has a positive impact because it can absorb labor and become a development asset in an area (Samsul et al., 2018). In reality, so far Indonesian corporate industrial practices tend not to respond to the surrounding environment and people incur additional health costs due to an environment polluted by waste from company activities. Simon et al. (2023) in Indonesia around 15-20 percent of waste is disposed of properly in landfills. The rest is disposed of in rivers and streams, creating flooding problems. It is also estimated that 85 percent of small cities and more than 50 percent of medium-sized cities dispose of their waste in the open. Meanwhile, around 75 percent of urban waste can be decomposed and used as compost or biogas. However, a lack of knowledge and training hinders productive waste management.

Environmental and social problems with negative impacts will spread and can be easily accessed using information technology. This requires the company's business activities to adjust to environmental issues. Environmental accounting or green accounting is the form of adjusting a company's business activities to environmental issues. So far, financial reports have not been able to provide information on reporting activities from empowering the surrounding environment. Green accounting is a means of reporting a company related to the environment (Astuti, 2012). Application Green accounting will encourage minimizing environmental problems the company faces. The purpose of green accounting is to increase efficiency in managing the environment by carrying out environmental activities regarding costs, benefits, and effects (Hamidi, 2013). In the face of the problem of waste reduction efforts are made from different points of view, contemporary management accounting has developed special waste collection tools called Material Flow Cost Accounting (MFCA), which can provide waste information from a financial and non-financial perspective that is useful in making waste reduction decisions. In Marota (2017), MFCA uses the variables production costs, company area and production results. Production costs are the costs incurred to process raw materials into finished products that are ready for sale, where these costs consist of raw material costs, direct labor costs, and production costs overhead factory (Hari et al., 2023). A company has targets to achieve, one of which is to minimize costs incurred during the production process and achieve the desired results. In this case, the problem that often arises in the company is in planning its financing.

A company also needs to organize the layout of the company area, which will support ongoing production activities. If a company wants to increase its production productivity, it needs to improve the layout of the company's facilities (Iskandar & Fahin, 2017). A good company layout will show the smooth production flow from the process to the final product. If the company wants an optimal layout to maximize profits, then the company can use a plant layout. Plant layout is a decision that concerns the arrangement of operating facilities in an orderly and efficient manner which includes the design or configuration of work center parts and equipment that refers to the production process (input-process-output), whether inside the building or outside so that operational activities run smoothly (Suhardi & Purnamaputri, 2017). Meanwhile, output or production value is an important factor in a company. Aniskin et al. (2015) in Ningsih & Indrajaya (2015), the production value is the total number of goods produced by a business multiplied by the selling price of these products using the production factors owned by the company in one period. If there is an increase in production output, producers will increase their production capacity.

Previous research on MFCA was conducted by Alfian et al. (2020) with a study on MFCA with environmental accounting in industrial companies. The results of his research show that MFCA can show a company's production cost detection model. Ardina et al. (2020) stated that MFCA can provide waste information from a company's production process, which is useful for efficient and profitable decision-making. This research is also in line with research conducted by Loen (2018) regarding the implementation of green accounting and material flow cost accounting that can improve company sustainability. According to Marota (2017), material flow cost accounting uses the variables production costs, company area, and output or production value in MFCA. The results prove that MFCA influences company sustainability. There is a difference between the research conducted by Marota (2017) and previous research, and this difference lies in the research object. In this research, the object is the consumer goods industrial sector, where the production process leaves behind several wastes and variables of green accounting, such as moderation.

2. Literature Review

2.1. Theory of Stakeholder

Stakeholder theory is a theory that requires companies to provide benefits to stakeholders or stakeholders. Theory stakeholder is generally published by Freeman (2010). Freeman & McVea (2005) define stakeholders which both individuals and groups of people can influence in an organization. Companies need to maintain and always be responsive to the social and environmental conditions in which they operate to achieve their goals. Stakeholders towards the company can be realized thereby increasing the company's sustainability (Ganesha & Hartanti, 2019). Disclosure of information from financial, social and environmental aspects is the company's way of communicating with stakeholder so that stakeholder will provide support to the company for the business activities carried out (Lindawati & Puspita, 2015). Clarkson (1995) states that stakeholders need to be divided into two groups, namely, primary

employees who are vital to the sustainability of the company, such as employees. Whereas Stakeholder secondary stakeholders affect the company but are not related to transactions in the company, such as the media. The relationship between the company and stakeholder arises because of the concept of usefulness that builds cooperation in creating company business continuity (Halim et al., 2020). The company's social and environmental responsibility can be demonstrated by its social and environmental responsibility to strengthen the relationship between the company and society. Forms of corporate responsibility can be green accounting, then realized in corporate sustainability. Additionally, companies can use material flow cost accounting methods where this system can show material and stock flows, providing information about waste and company activities.

2.2. Green Accounting

According to Abdullah & Amiruddin (2020), green accounting is an accounting process that identifies environmental liabilities, measures and allocates environmental costs and integrates environmental costs into the business. Green accounting is an effort to preserve and connect the environment with the company's economic interests (Auliya et al., 2020). According to Sapulette & Limba (2021), if a company's environmental performance supports green accounting, this reflects a company's performance in its contribution to preserving the environment. Environmental accounting (green accounting) can inform the company's internal and external parties. According to Sukirman-Suciati (2019), the purpose of environmental accounting is as an environmental management tool to assess the effectiveness of activities based on environmental costs and as a communication tool with the community to convey the impacts that occur to the public. This is an effort to overcome environmental pollution and the obligations that companies have for problems that occur.

2.3. Material Flow Cost Accounting (MFCA)

MFCA is one of the main tools in environmental management accounting that can increase the transparency of material use practices by developing material flow models while reducing environmental impacts and improving business efficiency (Mufti, 2021). The advantage of using the MFCA model is that it can increase internal profits and productivity and reduce negative impacts on the external environment, which will contribute to company or corporate sustainability development. All industries using raw materials and energy, all types and sizes, with or without an environmental management system, can use MFCA. The main concepts used in MFCA are based on inputs (materials, energy, water and other inputs) and outputs (main products or by-products, waste, liquid waste, emissions). This is determined from the quantity and calculating the material, energy and system costs incurred for the product and material losses (Rachmawati & Karim, 2021). MFCA in environmental cost accounting plays an essential role for companies that utilize environmental benefits to maintain the stability of life around them (Franciska et al., 2019).

2.4. Corporate Sustainability

A company's sustainability is all its activities and production processes considering social and environmental conditions and making a profit (Mulya, 2017). The survival of a company depends on its profit generation. This profit will be the main target of establishing a company. Generally, the greater the profits obtained in a company, the more guaranteed the company's sustainability. Ways to increase productivity can be done by reducing various activities that cannot add value, saving time, and minimizing costs incurred (Pristianingrum, 2017). However, currently, there is a shift in the company's goals from the original profit-oriented which only focuses on profits, towards stakeholder-oriented which fulfills the stakeholders' desires. Thus, companies need to care about environmental issues because it will bring a positive reputation to the company and positively impact community welfare (Sukihana, 2018).

2.5. Previous Research

Nugrahaeni & Handayani (2021) examine the influence of wages, capital and production value on labor absorption in the tofu industry in the Bandung sub-district. This research shows that the production value variable negatively affects labor absorption in the Sheraton tofu industry, Bandung, a sub-district. Next, Dewi & Syaifullah (2022) tested the effect of the number of industries, investment value, and production value on labor absorption in the small and micro industrial sectors in East Java. The results obtained from this research state that the variable numbers of companies and investment value significantly influence labor absorption in the small and micro-industrial sectors in East Java. Meanwhile, the production value variable does not substantially affect labor absorption in the small and micro-industrial sectors in East Java. Loen (2018) examines the implementation of green and material flow cost accounting (MFCA) against sustainable development. The results obtained in this research are that green material flow cost accounting (MFCA) positively influences sustainable development. Variable Resource efficiency can strengthen the implementation of green accounting and material flow cost accounting (MFCA) against sustainable development. Abdullah & Amiruddin (2020) tested the effect of green accounting material flow cost accounting in improving company

sustainability. This research shows that MFCA production costs and output or production value positively affect company sustainability. Meanwhile, the MFCA variable factory area does not increase company sustainability. Variable green accounting as a variable moderating does not affect MFCA production costs and factory areas in increasing company sustainability. On the contrary, green accounting influences MFCA results or production value in increasing company sustainability.

Nabila (2021) reviews green accounting for sustainable development: a case study of Indonesia's manufacturing sector. The results obtained show green accounting has a significant positive effect on environmental disclosure and environmental disclosure has a significant positive effect on sustainable development goals. Meanwhile environmental performance does not have a significant positive effect on environmental disclosure, green accounting has no significant effect mediated by environmental disclosure and environmental performance does not have a significant effect on sustainable development goals mediated by environmental disclosure. Marota (2017) investigates the green concepts and material flow cost accounting application for company sustainability. The results of this research show that material flow cost accounting has a significant positive influence on company sustainability.

Selpiyanti & Fakhroni (2020) examine the effect of green and material flow cost accounting on sustainable development. The results obtained from this research are that the implementations of green accounting and material flow cost accounting have a positive and significant influence in increasing sustainable development in palm oil companies listed on the Indonesian Stock Exchange. Rachmawati & Karim (2021) analyze the effect of green accounting towards the MFCA in improving business sustainability as well as resource efficiency as a variable moderating (case study on a green industry award-winning company). This study's results show that material flow cost accounting positively affects business sustainability. Meanwhile variables resource efficiency unable to moderate material flow cost accounting on company sustainability. As well as, variables green accounting does not moderate the impact on increasing resource efficiency on company sustainability.

2.6. Conceptual Framework and Hypothesis Building

2.6.1. The Influence of MFCA (Production Costs) in Increasing Company Sustainability

The influence of MFCA (production costs) in increasing company sustainability aligns with the theory of stakeholder. Theory stakeholder formed based on the interests between the company and the parties stakeholder. This theory states that a company's actions are influenced by the benefits that will be felt by stakeholders, where the company wants high profits and on the one hand, it also needs to pay attention to the wishes of its stakeholders. Generally, companies have problems in competition, so companies must carry out continuous innovation in the quality of goods and services and efficiency in reducing production costs so that product sales prices can remain competitive. Research by Rachmawati & Karim (2021) found that the MFCA model for detecting a company's production and business costs can improve the company's sustainability. So, the first hypothesis formulated is:

H1: MFCA (production costs) has a negative and significant effect on company sustainability

2.6.2. The Influence of MFCA (Factory Area) in Increasing Company Sustainability

In practice, companies not only focus on the welfare of their owners but also pay attention to the welfare of society and other elements that can indirectly contribute. For the sake of the welfare of these parties, companies need to pay attention to the production process for the company's sustainability. Tajelawi & Garbharran (2015) show that MFCA can provide waste information to help managers make decisions to achieve company sustainability. Marota (2017) states that there is an influence on the implementation of MFCA (factory area) to increase company sustainability, so the second hypothesis is formulated, namely:

H2: MFCA (factory area) has a positive and significant effect on the Company's sustainability

2.6.3. The Influence of MFCA (Production Results or Value) in Increasing Company Sustainability

Theory stakeholders explained that company relations must always be maintained regarding the social and environmental conditions in which the company operates the business. MFCA is used as a management approach that can specifically manage manufacturing processes with material, energy and data flows to be more efficient and under set targets. The results of Nugrahaeni & Handayani (2021) on the production value of the harmonious tofu industry in Bandung a District show an influence on labor absorption there. By using the MFCA model in research (Selpiyanti & Fakhroni, 2020), environmental accounting can detect the results of a company's business production. The benefits of using the MFCA model can be obtained because it can increase profits in internal productivity and reduce negative impacts on the external environment, contributing to the development of company sustainability. On the other hand, Dewi & Syaifullah (2022) state that production value does not significantly affect labor absorption in company sustainability. So, the third hypothesis is formulated, namely:

H3: MFCA (yield or production value) positively and significantly affects company sustainability.

2.6.4. Green Accounting Moderates the Relationship between Material Flow Cost Accounting towards Company sustainability

This environmental accounting has benefits for companies that want to become green companies. By applying green accounting, the results of the financial reports presented are holistic, increasing the company's awareness and attention to the impact of the company's operational activities on the environment. Green accounting is part of environmental accounting that combines environmental benefits and costs into decision making in the MFCA regarding environmental costs, such as waste processing, disposal, installation construction, and so on. According to Burhany (2011), to manage and reduce the environmental impact of the production process, companies must have accurate data regarding the amount and purpose of all energy, water and materials used. Marota (2017) examines MFCA with environmental accounting. The results of his research show that MFCA with the variables of production costs and factory area influences a company's sustainability. In a study by Abdullah & Amiruddin (2020), MFCA with yield variables or production value affects a company's sustainability. So, the fourth hypothesis is formulated, namely:

H4: Green accounting able to moderate material flow cost accounting towards the Company's sustainability

2.7. Research Framework

The research model for this research is as follows:

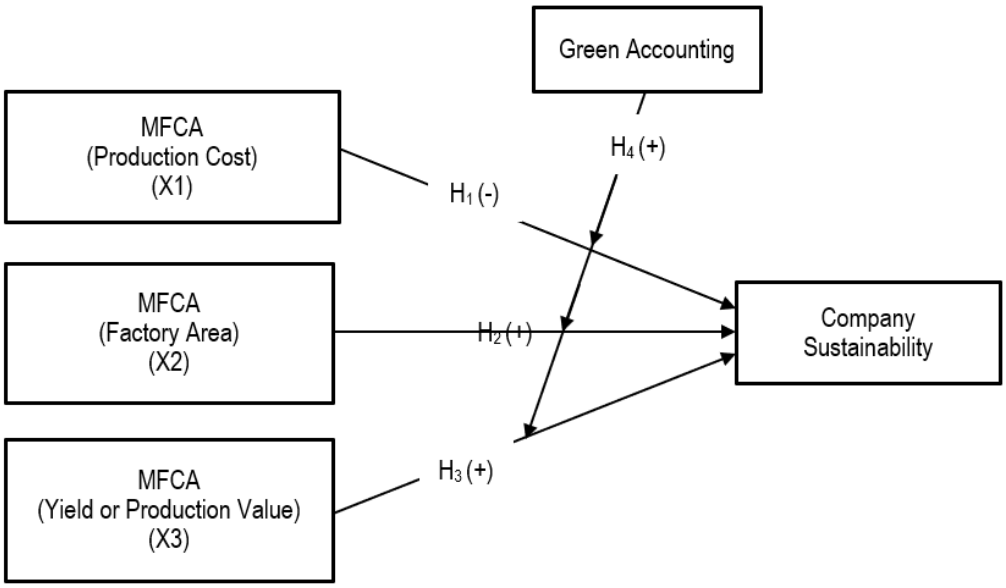

Figure 1. Research Framework

3. Materials and Methods

3.1. Operational Definition and Variable Measurement

In analyzing the data, this research uses material flow cost accounting with three proxies: production costs, factory production area, and output or production value as independent variables. Then the dependent variable in this research is company sustainability. Meanwhile, the moderating variables include green accounting. The following is a discussion of the variables used in this research:

3.1.1. Company Sustainability (Dependent Variable)

The dependent variable in this research is company sustainability. The sustainability of a company depends on the profits it will obtain. Efforts that companies need to pay attention to maintaining profits in the future are to pay attention to various aspects, namely environmental, social, economic, and technological. According Marota (2017), business sustainability is measured using formula calculations from research as follows:

$$CS = EC + SC + ENV+TECH \quad (1)$$

Where, CS is Company Sustainability, EC is Economic, SC is Social (CSR), ENV is Environmental (Utility costs), Tech is Technology (Laboratory costs)

3.1.2. Independent Variables

The independent variable used in this research is material flow cost accounting (MFCA). Material flow cost accounting can show the cost of losses experienced by a company and can help industry to handle waste for sustainable development. If the company does not care about the company's environmental problems, the company must be prepared to accept the short and long term consequences. Material flow cost accounting (MFCA) can be measured by production costs as X1, factory production area as X2, and output or production value as X3. The following is a discussion of proxies' material flow cost accounting (MFCA):

a. Production cost

Production costs are costs that companies charge during the production process to produce products that are ready to be sold. The formula for calculating production costs (Marisya, 2022) is as follows:

$$PC = RMC + LC + FOC \quad (2)$$

Where, PC is production cost, RMC is raw material cost, LC is labor costs and FOC is factory overhead costs

b. Factory Production Area

Production activities are supported from outside the production area in a factory. In industrial companies, there are several important factors in increasing company productivity, including factory layout, facility layout, and production equipment in the factory. Layout is the main basis in the industrial world. If the layout can be made well, it will streamline production flow and also maintain the survival of an industry (Pattiapon & Maitimu, 2021). The formula is as follows:

$$FPA = HFA \quad (3)$$

Where, FPA is factory production area and HFA is hectares of factory areas.

c. Yield or Production Value

Production value is the total number of goods produced by a company in a certain time and usually the products produced have been considered first, the components of production costs and the company's expected profits. The formula calculation (Purnamasari et al., 2018) used for the company's production work cycle is as follows:

$$CT = PT + WT + MT + IT \quad (4)$$

Where, CT is cycle time, PT is processing time, WT is waiting time, MT is moving time and IT is inspection time

3.1.3. Moderating Effect

The moderating variable used in this research is green accounting. Green accounting is a combination of information on environmental benefits and costs in company accounting practices to be useful for users in making economic management decisions. For internal companies, green accounting has the benefit of providing reports on internal management, such as controlling overhead costs and capital budgeting within the company. Measuring instrument used in green accounting refers to Global Reporting Initiative (GRI) which has three indicators, namely economic, environmental and social. Method Scoring Each item used in the GRI index is given a different weight. The company is given a score of 1 if it discloses an item of information, while a score of 0 if it does not disclose an item of information. According to Haniffa & Cooke (2005) in Saraswati et al. (2019), the calculation formula is as follows

$$GA_j = \frac{\sum X_{ij}}{n_j} x100\% \quad (5)$$

GA is green accounting of company j, X is Lesson by dummy variable: 1 = if item i is disclosed and 0 = if item i is not disclosed and n_j is number of items per indicator company j

3.2. Population and Sample

The population in this research is the consumer goods industry sector listed on the Indonesia Stock Exchange in 2015-2021. The sample is part of the population to be studied and which is considered to describe the population. This research uses sampling techniques purposive sampling. The research sample was determined based on purposive sampling which means selecting samples based on certain criteria, namely:

1. Consumer goods industrial company that has been listed on the Indonesia Stock Exchange from 2015 to 2021.

2. Consumer goods Industry Company that publishes complete annual reports on the Indonesia Stock Exchange from 2015 to 2021.
3. Consumer goods industrial companies during the observation year (2015 to 2021) had production costs, factory area, and output or production value.
4. Companies that were not delisted in the sample period.

Table 1. Research Sample

Descriptions	Frequency
Consumer goods industrial companies listed on the Indonesia Stock Exchange from 2015-2021	143
Consumer goods industry companies that do not publish complete annual reports on the Indonesia Stock Exchange from 2015-2021.	(80)
Consumer goods industrial companies that during the observation year (2015-2021) had no production costs, factory area, and output or production value.	(56)
Companies delisted from the stock exchange in the sample period.	(1)
No. of samples	6
No. of research periods (years)	7
Total sample	42

3.3. Data Types and Sources

The data used in this research is secondary data, namely data obtained from other parties or indirectly from the company's main sources. The data will be taken in the form of publications from 2015 to 2021. The data is in the form of financial reports and other data related to research problems. Secondary data is obtained from companies listed on the Indonesia Stock Exchange (BEI) so that the financial report data is in the form of documents. The main source in this research is the Capital Market Reference Center of the Indonesian Stock Exchange so that the data obtained in this research is data that the Indonesian Stock Exchange has listed. The data is in the form of financial reports of consumer goods industry companies that publish their company financial reports at the Capital Market Reference Center of the Indonesia Stock Exchange.

3.4. Data Collection Technique

The method used in collecting data for this research is documentation data. Documentation is archival research that contains past events. This method is carried out by collecting data from company financial reports published by the Indonesia Stock Exchange from 2015 to 2021, then processing it for analysis according to research needs. This data was obtained from the website Indonesian Stock Exchange (IDX).

3.5. Data Analysis

3.5.1. Classic Assumption Test

The normality test is useful for testing whether any residual variables have a normal distribution in a regression model. As is known in the t test, the residual value is assumed to follow a normal distribution. If this assumption is inappropriate, the statistical test will be invalid for small sample sizes. The multicollinearity test aims to test whether a correlation is found between the independent variables in the regression model. If the regression model is good, there is no correlation between the independent variables. Multicollinearity can be seen from the values tolerance and variance inflation factor (VIF). Nilai Tolerance measures the variability of selected independent variables that other independent variables do not explain. So, value tolerance low equals a high VIF value (VIF = 1/Tolerance) Mark Cut-off which is commonly used to indicate the existence of multicollinearity, namely the value tolerance ≤ 0.05 or the same as a VIF value ≥ 5. The heteroscedasticity test aims to test the regression model, whether there is inequality variance from one observation's residual to another. A good regression model will not cause heteroscedasticity. Chart Scatterplot can be used to detect heteroscedasticity. The autocorrelation test aims to test the linear regression model and determine whether there is a correlation between the residual errors in the previous t-1 period. A good regression model is free from autocorrelation.

3.5.2. Hypothesis test

Hypothesis testing in this research was carried out using the regression equation obtained in the calculation process. In order to find out whether the resulting regression equation is good for estimating the value of the dependent variable or not, a hypothesis test is carried out in the following way:

a. Multiple Linear Regression Analysis

The multiple linear regression model equation formed is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + e \quad (6)$$

Where Y is Company sustainability, a is Constant, b_1, b_2 b_3 is regression coefficients, X_1 is Production cost, X_2 is Factory area, X_3 is Yields or production value and e is error terms.

The results of linear regression testing to show whether all the independent variables intended in the model have an influence on the dependent variable using a significance level of 0.05 (α = 5%). This aims to find out whether all independent variables tested simultaneously and partially have a positive and significant effect on the dependent variable. Testing the moderation hypothesis can be done using the absolute difference test because it can overcome multicollinearity which usually occurs very high when using interaction tests and this model includes the main effect variable in the regression analysis to test the absolute difference value by looking for the standardized absolute value difference between the two independent variables. If the difference in absolute value between the two independent variables shows a significant positive result, then that variable moderates the relationship between the independent and dependent variables. The equation used is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_3Z + b_4\left[X_1 * Z\right] + e \quad (7)$$

Where Y is Company sustainability, a is Constant, b_1, b_2 b_3 is regression coefficients, X_1 is Production cost, X_2 is Factory area, X_3 is Yields or production value, Z is Green accounting and e is error terms. This hypothesis test is carried out through the coefficient of determination test, simultaneous test (f-test) and partial regression (t-test), namely:

b. Analysis of the Coefficient of Determination (R2)

Coefficient of determination (R2) measures the model's ability to show variations in the dependent variable. The coefficient of determination value is between zero and one. R value2 has an interval between 0 to 1 ($0 \leq R2 \leq 1$). When R2 is a large value, the R2 has a small value it means that the ability of the independent variable is very limited in explaining the dependent variable. The F statistical test is used to see whether all the independent variables included in the model have a joint influence on the dependent variable. If F is smaller than the error rate (α = 0.05), it can be said that the regression model is feasible. Meanwhile, if the value themselves, If F is greater than the error rate of 0.05, it can be said that the regression model is not feasible. In addition, the t-test is used to partially test the hypothesis to show the influence of each independent variable on the dependent variable. The t-test is carried out as a test of the regression coefficient of each independent variable on the dependent variable by comparing the p-value on the Colum and Say each independent variable. The significance level used is 0.05.

4. Results and Discussion

4.1. Descriptive Statistics Analysis

Descriptive statistical analysis can provide a statistical figure. The independent variables used in this research are material flow cost accounting (production costs, factory area, and output or production value). The dependent variable in this research is company sustainability, and the moderating variable is green accounting. In mechanism green accounting, three indicators cover economic, environmental, and social aspects. The results of descriptive statistical testing are as follows:

Table 2. Result of Descriptive Statistics Analysis

Variables	N	Min	Max	Mean	Std. Dev
Production cost	42	26,91	37,51	31,4959	3,39826
Factory Area	42	10,69	12,60	11,8094	0,64615
Yields or Production Value	42	22,38	30,13	27,1576	1,62643
Green Accounting	42	30	78	57,32	14,955
Corporate Sustainability	42	26,07	31,62	28,8710	1,47174

Table 2 displays a description of the statistical variables in this research. The production cost variable has a minimum value of 26.91 and the maximum value is 37.51. The mean value of production costs is 31.4959 with a standard deviation value of 3.39826. The factory area variable has a minimum value of 10.69 with the highest total factory area in the financial statements being 12.60. The mean value listed is 11.8094 and the standard deviation value is 0. 64615.The yield variable or production value has a minimum value of 22.38 and the maximum value is 30.13. The

average results or production value is 27.1576 with a standard deviation value of 1.62643. Variable green accounting has a minimum value of 30 with a highest or maximum value of 78. The mean value at green accounting amounts to 57.32 and the standard deviation is 14.955. The corporate sustainability variable has the lowest or minimum value of 26.07, with the highest or maximum value of 31.62. This variable's average or mean value is 28.8710 and the standard deviation value is 1.47174.

4.2. Classic assumption test

The classical assumption test was carried out before further analysis, namely multiple linear regression analysis. This classic assumption test is carried out to determine whether or not each assumption used in linear regression analysis is fulfilled.

4.2.1. Normality test

This normality test is used to determine whether the data is normally distributed. Determining if the test data is normal in this research can be done using two methods, namely graphic analysis and statistical tests. Graphic analysis can be seen using a histogram graph, observing that the data is normally distributed. Then, statistical tests can be used nonparametric Kolmogorov- Simonov.

Table 3. Result of Normality Testing using Kolmogorov Smirnov

Statistics		Unstandardized Residual
N		42
Normal Parameters [a, b]	Mean	0,0000000
	Std. Deviation	0,57883804
Most Extreme Differences	Absolute	0,107
	Positive	0,107
	Negative	-0,089
Test Statistic		0,107
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Table 3 shows the results of the normality test using the test Kolmogorov-Smirnov (K-S) with a value of 0.107 and a significance level of 0.200. So, the residual data can be said to be normally distributed because the results of Kolmogorov-Smirnov show a significance value above 0.05. Normality test results can also be strengthened by testing using a distribution graph, which shows that the data is normally distributed.

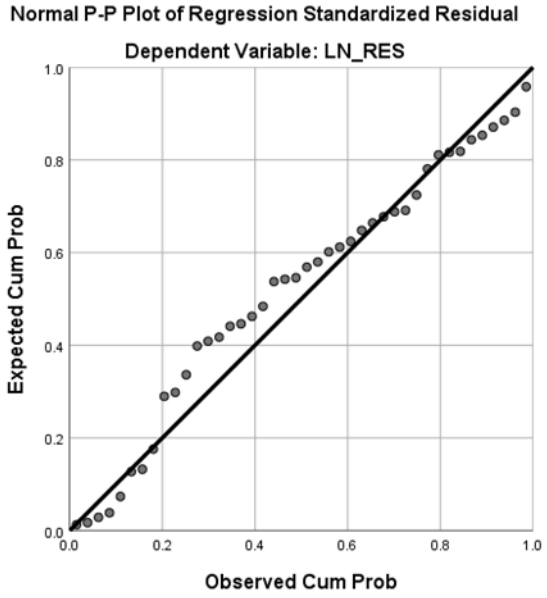

Figure 2. P- P Plot Graph

Figure 2 captures the normal probability plot and compares the cumulative distribution of the normal distribution which is part of the normality test results. Normality can be determined by looking at the distribution of data or points on the diagonal axis of the graph. Suppose the data or points spread around the diagonal line and follow the direction of the diagonal line. In that case, it shows a normal data distribution pattern and indicates that the regression meets normal assumptions. Figure 2 shows the results of the points spread around the diagonal line and spread along the diagonal line. Thus, it can be concluded that the data in the regression model with the normality test is normally distributed.

4.2.2. Multicollinearity Test

The multicollinearity test was conducted to test whether a correlation was found in the regression model between the independent variables. If there is no correlation between the independent variables, then it can be said that the regression model is good. In order to detect multicollinearity, you need to look at the values of Tolerance and Variance Inflation Factor (VIF). In general, cut-off value used to indicate the presence of multicollinearity is a tolerance value of < 0.10 or the same as the VIF value.

Table 4. Result of Multicollinearity Test

Variable(s)	Collinearity Statistics	
	Tolerance	VIF
Production cost	0,296	3,384
Factory Area	0,535	1,871
Results or Production Value	0,777	1,287
Green Accounting	0,387	2,587

a. Dependent Variable: Company Sustainability

Table 4 shows tolerance production costs of 0.296; factory area of 0.535; yield or production value of 0.777; And green accounting of 0.387. The results of these three variables have value tolerance above 0.10, indicating no correlation between the independent variables. The VIF value also shows that the three independent variables and the moderating variable have a value below 10, namely a production cost value of 3.384; the factory area value is 1,871; yield value or production value of 1.287; and value green accounting amounting to 2,587. So, the conclusion is that the regression model is free from multicollinearity between variables.

4.2.3. Heteroscedasticity Test

The heteroscedasticity test shows whether the regression model has differences in confounding variables from one observation to another observation. Variance residuals from one observation to another can be called homoscedasticity, whereas if they are different, they are called heteroscedasticity.

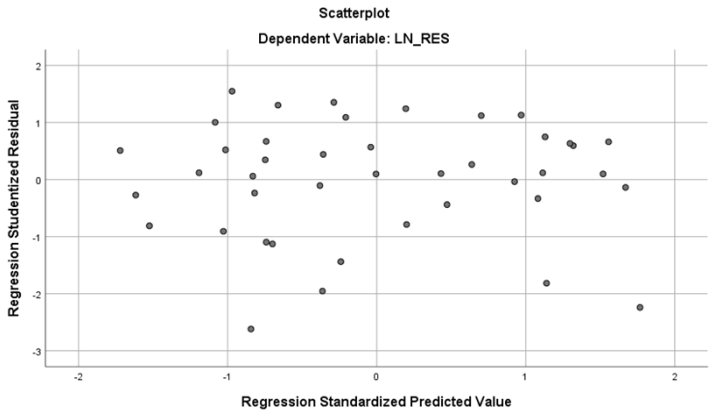

Figure 3. Heteroscedasticity Test Results

Figure 3 shows points spread unevenly randomly above or below the number 0 on the Y-axis. So, it can be concluded that there is no heteroscedasticity in the regression model, so it is suitable for use in research.

4.2.4. Autocorrelation Test

In the autocorrelation test, it is useful to test whether in the multiple linear regression models there is a correlation between confounding errors in period t and confounding errors in period t-1 (previously). If autocorrelation occurs, then there is an autocorrelation problem. This can be caused by observations carried out sequentially over time and related to one another. Meanwhile, a good regression model is free from autocorrelation. Several methods can be used to determine whether there is autocorrelation, such as the Durbin-Watson test (DW test). The autocorrelation test to fulfill the requirements is dU < d < 4-dU.

Table 5. Result of the Autocorrelation Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.343a	0,118	0,022	1,81575	2,191

a. Predictors: (Constant), Green Accounting, Results or Production Value, Factory Area, Production Costs
b. Dependent Variable: Company Sustainability

Table 5 captures the Durbin Watson value is 2.191 with a significance of 5%, the number of samples (N) is 42, and the independent variables are 3 (k=3) to get a value of dL=1.3573 and dU=1.6617. Meanwhile the result of 4-dU is 2.3383. The DW value listed in the table is 2.191, which is between dU and 4-dU. So, the value of 2.191 is greater than dU (1.6617) and the 4-dU value of 2.3383 is greater than the value of d. So, the autocorrelation value has met the qualifying requirements, so it is suitable for use for analysis at the next stage.

4.3. Hypothesis testing

4.3.1. Linear Regression Analysis

In carrying out hypothesis testing, a method called linear regression is used. This test is carried out to test each indicator in production costs, factory area, and output or production value on the company's sustainability. So, by testing this you can see the relationship between green accounting with production costs, factory area, and output or production value. Coefficient of determination (R^2) measures how far the independent variable contributes to the dependent variable. The following are the results of the coefficient of determination:

Table 6. Result of Coefficient of Determination Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.965a	0,931	0,926	0,368
a. Predictors: (Constant), Yield or Production Value, Production Costs, Factory Area				

Table 6 shows the results of multiple regression analysis with the coefficient of determination R Square is 0.926, which means that the contribution of the variables of production costs, factory area, output or production value to company sustainability is 92.6%. The F statistical test is useful for seeing that each independent variable can influence the dependent variable simultaneously. If value If the calculated F is smaller than the error rate of 0.05, it can be said that the estimated regression model is feasible. On the other hand, if value if the calculated F is greater than the error rate of 0.05, it can be said that the estimated regression model is not feasible. The following are the results of the F statistical test:

Table 7. Result of ANOVA

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression Residual Total	69,668 5,143 74,811	3 38 41	23,223 0,135	171,582	.000b

a. Dependent Variable: Company Sustainability
b. Predictors: (Constant), Production Results or Value, Production Costs, Production Area

Table 7 captures the results of testing the influence of production costs, factory area, and output or production value have a calculated F value of 171.582 with a significance value of 0.000. This shows a significance level of less than 5% or α = 0.05, which indicates that H1, H2, and H3 accepted. Thus, it can be concluded that the variables of production costs, factory area, and output or production value influence the company's sustainability. This analysis is used to test whether all the independent variables used in the model have an influence on the dependent variable. Testing this method uses a significant level of 0.05 or α = 5%. This was done to test the content of the variables of production costs, factory area, output or production value on the company's sustainability by paying attention to the strength of the relationship between green accounting with production costs, factory area, output or production value. The test results table from linear regression is as follows:

Table 8. Result of Hypothesis Testing

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	3,112	1,193		2,609	0,013
Production cost	-0,049	0,021	-0,124	-2,320	0,026
Factory Area	1,965	0,121	0,940	16,203	0,000
Production Value	0,151	0,039	0,182	3,843	0,000

a. Dependent Variable: Company Sustainability

Table 8 shows the multiple regression equation for each research variable. The constant value of Y is 3.112, which shows that if production costs, factory area, and output or production value are 0, then the company's sustainability value is 3.112. The production cost regression coefficient of -0.049 indicates a negative direction, where every 1% change in the value of production costs can change the company's sustainability value to -0.049. The coefficient of the factory area variable is 1.965, indicating a positive direction, where every 1% change in the factory area value can change the company's sustainability value to 1.965. The yield variable or production value of 0.151 indicates a positive direction, where every 1% change in yield or production value can change the company's sustainability value to 0.151. Next, the t test results for H1. The t-stat result obtained was -2.320 with a significance value of 0.026. The significant value of the production cost variable displays a value that is smaller than the significance level of 5% or α = 0.05 so it can be concluded that H1 accepted and stated that production costs have a significant effect on company sustainability. The results of this research show that there is an impact on the company's sustainability for every production cost that will be incurred by the company. If production costs become more effective and efficient, it can increase the sustainability of a company.

The results of the t test showed that the t-stat for hypothesis 2 was 16.203 with a significance value of 0.000, where the value was smaller than the significance level of 5% or α = 0.05. This shows H2 accepted so that the factory area has a significant effect on the company's sustainability in a positive direction. This means that the wider the company's factory area, the greater the company's sustainability. Meanwhile, the t test results for hypothesis 3 show a t-stat of 3.843 with a significance value of 0.000. So, if the significant value of the yield variable or production value is smaller than the significance level of 5% or α = 0.05, it is stated that the yield or production value has a significant effect on the company's sustainability in a positive direction. The meaning of this positive direction indicates that any increase in output or production value can increase the company's sustainability. Thus, the higher the company's output or production value, the greater the company's sustainability.

4.3.2. Absolute Difference Value

The absolute difference value test is used to determine the effect of MFCA (production costs, factory area, output or production value) on company sustainability with green accounting as a moderating variable. The results of testing the absolute difference values are presented in the Table below:

Table 9. Results of the Coefficient of Determination (R2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.985a	0,970	0,963	0,258

a. Dependent Variable: Company Sustainability
b. Predictors: (Constant) X3M, Production Results or Value, Factory Area Production Cost, X1M, X2M, Green Accounting

Table 9 shows the coefficient of determination, the R value2 is 0.963, which means that the company's sustainability means that the contribution of the influence of the variables X3M, output or production value, factory area, production costs, X1M,green accounting amounting to 96.3%.

Table 10. Result of Simultaneous F-Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	72,546	7	10,364	155,575	.000b
	Residual	2,265	34	0,067		
	Total	74,811	41			

a. Dependent Variable: Company Sustainability
b. Predictors: (Constant) X3M, Production Results or Value, Factory Area Production Cost, X1M, X2M,Green Accounting

Table 10 indicates that F value was 155.575 with a significance level of 0.000, far below 0.05. df value of regression is 7 and the residual is 34, so the total value is 41. Value Mean squared from regression amounting to 10.364 and the residual is 0.067. Then, access the sum of squares from regression amounting to 72,546 and a residual of 2,265 for a total of 74,811. So, it can be said that the variables X3M, output or production value, factory area, production costs, X1M, X2M together influence the company's sustainability by green accounting as the moderating variable.

Table 11. Result of Absolute Difference Test

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2,005	6,000		-0,334	0,740
Production cost	-0,273	0,087	-0,688	-3,125	0,004
Factory Area	3,332	0,456	1,594	7,303	0,000
Results or Production Value	-0,028	0,105	-0,033	-0,264	0,794
Green Accounting	0,075	0,100	0,835	0,753	0,457
X1M	0,006	0,002	1,621	3,347	0,002
X2M	-0,026	0,008	-3,241	-3,254	0,003
X3M	0,002	0,002	0,716	1,206	0,236
a. Dependent Variable: Company Sustainability					

Table 11 show a significance value of X1M of 0.002, which is smaller than the significance level of 5% or α = 0.05. This means that green accounting is able to moderate in increasing the influence of the MFCA variable (production costs) on company sustainability. The test results for the absolute difference value of the variable X2M have a significance level of 0.003 which is smaller than 0.05, so the hypothesis is accepted. This indicates a variable green accounting is a moderating variable that can strengthen the relationship between factory area variables and company sustainability. The absolute difference value test results for the variable X3M have a significance value of 0.236. This value is greater than the significance level of 5% or α = 0.05, which indicates that green accounting is unable to moderate or weaken the relationship of production results or value to company sustainability.

4.4. Discussion

4.4.1. MFCA (Production Costs) and Company Sustainability

This study indicates that production costs negatively influence the company's sustainability. The t test results for H1 obtained were -2.320, with a significance of 0.026. Therefore, hypothesis 1, which states that MFCA (production costs) negatively affects company sustainability, is accepted. The negative direction of the production cost variable coefficient shows that every time you reduce production costs, you can increase profits and the company's sustainability. This is in line with the theory of stakeholders, which assumes that stakeholder significantly influences success and failure in a company. Success and failure can be achieved if the company can pay production costs effectively, which can influence the company's sustainability. Theory Stakeholder theory states that company

sustainability cannot be separated from its internal and external role stakeholder. The relationship between the company and stakeholder is built based on the concept of usefulness that builds cooperation to improve company sustainability. The results of this research are in line with the research results of Rachmawati & Karim (2021) who found that the MFCA model for detecting a company's production and business costs can increase the company's sustainability.

4.4.2. MFCA (Factory Area) and Company Sustainability

This study found that MFCA (factory area) has a positive and significant influence on company sustainability. Therefore, hypothesis 2 which states that factory area has a positive effect on company sustainability is accepted. The positive direction of the coefficient of the factory area variable indicates that every increase in factory area will also increase the sustainability of a company. This means that the wider the company's factory area, the greater the sustainability of the company. The area of the production factory really supports the ongoing production activities of a company. A company cannot expand its factory area if it does not pay attention to the welfare of its employees. In line with theory stakeholder that the company will continue if there is a role from the member's stakeholder. The results of this research are consistent with research conducted by Marota (2017), which stated that there was a significant impact on implementation material flow cost accounting (factory area) to increase company sustainability.

4.4.3. MFCA (Yields or production value) and Company Sustainability

The result shows that production yields significantly positively affect company sustainability. The analysis results show that the coefficient beta unstandardized coefficients are 0.151 and have a significance of 0.000. So, hypothesis 3 which states that MFCA (Yields or production value) has a positive and significant effect on company sustainability, is accepted. This can happen because the company's MFCA (production output or value) can increase the company's sustainability. Material flow cost accounting from the internal side can increase profits and productivity. In contrast, from the external side it can reduce negative environmental impacts, both of which contribute to the development of company sustainability. This is in line with stakeholder theory, where companies must care about problems arising from the environment and be able to express them so that stakeholders can realize their hopes and improve company sustainability. The results of this research are consistent with research conducted by Selpiyanti & Fakhroni (2020), which state that environmental accounting can detect the results of a company's business production. Marota (2017) also reinforced and revealed that material flow cost accounting with a proxy for output or production value significantly influences a company's sustainability.

4.4.4. Moderating Role of Green Accounting

The results of the moderation regression analysis using the absolute difference value approach show green accounting is a moderating variable. This can be seen from the significant value for moderation costs with green accounting as a moderating variable; it has a value of 0.002 which is smaller than 0.05. So, green accounting can moderate MFCA (production costs) in terms of company sustainability. The results of this test mean that green accounting within the company significantly impacts the influence of MFCA (production costs) on company sustainability. Green accounting is a means of reporting a company related to the environment, which includes measuring, assessing and disclosing the costs of the company's activities (Astuti, 2012). Application Green accounting will encourage minimizing environmental problems the company faces. This follows stakeholder theory, which states that when a company discloses financial, social, and environmental information, it conveys it to stakeholders, which can change views and expectations regarding company activities. From the test results carried out through data processing, the significant value of the factory area with green accounting as a moderating variable is 0.003, which is smaller than 0.05.

This indicates that green accounting can moderate material flow cost accounting (factory area) on company sustainability. The results of this test show that green accounting in these companies has a significant impact on increasing the MFCA (factory area) and the company's sustainability. Based on the test results in data processing, the significance value of the results or production value can be seen in green accounting as a moderating variable is 0.236, which is a value greater than 0.05. Therefore, hypothesis 4 states that green accounting can moderate material flow cost accounting towards corporate sustainability has not proven capable of moderating. The results of this test mean that green accounting does not have a significant impact in increasing the influence of MFCA on corporate sustainability. The results of this research are supported by the results of research conducted by Marota (2017), which shows that MFCA, with the variables of production costs and factory area, significantly affects a company's sustainability. So, these results imply that it is important to practice corporate accounting by including environmental aspects. Thus, accounting can contribute to taking responsibility for the company's environment.

5. Conclusions

This study concludes that MFCA (production costs) negatively and significantly affects the company's sustainability. This means reducing production costs to increase profits and the company's sustainability. Meanwhile, MFCA (factory area and output or production value) positively and significantly influences company sustainability. It shows that the wider the company's area is, the more the company's sustainability can increase every time there is an increase in production results. Besides, green accounting cannot moderate material flow cost accounting on company sustainability.

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