Sustainability Criteria for SMEs Using the Pentuple Bottom Line Approach with the AHP Method

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Abstract, SMEs (small-medium enterprises) in Indonesia are rapidly developing with various types of businesses, especially in the city of Malang, Indonesia. In running their businesses, every SMEs is required to maintain the sustainability of their businesses. Therefore, sustainability needs to be considered if SMEs plans to survive and compete on a local, national, and international scale. Sustainability includes five main aspects, which are economic, environmental, social, phenotechnology, and spiritual. In addition to increasingly fierce competition and the decline in people's purchasing power due to the COVID-19 pandemic and the swift and dynamic changes in the business environment, their income has also decreased due to the pandemic. This is because many Tempe SMEs have to survive under challenging conditions. Based on this problem, research was conducted to analyze the pandemic's impact on Tempe SMEs' sustainability, especially in Malang City, Indonesia. The study aims to develop a hierarchy of indicators used to assess the sustainability of sustainable SMEs by considering the integration aspects of Profit (economic), People (social), Planet (environmental), Phenotechnology, and Prophet (Spiritual) using the AHP method. The research method used in this study is a qualitative method with descriptive analysis, which is then processed to obtain a systematic conclusion. The AHP method is used to help develop a priority from various options using multi-criteria. The consistency test carried out on the criteria weighting showed a CI value of less than 0.01, meaning the criteria hierarchy is considered entirely consistent.

Keywords: Sustainability, SMEs, AHP.

1. INTRODUCTION

Indonesia is a country rich in food and agriculture, where food processing is carried out by large, medium-sized companies and Small and Medium Enterprises (SMEs) [3]. The food sector is a human effort to manage agroecosystems with the help of technology, capital, labor, and management to achieve food sovereignty and security [8]. From the quality aspect, SME products are considered inconsistent where over time, the product quality tends to decrease in terms of taste or product size [18]. According to [5], product continuity concerns SMEs' ability to meet market demand continuously. To fulfill this aspect, in general, SMEs are constrained by capital. This causes the products produced by SMEs to be low in competitiveness in the market. In facing competition in the industrial world, Indonesia must be ready and competitive. Therefore efforts in planning, implementing, organizing, and controlling companies or businesses [31]. Therefore, small and Medium Enterprises (SMEs) need to be improved to achieve their goals and increase their competitiveness [11]. The primary distinguishing feature between companies and Small and Medium Enterprises (SMEs) is their production system, which is more specifically in the production process [15].

Globalization is a phenomenon that encourages companies at the micro-economic level to increase efficiency in order to be able to compete at local, national, and international levels. According to [34] SMEs must have managerial skills and know strategic selling techniques starting from the knowledge of products, product characteristics, and product competitiveness against similar products. Behind the reasonably good contribution of SMEs to the national economy, it turns out that this sector still has myriad fundamental problems. SMEs are still weak in business management capabilities, the quality of human resources (HR) is still limited, as well as weak access to financial institutions, especially banking [1]. This is done so that SMEs can market each product that is produced correctly, and the products that have been produced can survive even though they are in intense competition [37].

Sustainability is a concept that is applied within the company so that a company can achieve long-term sustainability in its business [14].

There are five aspects of sustainability, namely economic, environmental, social, phenotechnology, and spiritual. These five aspects are fundamental things that companies including SMEs must achieve in order to achieve sustainability targets. [25] [19] Sustainability variables include:

a. **Profit** aspect (economics, profit), is the most important element and becomes the main goal of every business activity, and profit itself is essentially an additional income that can be used to ensure the survival of the company.

b. **People** aspect (social, stakeholder community) is an aspect that affects the condition of the community in the midst of a sustainable industry. Consequently, the community is an important stakeholder for the company, because the support of the community, especially the surrounding community, ensures the existence of the company and provides great benefits to the community.

c. **Planet** aspects (environment) are aspects related to all fields in human life and all activities carried out by humans as living beings which are always related to the environment.

d. **Phenotechnology** (information technology) aspect is the fact that the existence or phenomenon of information technology must be an important part of maintaining the company's survival.

e. **Prophet** (spiritual) aspect is spiritual, mental, or spiritual balance in the process of preserving organizational life. As a model of intrinsic character education that can overcome corrupt behaviour. The Prophet is based on an autonomous human spiritual (intrinsic) awareness obtained from *taqarrub* (approach to Gods)

According to [10] [2] data from the Ministry of Industry of the Republic of Indonesia in 2020, during the Covid-19 pandemic, SMEs experienced a decline in demand for the products produced by up to 90%, whereas in the year before the Covid-19 pandemic 97% of all sales activities were carried out offline. This impact also affects the achievement of sustainability for SMEs which consists of aspects of profit, planet, people, phenotechnology, and prophet [19]. Some SMEs are not able to meet their performance targets in terms of sustainability. From the economic side, there are problems such as increasing production costs, labour, and raw materials [36]. From the environmental side, for example, an environmentally sound system is required to be able to maintain the stability of resources and avoid exploitation of natural resources and environmental functions. According to [7], while on the social side, it has an impact on the welfare of the workers involved in SMEs, directly there are fundamental changes, especially for SME workers during the Covid-19 pandemic, especially in terms of employee welfare [8]. Based on the problems that have been described, a research analysis of the impact of the Covid-19 pandemic on sustainability will be carried out on SMEs using the Analytical Hierarchy Process (AHP) method [33]. The aim of the research is to develop a hierarchy of indicators used to assess the sustainability of sustainable SMEs by considering the integration aspects of Profit (financial), People (Social), Planet (Environmental), Phenotechnology, and Prophet (Spiritual) using the AHP method. With the AHP method, priority factors that affect the sustainability aspect will be obtained so that SMEs cannot achieve the sustainability targets that have been set. From the results of the analysis based on the AHP method, a proposed policy formulation in the form of a sustainability policy can be made by SMEs to achieve sustainability aspects, especially those affected by the Covid-19 pandemic.

2. LITERATURE REVIEW

2.1 Small-medium Enterprises (SMEs)

According to (Peraturan Menteri Perindustrian Republik Indonesia No : 11/M-IND/PER/3/2014, 2014) Regarding the Technical Guidelines for the Restructuring of Machinery and/or Equipment for Small and Medium Enterprises Article 1 paragraph (1), (2), and (3) which mentions [26]:

1. Small and Medium Enterprise (SME) is a small industrial company and a medium industrial company.
2. Small Industrial Company (SE) is an industrial company with a total investment value of up to Rp. 500,000,000 (five hundred million Rupiah), excluding land and buildings for business premises.
3. Small and Medium Industrial Company (SME) is an industrial company with a total investment value greater than Rp. 500,000,000 (five hundred million Rupiah) up to a maximum of 10,000,000,000 (ten billion Rupiah), excluding land and buildings for business premises.

Technology has become a new paradigm to determine the quality and competitiveness of a nation. Technology has a relationship with industrialization, which has become a benchmark for economic growth that reflects the success of a nation's development [13]. According to (Republik Indonesia, 2004) regarding Industry, it is explained that small industry is an economic activity consisting of processing raw materials, raw materials, semi-finished goods, and or finished goods into goods that have a higher value for use [30]

2.2. Defining Analytical Hierarchy Process (AHP)

The Analytical Hierarchy Process (AHP) was developed by Dr Thomas L. Saaty of the Wharton School of Business in the 1970s to organize information and judgement in choosing the most preferred alternative. Comparisons are made based on the "judgement" of the decision-maker by assessing the level of importance of an element compared to other elements. Below is a quantitative scale determination from one to nine to assess the comparison of the importance of an element to other elements [32]. The Analytical Hierarchy Process is used as a problem-solving method compared to other methods for the following reasons [23] :

1. A hierarchical structure, as a consequence of the selected criteria, to the deepest sub-criteria.
2. Taking into account the validity up to the inconsistency tolerance limit as the criteria and alternatives chosen by the decision maker. Taking into account the durability of the decision-making sensitivity analysis output.

2.3. Sustainability

Sustainability is very multifaceted and the originality of sustainability is very complex [4]. [6] Sustainability can be a strategic resource that leads to competitive advantage, and in turn, superior organizational performance. While most of the sustainability studies look at all three aspects of the triple bottom line, some literature shows inconclusive results when strategies aim to address all three sustainability approaches together [33]. Business sustainability is most often presented in an integrated manner, combining all three aspects, as some of them overlap. Graphically, this can be represented by three overlapping circles, where the intersection in the middle represents continuity [35]. SME actors try to implement corporate sustainability by complying with policies and regulations [40]. SMEs strive to achieve sustainability by adopting lean manufacturing, green manufacturing and other sustainability practices. Sustainability practice is any practice that aims to achieve or support sustainable value [16]. Sustainability performance can be defined as company performance in all dimensions and for all drivers of company sustainability [21] .

3. RESEARCH METHOD

The research method used in this study is a mixed method with descriptive analysis and then processed in order to obtain a systematic conclusion. This case study research is related to the sustainability of SME which was carried out within the scope of Malang City, East Java province. In determining the model for appropriate criteria in sustainable manufacturing which is influenced by aspects such as Profit (financial) and People (Social), sustainable manufacturing which is influenced by these 5 aspects are integrated in the Analytical Hierarchy Process (AHP) method to develop a strategy for determining the criteria for sustainable manufacturing in food SMEs. Specifically, Tempe products need to be supported in increasing business and competitiveness in Malang City.

4. RESULTS AND DISCUSSION

In this subchapter, data processing based on the level of importance will be discussed. The results of the questionnaires that the respondents have filled out are then processed using AHP to determine the level of importance of each criterion and alternatives consisting of several indicators.

Determination of Decision Making Objectives based on AHP. The following is decision-making to determine the level of importance of each criterion. The following image shows the objectives, criteria, and indicators for the alternatives In this sub-chapter, the variables and alternatives used in making the AHP questionnaire given to respondents will be discussed. It can be seen from table 1 the indicators that will be used in the study. The following are indicators for each factor that can be used at a later stage:

Table 1. Indicators Used in the Study

Factor	Indicator
Profit	Economic performance
	Infrastructure
	Anti-Corruption
	Tax
Planet	Materials
	Water
	Compliance with Environmental Regulations
People	Staffing
	Management Relations with Employees
	Anti-Discrimination

	Diversity and Equal Opportunity	
	Freedom to associate	
	Indigenous people's rights	
	Human rights	
	Local community rights	
	Customers' health and safety	
	Marketing and labeling	
	Socioeconomic compliance	
Phenotechnology	*E - Commerce*	
	Hardware	
	Software	
Prophet	Honesty	
	Humanity	
	Sincerity	

Source: Author's processed data 2022

4.1. Indicator clusters for *Profit* factor (Economy)

In this cluster, there are 4 indicators that will be compared, in the pairwise comparison table. The following is a pairwise comparison table for indicators on Profit / Economic factors.

Table 2. Pairwise Comparison for Profit

	Economic Performance	Infrastructure	Anti Corruption	Tax
Economic performance	1	2	3	3
Infrastructure		1	3	2
Anti-corruption			1	2
Tax				1

Source: Author's primary data, 2022

Next, the average of each indicator is calculated horizontally which will be defined as the weight of each indicator if it passes the   consistency test. The calculation of   the average indicator is as follow

Table 3. Economic Weight Calculation

	Economic Performance	Infrastructure	Anti Corruption	Tax	Average
Economic performance	0.46153	0.52174	0.4	0.375	0.43956
Infrastructure	0.23077	0.26087	0.4	0.25	0.28541
Anti-corruption	0,15383	0,08694	0.1333	0.25	0.15601
Tax	0.15383	0.13043	0.0666	0.125	0.11896

Source: Author's primary data, 2022

The average generated in table 3 above is a value that will later be used as a weight for each indicator if the assessment has passed the consistency test.
Based on these calculations, it is found that the max lambda value is 4.144961. Next, the consistency index value is calculated as follows:

$$CI = \frac{4.144961 - 4}{4 - 1} = 0.04832$$

The Consistency Index value is then used
to calculate the Consistency Ratio value by dividing the consistency index value by the random consistency index value as follows:

$$CR = \frac{0.04832}{0.9} = 0.053689$$

Thus, it can be stated that the assessment is considered consistent because the consistency ratio is less than 10% so that the average value can be considered as a weight for each indicator on the Profit / Economy factor.

4.2. Indicator clusters for *Planet* factor (Environment)

In this cluster, there are 3 indicators to be compared in the pairwise comparison table.
The following is a pairwise comparison table for indicators on Planet (Environmental) factors.

Table 4. Pairwise Comparison for Planet

	Materials	Water	Environmental Regulations
Materials	1	2	3
Water		1	2
Environmental Regulations			1

Source: Author's primary data, 2022

Next, the mean of each indicator is calculated horizontally which will be defined as the weight of each indicator if it passes the consistency test. The calculation of the average indicator is as follows:

Table 5. Planetary/Environmental Weight Calculation

	Materials	Water	Environmental Regulations	Average
Materials	0.545455	0.571429	0.5	0.53895
Water	0,272727	0.285714	0.333333	0.29725
Environmental Regulation	0,181818	0.142857	0.166666	0.16378

Source: Author's primary data, 2022

The average produced in table 5 is a value that will be used as a weight for each indicator if the assessment has passed the consistency test. Based on these calculations, it is found that the max lambda value is 3.0092. Next, the consistency index value is calculated as follows:

$$CI = \frac{3.0092 - 3}{3 - 1} = 0.0046$$

The Consistency Index value is then used to calculate the Consistency Ratio value by dividing the consistency index value by the random consistency index value as follows:

$$CR = \frac{0.0046}{0.58} = 0.007931$$

Thus, it can be stated that the assessment is considered consistent because the consistency ratio is less than 10% so that the average value can be considered as a weight for each indicator on Planetary/Environmental factors.

4.3. Indicator clusters for *People* factor (Social)

In this cluster, there are 11 indicators to be compared. Some indicators have names that are long enough. So, to make reading easier, the pairwise comparison table will be written in letter notation accompanied by a list of indicator names for each of the letter notations. The following is a pairwise comparison table for indicators on social factors:

Table 6. Pairwise Comparison *People* / Social

	A	B	C	D	E	F	G	H	I	J	K
A	1	1	0.33333	1	0.3333	1	0.33333	0.33333	3	0.2	3
B		1	1	1	1	3	0.33333	3	3	0.2	3
C			1	1	1	3	0.33333	3	3	0.2	3
D				1	3	3	0.2	3	3	0.2	3
E					1	3	0.2	3	5	0.2	3
F						1	0.2	1	3	0.33333	3
G							1	5	5	1	5
H								1	3	0.33333	3
I									1	0.33333	3
J										1	3
K											1

Author's primary data, 2022

Notes:
A. Staffing
B. Management relations with employees
C. Anti-discrimination
D. Diversity and Equal Opportunity
E. Freedom to associate
F. Indigenous people's rights
G. Human rights
H. Local community rights
I. Customers' health and safety
J. Marketing and Labelling
K. Socioeconomic compliance

Next, the average of each indicator is calculated horizontally which will be defined as the weight of each indicator if it passes the consistency test. The calculation of the average indicator is as follows:

Table 7. People / Social Weight Calculation

	A	B	C	D	E	F	G	H	I	J	K	Average
A	0,0461	0.0697	0,0256	0,0638	0.0192	0,0422	0,0793	0,0144	0,0927	0,0461	0,9090	0.053492
B	0,0461	0.0697	0,0769	0,0638	0,0576	0,1267	0.0793	0,1304	0,0927	0,0461	0,9090	0.0794
C	0,1384	0,0697	0,0769	0,0638	0,0576	0,1267	0.0793	0,1304	0,0927	0,0461	0,9090	0.097179
D	0.0461	0,0697	0,0769	0,0638	0,1730	0,1267	0,0476	0,1304	0,0927	0,0461	0,9090	0.085902
E	0,1384	0,0697	0,0256	0.0212	0,0576	0,1267	0,0476	0,1304	0,1546	0,0461	0,9090	0.082078
F	0,0461	0.0232	0.0256	0,0212	0.0192	0,0422	0,0476	0,0434	0,0927	0.0769	0,9090	0.047942
G	0,1384	0,2142	0,2307	0,3191	0,2884	0,2112	0,2381	0,2174	0,1546	0,2307	0,1515	0.214303
H	0,1384	0,0232	0.0256	0,0212	0.0192	0,0422	0,0476	0,0434	0,0927	0.0769	0,9090	0.056333
I	0.0153	0,0232	0.0256	0,0212	0,0115	0.0140	0,0476	0,0144	0,0309	0.0769	0,9090	0.033705
J	0,2307	0,3488	0,3846	0,3191	0,2884	0,1267	0.2381	0,1304	0,0927	0,2307	0,9090	0.222645
K	0,0153	0,0232	0.0256	0,0212	0.0192	0.0140	0,0476	0,0144	0.0103	0.0769	0,0303	0.026941

Source: (Author's primary data, 2022)

The average generated in Table 7 is a value that will later be used as a weight for each indicator if the assessment has passed the consistency test. Based on Table 8 calculation, it is found that the max lambda value is 12,492. Next, the consistency index value is calculated as follows:

$$CI = \frac{12.492 - 11}{11 - 1} = 0.1492$$

The Consistency Index value is then used to calculate the Consistency Ratio value by dividing the consistency index value by the random consistency index value as follows:

$$CR = \frac{0,1492}{1.51} = 0.0988$$

Thus, it can be stated that the assessment is considered consistent because the consistency ratio is less than 10%, so the average value can be considered as a weight for each indicator on the people / social factor.

4.4. Indicator clusters for *Phenotechnology*
In this cluster, there are 3 indicators to be compared in the pairwise comparison table. The following is a pairwise comparison table for indicators on the Phenotechnology factor:

Table 8. Pairwise Comparison for Phenotechnology

	E- Commerce	Hardware	Software
E - Commerce	1	2	3
Hardware		1	2
Software			1

Source: Author's primary data, 2022

Next, the average of each indicator is calculated horizontally which will be defined as the weight of each indicator if it passes the

consistency   test.   The   calculation   of   the   average   indicator   is   as   follows

Table 9. Phenotechnology weight calculation

	E - Commerce	Hardware	Software	Average
E - Commerce	0.545455	0.571429	0.5	1.61688
Hardware	0,272727	0.285714	0.333333	0.89177
Software	0,181818	0.142857	0.166666	0.49134

Source: Author's primary data, 2022

The average generated in table 9 is a value that will later be used as a weight for each indicator if the assessment has passed the consistency test.
Based on these calculations, it is found that the max lambda value is 3.0092. Next, the consistency index value is calculated as follows:

$$CI = \frac{3.0092 - 3}{3 - 1} = 0.0046$$

The Consistency Index value is then used to calculate the Consistency Ratio value by dividing the consistency index value by the random consistency index value as follows:

$$CR = \frac{0.0046}{0.58} = 0.007931$$

Thus, it can be stated that the assessment is considered consistent because the consistency ratio is less than 10%. So, the average value can be considered as a weight for each indicator on the Phenotechnology factor.
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4.5. **Indicator clusters for Prophet factor** (**Spiritual**)
In this cluster, there are 3 indicators to be compared in the pairwise comparison table. The
following is a pairwise comparison table for indicators on the Prophet (Spiritual) factor:

Table 10. Pairwise Comparison for Prophet (Spiritual)

	Honesty	Humanity	Sincerity
Honesty	1	2	1
Humanity		1	1
Sincerity			1

Source: Author's primary data, 2022

Next, the average of each indicator is calculated horizontally which will be defined as the weight of each indicator if it passes the consistency test. The calculation of the average indicator is as follows :

Table 11. Prophet weight calculation

	Honesty	Humanity	Sincerity	Average
Honesty	0,4	0,5	0,33333	0.41111
Humanity	0,2	0,25	0,33333	0,26111
Sincerity	0,4	0,25	0,33333	0.32777

Source: Author's primary data, 2022

The average generated in table 11 is a value that will later be used as a weight for each indicator if the assessment has passed the consistency test.
Based on these calculations, it is found that the max lambda value is 3.05366. Next, the consistency index value is calculated as follows:

$$CI = \frac{3.05366 - 3}{3 - 1} = 0.02683$$

The Consistency Index value is then used to calculate the Consistency Ratio value by dividing the consistency index value by the random consistency index value as follows:

$$CR = \frac{0.0268}{0.58} = 0.04626$$

Thus, it can be stated that the assessment is considered consistent because the consistency ratio is less than 10%. So, the average value can be considered as a weight for each indicator on the Prophet / Spiritual factor.

4.6. Indicator clusters for Pentuple Bottom Line
Table 12. Pairwise Comparison for Pentuple Bottom Line

	Profit	Planet	People	Phenotechnology	Prophet
Profit	1	2	1	2	1
Planet		1	2	1	2
People		1	2	1	1
Phenotehnology			1	2	1
Prophet					1

Source: Author's primary data, 2022

Next, the average of each indicator is calculated horizontally which will be defined as the weight of each indicator if it passes the consistency test. The calculation of the average indicator is as follows:

Table 13. Pentuple Bottom Line weight calculation

	Profit	Planet	People	Phenotechnology	Prophet	Average
Profit	0,1818	0,4	0.1538	0.2857	0.1666	0.23758
Planet	0.0909	0.2	0.3076	0.1428	0.3333	0.21492
People	0.1818	0.2	0.3076	0.1428	0.1666	0.19977
Phenotechnology	0.1818	0.1	0.1538	0.2857	0.1666	0.17759
Prophet	0.3636	0.1	0.0769	0.1428	0.1666	0.16998

Source: Author's primary data, 2022

The average generated in the table above is a value that will later be used as a weight for each indicator if the assessment has passed the consistency test. The overall assessment simulationfrom the three SMEs involved can be concluded that the SMEs has the highest level of sustainability to the lowest. The following is a ranking of the final value or level of sustainability of each SME from the largest to the smallest:

Table 14. SMEs sustainability ranking

No.	SMEs name	Sustainability level
1.	Tempe Chips	86,7045
2.	Tempe Mendohan	83.7579
3.	Stik Tempe Mendohan	79.7921

Source: Author's primary data, 2022

The level of sustainability of an SME represents how the SME can maintain its sustainability, both from Profit/Economy, Planet/Environment, People/Social, Phenotechnology, and Prophet/Spiritual factors. However, each of these factors certainly has a different level of influence and therefore it is necessary to weigh it not only at the indicator level but also at the factor level.

5. CONCLUSION
The final results of the AHP analysis and screening of indicators were carried out using a questionnaire method guided by interviews. The calculation of the average weight of the indicators is as follows: Profit 0.23785, Planet/environment 0.21492, People/social 0.19977, Phenotechnology 0.17759, and Prophet/spiritual 0.16998.

The results of the assessment simulation to test the function of the measuring instrument that has been produced to assess the SMEs 'sustainability by considering aspects of Profit, Planet, People, Phenotechnology, and Spiritual with the Analytical Hierarchy Process (AHP) method, that SME keripik tempeh final value and level of sustainability 86, 7045. The final result of the Mendohan tempeh SMEs assessment and the level of sustainability was 83.7579, and the final result of the Mendohan tempeh sticks SMEs assessment and the sustainability level of 79.7921. The level of sustainability of *keripik* tempe has a high final value because the value of high economic factors tends to have a high level of sustainability.

The consistency test that was carried out on the weighting of the criteria showed a CI value of less than 0.01, which means the hierarchy of criteria is considered quite consistent. Consistency test for alternatives on each criterion based on weighting shows the CI value is less than 0.01 which means the alternative hierarchy for social, environmental, and economic criteria is considered quite consistent. Based on the results of the weighting of interests, input can be given to the government as well as to SME actors related to policy making and business strategies in dealing with the Covid-19 pandemic, especially on social criteria, namely health and safety, environmental criteria, namely reducing energy use, and economic criteria, which is profit.

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