MULTI-CRITERIA DECISION MAKING FOR SMES SUSTAINABILITY ASSESSMENT

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ABSTRACT

The importance of SMEs to world economic and are pillars of the country's economic development. The number of SMEs was increased from year to year in the world. The number of SMEs in ASEAN alone currently reaches more than 70 million business units and cover 99% of all businesses in the region. Directly proportional to it, competition and sustainability vulnerabilities also getting higher. Sustainability issues had been the main focus for SMEs. Sustainability was based on three main baselines (economic, social, and cultural). Currently, a tool needed to assessment sustainability and develop a competitive strategy for these SMEs. However, the tools for sustainability assessment in SMEs was not available. This study aims to develop a sustainability assessment tool in the SMEs sector. Multi-Criteria Decision Making (MCDM) was a framework that supports the decision-making process by combining several baselines. One of the MCDM methods that can be used was the Analytical Hierarchy Process (AHP).

KEYWORDS MCDM; Tools; Sustainability; SMEs

INTRODUCTION

Sustainability as a complex system, which integrates three main pillars, namely economic, social, and environmental (Purwaningsih, et. al., 2020, p.2). Based on World Commission of the Environment and Development 1987, sustainable development were a development that can meet current needs without interfering with meeting needs in the coming year (Purwaningsih, et. al., 2021, p.2). Sustainability has an essential topic in many area such as society, politics, industry, and research. Sustainable industry is defined

as "active concern for human rights, the environment, anti-corruption, job requirements, gender equality, and diversity, and business ethics" (Tsvetkova, et al., 2020, p.1). Currently, the concept of sustainability has been developed and used in various fields of science based on different approaches. One of them was sustainable in Small and Medium Enterprises (SMEs) (Chen, et. al., 2014, p.1).

Similar to the concept of sustainability, SMEs' sustainability also adopts three data fields or what is known as the Triplebuttom line. Consists of economic, social, and environmental. Economics means focusing on the welfare and productivity of industry, social means having an impact on the surrounding community and as much as possible the industry increases the income of the surrounding area, environment means industry was also concerned with the natural impacts that will be caused if the business continues. The sustainability of SMEs is the ability to survive in dynamic competition and challenges in the economy, society, and the environment (Jayasundra, et. al., 2020, p.4).

SMEs play an important role in the world economy (Bayraktar and Algan, 2019, p.2) and are pillars of the country's economic development (Sarfiah, et. al., 2019, p.; Tri Wisudawati and Sulistyowati, 2020, p.2). So, these clearly could be said that SMEs was an important component of the economic system of every country in ASEAN (Association of Southeast Asian Nations) (Schaper, 2020, p.8). Based on Pratama (2019), in 2019, the ASEAN Faderation of Accountants targets that SMEs become the backbone of the regional and national economy, which includes most of the businesses currently running in a country (p.1). This statement was also in line with the theory put forward by many policy makers, industry advocates, and other commentators (Schaper, 2020, p.2). Based on ASEAN (2020), ASEAN itself states that SMEs was an increasingly important force from year to year in economic integration within ASEAN (p.1).

The number of SMEs in ASEAN currently reaches more than 70 million business units, by accommodating workers more than 140 million people and cover 99% of all businesses in the region (Schaper, 2020, p.1). Based on Schaper (2020), number of SMEs in Brunei around 5,900 units in year 2017, Cambodia around 460,000 units in year 2019, Indonesia around 64,194,000 units in 2018, Laos around 114,200 units in year 2016, Malaysia around 907,100 in 2016, Myanmar around 114,200 units in year 2015, Philippines around 998,300 in year 2018, Singapore around 271,800 units in year 2019, Thailand around 3,077,800 units in 2018, and Vietnam around 744,800 units in year 2019 (p.5).

In direct proportion to the number and role of the economy, sustainability and competition vulnerabilities are also getting higher (Chen, et. al., 2014, p.1, Jayasundra, et. al., 2020, p.2). SMEs are often much more difficult to understand, handle and measure than large enterprises (Schaper, 2020, p.8). SMEs may mean small businesses, but collectively they are a major economic factor in every country in the ASEAN region. The more effectively policymakers and governments can measure and assess this important phenomenon, the more effectively they can work and drive their growth.

On the other hand, currently there are not many and still limited tools for assessment of sustainable SMEs developed that are generally used in all countries. The tool of sustainability assessment can generally be divided by dimension, index or indicator based approaches, also product related assessments and integrated assessments (Chen, et. al., 2014, p.2). Based on Chen, et. al. (2013), the types of indicator-based and index-based assessment tools are considered most suitable for the objectives stated at the outset, namely, simultaneously ensuring specific assessments and general applicability (p.5). So the aim of this research is to develop a model of sustainability assessment tool in the SMEs sector.

RESEARCH METHOD

Based on several papers using three criteria: journal publishing, proceedings, and google citations. During in this stage, there was six papers were chosen after considering these. The data processing was conducted using category method and indicator. Table 1 show the summary of sustainability method based literature.

Table 1. The Summary Of Sustainable Method

No	Method	Indicator	Author
1.	Multi-criteria Decision Making	**E:** revenues, capital investment, value added, infrastructure investment, financial risk, inflation/ depreciation **V:** materials used by the system, water used by the system, energy used by the system, air emissions, solid AND liquid waste, hazardous waste **S:** impact on local community, hire local skills, impact on labour	Ziout, et. al., 2013 (p.4)
2.	Product-Service System (PSS)	**E:** self driven entrepreneurs, proses diversifikasi, products innovative **V:** local resources **S:** partnerships, collaboration between stakeholders	Bhamra, et. al., 2015 (p.3)
3.	Barometer of sustainability	**V:** soil, water, air, biodiversity **S:** wealth, knowledge and culture, of resourcescommunity, equity, use of resources	Batalhao, et. al, 2017 (p.3)
4.	Product-Service System (PSS)	**E:** market position and competitiveness, profitability, customer value added, business development, partnerships, macroeconomic effects **V:** optimization of system life, transportation reduction, resource use, waste minimization, conservation, toxicity **S:** social responsibility, OSH, environmental conditions, employment, industrial relations, cultural diversity	Purwaningsih, et. al., 2016 (p.4)
5.	Multidimensional Scaling (MDS)	**E:** public participation and access, opportunities for local communities, economic sustainability **V: e**nviromental Protection, flora protection, energy management **S:** visitor management & public relations, information services **I:** management organization, safety and security, visitor satisfaction	Purwaningsih, et. al., 2021 (p.4)
6.	Composite Index	**E:** economic dependence, form creation, fiscal potentioal, taxed household, productivity in industry **V:** off-site greenhouse gas, share of non-artificialized area, waste sorting center5 **S:** women in job, equipment and service, poverty	Bonet, et. al., 2021 (p.3)

Note: E= Economic; V= Environment, S= Social; I= Institutions

The conceptual stage of the sustainability assessment model. It is based on three main stages, namely the sustainability framework, development of indicator models, and assessment. Stage one: the sustainability framework based on the objectives to be addressed in the research. Stage two: compiling indicators looking for literature related to any indicators that affect the object of research. Execution stage tree: assessment of the object

RESULT AND DISCUSSION

The results section is divided to describe advantage and disadvantage of sustainability assessment method. According to the literature there were live method that can be review. Afterwards, the results was summarized and gap in current research is clearly.

Multi-criteria Decision Making (MCDM) is able to analyze quantitative and qualitative evaluations. One of the analyzes that can be used in MCDM is AHP. AHP is designed to be able to solve a complex problem by dividing the situation into a hierarchical system and then its elements by "comparison measuring pairs" and matrices for criterion weights. The eigenvalues were used to assess the strength of the consistency ratio (CR) comparative matrix (Ziout, et. al., 2013, p.3; Ngamsomsuke, et. al., 2012, p.1).

The Product Service System (PSS) method is a system of products, services, support networks and infrastructure designed to meet customer needs (Bhamra, et. al., 2015, p.3; Tukker, 2015, p.2). According to Purwaningsih et al. (2016), Product service system is seen as a development method from Design for Sustainability (D4S) that can be used to identify recommendations for improvement in increasing sustainability in an industry (p.3). Furthermore, based on PSS, it can be seen how products and services can be developed together by considering social, environmental and economic aspects towards a sustainable industry (Kjaer, et al., 2018, p.3; Fernandes, et al., 2020, p.2). The stages of the Product service system method for compiling recommendations (Purwaningsih, et al. 2016, p.5), such as identification, SWOT analysis, formulation, and assessment.

Multidimensional Scaling (MDS) an analytical method to evaluate multidisciplinary sustainability based on techniques which places the characteristics in the order in which the attributes are measured. This method uses six stages, namely identification of attributes, developing a rating scale, retrieving data, and calculating. this method is assisted by a scarter plot in simulating the output of the analysis results (Purwaningsih, et. al., 2021, p.4).

The Barometer of sustainability has proved to be effective tool and evaluation with potential into the decision making process that allows for systematic evaluation of social, economic, environment. (Batalhao, et. al., 2017, p.3). It is fundamental to understanding new dinamic on large scale. The Barometer of sustainability was used two dimension baseline such as human dimension and ecological dimension. In the analisys of barometer identic by grapich like spider diagram with sub dimension in every brunch. The wide or narrow the spider diagram based on number of sustainability rate.

Composite index is a calculation method that helps perform mathematical calculations, and specifically (Bonet, et. al., 2021, p.2). The application of this methodology was demonstrated in Catalonia (Spain) from 2007 to 2017 (Asif and Searcy, 2014, p.2). The result of the composite index method is that tight control over easy interpretation allows for a variety of analyzes and flexible applications for various situations (Mapar, et. al. 2020, p.2). According to Gallego and Font (2019), the composite index method provides a tool for stakeholders to have a comprehensive and integrated understanding of the vulnerability of tourist destinations (p.3). More deeply, this method provides powerful data that can be used to analyze current policies, negotiate conditions, prepare future plans (Gallego and Font, 2019, p.3), and help make appropriate resource allocation assessments (Panda, et. al., 2016, p.3). Composite index have tree step for assessing sustainability, normalization, weighting, and agregation.

CONCLUSION

The type model for tool of sustainability assessment was rapidly growing to meet more of society and research need. MCDM one of method can used to sustainability SMEs assessment. Multi-Criteria Decision Making (MCDM) was a framework that supports the decision-making process by combining several baselines. MCDM method that can be used was the Analytical Hierarchy Process (AHP). This research is limited to compiling references for sustainability assessment methods, so validation of the method is needed. This research The method will be test and validate to some SMEs in sector furniture with many waste from production process.

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