

The Criteria of Sustainable Product Development and Organizational Performance.

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Abstract—The demand for quality product has encouraged organizations to adopt the criteria of sustainable product development that can affect organizational performance. The objectives of developing sustainable product are to satisfy customers, achieve sustainability in business and meet stakeholders' demand on the industry. Nevertheless, adopting the criteria of sustainable product in a new product development in industry is rarely present, especially in an automotive industry. This study addresses the relationship between the criteria of sustainable product development and the effect on an organizational performance. Thus, the outcome of this study contributes to the enhancement of criteria for sustainable product development in the automotive industry and other related industries. The causal relationship approach is adopted in this study by using random sampling among the 273 automotive suppliers in Malaysia. The analysis result using PLS SEM reveals that the criteria of sustainable product development that consists of economy, social and environment are contributing to significant positive effect on the organizational performance in automotive industry.

Keywords—sustainable product development, economy, environment, social, Malaysian automotive industry, organizational performance.

1. Introduction

In the centuries of sustainable environment, adopting sustainable production of a new product development has become important in an organizational performance. In fact, the product developed by industry should involve the environment, economy and social elements [6][7]. However, many organizations only consider the product quality without considering the requirement of sustainable product.

The development of new product has to take into account the environment, economic and social elements in sustainable product which is necessary for the industry. This sustainable production of new product development aims to meet customers' satisfaction and fulfil interested parties' need [5]. For example, [9] claimed that sustainable product development has mediating effect in the relationship between quality management practices and organizational performance in Malaysia automotive industry. More, recently many studies claimed that sustainable product development has some influences on organizational performance. However, although a comprehensive new product development was demonstrated over a few decades, very little attention has been addressed on the criteria of sustainable product development effects on an organizational performance in the Malaysian automotive industry.

2. Literature Review

In general, the sustainable product development definition was based on the WCED (1987) that mentions the development of product should consider the future of needs and requirements.

However, the most accepted definitions of sustainability is triple bottom line [2] that consists of the environment, economy and social. Moreover, sustainability refers to the preserving and maintenance practices of a quality product. However, there are still arguments of conceptualization and applications of sustainability in the organization. Basically, the principle of definitions sustainability are based from WCED 1994's criteria.

In this research, the criteria of sustainable product development are based on three requirements that consist of economic, environment and social needs. The organizational performance variables used in this study was financial and non-financial criteria.

2.1 The Criteria of Sustainable Product Development

The sustainability of the organization is a vital strategy, on how the organization has set their strategies in order to lead and be sustainable in business in the twenty-first century. This includes employing the strategies in the long term instead of short term. [4] claimed that an organization should be approachable in long term perspectives as they want to be more competitive in the industry.

To sustain, the organization should adopt sustainability elements in the development of new product that consists of economy, environment and social [1]. These dimensions gained from the concept of [2] three pillars of product development that are known as social, economy and environment. The social perspectives are meeting the needs of human being partly to fulfil interested parties of new product development. The economic perspectives indicate the requirements for economic growth of the industry and the environment perspectives require endangered human quality life to be considered.

2.1.1 Economy

One of important parts of sustainable product development criteria is economic matter of the organization that plays the role in term of optimum

cost incurred while developing new products. Hence, primarily concept of economic matters is on

coordination of activities within and between the organizations during the development of new product, that includes the process of design, assembly and after sales service of new product development [9]. Thus, in early stage of sustainable product development, the type of material used in a new product must also consider fulfilling interested parties and stakeholder requirements, for example as an asbestos free product.

Economy in a process assembly of new product development is how the organization can minimize the cost involved without compromising the quality of the product. The organization must be actively involved in after sales service to customer of recycling cost and the awareness of customer in term of economic value added. On top of that, the economic value of waste management in the organization of a new product development are needs to be controlled at all stage of product development and able to meet the regulatory and statutory requirements.

2.1.2 Environment

The criteria of sustainable product development has grown and become a concern essentially on the environment consequences impact on product and organizational performances. These issues, nonetheless, become broader viewpoint of new product development. Among the macro topic have being discussed by organizations is how they follow a strictly related environmental regulation in improving the organization environmental situation that is associated with human sciences of life [11].

To achieve this target, the environment criteria of a new product development is how the organization consider controlling at optimum level solid waste used in the new product and that the process of manufacturing product that can decrease the consumption of any toxic material. For that reason, an environment management system ISO 14001 have been broadly adopted by organizations, to improve environmental criteria in a new product development which can decrease the consumption of toxic material, reduce solid waste management

and ultimately improve organization environmental situation.

2.1.3 Social

Social issues are rarely seen as long-term programs of an organization, and are sometimes set aside in the long term of an organization strategy planning, as most organizations are less concerned with social topics. However, past studies have found that there is a positive relationship between the social and organizational performances.

Social issues are also important elements in the success of an organization and should be noted by the organizational leadership. This is because the successful completion of social content among employees can assist the organization to achieve greater success in the future. According to [12], there is relationship between sustainable enforcement organization and their performance. Thus, the organization favors active participation in social activities that can easily compete with the challengers. Providing good incentives and engagement with employees are among the recommended activities that can improve employees' social life in the organization.

2.1.4 Organizational Performance

Organizational performance is a method used to measure how far an organization has achieved success. [8] define that organizational performance indicators are based on product quality, cost reduction and time delivery of products to customer. These indicators are important as guides to improve their performance [10]. In this study, there are two variables used to measure organizational performance, namely, financial and non-financial performances.

3. Research Methodology

The quantitative method used in this study was in the form of well structured questionnaires. They were distributed among the automotive vendors suppliers in Malaysia. This involved the use of a random sampling techniques on 273 automotive suppliers. However, only 91 automotive suppliers

responded with validated answers. The respondents of the study were manager, chief executive officer and senior manager that were involved in the decision making of the organization. The data was validated and proceeded for PLS-SEM for analysis.

4. Research Framework

The framework model of this study is designed between sustainable product development and organizational performance was developed based on previous and comprehensive literature review.

Furthermore, the linkage of sustainable product development should reflect the business sustainability that meet our needs, but also ensure that future generations are able to meet their needs [3]. This framework is illustrated in **Figure 1** showing framework that integrated principles of these three bottom pillars (economy, environment and social).

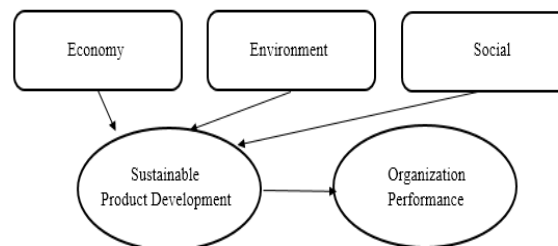


Figure 1: Research framework.

5. Research Hypothesis

Research hypothesis were constructed to determine the relationship of sustainable product development and organizational performance. As a result, three hypotheses in this study are developed in purpose to validate the relationships between sustainable product development and organizational performance. The hypothesis of this study are developed as follows:

- H1: Economy of sustainable product development have relationship with organizational performance.
- H2: Environment of sustainable product development have relationship with organizational performance.
- H3: Social of sustainable product development have relationship with organizational performance.

6. Result and Discussion

The result reveals three constructs of criteria for sustainable product development and the impact on organizational performance in the Malaysian automotive industry. The coefficient of determination, R^2 is 0.501 indicating that sustainable product development moderately explains 50.1% of variance in organizational performance.

The inner model suggests that sustainable product development has the strongest effect on organizational performance with the hypothesis

path relationship between sustainable product development and organizational performance is statistically significant ($t\text{-stat} = 3.027$ and $p\text{-values} = 0.003$). This supports the research direction.

The study demonstrates that sustainable product development can improve organizational performance by implementing of economic, environmental and social constructs of new products.

Table 1: reveals that the economy (0.814), environment (0.779) and social (0.833) are the most significant indicators of sustainable product development that have significant impacts on the organizational performance in the Malaysian automotive industry. **Figure 2** shows the path coefficient of economy (0.466), social (0.260) and environment (0.045). It indicated economy is most moderated influence to organizational performance.

Table 1: Summary result of study

Latent Variable	Indicator	Loading	CR	AVE	VIF
Sustainable product development	Economy	0.814	0.909	0.667	2.174
	Environment	0.779	0.889	0.622	2.832
	Social	0.833	0.902	0.697	2.756
Organizational performance	Financial	0.919	0.935	0.879	
	Non Financial	0.956			

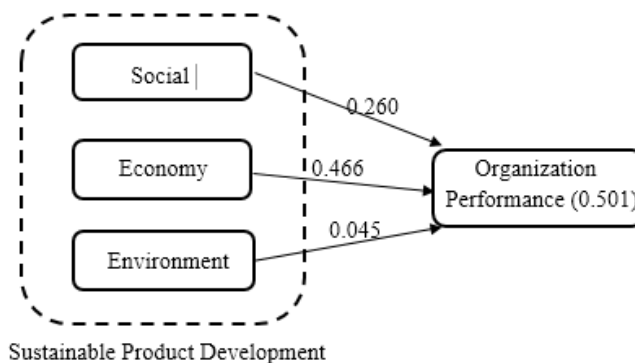


Figure 2: The results of PLS-SEM on path coefficient of research study

7. Conclusion

Complying to the criteria of social, economy and environment of sustainable product development has positive impacts on the organizational performance. The most significant impacts of these criteria on organizational performance are economy issues and follows by social and then lastly is environment. The implications of economy, social and environment in the sustainability of the product development are most significant influence on organization performance. These findings are broadly important to automotive business in Malaysia and other countries as well as newly developed products to meet the future needs.

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