

GREEN PRODUCT INNOVATION, RESOURCE COMMITMENT, ENVIRONMENTAL DYNAMISM AND PERFORMANCE OF AGRICULTURAL SMALL AND MEDIUM ENTERPRISES

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ABSTRACT: *The purpose of this study was to look into the relationships between green product innovation initiatives and firm performance of Malaysian Small and Medium Enterprises (SMEs) in the agriculture sector. The moderating role of resource commitment and environmental dynamism on the relationship between green product innovation initiatives and firm performance was also investigated in this study. Responds were obtained from Malaysian SMEs Managers. The information gathered was analyzed using the Statistical Package for the Social Sciences (SPSS) and Partial Least Squares-Structural Equation Modeling (PLS-SEM). This study found a positive relationship between green product innovation and firm performance. The findings revealed that environmental dynamism and resource commitment moderated the relationship between green product innovations and firm performance. This study is significant, particularly for the owners/managers of SMEs in Malaysia's agriculture sector. This research increased understanding and awareness of green product initiatives. This study also demonstrated that SMEs can improve their overall performance through better market position, reduce production costs, improve recycling, reduce waste, and establish a positive ecological and environmental reputation.*

Keywords -Green product innovation, firm performance, Environmental Dynamism, Resource Commitment, SMEs.

I. Introduction

The study is based on SMEs in Malaysia's agriculture sector [1]. Owners/managers of agriculture SMEs (435 firms) were identified as to possess relevant knowledge required to provide research data. SME owners/managers have the important information about their company's performance [2]. Up to date green innovation strategies in the Malaysian agriculture sector received little attention [3],[4]. Furthermore, the majority of Malaysian SMEs' interest in green issues is limited to energy ventures or gains in clean or green image [3], and firms are more concerned with the bottom line at the expense of sustainability. Organizations have become increasingly motivated to participate in green innovation initiatives as a strategy for environmental protection and superior financial growth [3],[5]proposed broadening the scope of green innovation research to firms in other countries in order to improve firm performance. Furthermore, [4] and [6] proposed additional research to investigate the relationships between green innovations and firm performance. Similarly,[3] recommended looking into the impact of green innovation on firm performance in Malaysia. This is especially important in terms of sustainability, as SMEs generate 80% of Malaysia's waste [7]. Furthermore, according to [8], green innovation lays the groundwork for firms to "balance profitability and environmental responsibility while simultaneously achieving an economic and environmentally harmonious development model that has been vigorously advocated by researchers and practitioners" (p.41). Green innovation initiatives are critical for a company's business management [9]. Furthermore, green practices among Malaysian SMEs are critical for national economic growth [10]. Furthermore, several empirical findings have established a positive relationship between green innovation and firm performance [11]; [3]; [6]; [12].

II. Purpose of Study

The first objective of this study is to look into the effects of green product innovation on firm performance in Malaysian agriculture SMEs. The research second goal is to discuss how resource commitment and environmental dynamism can be used to balance this relationship. The single antecedent in this study is green product innovation, and the consequential construct is firm performance, with resource commitment and environmental dynamism acting as moderators. The variables in the study are as follows:

2.1 Firm Performance (FP)

This study defines firm performance as a firm's efficiency in terms of return on investment, return on equity, and return on asset; a level of growth in terms of sales growth, employee growth, and market share growth; and profit levels (return on sales, net profit margin, and gross profit margin).

2.2 Green Product Innovation (GPI)

In this study, green product innovation is defined as the extend SMEs create/improve the development of new or improved products with less or no toxicity, prevent pollution, save energy, reduce waste, and recycling.

2.3 Resource Commitment (RC)

The extent to which SMEs have allocated financial, software and hardware, and human resources to environmental innovation practices is defined as resource commitment in this study.

2.4 Environmental Dynamism (ED)

Environmental dynamism is defined in this study as the rate at which uncertainties, change, or unpredictability are experienced or exist in the internal or external environment of SMEs.

II. Literature Review and Hypothesis

2.1 Green Product Innovation (GPI) and Firm Performance (FP)

The goal of new product innovations is commercialization, which is why financial indicators such as product profitability are commonly used to determine a product's performance [13]. However, the success of green products is measured using both an environmental index and a financial index to determine the impact of new product innovation on firm performance [13]; [14], demonstrating the link between green product innovation and firm performance. Researchers strongly support the link between product innovation and process innovation, implying that process innovation may lead to product innovation [15]. Firms that engage in product innovation and green design outperform firms that do less or do not focus on green product innovation [16]. According to conventional findings in the literature, green product innovation is positively related to firm performance as a growing number of people become more interested in environmental issues and purchase green products that provide the dual benefit of cost and environmental protection [17]. Moreover, green product innovation is important for developing a unique market position and building a green leadership reputation [8]. Green product innovation is a profitable business model and provides a sense of goodwill for consumers while helping firms focused on product innovation and environmental consideration, and get ahead of the competition [18]. Based on the discussion the present research proposed the following hypothesis:

H₁: There is a positive relationship between product innovation and firm performance

2.2 Resource Commitment (RC), Green Product Innovation, and Firm Performance

[19] incorporated resource commitment as a moderator in the relationship between environmental innovation practices like green product innovation, and financial performance and found that high resource commitment strengthens the relationship between environmental innovation practices and the firm financial performance. Thus, [19] concluded that this finding provided a more comprehensive understanding of the effect of environmental innovation practices such as green product innovation on financial performance, such as in the context of this study. As such, variations in resource commitment influences the strength of the relationship between green product innovation and firm performance. As a result, it is critical to comprehend the role of resource commitment as a moderator among the variables [20]. Similarly, [21] discovered that when resource commitment is higher, the effect of quality management on environmental innovation (such as green innovations in this study) is enhanced. Furthermore, [22] investigated the moderating effects of environmental orientation and resource commitment on the reputation, quality management, and environmental innovation of green oriented SMEs, and discovered that green oriented firms will reap more performance benefits from Eco innovation when they commit more organizational resources. Thus, committing resources strengthens the link between green product innovation and firm performance. According to the findings of the current study, resource commitment strengthens the relationship between green product innovation and firm performance. Thus, when resource commitment is high, the relationship between green product innovation and firm performance is strengthened. However, when resource commitment is low, the relationship between green

product innovation and firm performance is weakened. As a result, the current study proposed the following hypothesis:

H₂: Resource commitment strengthens the relationship between green product innovation and firm performance

2.3 Environmental Dynamism, Green Product Innovation, and Firm Performance

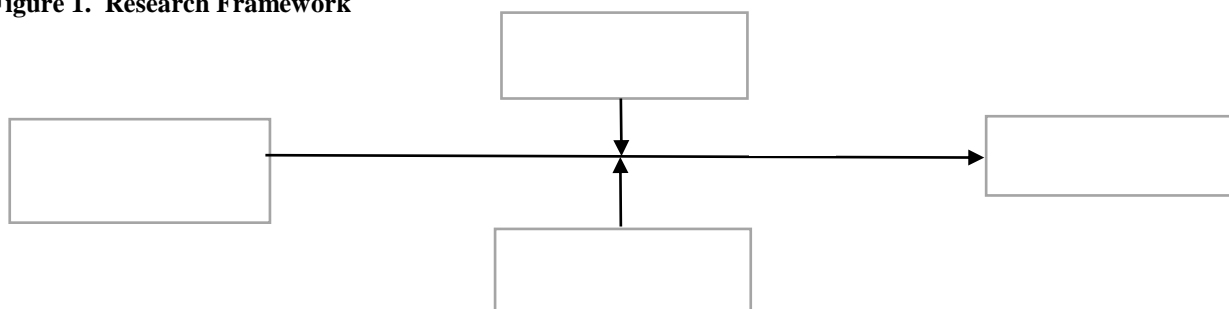
Companies seeking green product innovation are more likely to capitalize on changing conditions by improving existing products or developing new green products. As a result, environmental dynamism is expected to moderate the relationship between green product innovation and firm performance. The contingency theory can explain the preceding assumption. There are three (3) types of variables in the theory: contextual variables, response variables, and output variables [23]. Contextual variables are exogenous situational characteristics that can have an impact on the organizations involved. Environmental dynamism is one such contextual variable, and consumer demand volatility is another [24]. According to [25], market demand fluctuations can affect green innovation and thus the effectiveness of green product innovation on firm performance. As a result, the study conducted by [26] confirmed that environmental dynamism moderates the relationship between green product innovation and firm performance. However, in terms of innovation, the external environment is critical because it can drive a firm to be more or less innovative depending on its dynamism [27]. Existing products are easily rendered obsolete in a dynamic environment characterized by frequent and rapid changes brought about by technology, customers, and suppliers. Using primary data from small and medium-sized exporting firms in the United Kingdom, [28] discovered that environmental turbulence weakens the relationship between new product success and financial performance. As a result, when environmental dynamism is high, the relationship between green product innovation and firm performance weakens. When environmental dynamism is low, however, the relationship between green product innovation and firm performance is strengthened. The current study proposed the following hypothesis based on this discussion:

H₃: Environmental dynamism weakens the relationship between green product innovation and firm performance

III Resource Base View Theory & Contingency Theory

The RBV perspective was used in this study to better understand the internal factors influencing green product innovation. According to RBV theory, successful corporate strategies include the development of capabilities or resources (both tangible and intangible assets) as well as skills (i.e. reproducing and maintaining these resources). Meanwhile, the contingency theory is being applied to research the relationship between green innovation initiatives and environmental dynamism. Based on previous researchers' discussions and suggestions, the current study used the resource base view RBV, and the contingency theory to underpin the current study research framework (Fig 1).

Figure 1. Research Framework



III. Methodology and Measurement

Because this was a positivist study, a quantitative approach was used to predict the influence of independent variable, (green product innovation) and moderator variables (resources commitment and environmental dynamism) on dependent variables (firm performance). Furthermore, the quantitative method was chosen for the research design because it is consistent with the type of data (survey) and the research objectives. The total sample size used for this study was 410.

V. Empirical Results

In this study, structural equation modeling (SEM) was used to validate the research framework and hypotheses and to obtain empirical results. SEM is a statistical technique that accounts for interactions, non-linearities, correlate independent variables, measurement error, correlated error terms, and multiple latent independents measured by multiple indicators to more powerfully test and estimate causal relationships. Green product innovation comes first, followed by agricultural SME performance, with resource commitment and environmental dynamism acting as moderators. The SEM for this study includes two levels of analysis: the measurement model and the structural model.

5.2 Results of Measurement Model

This study examines reflective measurement models, including internal consistency, individual indicator reliability, convergent validity, and discriminant validity. Examining the loadings of each of the constructs' individual items is one way to assess reliability. The loadings of the constructs listed in (Table 1) are all significant in terms of the measurement model's quality. Table 1 shows the Cronbach's coefficients for the reliability measure. In general, the Cronbach's coefficient must be at least 0.7 [32]. Because the Cronbach's coefficients of the four constructs are greater than 0.7, the measurement in this study is reliable. Furthermore, it is critical to determine whether the measurement's validity is acceptable.

The questionnaire used in this study has a high level of content validity. Second, Fornell and Larcker's measure of average variance extracted (AVE) (Table 1) was used in this study to assess the measurements' discriminative validity [33]. The AVE calculated the variance captured by a construct via its items in relation to the variance due to measurement error. The square root of a construct's AVE must be greater than the correlations between the construct and other constructs in the model to satisfy the discriminative validity requirement. The square roots of the AVEs for firm performance and green product innovation (Fornell and Larcker's) (Table 2), for example, are 0.7582 and 0.7818, respectively.

Table 1. Item Loadings

Results of cronbach's alpha composite reliability and AVE

Constructs	Cronbach's Alpha α	Composite Reliability (CR)	Average Variance Extracted (AVE)
FP	0.877	0.904	0.574
GPI	0.893	0.916	0.611
RC	0.859	0.872	0.636
ED	0.828	0.887	0.664

Table 2. Fornell and Lackert

	FP	GPI	RC	ED
FP	0.7582			
GPI	0.5100	0.7818		
RC	0.0626	0.0658	0.7975	
ED	0.0520	0.0575	0.5172	0.8154

5.3 Results of Structural Model

H₁ There is a positive relationship between green product innovations and firm performance.

Results shows ($\beta = 0.321$, t-value= 8.049, p-value= 0.010). Based on these results obtained $P < 0.05$, hence **H₁** is supported; green product innovation has a positive and significant relationship with firm performance. (Table 2).

Table 2. Direct relationship test

Hypothesis	Relationship	Path Coefficient	Standard Error	T-Statistics	P Values	Decision
H ₁	GPI → FP	-0.035	0.053	0.603	0.010	Supported

H₂: Resource commitment strengthens the relationship between green product innovation and firm performance

Results shows ($\beta = 0.194$, t-value = 1.931, p-value= 0.023). Based on the results obtained, $P < 0.05$, hence **H₂** is supported; resource commitment strengthens the relationship between green product innovation and firm performance (Table 3).

H₃: Environmental dynamism weakens the relationship between green product innovation and firm performance

Results shows ($\beta = -0.183$, t-value = 1.822, p-value = 0.035). Based on the results obtained, $P < 0.05$, Hence, **H₃** is supported. Therefore, when environmental dynamism is high; it weakens the relationship between green product innovation and firm performance (Table 3).

Table 3. Results of moderation (indirect relationship) test

Hypothesis	Relationship	Path Coefficient	Std. Error	T Value	P Value	Decision
H ₂	GPI → FP ↑ RC	0.0194	0.097	1.931	0.023	Supported
H ₃	GPI → FP ↑ ED	-0.183	0.101	1.822	0.035	Supported

VI. Conclusions

The purpose of this study is to investigate the effects of green product innovation on firm performance in Malaysian agriculture SMEs, as moderated by resource commitment and environmental dynamism. Hypotheses H1, H2, and H3 are supported in this study. This study includes three academic contributions. First and foremost, this research incorporates resources and capability into RBV research. RBV considers resource and capability to be important assets that a company can control. The uncertainty challenge is how companies convert resources into capability for new products [29]. This study presents a novel perspective for green product development by addressing the relationship between resource commitment, green product innovation, and firm performance.

Second, this research proposes a novel concept of environmental dynamism, which is the ability to deal with rapid changes in the firm's external and internal environments. The moderation role of environmental dynamism and resource commitment was investigated concurrently in this study. Corporate environmental dynamism (ED) can have an indirect positive impact on firm performance innovation through green product innovation. Green product innovation can have a positive indirect effect on firm performance due to resource commitment (RC). As a result, this research demonstrates that ED and RC act as moderators between green

product innovation and firm performance. This research also demonstrates that corporate environmental dynamism and resource commitment are important predictors of firm performance in green product innovation. Corporate environmental dynamism can lead to companies looking for opportunities in the current surge of green innovation for the advancement of their businesses. Environmental pressures from stakeholders frequently influence firm environmental dynamism [34].

Corporate environmental dynamism can assist firms in developing a keen interest in integrating, building, and reconfiguring internal and external competencies to meet environmental regulations or requirements. This study also includes three practical contributions for businesses. First, green product innovation is an effective differentiation strategy that enables Malaysian agriculture SMEs to establish new businesses both nationally and internationally. Environmental trends have the potential to become the impetus that drives firms to implement corporate environmental dynamism in order to further enhance green product innovation and firm performance.

Third, this study suggests that Malaysian firms should focus more on improving their corporate environmental activities in order to improve their green innovative capability. The majority of Malaysian businesses are small and medium-sized enterprises (SMEs). According to the findings of this study, SMEs must improve their green innovative capabilities in order to thrive in an uncertain environment. SMEs in Malaysia should build companies' environmental vision or mission to raise their corporate image.

Fourth, Malaysian agriculture SMEs can improve their capability in determining how to best deploy their resources under various conditions. As a result, this study suggests that firms should develop and cultivate their green innovations in order to determine whether green products can improve firm performance. Fourth, the current research findings have important theoretical, managerial, and practical implications for a broader range of SMEs, universities, and other agricultural and environmental research institutions. Although previous research investigated the impact of green innovation initiatives with various environmental consequences, the research model of this study model is the first model in the context of Malaysian agriculture SMEs investigating the relationship between green innovations and firm performance. Nonetheless, green innovations is an area that needs more research in Malaysia [35]; [3].

Furthermore, the current research findings are significant because, when compared to large firms, SMEs are perceived to be less aware of their company's operations and less interested in implementing green business practices [36]. As a result, this research is critical for understanding the potential impact of green innovations on firm performance of agricultural SMEs. Furthermore, the current study adds to the growing debate about whether it pays to be "green," and this debate was extended to the agriculture sector to gain a broader theoretical understanding. As a result, the current study has paved the way for future research into firm performance (an outcome) using green innovations as a driver and resource commitment and environmental dynamism as moderator variables.

Moreover, the current study responds to the call for additional research to incorporate additional moderation variables in the study of green innovations [6] in order to learn more about the relationship between green innovations and firm success. Scholars have indicated in the current literature that a variety of factors (e.g., organizational, environmental, contextual, and resources, among others) may have an impact on the relationship between green innovations and firm performance. This research adds to our understanding of the impact of potential moderation variables. Thus, responding to suggestions to investigate the extent to which potential moderators may influence the impact of green innovations on firm performance [37];[38]; [6]. As a result, the study's uniqueness is further established by incorporating two (2) moderating variables, resource commitment and environmental dynamism, into a single theoretical model. The study's findings add to the debate about resource commitment and its impact on the relationship between green product innovations and firm performance. Future researchers may test or expand the current model in agriculturally based economies throughout the world.

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