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The Influence of Green Product Development Performance to Enhance Enterprise Effectiveness and Innovation

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Abstract: Climate change and environmental crises are currently affecting the living environment of both people and the planet in general. This necessitates businesses to have a prompt and effective response to minimize or improve the harmful effects that lead to environmental imbalance and fulfill corporate social responsibility through focusing on transitioning to a model of sustainable economic development and encouraging the development and production of green products. This study discovers that the five factors green creativity, green dynamic capabilities, green transformational leadership, reactive green innovation, and proactive green innovation have a positive influence on and aid in the creation of exceptional green product development performance. A survey questionnaire was used to collect data for this research with the participation of more than 1000 people. These figures reveal that the participants are people who are knowledgeable about environmental issues and are actively interested in environmental protection (as well as people who have used green products). Research using software to support SPSS.20 and AMOS.24 to test the hypotheses. The study serves as a framework to help businesses better comprehend the relationship between economics and the environment with the purpose of providing valuable data and raising awareness for innovation in development models for businesses and organizations.

Keywords: green product development performance; green creativity; green dynamic capabilities; green transformational leadership; reactive green innovation; proactive green innovation

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1. Introduction

In recent years, adverse consequences from negative impacts on the environment have become a major global concern as a result of industrial development and evolution. In Vietnam, human-caused activities including the emission and discharge of untreated waste from industrial parks, mines, and traditional craft villages cause heavy environmental pollution (Chu 2018). In addition, traffic, agriculture, and deforestation also contribute to pollution in urban, rural, and forested areas. These issues have ramifications not only for the environment's sustainability but also endanger human health (Raza et al. 2022). Therefore, environmental degradation is always a difficult topic and attracts people's attention (Choi 2020; Oh and Park 2020; Nguyen et al. 2021). As environmental issues are being clearly perceived by the public, green products are also gaining attention and acceptance (Chen 2010). According to Chen and Chang (2012), many consumers pay more attention to green products. Many companies are willing to develop more green products (Chen 2011) since it can help companies and economies thrive in the international market, bring value and drive towards sustainable development of the environment. Moreover, the creation of green products is very important for businesses to respond appropriately to the environmental crisis (Albino et al. 2009), which is also the social responsibility of

businesses. Consumers are smart enough to recognize and resist companies whose actions destroy their environment.

In this study, the authors will develop a research framework that can help companies improve their green product development performance through five related determinants: green creativity, green dynamic capabilities, green transformational leadership, reactive green innovation, and proactive green innovation. Success in green product development depends on creating products with core attributes that can satisfy the needs of customers and other internal and external stakeholders. Product development firms will contribute little to the sustainability mission unless they can provide consumers with a realistic "green" product option (Pujari et al. 2003). Green product development also plays an important role in determining the sales of green products of a business and this development process not only changes the company management model but also reshapes the global market principles for business (Lymperopoulos et al. 2012). Furthermore, since the goal of sustainability is eliminating hunger, reducing poverty, and improving people's spiritual and material lives, this will be difficult if the country does not generate income that contributes to the economy (Costa et al. 2021). It is an obvious fact that the majority of consumers of green products are the driving force for enterprises to research and develop green products. In addition, this study was conducted in Vietnam, where the economy is in a developing stage, with the aim of providing clear directions for countries in the development stage toward economic integration, society, the environment and fulfilling social responsibilities. Business sustainability can be defined as attaining environmental goals while maintaining long-term company growth. Innovative practices in business operation and development are essential for economic sustainability. New improvements in the production process and efficient development of green products will bring a number of benefits, including promoting the nation's ecosystem (Costa et al. 2021). According to the results of previous studies, businesses in the next stage of sustainable management should focus on green transformation, minimize harmful emissions to the environment and human health, and actively find measures for green space development and sustainability (Hoffman 2018). Therefore, according to the experimental results, this study tries to fill the gaps of previous studies by analyzing and identifying the factors green creativity, green dynamic capabilities, green transformational leadership, reactive green innovation, and proactive green innovation. All hypotheses are accepted and they all have a positive impact on the performance of green product development, providing strategies that companies need to improve, the most powerful of which is green transformation leadership. Furthermore, this study is a useful document for Vietnamese firms that want to elevate the value of green products to an international level in order to make tangible contributions to the global community, decrease negative impacts from exploitation and manufacturing activities, and supply the current and future demand for green products.

2. Literature Review and Theoretical Background

2.1. Green Creativity

'Green Creativity' is defined as the development of new ideas with new useful characteristics for green products, services and practices (Song and Yu 2018). Organizational creativity is accomplished by the creation of an idea, product, or service of useful value by individuals working together within an organizational system (Woodman et al. 1993). To improve the development efficiency of enterprises, promoting solutions to develop organizational creativity is the main way to bring about innovation (Halbesleben et al. 2003). Organizations that accumulate innovative ideas can develop better and superior product performance (Hunt and Morgan 1995). The success of new product development will be significantly influenced by innovative ideas (Cooper 1979). The creativity of the team can create the conditions for the development of new products with new characteristics since usefulness is decisive for the success of the new product (Chang et al. 2010). Previous literature suggested that group creativity can be defined as the creativity developed by group members (Pirola-Merlo and Mann 2004). From the customer's point of view,

an innovative idea is considered by its originality and measured by how useful it is to the customer (Ford 1996). In addition, consumer needs can be effectively met by the unique, outstanding innovation of the product development and improvement team (Cooper 1979; Deshpande' et al. 1993). For organizations and enterprises, group creativity is considered the main factor of innovation (Yoon et al. 2010). Therefore, research carried out by (Cooper 1979; Smith and Reinertsen 1992; Amabile et al. 1996; Griffin 1997) has shown that product development performance is positively influenced by creativity in product development teams. According to the above discussion, this study hypothesized the following:

Hypothesis 1 (H1). *Green creativity is positively related to green product development performance.*

2.2. Green Dynamic Capabilities

Dynamic capability is defined as the process of using an organization's resources, focusing on the process of setting up or rearranging internal and external processes and resources to accommodate changes in the organization environment (Teece et al. 1997). In addition, green dynamic capability is shown to be the ability of organizations and companies to integrate resources for the purpose of achieving sustainability and improving the green environment in their business activities (Rodrigo-Alarcón et al. 2018). According to Wohlgemuth and Wenzel (2016), in a competitive, complex and unstable business environment, dynamic capability will be a useful solution in improving the company's competitiveness. To develop green product performance, businesses need to apply their dynamic capabilities through combining existing knowledge elements and acquiring new knowledge (Andriopoulos 2001). An organization with stronger dynamic capabilities will be able to improve and develop better product performance (Arora 2002). Therefore, dynamic capabilities have a significant positive effect on product development performance (Hsu and Fang 2009). Innovation requires finding new sources of information different from the existing knowledge base in order to innovate, supplement and grow it, so organizations that embrace innovation will have to deal with a high degree of uncertainty, where dynamic capabilities are an important driver of innovation (March 1991; Lee and Kelley 2008). Organizational product development teams can rapidly develop new products that match and meet customer needs by applying dynamic capabilities to integrate resources and easily align operations development (Pavlou and El Sawy 2011). Thus, firms' competitive advantages can affect innovation performance through dynamic capabilities (Galunic and Eisenhardt 2001). Therefore, dynamic capability will positively affect new product development performance (Clark and Fujimoto 1991; Iansiti and Clark 1994). Based on previous studies, Hypothesis 2 was established:

Hypothesis 2 (H2). *Green dynamic capabilities is positively related to green product development performance.*

2.3. Green Transformational Leadership

Transformational leadership is a multidimensional concept that has meanings in terms of goals, culture, vision, structure, personal support, and performance expectations (Luyten and Bazo 2019). Previous literature has also widely demonstrated that transformational leadership has a direct influence on creating an innovative climate in the organization to create incentives for members to improve the operational efficiency of the business (Boehm et al. 2015; Pasha et al. 2017; Thomas 2017; Sethibe 2018). Robertson (2018) defined green transformational leadership as the behavior of leaders who motivate employees to achieve corporate environmental goals and inspire to exceed environmental performance expectations. Additionally, the meaning of green transformational leadership is to provide clarity, motivation to employees, and support for employees' development needs towards their environmental goals for the organization (Mittal and Dhar 2016; Chen and Chang 2013). Studies have determined that the performance of companies is due to the interaction

between leaders and their employees (Caplan 1987). Green transformational leadership motivates employees to acquire new knowledge (Le and Lei 2018; Han et al. 2016) and engages them interactively in activities related to green processes, product innovation, or introducing green products or services into the market (Andriopoulos and Lewis 2010). In addition, Bass (1985) suggested that transformational leaders should include four aspects: intellectual stimulation, individualized consideration, charisma, and inspirational motivation. Intellectual stimulation helps employees build cognitive processes appropriate to the creativity of problem formulation, information seeking, solution creation, and problem solving (Reiter-Palmon and Illies 2004). Research (Gong et al. 2009) suggests that transformational leaders can foster collective creativity through identifying individuals' needs, and providing coaching and mentoring. For charismatic transformational leaders, they create a clear vision for the team, energize, and drive creative generation (Avolio et al. 1999). Finally, transformational leaders with a high level of motivation inspire their followers to think creatively by encouraging them to voice their ideas (Gong et al. 2009). Therefore, green transformational leadership can enhance new product development performance by setting expectations, stating a vision for high performance, motivating and inspiring team members with clear goals and supporting individuals in green product development activities (Podsakoff et al. 1990; Sarros et al. 2008). Based on the above statement, we propose the following Hypothesis 3:

Hypothesis 3 (H3). *Green transformational leadership is positively related to green product development performance.*

2.4. Reactive Green Innovation

For the organization's green product development activities, this is considered an important way for the company to connect with the market. Enterprises should spend money on development and product improvement strategies in order to stay ahead of their competitors in the business market (Ayag 2005). In addition, for green product development strategies, creating a product that can be produced at the lowest cost or innovating the product to make the product differentiated to meet the needs of consumer consumption are all methods that help businesses gain a significant competitive advantage (Orsato 2006). An organization or enterprise will face many disadvantages in competition and future business risks if it cannot effectively control the product development department (Fitzsimmons et al. 1991). From the above discussion, it can be considered in the field of environmental protection, to implement enterprise-wide environmental management in a proactive manner. Competitors will adjust and innovate so as not to be negatively affected by the adverse competitive environment. Our hypothesis is that green product development performance is linked to reactive green innovation, and Hypothesis 4 was found:

Hypothesis 4 (H4). *Reactive green innovation is positively related to green product development performance.*

2.5. Proactive Green Innovation

For businesses, product development is a potential way, it supports the image of businesses that are firmly established in the market and to create a competitive advantage compared to other competitors in a continuously changing market (Brown and Eisenhardt 1995). According to Benn et al. (2014), product development is the main source of competitive advantage of enterprises in the context of market diversity, so businesses must emphasize their brands in designing an outstanding organizational image in the market. Customer needs are met by seizing market opportunities in product development (Stark 2015). Enterprises develop green products to innovate and redesign products with the aim of minimizing environmental pollution problems, contributing to jointly dealing with environmental issues (Chen 2001). Besides, research (Cronin et al. 2011) has demonstrated that the development of environmentally friendly products and services is necessary.

This is considered the key to helping businesses succeed in fulfilling the growing demand of customers for environmental protection products. Meanwhile, companies are striving to meet the needs of customers regarding the development of environmentally friendly products and services. As a result, we believe that proactive green innovation is connected to green product development performance and propose the following hypothesis:

Hypothesis 5 (H5). *Proactive green innovation is positively related to green product development performance.*

2.6. Green Product Development Performance

Chen and Chang (2013) gave the first definition of green product development performance as the ability to create products with a less negative impact on the environment and less harm to human health. It is part or whole made by using recycled materials, and produced in a more energy-efficient manner and supplied with less packaging to the market. Companies are still trying to figure out how to profit from green products, despite the fact that green development is becoming more common (Gabler et al. 2015). Furthermore, Chen et al. (2016) argue that creating green products with efficiency, as a new kind of business strategy, requires breaking the original production method. Research results from Chang (2016) show that corporate environmental commitment has a direct and indirect positive impact on green product innovation performance through green adaptability. Managers must recognize that providing green product development performance is critical to long-term sustainability and can provide a competitive advantage and strengthen an organization's ability to grow sustainably.

The conceptual framework of this study is depicted in Figure 1.

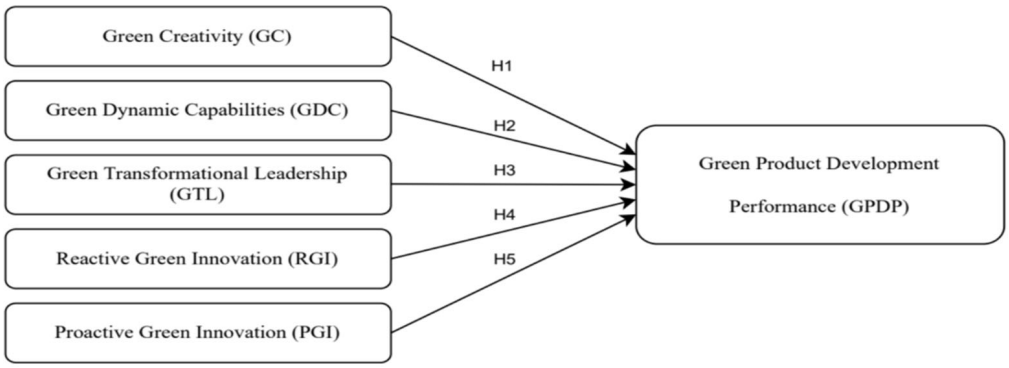

Figure 1. Research framework. H1–H5 are the hypotheses presented below.

3. Research Methods

3.1. Research Design

The research is designed based on the theoretical model proposed in Figure 1. The suggested independent variables are green creativity, green dynamic capabilities, green transformational leadership, reactive green innovation, and proactive green innovation, while green product development performance is the dependent variable in the study. The questionnaire is designed for the participants to respond to their level of agreement with the survey question created on a 5-point Likert scale, with the following principles: the lowest rule (1) being "strongly disagree" to the highest level (5) "strongly agree". Most of the previous measurement models used the Likert scale due to its usefulness in social science research and education, which is a basic psychological assessment tool (Joshi et al. 2015).

3.2. Data Collection Method

This study applies a survey method to test the hypotheses and conceptual models proposed in the research paper and conduct a survey to collect data using an online questionnaire based on a graph sample by Google. The consistency design of the questionnaire

builds reliability and useful value from the data for analysis (Taherdoost 2018). The questionnaire was based on a convenience sampling approach and was sent to the surveyors through social networking sites (Facebook, Instagram, Zalo, and private email messages). Research subjects are individuals who have experience working in companies in cities and students who have graduated from university and are starting to work in enterprises. They are highly educated individuals with knowledge of environmental issues and green products to ensure that the information they provide is of high quality and reliability. The survey questionnaire in this study asked respondents to identify their experience and knowledge about developing green products that can benefit companies and consumers. After that, participants will be assessed on factors such as "green creativity", "green dynamic capabilities", "green transformational leadership", "reactive green innovation" and "proactive green innovation" to consider the degree of influence on "green product development performance" in enterprises. The survey was conducted from December 2021 to February 2022. A total of 1042 questionnaires were distributed, after screening for incorrect and inappropriate responses. Finally, 1009 valid questionnaires were suitable for statistical analysis.

3.3. Data Analysis Method

The data collected in this study was conducted by applying both qualitative and quantitative analysis methods in the survey questionnaire. Demographic related survey elements were collected through qualitative techniques in survey questionnaires, as the data collected from the surveyors will be applied quantitative techniques to evaluate and analyze (Kidder and Fine 1987). The aim of this study was to determine the reliability and validity of the analyzed data using the statistical software packages SPSS.20 and AMOS.24 for data analysis by using statistical software methods for calculating Cronbach's alpha reliability, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM).

Cronbach's alpha (or mean) to assess the reliability of the scale of variables and eliminate those variables that are not suitable (Cronbach 1951). Perform exploratory factor analysis (EFA) to develop the scale and examine the underlying relationships between the variables. Confirmatory factor analysis (CFA) is used to determine univariate, multivariate, convergent, and discriminant values that help bridge the gap between hypothesis and findings. Structural equation analysis (SEM) was used to confirm the fit, evaluate the hypothesis, and determine the degree of impact of the independent variable on the dependent variable of the proposed structural model (Kline 2005; Byrne 2010; Hair et al. 2014).

In this study, since our structural model is complex with multiple layers, so study chooses the structural equation modeling (SEM) method as suitable for analyzing aggregated data (Hair et al. 2014). Structural equation modeling (SEM) in AMOS is used to test the direct and indirect effects of variables in the research model. Structural equation modeling (SEM) is used through two phases (Hair et al. 2014). First, we use the structural model to measure the overall fit of the research model. Second, we use the measurement model to determine how measured variables represent the domain constructs. As for the determination of the appropriate sample size, there is currently no universally agreed upon method for determining the appropriate sample size. Therefore, the suitable sample size for the analysis is determined through a number of criteria. First, the minimum size that can perform structural equation modeling analysis is 100 samples (Hair et al. 2014; Kline 2016; Wang and Wang 2012). Second, the minimum sample size should be at least five times larger than the number of measured items (Pallant 2005), with the current research model of 24 measured items, a minimum sample size of 120 is required. Finally, the sample size must be 10 times larger than the latent variables in the research model (Hair et al. 2011), with our research model having six latent variables, so only 60 sample sizes from participants are eligible. Therefore, the sample size of this study including 1009 appropriate responses of the participants, completely satisfying all of the above conditions.

4. Results

4.1. Profile of Respondents

During the entire survey, after completion, the team obtained 1042 forms with 1009 valid forms to carry out the study. The results are described in detail below. Information about individuals participating in the survey is collected by a qualitative method through observing variables such as gender, age, education level, occupation, and average income per month presented in Table 1. Regarding gender, male accounts for 48.5%, female 51.5%. The sample survey after completing the design was sent to all proposed age groups and collected the opinions of survey respondents, in which the age group received the highest response rate from 22 to 30 years old with 82.6%, 9.4% over 30, 6.2% between the ages of 18 to 22 and 1.8% under the age of 18. Similarly, for education level, the results show that the majority of respondents had university degrees with the highest reaching rate of 81.3%, with college accounting for 6.7%, intermediate accounting for 4.9%, postgraduate accounting for 4.2%, and high school accounting for 3%. In terms of occupations, 68.7% of the participants are workers and employees, 7.2% are freelance, 6.7% are civil servants, and the industry groups of students, housewives, business, and college students have the proportions of 5.1%, 4.5%, 4.2%, and 3.7%, respectively. Furthermore, the largest group had a monthly income of 3–5 million VND (42.7%), followed by 5–10 million VND (36.6%), under 3 million VND (12.5%), and over 10 million VND just contributed 8.2%. The results from the survey, the data is completely relevant to the research issue and completely reliable for the study.

Table 1. Description of demographic characteristics of the surveyed sample.

Demographic	Characteristics (n = 1009)	Frequency	Percentage (%)
Gender	Female	520	51.5
	Male	489	48.5
Age	Under 18 years old	18	1.8
	18–22 years old	63	6.2
	22–30 years old	833	82.6
	Over 30 years old	95	9.4
Education	High school	30	3
	Intermediate	49	4.9
	College	68	6.7
	University	820	81.3
	Postgraduate	42	4.2
Occupation	Student	51	5.1
	College Student	37	3.7
	Civil servant	68	6.7
	Workers—Employees	693	68.7
	Business	42	4.2
	Housewives	45	4.5
	Freelance	73	7.2
Income	Under 3 Million VND	126	12.5
	3–5 Million VND	431	42.7
	5–10 Million VND	369	36.6
	Over 10 Million VND	83	8.2

4.2. Test of the Reliability of Scale

Cronbach's alpha reliability performance is used to test the reliability of the scale in the research model that affects the green product development performance factor, and check the consistency between variables of the same factor since the higher the consistency of the observed variables, the more reliable the scale will be. Showing the correlation relationship between total variables and significant variables in Table 2.

Table 2. Cronbach's alpha.

Construct	Items	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Green Creativity (GC): Cronbach's Alpha = 0.991	GC1	0.965	0.992
	GC2	0.973	0.989
	GC3	0.990	0.985
	GC4	0.983	0.987
Green Dynamic Capabilities (GDC): Cronbach's Alpha = 0.992	GDC1	0.971	0.991
	GDC2	0.974	0.991
	GDC3	0.990	0.986
	GDC4	0.982	0.989
Green Transformational Leadership (GTL): Cronbach's Alpha = 0.995	GTL1	0.976	0.996
	GTL2	0.992	0.991
	GTL3	0.992	0.991
	GTL4	0.984	0.993
Reactive Green Innovation (RGI): Cronbach's Alpha = 0.990	RGI1	0.988	0.984
	RGI2	0.960	0.992
	RGI3	0.971	0.989
	RGI4	0.988	0.984
Proactive Green Innovation (PGI): Cronbach's Alpha = 0.991	PGI1	0.972	0.990
	PGI2	0.969	0.991
	PGI3	0.990	0.985
	PIG4	0.980	0.988
Green Product Development Performance (GPDP): Cronbach's Alpha = 0.961	GPDP1	0.893	0.954
	GPDP2	0.959	0.933
	GPDP3	0.886	0.955
	GPDP4	0.896	0.952

In Table 2, the Cronbach's alpha value of all factors is greater than 0.7, showing the high reliability of the relationship between the observed variables and the total variable, and the factor is considered acceptable when it is a Cronbach's alpha score of 0.6 or higher (Hair et al. 1998). Besides, the correlation coefficients of each observed variable with the overall variable are all greater than 0.3, showing that these variables are satisfactory (Nunnally and Bernstein 1994). The results satisfied the standard Cronbach's alpha performance conditions and showed that the factors in the study were reliable, so the factors were retained for further testing.

4.3. Exploratory Factor Analysis (EFA)

The principal axis coefficient in this study is used with promax rotation and factor loading coefficients $\geq$0.5 to combine the remaining variables into the exploratory factor analysis (EFA) model for the purpose of determining the relationship of factors belonging to different groups and considering removing bad variables (Anderson and Gerbing 1988). Table 3 KMO and Bartlett's Test show the Kaiser-Meyer-Olkin value is 0.888 > 0.5, indicating that the prerequisites for implementing exploratory factor analysis have been reached. Besides, Bartlett's test is statistically significant with Sig = 0.000 < 0.05. This data is regarded as evidence of factor correlation. Furthermore, the results of the pattern matrix show that 20 observed independent variables are classified into 5 factors, all observed variables have

factor loading coefficients >0.5, the cumulative total variance of 97.842% >50%. These 5 factors explain 97.842% of the change in data of 20 observed variables. It can be seen that the model is identical to the original scale, and it is concluded that by including five observed variables in the EFA analysis, all variables are suitable and correlated with one another, and no variables are excluded.

Table 3. Result of the second exploratory factor analysis.

Factor	Pattern Matrix [a]				
	1	**2**	**3**	**4**	**5**
GTL2	0.948				
GTL3	0.946				
GTL1	0.944				
GTL4	0.936				
RGI4		0.944			
RGI1		0.939			
RGI3		0.922			
RGI2		0.909			
GC3			0.934		
GC4			0.932		
GC1			0.928		
GC2			0.910		
GDC2				0.931	
GDC3				0.927	
GDC1				0.922	
GDC4				0.918	
PGI1					0.929
PGI2					0.923
PGI3					0.918
PGI4					0.911

KMO: 0.888 Cumulative of Variance (%): 97.842. Note: [a] Rotation converged in 6 iterations.

4.4. Confirmatory Factor Analysis (CFA)

After exploratory factor analysis (EFA), we measure the fit of the data and the measurement model by confirmatory factor analysis (CFA) through the software supporting SPSS and AMOS (Hu and Bentler 1999). The measurement model of the research concepts is shown in Figure 2. The indicators used to analyze the results, such as Chi-square (CMIN), which is adjusted by degrees of freedom (CMIN/df), CFI, GFI, TLI, RMSEA, and PCLOSE indices, and the model is considered fit for the market data when the conditions are met, can be seen clearly in Table 4. Due to the standardized regression weight of the observable variables, indices >0.5 are fully significant for the research model, the correlation coefficients of the concept pairs at the 95% confidence level (p-value = 0.000), and the p-value of the variables. All observations have a Sig value = 0.000, so the observed variables achieve a discriminant value, which is considered a good representative of the CFA model factor, and the observed variables are kept unchanged in the model.

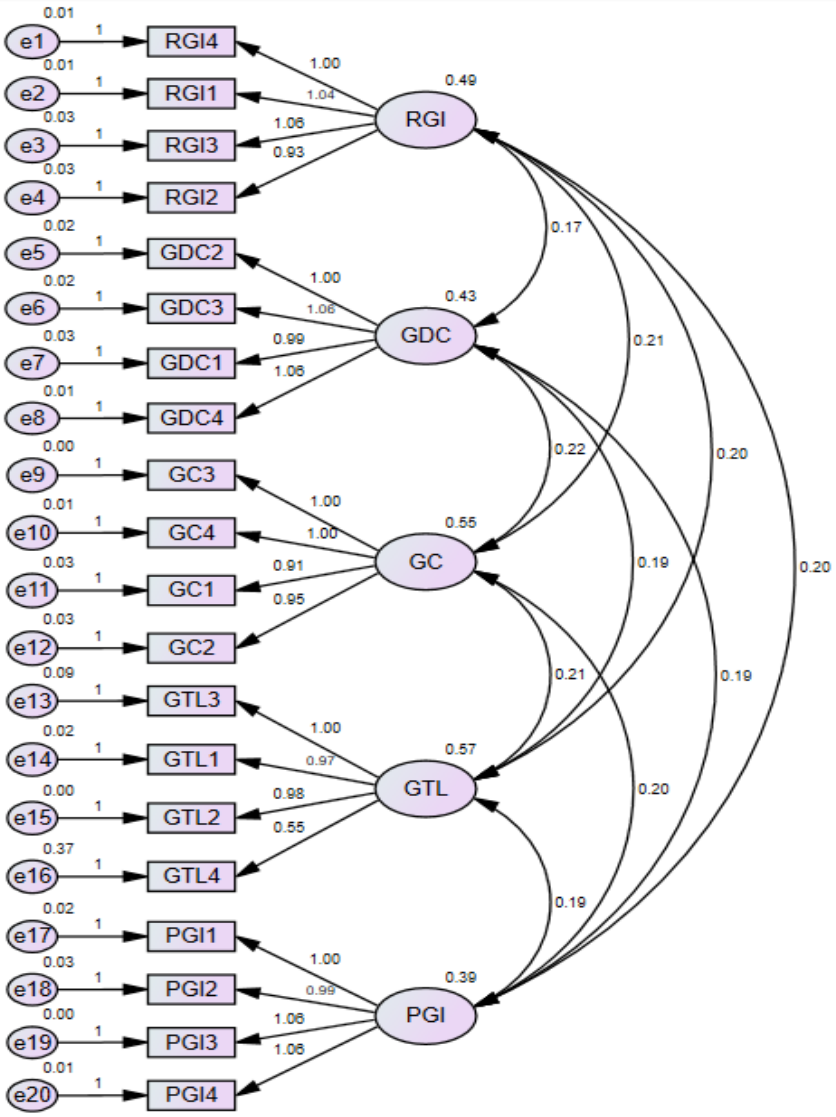

Figure 2. Results of CFA of green product development performance scale (standardized).

Table 4. CFA measurement model fit indices.

Parameters	Observed Value	Ideal Threshold	Result
Chi-square/df	2.492	<3	Good
GFI	0.969	>0.9	Good
CFI	0.995	>0.9	Good
TLI	0.986	>0.9	Good
RMSEA	0.059	<0.08	Acceptable
PCLOSE	0.04	>0.01	Acceptable

4.5. Structural Equation Model (SEM)

In general, structural equation modeling (SEM) of the AMOS 24.0 program is a concept of multivariate statistics to test the relationship between structures in the research model and include measurement deviations in the structural coefficients (Hair et al. 2010; MacKenzie 2001). We proceed to confirm or reject the proposed hypotheses based on statistical data (Figure 3 and Table 5). After performing the SEM process and adjusting the model, the results show that the indicators are consistent with the overall model as

the Chi-square (CMIN/DF) value is 2.230, the Goodness-of-Fit Index (GFI) value is 0.961, the Adjusted Goodness of Fit Index (AGFI) value is 0.945, the Normed Fit Index (NFI) is 0.956, the Comparative Fit Index (CFI) value is 0.993, the Turker Lewis Index (TLI) value is 0.982, the Root Mean Square Error of Approximation (RMSEA) is 0.061, and the Root Mean Square Residual (RMR) value is 0.029, according to the measurement criteria mentioned in Table 5.

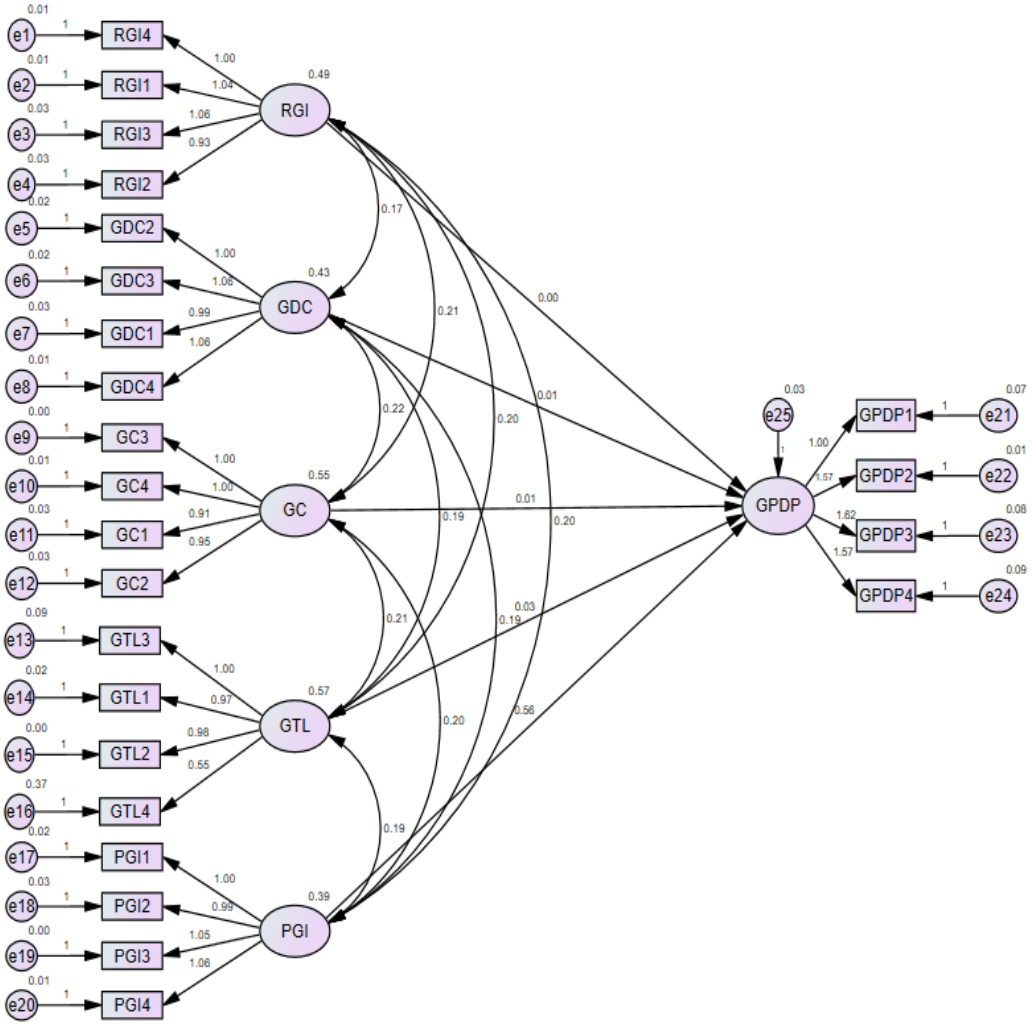

Figure 3. Direct and indirect effects on green product development performance.

Table 5. Goodness of Fit.

Goodness-of-Fit Indices	Criterion	Results of This Study
Chi-Square (CMIN)	<3.00 (Hair et al. 2006)	2.230
Goodness-of-Fit Index (GFI)	>0.90 (Shevlin and Miles 1998)	0.961
Adjusted Goodness of Fit Index (AGFI)	>0.90 (Hooper et al. 2008)	0.945
Normed Fit Index (NFI)	>0.90 (Bentler and Bonett 1980)	0.956
Comparative Fit Index (CFI)	>0.90 (Bentler 1990)	0.993
Turker Lewis Index (TLI)	>0.90 (Bentler and Bonett 1980)	0.982
Root Mean Square Error of Approximation (RMSEA)	<0.08 (MacCallum et al. 1996)	0.061
Root Mean Square Residual (RMR)	<0.05 (Hair et al. 2006)	0.029

The hypothesis analysis results are displayed in detail in Table 6. The model shows good fitness and all scales are accepted (Hu and Bentler 1999). The analysis results on structural equation modeling (SEM) show that Sig of (GC), (GDC), (GTL), (RGI) and (PGI) is *** on AMOS (AMOS symbol *** is sig equivalent to 0.000). Hypotheses H1, H2, H3, H4, and H5 are accepted since they have positive path coefficients and a *p*-value of less than 5%. The results show that five independent variables (GC), (GDC), (GTL), (RGI), and (PGI) all have a positive impact on the dependent variable (GPDP), so all hypotheses are accepted. The standardized regression weights with an estimate of the variables green creativity (H1) and green dynamic capabilities (H2) are ($\beta = 0.437$, $p < 0.001$) and ($\beta = 0.211$, $p < 0.001$), respectively, which means that these variables have a significant positive effect of 0.437 and 0.211 units on green product development performance (GPDP). Green transformational leadership (H3), had the greatest influence on green product development performance (GPDP) with $\beta = 0.874$, $p < 0.001$. It can be seen that the higher the green transformational leadership, the more outstanding the green product development performance will be. Reactive green innovation (RGI), has a positive effect of ($\beta = 0.260$, $p < 0.001$) on green product development performance (GPDP). Besides, the study also shows that proactive green innovation (PGI) also has an important impact on green product development performance (GPDP) with ($\beta = 0.455$, $p < 0.001$). In general, we verify that there is a positive relationship between H1, H2, H3, H4, and H5 for green product development performance (GPDP). We have found that increasing green creativity, green dynamic capabilities, green transformational leadership, reactive green innovation, and proactive green innovation can improve green product development performance.

Table 6. Results of Testing Hypotheses (Estimate. S.E. C.R. *p*-value. Result from Regression Weights).

Hypotheses	Path	Explanatory Variables	Estimate	Standardized Regression Weights	S.E.	C.R.	*p*-Value	Results
H1	GC → GPDP	Green creativity is positively related to green product development performance.	0.544	0.437	0.084	6.865	0.000	Accepted H1
H2	GDC → GPDP	Green dynamic capabilities is positively related to green product development performance.	0.366	0.211	0.068	5.724	0.000	Accepted H2
H3	GTL → GPDP	Green transformational leadership is positively related to green product development performance.	0.615	0.874	0.079	8.631	0.000	Accepted H3
H4	RGI → GPDP	Reactive green innovation is positively related to green product development performance.	0.270	0.260	0.073	4.167	0.000	Accepted H4
H5	PGI → GPDP	Proactive green innovation is positively related to green product development performance.	0.523	0.455	0.081	5.375	0.000	Accepted H5

Note: *p*-value < 0.001. Significant at the 0.05 level.

5. Discussion

Nowadays, all circles are widely concerned about how to improve green product development performance in the environmental era (Chen and Chang 2013). According to the empirical results of this study, we provide approaches of green creativity, green

dynamic capabilities, green transformational leadership, reactive green innovation, and proactive green innovation, to improve green product development performance, support and complement previous literature, and have practical significance for organizations and businesses.

Based on the findings, the majority of participants are between the ages of 22 and 30 (82.6%), have university degrees (81.3%), and work in a variety of occupations, but the majority are workers and employees (68.7%) who are interested in environmental issues, green products and ways to improve efficiency in green product yield. Numerous studies have demonstrated that the relationship between age, education, and political ideology leads to greater concern with environmental quality (Liere and Dunlap 1980). Therefore, we propose that the workplace should be focused and enhanced since this will be the place to provide knowledge and motivation for the people involved in the work to increase the high green product production performance.

Green creativity (GC) Hypothesis 1 was accepted, as this study showed that green creativity has a significant effect on green product development performance. Previous studies (Chang et al. 2010) have shown that the creativity of the team in the organization can promote the development of the product, which is one of the determining factors that can affect a new product's success. Then, we make some recommendations based on the findings of this study for improving green innovation and even green product development efficiency, such as developing green strategies to find innovative solutions for green products, organizing contests and awards to encourage new creative ideas from individuals and teams. It is important to set goals to improve operational efficiency and environmental protection through innovative products.

Hypothesis 2 is green dynamic capabilities (GDC), the study's results clarify that it makes a significant contribution to green product development performance through the combined implementation of green knowledge and technology into products to improve quality. Previous research by (Eisenhardt and Martin 2000; Winter 2003) has shown that increasing dynamic capabilities plays an important role due to its adaptability to change. Hence, some recommendations for businesses are given that businesses need to have a vision of their ability to develop new green products through environmental monitoring, combined with absorbing and applying green knowledge, and apply green science and technology innovation to production to bring new core values so that competitors cannot imitate and replace products or business operating models, which also increases their productivity and ability to optimize the deployment of company resources.

The results of this study show that Hypothesis 3 green transformational leadership (GTL) has the strongest impact on green product development performance since it makes effective contributions through creating motivation for employees and satisfying their psychological needs as managers of organizational strategies (Thomas 2017; Bass 1998). As the creator of organizational strategy and a forerunner of organizational management, the leader is bound to have an impact on the company's product development performance, including motivating employees (Sethibe 2018) and meeting their psychological demands (Thomas 2017). Furthermore, green transformation leadership is concerned with the green psychology of employees and has an important role in the success of green product development performance (Zientara and Zamojska 2016; Milliman 2014). Indeed, we propose that businesses should pay attention to managers with a high ethical commitment to social responsibility (Haque et al. 2017) through training and recruitment, providing a learning environment to strengthen the leader's sense of responsibility to the environment. Leaders could also provide opportunities for employees to learn more about human resource practices as stakeholders (Haque et al. 2020), and incorporate activities team building for environmental purposes to promote green product development. Businesses can focus on transformational leadership to generate benefits while meeting market demands.

The study results showed that Hypothesis 4 on reactive green innovation (RGI) showed a positive association between reactive green innovation and green product development performance in the study results. In the business environment, reactive green innovation

will help companies respond to consumer interest in green products, change and comply with environmental regulations, and cope with competitive obstacles in order to achieve corporate success (Chen et al. 2012). Thus, some solutions for organizations to improve reactive green innovation are to actively seek new solutions to respond to environmental innovations, establish a consumer insight research team with the aim of creating and innovating suitable products, and gain a competitive advantage over competitors through green products of high quality.

The final hypothesis of the study is proactive green innovation (PGI) Hypothesis 5. This hypothesis also has a close correlation to the green product development performance. As society's needs evolve, users of a company's products and services are increasingly concerned about their health. Businesses should focus on developing product innovation; this is the market that should be seized to meet the needs of consumers and interested parties through the company's products and services (Krishnan and Ulrich 2001). When organizations adopt innovation in their operations, it allows for increased efficiency in the use of energy and materials, thereby meeting environmental and economic sustainability goals (Kuzma et al. 2020). Wisely, if companies want to enhance proactive green innovation and profit from green products, they must proactively create new green opportunities through creating training courses that help raise awareness of the culture of active green innovation in the company. Besides, applying new production methods, upgrading product manufacturing processes, using environmentally friendly materials, recycling valuable resources, saving energy, lowering production costs, and effectively delivering green products that fulfill green criteria.

6. Conclusions and Implications

6.1. Conclusions

The circular economy over time is increasingly considered as a way to increase sustainable economic development. With increasing concern for the environment, companies are increasingly participating more in the race for environmental economic development. The objective of this study is to examine which factors from the conceptual framework applied by the theory can affect the green product development performance of enterprises. Research results show that in terms of new findings, the factors green creativity, green dynamic capabilities, green transformational leadership, reactive green innovation, and proactive green innovation all significantly positively affect green product development performance. Survey data is collected from people who are of working age or intend to work, they have completed their education at these colleges and universities to ensure their opinions are valid reliability and highest quality. The study was conducted on a scale of more than 1000 participants. The results of the study were tested and analyzed through many methods such as Cronbach's alpha reliability, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM) to verify the influence of the variables measured and draw conclusions from this study. The findings of this research show that green transformational leadership is the factor that most strongly increases green product development performance. The findings and recommendations of this study are incredibly valuable for businesses and business organizations to develop, design solutions and strategies to increase green product development performance in the future and meet the 17 criteria of the United Nations' Sustainable Development goals on global environmental problems. To achieve the research goals of identifying factors that help improve the performance of green products, making recommendations to businesses, and helping businesses fulfill their mission of sustainable development, this requires businesses to take root in the practice of innovation, change the organizational structure of their operations, improve in production, responsibly exploit resources, focus on creativity, share new ideas, and co-develop. In addition, Vietnam is a country in the stage of economic development, so it is necessary to be a part of building and contributing to, and implementing social responsibility for the sustainable development of the world. Less-developed countries should also be promoted to get to the innovation path through knowledge frame-

work and shared recommendations. When businesses in each country perform well in producing high-quality green products, that business has contributed to promoting a solid globalized ecosystem. Furthermore, this research will provide potential documents for further research that is being conducted in Vietnam or other countries around the world.

6.2. Theoretical Contribution

The findings in this study contribute to the literature in several respects. In terms of theoretical implications, this study has several contributions. Firstly, the study uses theories and definitions of green creativity, green dynamic capabilities, green trans-formational leadership, reactive green innovation, and proactive green innovation to define the theoretical framework and research model with the goal of developing and enhancing the importance of green product development performance for businesses. Secondly, research results have demonstrated that both green creativity, green dynamic capabilities, green transformational leadership, reactive green innovation, and proactive green innovation have a positive impact on green product development performance. Finally, this study found that the reactive green innovation factor also had an effect on green product development performance compared with previous studies, although the level of influence from reactive green innovation factor from the research results shows that there is not really a strong impact. In addition, this study reveals that green transformational leadership has the strongest direct influence on green product development performance in enterprises, while previous studies have mainly focused on employees' technical capabilities (Jabbour et al. 2015) and green development strategies (Norton et al. 2017). This study expands the research on the leader as an influencer on product development outcomes in the company and a pioneer in the organizational management system with the responsibility of stimulating employee motivation (Sethibe 2018; Robertson 2018). In the current research field, scholars have not paid much attention to the leading factor in the development of green products. Thus, the results of this study may fill the gap of previous studies with the contribution found.

In the current context, most Vietnamese enterprises have paid great attention to the production and improvement of green products for the purpose of being both environmentally friendly and healthy for consumers in recent years, underlining the importance of sustainable economics in green product development performance. The study adds important new data to the theoretical model, which can be used as a foundation for more research.

6.3. Practical Implications

For practical purposes, after performing the analysis, we propose some ideas to promote the green product development performance of enterprises that are focusing on a sustainable economy and solve some limited issues to encourage customers to use green products of the enterprise. First, green transformational leadership is a leading predictor of improving product development performance in sustainable development-oriented businesses. The role of leaders in enterprises is always highly appreciated, so it is necessary to build green cultures in the organization, which creates a premise for the development of individuals in the enterprise, contributing to the implementation of the green culture with the aim of successful of green product development. Simultaneously, leaders must actively seek out more green knowledge and keep up-to-date on the current state of the environment as well as consumer demand for green products, which in turn have an impact on a business's performance. The information gap was narrowed and contextualized on green transformation leadership by collecting a survey from companies in Vietnam, which discovered high reliability as the majority of them agreed that green transformation leadership is a decisive factor for the development orientations of enterprises. Moreover, the organization can enact various management measures, motivating leaders to make statements of commitment to a green environment for the development of the organization and plans to develop products and services for organizations. A green transformation leader needs to clearly understand the corporate green attributes and, by all means, commu-

nicate those green attributes to their customers, employees, and partners, contributing to building and maintaining a competitive position in the market. Second, this study verifies that enhancing green creativity, and green dynamic capabilities has a positive effect on green product development performance. There is an intermediate relationship between green creativity and green product development performance and between green product development performance and green dynamic capabilities. While green creativity emphasizes innovation from great green ideas for products, green dynamic capabilities emphasize the application of green knowledge and new green technology in the production process to create core values for the enterprise while improving the quality of green products. Therefore, businesses need to encourage creative ideas into green products, promote the quality of green products, and motivate unique ideas with rewards. Creating goals and strategies to help the company get a solid foundation, combining fully equipped with green dynamic capabilities through green technology production processes, creating practical values for the process integration with a sustainable economy in Vietnam. Third, the results show that both reactive and proactive green innovation support the performance of green products of enterprises. To maintain and develop their businesses, businesses should invest in innovation, applying both reactive green innovation and proactive green innovation, which enables businesses to be proactive in finding new opportunities. Innovative solutions, practical innovation in every part of the company, active in creating and participating in seminars on green innovation ideas. Furthermore, it assists businesses in adapting to the needs of interested parties to changing environments, as well as responding to competitive challenges. To deal with barriers to innovation, managers need to be fully equipped with basic knowledge and skills in using new production methods as well as modern innovations in green technology. Innovative solutions can be seen as a substantial asset to an organization, be it process-based solutions or product and service innovations, which both provide platforms to improve the performance of the company's products. Fourth, when businesses balance all five factors of green creativity, green dynamic capabilities, green transformational leadership, reactive green innovation, and proactive green innovation into the operation process in each department, it will contribute to helping businesses improve the quality of green products, promote the purchase of green products by customers, significantly increase revenue, and position the brand associated with sustainable development. However, businesses that want to achieve success need to be ready to have support packages, invest in human resources, equipment, and new technologies, focus on quality and improve productivity, ensure optimized costs, create opportunities for innovation and business expansion of the enterprise, and improve the reputation of the company. Moreover, the government needs to have policies to promote the formation and application of green practices for businesses. The Government of Vietnam has also issued Decision No. 1393 on "Green Growth Strategy 2011–2020 and Vision 2050" to affirm two important tasks of greening production and greening consumption (VAOSS 2016). The improvement of the legal system is a prerequisite to issuing synchronous policies oriented towards green development. Specifically, government agencies need to come up with policies to encourage the production of green products and services, create opportunities to develop industries and fields that apply clean technology, prioritize policies and plans to develop renewable energy and measures to save and efficiently use resources, encourage businesses to voluntarily abide by the Law on Environmental Protection, improve the quality of people's living environment, and ensure sustainable development goals. In addition, the government can offer support in the land, capital, and tax exemption for businesses to label eco-labels on their products to promote the direction of businesses towards the same goal of sustainable development. When businesses succeed in attaching their products and services with a green image, they can ensure a balance between market share and profit since today's consumers are not only interested in the quality, design, and price of products but also in high requirements on the level of safety when using products and services for human health and the environment. These policies are also an important legal basis for building

a green growth strategy in Vietnam in the future, creating competitive advantages, and helping businesses achieve their goals of reaching out to foreign markets.

7. Research Limitations and Future Research Directions

The research acknowledges certain limitations in its findings and conclusions. First, we discover that the survey findings are primarily obtained from businesses and individuals who are aware of, produce, and have utilized green products. This means that the research is not quite diverse from companies with different backgrounds, since each organization will have different business models and perspectives on the production of products with the goal of protecting the environment. Second, we did not conduct any tests on corporate culture or sociocultural in Vietnamese businesses, instead, we focused on the roles of individuals in the organization. Finally, this study was conducted in Vietnam, so it is not comprehensive in terms of research implications for all other national environments in the world. Hence, when environmental sustainability is a key issue, the industries of tourism and building can also be considered for future studies. To complement this research, future investigations will be conducted in other nations. Future research will be able to compare frameworks in different nations, obtain a deeper grasp of the national context, and look into cultural differences. Government policies that protect the environment are also good research variables for the future to examine new elements influencing green product development performance.

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