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Research Article 01

Greening for Gain: How Firm Resources Shape Competitive Advantage in Sri Lanka's Green Apparel Sector

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Abstract

Green innovation stimulates healthier living, minimizes environmental harm, and supports long-term socio-economic well-being. Organizations with green practices can enhance competitiveness and build a strong corporate image through sustainable practices. This study examines the moderating role of firm resources on green innovation and competitive advantage. It uses the deductive approach to test the hypotheses. Data were collected using the survey method and a self-structured questionnaire. A simple random sampling technique was used to find the sample. The unit of analysis is the individual. PLS-SEM was used for data analysis. The results indicated that green innovation has a significant positive impact on competitive advantage and an insignificant moderating effect of firm resources on the relationship between green innovation and competitive advantage. The findings extend the Resource-Based View theory by providing empirical support. Further, findings show how organizations can lead to a competitive advantage with green innovation. Moreover, it suggests that having more resources is not important to gain a competitive advantage. This study is unique in examining the moderating impact of green innovation on competitive advantage in the green apparel sector. Further, it is original in its combined examination of three constructs within a single framework. Further, it addresses this notable gap in existing.

Keywords: Competitive advantage, firm resources, green apparel sector, green innovation, moderator

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Introduction

Today, global warming is one of the most pressing problems worldwide, largely driven by human actions that harm the environment through economic pursuits. To alleviate this damage, many companies are turning to green innovations. By incorporating green innovations into organizations, they can achieve both environmental and economic benefits (Rupasinghe, *et al.*, 2025a; Jain at al.,2024). These innovations allow companies to produce differentiated products compared to their rivals, allowing them to pioneer in their industry and boost revenue. Additionally, green organizations have the advantage of attracting environmentally conscious customers more easily.

Green innovation is defined as the improvement of green products and green processes that redesigning a current product to minimize any harmful impact on the environment throughout all the stages of a product's life cycle (Wang, 2019). Not only product and process innovations, but some organizations also modify their business models by adding new structures, strategies, and improving their resource productivity by substituting with greener inputs (Oduro et al., 2021).

In most organizations, green innovation is considered a business strategy to obtain a competitive advantage since it helps to open new markets or create new products and applications sustainably and responsibly (Guinot *et al.*, 2022). Further, green innovation is way for organizations to increase competitive advantages in various aspects. For example, product differentiation, product customization, and cost reduction (Hawkes, 2017). Considering firm differentiation, organizations can enhance product with advance features in order to decrease pollution and it will rise the demand for an organization's products from green consumers (Kuijk, 2018). The final result of green innovation is a drop in pollution and it causes the reduction of operation costs. In that sense, reducing pollution may uplift the demand for an organization's goods from green customers. As a result of it, organizations establish a positive reputation for their products and increase sales. Furthermore, under green product customization, firms can increase product design and quality to meet customer and environmental expectations.

This study clearly explains that green innovation is not enough to gain a competitive advantage. Resource-based view theory describes that organizations with greater resources and superior capabilities can enhance competitive advantage. Moreover, with rare, imitated or substitutable, and valuable resources, organizations could compete better than their market competitors. Firm resources do not directly influence the association, but they will strengthen or weaken this main relationship. For instance, a firm with more resources and green innovation is more likely to result in a stronger competitive advantage because they have the essential support to implement and market their innovative product. However, this study argues that having a bulk of resources does not influence to gain a competitive advantage in the Sri Lankan context.

This study selected apparel sector since it is one of the world's largest contributors to various negative environmental results (Fatoki, 2021). Further it has ranked as the second most polluting industry worldwide, it contributes nearly 10% of global carbon emissions (Muthukumarana et al., 2017). By 2015, the organic clothing industry accounted for 5% of the total apparel market (Malviya, 2012). In Sri Lanka, apparel sector is the key export revenue earner in Sri Lanka (EDB 2022). Thus, studying a green apparel sector is important to gain a competitive advantage to Sri Lankan apparel products in the global market. Most existing studies have been undertaken in developed countries (Zameer et al., 2020; Xiaoyi et al., 2023; Zhu et al., 2013; Zhu et al., 2006; Zhou et al., 2021), thereby limiting insights into how these

relationships operate within smaller, export-oriented economies (Rupasinghe et al., 2023; Pandithasekara, 2022).

According to the existing studies, there is lack the discussions of the concept of green innovation and competitive advantages so far within the current body of knowledge (Rupasinghe, *et al.*, (2024): Rupasinghe *et al.*, (2023); Bataineh *et al.*, (2024). Further, it is noted that there remains a lack of studies examining its relationship with moderating effects (Rupasinghe, *et al.*, 2025b). Specially, there is no inadequate empirical evidence on the role of firm resources as a moderating construct in the relationship between green innovations and competitive advantages. This study fulfil above gaps with the objective of investigating the impact of green innovation on competitive advantage with the moderating effect of firm resources in the Sri Lankan green apparel sector to address the above research gaps.

Literature Review

Green Innovation

Green innovation is explained as eco-innovation, environmental innovation, and sustainable innovation (Weng et al., 2015). Green innovation is improved products or new product, processes, and managerial systems that support to sustain the environment. According to Xie et al., (2019), green innovation contains of exclusive or different systems, processes, practices and products that provide a benefit to the environment and subsidize organizations' sustainability. Various dimensions have been used to identify green innovation in past literature. But the most popular dimensions are product innovation, process innovation, (Tang et al., 2018; Chen, 2008; Wang, 2019; Skordoulis et al., 2022; Arenhardt et al., 2016), and managerial innovation (Chen 2008; Tseng, et al., 2013; Wang, 2019; Rupasinghe et al., 2025a). As, Chen et al., (2006) stated, numerous studies on green product innovations emphasis on number of motives, increasing input efficiency, reducing harmful waste in the production process, and being further competitive. Wong et al., (2012) refer to green product innovation as the development of a new product or service that minimizes or eliminates negative environmental impact, performing better in sustainability compared to existing or competing alternatives. Green process innovation contains enhancing current manufacturing processes and implementing green technologies to produce goods and distribute services with little to no undesirable environmental impact (Wong et al., 2012). Managerial innovation involves formulating green objectives and strategies that align with daily operations, supported by a dedicated budget to foster green innovative thinking (Tseng et al., 2013).

Competitive Advantage

Green organizations' goods are 'new' enough to distinguish themselves from competitors' products and it leads to gaining a competitive advantage. Competitive advantage denotes to the condition whereby an organization has a greater position with in the marketplace (Fatoki, 2021). Agustian et al., (2023) defined it as the attributes or capabilities that enable a firm to deliver greater value to customers than its competitors. An organization's ability to increase the quality of its goods, decrease the costs of its products, or expand market share or profit is recognized as a competitive advantage (Grupe and Rose, 2010). Mady et al., (2022) discovered that eco-organisational and eco-process innovations significantly impact sustainable competitive advantage. Similar findings are reported in the Al-Abdallah and Al-Salim (2021) study on "Green product innovation and competitive advantage: an empirical study of chemical industrial plants in Jordanian qualified industrial zones". The results indicate a significant positive impact of green product innovation on competitive advantage.

According to Chang (2011), green product and process innovation fosters corporate competitive advantage while reducing firms' negative impact on the natural environment. Zameer *et al.,* (2022) revealed that environmental orientation and business analytics play a key role in green innovation and green competitive advantage.

Green Innovation and Competitive Advantages in the Apparel Sector

Green apparel refers to apparel manufactured using green practices and environmentally friendly processes, and that supports fair trade (Khare & Kautish 2022). Green clothing is made of natural fibers, without using chemicals and employing processes that do not harm the environment (Khare & Kautish 2022). Thus, the present study defines the green apparel industry as 'clothes that are made with natural fibres or recycled materials using an environmentally friendly employment process, designed for extended lifetime use under zero ecological impact'.

Islam at al., (2024) revealed that the contribution of green competitive advantage to firms' sustainable performance by implementing green innovation practices in business operations in Garment Firms in Bangladesh. Jain at al., (2024) found that green innovation has a significant impact on economic performance and environmental performance. The study on 'Assessing Chinese Textile and Apparel Industry Business Sustainability: The Role of Organization Green Culture, Green Dynamic Capabilities, and Green Innovation in Relation to Environmental Orientation and Business Sustainability' by Xiaoyi et al., (2024) demonstrated that environmental orientation significantly and positively influences organization green culture and green dynamic capabilities. However, the positive influence of Environmental Orientation on green innovation was insignificant.

Sri Lankan apparel manufacturers have a strong worldwide reputation for ethical, high-quality manufacturing. The 'Made in Sri Lanka' brand is synonymous with reliability, social quality, and environmental responsibility because employee welfare and social accountability are among the most significant features of its sourcing model. As evidence from the literature, consumers are willing to pay the highest prices for 'green' products (Drozdenko et al., 2011). Thus, Sri Lankan products with green tagging may offer a competitive advantage in the international market (Muthukumarana et al., 2017).

In the Sri Lankan green apparel sector, Rupasinghe et al., (2025a), found that green innovation significantly enhances competitive advantage. Further, it revealed that the green corporate image partially mediates the impact of green innovation on competitive advantage. By identifying green innovation as a key driver of organizational performance, the study of Pandithasekara (2022), demonstrates that organizational performance is shaped by multiple dimensions, including financial performance, competitive advantage, environmental performance, operational performance, talent development, and organizational culture in Sri Lanka. Herath, (2021) found that Green Supply Chain Management impact on Organizational Performance in Sri Lankan Apparel and Textile Manufacturing Organizations. Moreover, Somarathna (2020) found in his study that, to achieve sustainable competitive advantage, organizations can differentiate their products through green product and green process innovation.

Based on this background, the following hypothesis was developed.

H1: *Green innovation has a significant positive impact on competitive advantage*.

H_{1a}: *Green Product innovation has a significant positive impact on competitive advantage*

H_{1b}: *Green Process innovation has a significant positive impact on competitive advantage*

H_{1c}: *Green Managerial innovation has a significant positive impact on competitive advantage*

Firm Resources

Tangible and intangible, empirical, physical, financial, and human capital resources are the major elements of firm resources (Al-Abdallah & Al-Salim, 2021). According to the Resource-Based View theory, firms with superior resources and capabilities can achieve sustainable competitive advantage (Carmeli & Tishler, 2004). Further, it suggests that differences in firm performance are the consequences of resource heterogeneity across firms. Firms that can gather resources and capabilities that are valuable, rare, non-substitutable, and imperfectly imitable will achieve an advantage over competitors. In that sense, so-called resources are not enough to gain a competitive advantage; those resources should have the feathers to achieve competitive advantages. The argument is that although firms have the same resources, their performance may be different due to differences in their managerial skills and capabilities (Kabue & Kilika, 2016). Based on this background, the following hypothesis was formulated.

H2: *Firm resources significantly positively moderate the relationship between green innovation and competitive advantage*

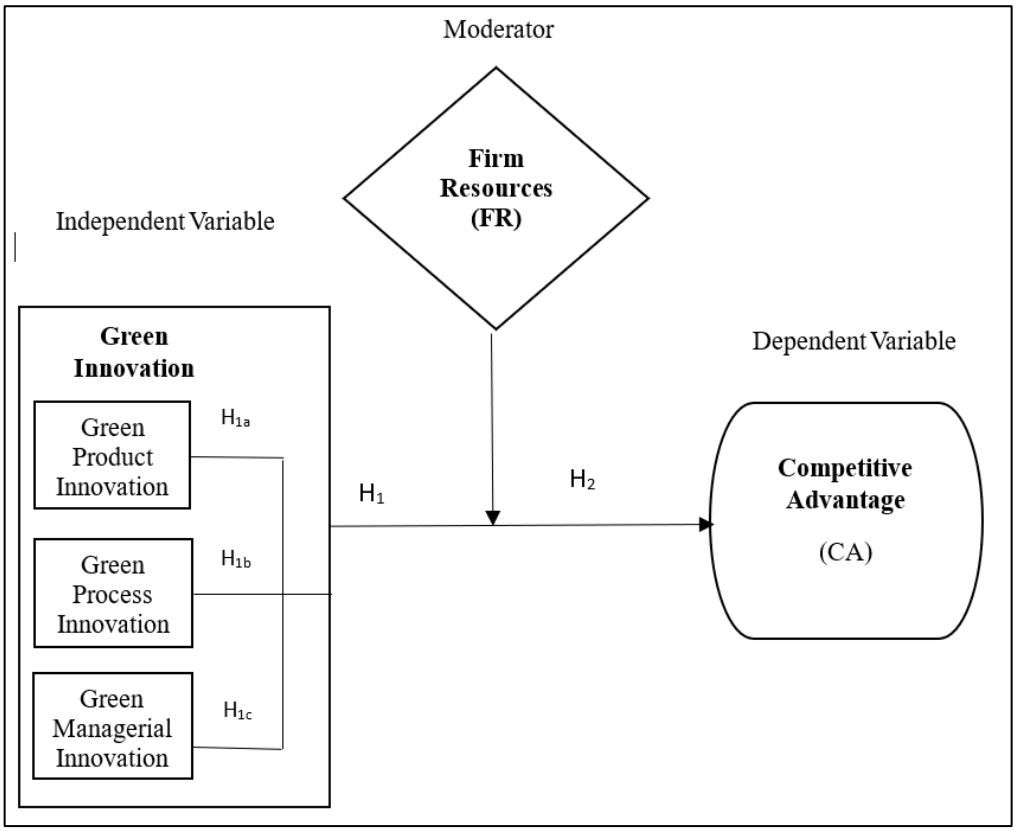

Figure 1: The Theoretical Model
Source: Compilation by researchers based on the literature (2025)

Research Methodology

This study used the deductive approach to test the hypotheses. Variable identification and quantification have been done based on the existing theories of green innovation and competitive advantage. The study applied the survey method and focused on the green apparel sector in Sri Lanka. The apparel sector was selected since it is the world second highest carbon emission contributing sector (Muthukumarana et al., 2017) and in Sri Lanka, it is the main export income-earning sector (EDB, 2021). The target population is all managers in the green apparel sector. The simple random sampling method was employed to find the sample. In Sri Lanka, there is no documented information regarding green-practicing apparel organizations. In this sort of situation, the researchers use different sources to find information. One is the list of green practicing apparel organizations from the Central Environmental Authority, because they are offering a green presidential award to the organizations. Among applied organizations, 30 green practicing apparel organizations. Second, by referring to the websites of the apparel organization, 53 organizations were found. Third, got information from the green practicing organization about their revivals. Then, one list was created by combining all together. Finally, 110 companies were included in the list. Three respondents from each company were selected. Then, the consent of the contributors was obtained via telephone calls. The nature of the research and the purpose of the data collection were explained and ensuring the privacy and anonymity of the contributors and organizations, the right to withdraw at any time, and the voluntary nature of participation. Grounded in this contributor's agreement to voluntarily contribution was gotten, and sent a self-administered structured questionnaire to the participants. The questionnaire was distributed at one time and collected later, giving enough time to fill it.

The unit of analysis is individual. The sample here is limited to functional-level managers, general managers, factory managers, and the CEO who can provide the expected information. The sample size was 297. The five-point Likert scale was used in all questionnaire items. The first part collected demographic information concerning participants' socio-demographic characteristics (profession, experience in the current position, age, and highest educational qualification). The second part consisted of 14 statements that collected data on green innovation (the independent variable). It was measured through three main dimensions: product innovation (four items), process innovations (four items), and managerial innovation (six items). The third part collected data on competitive advantage (eight items) and, the fourth part consists of statements regarding firm resources (four items). PLS-SEM was used for data analysis. Table 1 shows operationalization of the study variables.

Table 1: Operationalization of Study Variables

Construct	Dimension	Source	Measurement scale
Green Innovation	Green Product innovation	Huang and Li (2017)	5-point Likert scale
	Green Process innovation	Huang and Li (2017)	
	Green Managerial innovation	Tseng *et al.,* (2013)	
Competitive Advantage	Cost Quality R&D ability	Arenhardt *et al.,* (2016)	5-point Likert scale
	Management capacity		

	Profitability		
	Growth		
	Corporate image		
	Market position		
Firm Resources	Assets Capabilities Information Knowledge	Al-Abdallah & Al-Salim (2021); Camelo-Ordaz *et al.,* (2003)	5-point Likert scale

Source: Researcher compilation based on literature (2025)

Results and Interpretations

The study employed Smart PLS, a statistical instrument to inspect the data through partial least squares equation modeling (PLS-SEM). According to the decision criteria of Baruch and Holtom (2008), the acceptable response rate in behavioral studies is 52.7%. As such, the response rate of 92% of the current study was accepted as a good level of response. The results of the independent sample t-test discovered that there were no significant differences in most of the answering forms of first and late respondents, suggesting that non-response bias does not happen.

Profile of Respondents

Of the 297 respondents, the majority (n = 214) were functional-level managers. Factory managers accounted for 30, general managers for 28, and chief executive officers (CEOs) for 25 of the sample. Regarding work experience, 27% of respondents had 6–10 years of experience in their current positions, while 27% reported 16–20 years of experience and 26% had 11–15 years. Additionally, 13% had 21–25 years of experience, and only 7% had fewer than five years of experience. In terms of age, the largest proportion of respondents belonged to the 36–45-year age group (n = 132), followed by 36% in the 46–55-year category. Smaller proportions were aged 26–35 years (12%), below 25 years (1%), and above 55 years (7%). With respect to educational qualifications, the majority of respondents held a bachelor's degree (n = 184), while 74 respondents had completed GCE Advanced Level (A/L). A further 35 possessed postgraduate qualifications, and only four respondents had completed GCE Ordinary Level (O/L). Overall, the demographic profile demonstrates that the sample consists of experienced and well-qualified respondents, supporting the appropriateness of the sample and strengthening the credibility and validity of the study's findings.

Green Innovation Scale

The following Table 2 illustrates the basic results that are utilized to measure the appropriateness of the green innovation assessment scale. The green innovation as a second-order construct contained of three dimensions (first-order constructs). Green innovation was assessed utilizing fourteen items; product- four items, process- four items, and managerial-six items of scale. The following table shows the Composite Reliability, Cronbach's Alpha, Average Variance Extracted (AVE), and Standardized Root Mean Square Residual (SRMR) of the green innovation measurement scale.

As per the survey data (see Table 2), the composite reliability of each dimension of green innovation is satisfactorily good enough, which is stated more than 0.7 of values (Hair *et al.,* 2019). The higher the alpha, the more reliable the data. The reliability of the green innovation assessment scale data is high, as all of them have described more than 0.7 values (Hair *et al.,* 2019). Greater than 0.5 AVE value should be accepted. Accordingly, all dimensions of green innovation informed an AVE above 0.5. To statistically acceptable the scale employed to measure green innovation, SRMR should be measured and it must be lower than 0.08. Table 2 explains the 0.116 SRMR value, which does not satisfy the cut-off.

The whole measurement of green innovation is also satisfactory and meets the basic standards. According to the basic green innovation model, Composite Reliability and Cronbach's Alpha were reported higher values, which is greater than 0.7. AVE for the green innovation is recorded as 0.579, which is greater than 0.5 and acceptable.

Table 2: Model Fit Indices for the Green Innovation Scale

Variable/ Dimension	Composite Reliability (CR)	Cronbach's Alpha	Average Variance Extracted (AVE)	SRMR
Product innovation	0.782	0.772	0.595	0.116
Process innovation	0.792	0.790	0.614	
Managerial innovation	0.844	0.844	0.561	
Green innovation	0.917	0.916	0.579	

Source: SmartPLS output (2025)

Measurement Model

Internal consistency was measured using two statistics, namely Cronbach's Alpha and Composite Reliability (Hair et al., 2010). As all Cronbach's alpha values and composite reliability values are greater than 0.70, the internal consistency of the measurement model is confirmed. The Average variance extracted (AVE) is calculated to consider the convergent validity of the data (Hair et al., 2019). Table 3 shows that the AVE extracted for each construct/variable is higher than the expected level of 0.5 (50%).

Table 3: Internal Consistency and Reliability

Variable	Dimension	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Green Innovation	Product	0.772	0.781	0.595
	Process	0.762	0.763	0.678
	Managerial	0.823	0.823	0.585
Competitive Advantage		0.898	0.899	0.620
Firm Resources		0.881	0.883	0.738

Source: SmartPLS output (2025)

Discriminant validity was tested using two different statistical tests: the Fornell-Larcker Criterion and the Heterotrait-Monotrait ratio (HTMT). Table 4 illustrates that all HTMT values are less than 0.9, and it is decided that there are no discriminant validity issues.

Table 4: Heterotrait-Monotrait Ratio

	CA	FR	Managerial	Process	Product
CA					
FR	0.731				
Managerial	0.727	0.474			
Process	0.604	0.403	0.829		
Product	0.592	0.319	0.792	0.866	

Source: SmartPLS output (2025)

According to Table 5, none of the inter-construct coefficient values is higher than the square root of AVE. Thus, it concludes that the discriminant validity is confirmed.

Table 5: Fornell-Larcker Criterion-Validated Measurement Model

	CA	FR	Managerial	Process	Product
CA	0.787				
FR	0.653	0.859			
Managerial	0.627	0.408	0.765		
Process	0.501	0.334	0.736	0.823	
Product	0.501	0.270	0.636	0.667	0.771

Source: SmartPLS output (2025)

Structural Model

The Structural equation model was applied to examine the hypothesis and identify the impact of constructs. In here, R^2, F^2, and Q^2, path coefficient, and multicollinearity were used to determine the impact of exogenous variables on endogenous variables. Thus, the structural model of the present study can be illustrated as follows.

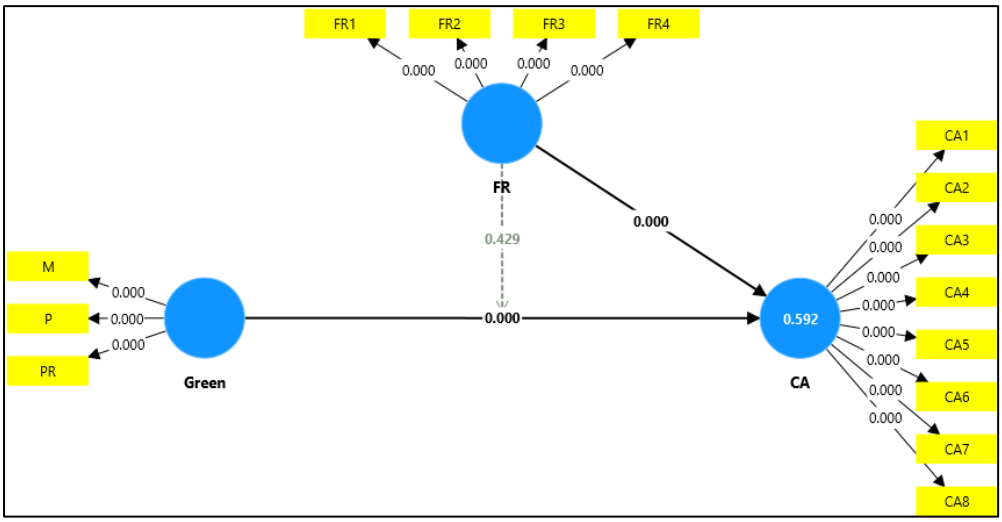

Figure 2: Structural Model
Source: SmartPLS output (2025)

Assessing the R^2 determines the model prediction's validity or the in-sample predictive power (Rigdon *et al.*, 2016). The larger the difference in R^2, the more important the construct is. According to the study result a 60.2% change in CA is explained by green innovation in the model (R^2 =0.602) (refer Table 6).

Table 6: Coefficient of Determination (R^2)

Construct	R-square	R-square adjusted
CA	0.602	0.598

Source: SmartPLS output (2025)

The next step to measure the structural model is the Cross-validated Redundancy Measure (Q^2) and it gives the predictive accuracy of the PLS path model (Hair *et al.*, 2019). Usually, Q^2 values higher than zero (0) have a small, 0.25 has a medium, and 0.5 has a large predictive weight in the PLS path model (Hair *et al.,* 2019). Table 7 demonstrations that all Q^2 values are greater than 0.3 and, have a medium (less than 0.5) predictive relevance of the PLS model.

Table 7: Cross-Validated Redundancy Measure (Q^2)

	Q^2predict	RMSE	MAE
CA	0.394	0.785	0.591

Source: SmartPLS output (2025)

Multicollinearity issue was not found in this research as the VIF value of all variables ranged between 1.523 and 2.753 (see Table 8).

Table 8: Multicollinearity

Indicators	VIF	Indicators	VIF
CA5	2.050	M2	1.857
CA6	2.010	M3	1.572
CA7	2.166	M4	1.884
CA8	2.276	M5	1.620
FR1	2.641	M6	1.781
FR2	2.753	P1	1.523
FR3	2.213	P2	1.736
FR4	1.899	P3	1.592

Source: SmartPLS output (2025)

Path Coefficients

Indicator loadings or the path coefficients and their respective p-values should be considered. Path coefficients fall between -1 to +1 (Hair et al., 2019) and Coefficient values closer to 1 show a strong effect between constructs and the p-value should be less than 0.05 (95% confidence).

Table 9: Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Green -> CA	0.385	0.387	0.053	7.248	0.000
FR x Green -> CA	-0.010	-0.008	0.034	0.279	0.390

Source: SmartPLS output (2025)

Table 9 shows that coefficient values between the inner model Green- CA construct have positive coefficients and p-values are less than 0.005 (0.000 $p < 0.005$) but not for FR. Here the direct relationship between Green- CA is significant. FR does not have a significant influence.

Direct Effect of Green Innovation – Competitive Advantage

The path coefficient and significance level for the Green-CA relationship in the structural model were estimated. The results, as shown in Table 10, show a strong path coefficient ($\beta = 0.634$) with a p-value of 0.000 (< 0.005). This finding provides empirical support for hypothesis H1, confirming that green innovation has a significant positive impact on competitive advantage.

Table 10: Direct Effect – Green Innovation – Competitive Advantage

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Green -> CA	0.634	0.657	0.037	17.715	0.000

Source: SmartPLS output (2025)

Direct Effects of Green Innovation Dimensions - Competitive Advantage

The study examined the direct impact of the dimensions of Green Innovation, green product innovation, green process innovation, and green managerial innovation on competitive advantage (refer Table 11). As per the results of the study product innovation ($\beta = 0.176$, $p = 0.002 < 0.005$) and managerial innovation ($\beta = 0.522$, $p = 0.000 < 0.005$) performed a significant positive impact on competitive advantage. Process innovation ($\beta = 0.006$, $p = 0.462 > 0.05$) did not have a significant impact on competitive advantage. This result empirically supports the hypotheses H_{1a} and H_{1c} but not H_{1b}.

Table 11: Effect of Green Innovation Dimensions on Competitive Advantage

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Result
Product -> CA	0.176	0.176	0.061	2.883	0.002	Supported
Process -> CA	0.006	0.007	0.065	0.095	0.462	Not-supported
Managerial -> CA	0.522	0.526	0.067	7.776	0.000	Supported

Source: SmartPLS output (2025)

Moderator Analysis

Two main statistical techniques are followed to test the moderating impact interaction effect (product indicator approach) and multiple-group analysis (MGA). The present study adopted the product indicator approach utilizing PLS-SEM (Hair et al., 2019).

Table 12: Moderator Analysis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
FR -> CA	0.486	0.487	0.040	12.016	0.000
Green -> CA	0.438	0.440	0.045	9.720	0.000
FR x Green -> CA	-0.026	-0.026	0.032	0.791	0.429

Source: SmartPLS output (2025)

Table 12 presents the outcomes of analysis the hypothesized moderating impact. As shown in the table 12, only are T value of FR>CA and green >CA are greater than 1.96. Thus, they are significant. But T value for FR x Green -> CA is less than 1.96 (0.791<1.96). Therefore, moderating effect is insignificant. This finding indicates that the hypothesis of H2 was not supported, as no significant differences were saw between the path coefficients through FR x Green -> CA in the green apparel companies of Sri Lanka.

These findings are aligns with the findings of Nasrollahi et al., (2020); Qiu et al., (2019); Skordoulis et al., (2017); Chang, (2011); Chen et al., (2006), who finalized that organizations can achieve a competitive advantage by adapting green innovation. Also, Al-Abdallah and Al-Salim (2021); Chang, (2011); Somarathna, (2020) similarly summarized that green product innovation has a statistically significant positive impact on competitive advantage.

The results demonstrate that green product innovation has a statistically significant positive impact on competitive advantage. These findings is align with prior research conclusions (Al-Abdallah & Al-Salim 2021; Somarathna, 2020; Ar, 2012; Chang, 2011). It shows the importance of designing new products, using eco-friendly materials for the products, and

using environmentally friendly packaging. It highlighted that to gain a competitive advantage it is required to engage in more green product innovation activities. According to the present study findings, it is noted that there is no significant impact of process innovation on competitive advantage. This result contrasts with the findings of Ma et al., (2017); Chang, (2011), which emphasized the positive role of using cleaner technology, recycling, reuse and remanufacturing material in achieving competitive advantages. One possible clarification for this could be that process improvements may not be immediately visible. Moreover, process innovations may require a longer time to yield tangible benefits. However, apparel organizations are often evaluated based on short-term competitive advantage, which includes order volumes and buyer interest. Thus, the long-term benefits of green process innovation may go unrecognized. Another factor is that foreign buyers heavily influence Sri Lankan apparel companies and usually expect visible improvements, such as GOTS or OEKO-TEX product certificates, rather than process greening. This may lead to a perception of low attention and benefits in that area. Managerial innovation showed a strong positive impact on competitive advantage, highlighting practices such as redefines operations, providing environmental awareness seminars and training, and using environmental management systems.

Some studies found that when achieving sustaining competitive advantage, firm resources play an important role (Avlonitis & Slavou, 2007; Rose et al., 2010). Firm resources undoubtedly play a crucial role in realizing competitive advantage, but this depends on the organization's capability to effectively convert these resources into tangible abilities (Abou-Moghli et al., 2012). The outcomes of current research are not connected with the prior study by Al-Abdallah and Al-Salim (2021), which indicates a significant positive moderating impact of firm resources on the direct relation between green innovation and competitive advantage. It implies that the having more resources, create the higher the impact of green product innovation on competitive advantage. Nevertheless, the outcomes found in current study explains that even without the moderation effect of firm resources, green innovation would have a significant positive impact on competitive advantage, rejecting the research hypotheses. In this sense, we can't conclude that, organizations with more resources definitely reach to higher competitive advantage because of green innovation compared to organizations with less resources. Yet, some scholars mentioned that to convert the organizations into 'green organizations' do not need a big opening investment, and it could begin with less sufficient resources and gradually achieve a competitive advantage (Abou-Moghli et al., 2012). There may be several context-specific reasons for this situation. First, most green apparel organizations are operating under similar conditions in a free trade zone in Sri Lanka. Thus, these organizations have the same level of financial, human, and technological resources. With these same resources, it is harder to detect any moderating impact on the relationship between green innovation and competitive advantage. Second, even if some green apparel organizations are well-resourced, using resources for innovation may be less. These organizational and cultural factors may limit measuring how effectively resources are gained to competitive advantage, weakening the moderating impact. Third, most Sri Lankan green apparel organizations focus on 'price', following the cost leadership strategy rather than differentiation strategies. Therefore, even if they have enough resources, those may not be utilized those resources for a green innovation differentiation strategy that is more cause to create a competitive advantage through green innovation. The other factor may be that even organizations with limited resources can fulfill basic green requirements with the support of government or industry.

Conclusion and Recommendation

This research has addressed several overarching research questions related to green innovation and competitive advantage with a specific focus on firm resources, and how firms can gain higher competitive advantage accordingly. The results indicated that green innovation has a significant positive impact on competitive advantage. These findings align with the study of Walker and Wan (2012), In addition to lowering production costs and minimizing liability expenses, green innovation can serve as a key source of competitive differentiation, enabling firms to expand their market share and boost revenue. Thus, applying green innovation will help the green apparel sector to realize a competitive advantage. Moreover, grounded on these study findings, green apparel organizations should prioritize green products and green managerial innovations, including the development of eco-friendly products, the use of sustainable materials, and the adoption of environmental management systems. Although green process innovations are not crucial according to the study findings, previous research has found as it was an important factor. Thus, it is required to investigate this relationship in different cultural contexts.

Further, it indicates an insignificant moderating impact of firm resources on the relationship between green innovation and competitive advantage. It implies that, with higher firm resources, no impact of green innovation on competitive advantage. Although previous studies confirm that firm resources lead to gaining a competitive advantage, we argue that having resources is not enough to achieve a successful competitive advantage. It is important the way we manage the resources. Accordingly, this research's findings contribute by adding additional clarity to the ongoing debate of 'Do firm resources accelerate the relationship of green innovation on competitive advantage?'

Successful green innovation initiatives require more than top-down directives; they depend on an organizational culture that actively supports sustainability. Managers play a pivotal role in fostering such a culture by modelling environmentally responsible behavior, setting clear sustainability objectives, and empowering employees to contribute innovative ideas. Moreover, employee engagement and cross-functional collaboration are essential for embedding green thinking across the organization. Aligning incentive systems and training programs with sustainability goals further facilitates the achievement of desired outcomes. Finally, policymakers should provide incentives for green innovation to encourage it among small companies.

Research Implications

This study found that green innovation significantly improves competitive advantage, and firm resources have an insignificant moderating effect on that relationship. The findings extend the Resource-Based View theory by providing empirical support.

Practitioners can use our findings to produce more green innovations to realize a competitive advantage in the market. It suggests prioritizing green products and green managerial innovations for gaining competitive positioning in green markets. Further, it contributes to the existing literature on managerial innovation under green innovation by highlighting that implementing green innovation often requires leadership commitment, organizational changes, and employee training focused on eco-friendly products. Such managerial revisions represent non-technological innovation appliances that remain underexplored in the green innovation literature. Further, it highlights that green innovation does not need extra resources; instead, it can be achieved through effective management of existing resources.

The findings of the current study acknowledge certain limitations. First, this study employs a sample of managers who work in the green apparel sector in Sri Lanka, but does not integrate the other sectors. Nevertheless, the importance of the other sectors' impact on the economy is crucial. Future studies are stimulated to integrate the other sectors to gather more generalizable findings. Second, this study's outcomes are limited to the green apparel sector in Sri Lanka. Future research can empirically test this conceptual framework in different contexts. It may not be representative of other countries with different regulations and economic challenges. Therefore, it could be valuable to do this research in different contexts to add empirical evidence to assess the generalizability of the findings.

Third, this research considered the moderating role of firm resources regarding the green innovation and competitive advantage association. There are some other aspects touching this direct relationship, such as the organizational culture, managerial concern, innovation orientation, and environmental knowledge. Thus, it is suggested to incorporate the firm's other factors in future research settings.

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