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International Journal of Services Technology and Management

ISSN online: 1741-525X - ISSN print: 1460-6720
https://www.inderscience.com/ijstm

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Article History:

Received:	23 December 2023
Last revised:	18 April 2024
Accepted:	08 September 2024
Published online:	28 March 2025

Sustainable garment manufacturing enterprises in China: the mediating role of business sustainability towards competitive advantage

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Abstract: This study investigated the mediation of business sustainability on the link between green management and competitive advantage. The value of this pursuit is based on the vague findings of existing literature on how green management and business sustainability can contribute to competitive advantage. The participants of this study are managers of garment manufacturing companies in the Pearl River Delta of Guangzhou City, China. They were surveyed using a Likert scale questionnaire. Response data were analysed using partial least squares-structural equation modelling (PLS-SEM). This study found a significant effect of green management on business sustainability. Furthermore, business sustainability has a significant effect on competitive advantage. However, direct analysis revealed no significant effect of green management on competitive advantage. Consequently, the link between green management and competitive advantage depends on the sustainable practices implemented by garment manufacturing companies. The implications for garment manufacturing and for future research are also given in this paper. The Garments manufacturing industry should emphasise deploying green management practices and ensure that these methods result in quantifiable advances in sustainability, enhancing their competitive edge.

Keywords: business sustainability; garments manufacturing; China; competitive advantage; green management; mediation analysis; structural equation model.

Reference to this paper should be made as follows: Wan, H. and Paulino, E. (2024) 'Sustainable garment manufacturing enterprises in China: the mediating role of business sustainability towards competitive advantage', *Int. J. Services Technology and Management*, Vol. 29, Nos. 2/3/4, pp.107–131.

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1 Introduction

Since 2010, China has been considered the world leader in the textile or garments industry (Hasanbeigi and Price, 2015). China has exported at least $316 billion of textile products, which is at least six times more than Bangladesh, considered the second in the ranking. The average production of textile enterprises from 2019 to 2021 has also caused an increase in revenue from 118.27 million yuan to 105.56 million yuan and 120.08 million yuan (Payzievna, 2020). Due to the persistent need for fashion and clothes, garment manufacturing enterprises in China continue to flourish (Lüthje, 2019).

However, profitability and growth will be temporary if the means of acquisition are not sustainable (Nastiti et al., 2019). Consequently, as industries continue to flourish, the necessity for sustainable practices becomes increasingly urgent. Numerous governments have adopted laws and set rules to reduce environmentally hostile business activities. Van Huis and Oonincx (2017) stated that rapid economic progress has negatively affected environmental sustainability. China is a global leader in the production of greenhouse gases and other pollutants due to the expansion of its industry (Yoro and Daramola, 2020). Desore and Narula (2018) stated that aside from issues such as labour cost increases, economic downturn, and the pandemic spreading across China, the garments industry faces other dilemmas. The textile and garment industry is a massive worldwide enterprise and one of the world's most prominent pollutants. This industry has substantial environmental implications for climate change (Niinimäki et al., 2020). The demand to transform industrial practices in the garment and textile industries to adopt environment friendly practices has recently emerged as a hot topic in academic research and public dialogue.

Improving operations leading to profitability may have an unintended consequence. Based on the triple bottom line theory, for any industry to be sustainable, the increase in profits should also come hand in hand with protecting the environment and society (Żak, 2015). Otherwise, financial benefits would only be untenable. The textile industry is now faced with sustaining profitability through active consciousness of society and the environment. With this regard, the China National Textile and Apparel Council has been pushing for cleaner technologies since 2016 through its published five-year development guidelines (Gai et al., 2022). As such, there have been increased calls for transitioning from a high-pollutant business process to more sustainable methods (Horn et al., 2016). One of the emerging concepts now is called 'green management'.

Business practices known as green management take into account the health of the environment to accomplish any goal (Belhadi et al., 2020). As a result, green management is a growing movement that impacts the efficiency and productivity of

Asian businesses and corporations. 'Green' manufacturing involves minimising resource use, reducing pollution and waste, increasing material reuse and recycling, and decreasing factory emissions. To lessen the environmental impact of their operations, green manufacturers do research and develop new technologies and methods (Mao et al., 2019; Abualfaraa et al., 2020). One method is commending businesses for producing eco-friendly goods and boosting local and international competitiveness.

Existing studies have concluded that green management positively impacts competitiveness (Younis et al., 2016; Singh et al., 2015; Fernando and Hor, 2017; Molina-Azorín et al., 2015; García-Granero et al., 2018; Agyabeng-Mensah and Tang, 2021). Furthermore, studies have pointed out that green practices in a business firm are a factor in sustainability (Martens and Carvalho, 2017; Lăzăroiu et al., 2020; Abualfaraa et al, 2020; Teixeira et al., 2021; Sarkar et al., 2022). Some studies have concluded that firms that have started to inject green management into their operations have manifested stability in their production, design of products, and marketing programs (Alzgool, 2019; Piya et al., 2022). However, some Chinese firms are slow to adopt green practices due to their additional costs but unsure of profitable benefits (Zhang et al., 2018; Wang et al., 2018; Zeng et al., 2021). There are studies that show green management does not clearly result in tangible returns (Ambec and Lanoie, 2008; Delmas and Pekovic, 2012; Chen and Chang, 2013; Hansen and Schaltegger, 2016)

In line with that, this research paper addresses the gap associated with the existing literature's conflicting results and differing perspectives (Cantele and Zardini, 2018; Singjai et al., 2018).

This study aims to assess the connection between green management and competitive advantage through the indirect effect of business sustainability in garment manufacturing enterprises in China. The interest and significance of this study come from the observation that the results of previous research on the possible advantageous impact of green management practices on competitive advantage are inconsistent. The corporate leaders would benefit from knowing the potential repercussions of embracing green management. The environmental effort also entails huge costs for any company. Green methods can be inefficient from the perspective of profitability optimisation. So, studies investigating the outcome of investing in green management, especially in garment manufacturing, can be crucial.

2 Literature review

2.1 Green management

As a result of significant environmental difficulties, including global warming, waste, and pollution, people are now more conscious of environmental issues and the importance of green-based activities. The term 'green' no longer just describes a colour. Instead, it now has a more complex sense. It broadly refers to a method that is constantly 'eco-friendly' towards everything and everywhere. As a result, a greater understanding of environmental issues has motivated establishments like restaurants and enterprises to go 'green' (Wang et al., 2016). The green management implementation of enterprises has a variety of aspects. This may include developing green products, striving for green marks, implementing a green marketing mix, and strengthening procedures that support the environment (Sezen and Çankaya, 2018). Meanwhile, Liu and Jensen (2018) proposed

five aspects: green product development, green marketing, green enterprise management, avoiding environmental risks, and finding new green business opportunities.

It can also be seen in the aspect of the environmental behaviour of employees, based on their efforts and environmental protection-related reasons. Some include managing energy use, reducing waste, recycling materials, and other comparable efforts that can eliminate environmental hazards (Kollmuss and Agyeman, 2002; Williams, 2008; Busse and Menzel, 2014; Leeuw et al., 2015). Nayak and Padhye (2018) proposed that comprehensive thinking and practical breakthroughs should be made from various aspects to build a green management mode in modern society. It includes strengthening the environmental protection consciousness, which may entail firms passing environmental certification and formulating green management systems (Arulrajah et al., 2015).

From the industry's perspective, garment makers may lower their environmental impact using energy-efficient manufacturing methods and sustainable materials (Saha et al., 2020). This meets the rising need for environmentally friendly goods and boosts the company's reputation which may attract eco-conscious customers (Habib et al., 2020). Green management approaches reduce resource consumption and waste, boosting operational efficiency and profitability (Prabhu et al., 2020). Environmental compliance protects the company's brand and market position by ensuring long-term sustainability and reducing hazards (Rahman, 2021). In an increasingly sustainability-focused corporate world, green management in garment manufacturing boosts market competitiveness and environmental stewardship.

Based on the literature reviewed green management as a construct can be measured through green performance appraisal, green behaviour, and environmental goal setting (Ardiza et al., 2021; Dumont et al., 2017; Bargh et al., 2001).

2.2 Business sustainability

Bansal and DesJardine (2014) stated that most executives want their enterprise to be at least as prosperous as it has been in the past, if not even more profitable. According to this rationale, an institution's capacity to achieve brief financial demands without risking its long-term financial viability is defined as business sustainability. The concept of sustainability has evolved as the environment in which businesses operate is becoming increasingly hostile (Annarelli and Nonino, 2016). Natural catastrophes, pandemic diseases, attacks, economic downturns, equipment failure, and human error are just a few events that might endanger a business's stability and security. Dyllick and Muff (2016) claimed that sustainability has two phases: enterprise integration and market transformation. In line with that, Tur-Porcar et al. (2018) claimed that the market transformation broadens that focus to include the market's and society's vitality. Meanwhile, another comprehensive business sustainability perspective claims that sustainable business has become a matter of discussion because of its economic, social, political, and environmental importance (Meza-Ruiz et al., 2017).

Multifaceted issues make business sustainability crucial in garment production. First, resource-intensive operations like dyeing and finishing pollute water and energy, causing environmental issues (Rana and Allen, 2021). Fast fashion promotes high-volume, low-cost manufacturing, which increases waste and carbon emissions (Peters et al., 2021; Beyer and Arnold, 2021). Eco-friendly manufacturing techniques like employing organic or recycled materials and water and energy-efficient technology must be combined with

ethical labour practices like fair salaries and safe working conditions to solve these problems (Beyer and Arnold, 2021). Transparency and accountability across the supply chain help clothing manufacturers assess and manage environmental and social consequences, ensuring their long-term sustainability and resilience (Roopsing and Suk-Kavessako, 2020; Sarkar et al., 2020; Wongwilai et al., 2022).

Based on the literature reviewed on business sustainability, it can be measured through design sustainability, production technology and machine sustainability, and marketing sustainability (Mura et al., 2018; Meza-Ruiz et al., 2017; Belz and Peattie, 2009).

2.3 Competitive advantage

Competitive advantage is an organisation's ability to generate more economic value than its rivals (Chase and Aquilano, 2021). Nevertheless, the precise definition can closely relate to the economic value generated (Barney and Hesterly, 2019). It enables an organisation to produce value for the business and its shareholders while achieving greater margins. On the other hand, Simons (2019) saw the competitiveness of firms from its internal resources. Moreover, Distanont and Khongmalai (2020) defined competitive advantage as an exclusive feature of an organisation or firm that other businesses cannot easily imitate. Friesenbichler and Reinstaller (2022) argued that competitive advantage results from strategic decisions towards materialising market opportunities. However, in these aforementioned studies, it can be understood that they have measured competitive advantage through a more tangible approach. These tangibles are sales growth, net profit margin, and market share, which are used in this study.

In the context of garment manufacturing, competitiveness, such as cost leadership, can be achieved by implementing operational efficiencies, including lean manufacturing practices and capitalising on economies of scale (Sigalas et al., 2013; Swazan and Das, 2022). On the other hand, differentiation strategies centre around distinctive product attributes, branding, and customer satisfaction (Uddin et al., 2023). Additionally, to obtain a competitive edge, sustainable practices have become a crucial element, given the growing emphasis that consumers place on products that are both environmentally and socially responsible (Razzak, 2023). To maintain a competitive advantage in the global marketplace, successful firms in the garments manufacturing sector must, therefore, strategically balance cost-effectiveness, innovation, and sustainability (Do, 2021; Swazan and Das, 2022; Razzak, 2023).

2.4 Theory

The research draws its framework from Porter's green competitive advantage theory, also known as Porter hypothesis (Porter and van der Linde 1995; Porter, 1999; Wang et al., 2011). This theory contends that strong environmental standards and regulations can stimulate innovation and give businesses a competitive edge. Porter and van der Linde (1995) and Porter (1999) claims that businesses that prioritise environmental sustainability may have an advantage over their competitors. Environmental sustainability can be a source of innovation, cost savings, differentiation, and long-term strategic advantage for businesses based on Porter's green competitive advantage theory (Porter and van der Linde, 1995).

Zameer et al. (2020) have tried to apply this theory when they have explored factors that might boost green competitive advantage across equipment manufacturing companies in China. When applied to China's manufacturing business, Porter's green competitive advantage theory highlights the need to incorporate ecologically friendly methods to acquire a competitive advantage. Effective promotion of sustainability efforts and mitigation of environmental risks are also part of this process. It can be through the use of eco-friendly materials, the acquisition of eco-certifications, the reduction of energy consumption and waste, the establishment of green supply chain practices, the development of new environmentally friendly product lines, and adherence to environmental regulations.

In the context of China, a significant participant in the sector, businesses may stand out by adopting sustainable practices in a field notorious for its high resource consumption (Cao et al., 2022). As consumer tastes, government restrictions, and technological advancements all change, so must the strategies that give green businesses an edge in the marketplace.

2.5 Hypothesis

2.5.1 Green management linked with business sustainability

Previous attempts to link green management and business sustainability can be found in the existing literature. Based on the results of the previous literature, businesses that proactively use their resources would benefit from the environmental standards and be better prepared to adapt to their needs (González-Benito and González-Benito, 2005; Kuo et al., 2022). Li et al. (2021) concluded that excellent environmental concern will indirectly decrease expenses while boosting income. However, Raharjo (2019) failed to identify proof that environmental success and financial performance are positively correlated. Furthermore, Purnomo and Widianingsih (2012) have established the link between a company's environmental performance and financial growth in Indonesia. Kotlar et al. (2018) figured that the financial success of a corporation is only marginally and adversely affected by environmentally conscious management. Some enterprises have adopted green management strategies yet have not translated into sustainable practices (Muisyo and Qin 2021; Loknath and Azeem, 2017). This may discourage companies from adopting green management practices (Longoni et al., 2018). In line with the result, it has been found that green management is more effective and more efficient and does not have a negative influence (Soelton et al., 2020). This hypothesis is thus developed based on the comprehension of the debate above:

H1 Green management has a significant effect on business sustainability.

2.5.2 Business sustainability linked with competitive advantage

Studies have explored the relationship between the sustainability of firms and their advantage over competitors. Sustainable business practices tend to improve the competitiveness of any firm, as concluded by some studies (Grimstad and Burgess, 2014; Cantele and Zardini, 2018; Ahmadi-Gh and Bello-Pintado, 2022). Sustainable economic, formal, and social practices positively affect competitive advantage. If companies implement sustainable practices, it is manifested in their market share (Moravcikova et al., 2017; Cantele and Zardini, 2018; Kwarteng et al., 2016). Studies have also found

that brand and corporate reputation depend on the corporate direction. When the board of directors always generates policies for the long-term, it affects how clients or customers perceive their products or services (Cantele and Zardini, 2018; Haseeb et al., 2019; Singh et al., 2019).

In the previous decades, there has been a rising concern about manufacturing activities that have caused degradation of the environment (Jones et al., 2018; Kuncoro and Suriani, 2018). So, there have been motivations from firms to not only comply with regulations but also towards voluntary adoption of environmental responsibility strategies that simultaneously address economic, environmental, and social goals (Haseeb et al., 2019; Geissdoerfer et al., 2017; Kraus et al., 2020; Vives, 2022). Ahmadi-Gh and Bello-Pintado (2022) study was to determine the effects of different sets of sustainable business practices on the outcomes of sustainability efforts and the level of competitive advantage enjoyed by manufacturing enterprises. To ascertain how these practices contribute to organisations' competitive advantage, they also consider their impact on the regulatory, environmental, and manufacturing sustainability outcomes (Kuncoro and Suriani, 2018; Singh et al., 2019; Danso et al., 2019). These outcomes impact how customers value these companies' products (Epstein, 2018; Caldera et al., 2019).

Based on the aforementioned studies, there seems to be a connection when firms consider sustainable practices to their competitive advantage:

H2 Business sustainability has a significant effect on competitive advantage.

2.5.3 Green management linked with competitive advantage

The use of environmentally responsible management strategies may lead to the attractiveness of firms to their customers (Arseculeratne and Yazdanifard, 2014; Singjai et al., 2018; Wang, 2019). Some studies have linked the implementation of green management to a firm's competitiveness. Customers or clients would likely support companies that are transparent in their green initiatives.

In the hospitality sector, clients show more interest in hotels and resorts that implement eco-friendly initiatives such as energy-efficient lighting, water-saving fixtures, and waste recycling programs to minimise environmental footprint (Sharma, 2021; Font and Guix, 2019). In the transportation sector, companies that introduce eco-friendly automobiles, such as fully electronic or hybrid vehicles, continue to expand their market share (Bose and Pal, 2020). In the food sector, companies invest in sustainable farming practices, organic ingredients, and eco-friendly packaging to meet increasing consumer demand for environmentally responsible products (Smith et al., 2021; Bajželj et al., 2020). In the technology sector, those firms with higher investments in discovering environment-friendly methods and raw materials also lead in revenue against competitors.

Integrating green management practices within the garment manufacturing sector can bolster competitiveness across multiple dimensions greatly (Fletcher et al., 2019). It distinguishes the company from competitors and enhances brand repute and consumer confidence by demonstrating steadfast dedication to environmental sustainability, appealing to environmentally aware consumers (Thakkar and Deshmukh, 2020; Tanveer et al., 2022). While some studies have found the benefits of green management in terms of competitiveness (Gomes and Daud, 2020; Rahman, 2021; Prabhu et al., 2020; Fraj et al., 2015), other pursuits found a contradicting discovery. Habib et al. (2022)

discovered a negative relationship between environmental practices and firm performance. Islam et al. (2020) have concluded that green management is not being implemented in some firms as it leads to additional costs rather than benefits. Azad et al. (2022) claim that customers are not so interested in whether the garment company is applying green management.

With this conflicting findings it is critical to state the following hypothesis:

H3 Green management has a significant effect on competitive advantage.

2.5.4 Business sustainability as a mediating variable

Studies were done to look into how company sustainability acted as a mediating factor. In a study carried out by López-Arceiz et al. (2022), the researchers analysed the role that persistence plays in the evaluations carried out by sustainability agencies, focusing on the interaction between the characteristics of sustainability committees, sustainability strategies, and performance.

Wijethilake (2017) research examined how business sustainability works as a moderating factor in the link between proactive sustainability strategy and corporate sustainability performance, which concluded the role of sustainability in moderating the relationship between proactive sustainability strategy and corporate sustainability performance.

The mediating role of business sustainability may also be applied to the garment manufacturing sector. Garment makers may balance profitability, environmental responsibility, and social equality by adopting sustainable methods. Sustainability may affect the link between innovation and resilience, helping organisations adapt to changing market dynamics, legal needs, and customer preferences (Abbas et al., 2020). Through its mediating role, business sustainability helps clothing makers balance and responsibly expand to ensure long-term prosperity and protect people and the earth (Hussain et al., 2020).

Studies have figured that a company's worth is indirectly impacted by sustainable practices (Kamble et al., 2020; Zhang et al., 2019; Alzoubi et al. 2020). Diantimala (2018) has proven the intervening influence of sustainability on the link between sustainability disclosure and business value. Chuang and Huang (2018), on the other hand, figured that sustainable practices may indirectly impact business value. Therefore, it is hypothesised that:

H4 Business sustainability mediates the relationship between green management and competitive advantage.

3 Methodology

3.1 Research design

Quantitative correlational approach is observed using the partial least squares-structural equation modelling (PLS-SEM) to answer each hypothesis. This examines the direct and indirect associations between green management, business sustainability, and competitive advantage.

3.2 Research population, sampling, and data gathering

Letters of intent to research with attached consent forms were sent to textile manufacturing companies in Pearl River Delta, Guangzhou City, in China, from September to October 2022. The respondents of this study consist of managers or executives of clothing manufacturing enterprises who have been employed for at least three years or more. The survey was conducted between October and December 2022. 180 executives and representatives of textile manufacturing companies participated in it. This number of samples is beyond the minimum sample size of 72 computed from priori power analysis with power = 0.80 ($1 - \beta$), effect size = 0.25, and $\alpha = 0.05$. If the research purpose is to accept or reject any hypothesis, statistical power analysis is the best way for determining the sample size since it considers effect size and the sampling errors (Cohen, 1988, 1990, 1992; Kyriazos, 2018). In this area of Guangzhou City, there are many different scales of clothing manufacturing enterprises, which justifies using stratified sampling (Sharma, 2017; Parsons, 2014). The scale of the companies was treated as 'strata' to represent the whole population. 59 representatives are from small scale, having 10 to 100 workers; 82 respondents are from 101 to 300 workers; and 39 participants are from large-scale, having at least 301 workers.

3.3 Instrumentation

Reflective indicators were used to measure each construct. These items were formulated based on the dimensions used from previous literature (Tang et al., 2018; Dyllick and Muff, 2016; Vorhies and Morgan, 2005; Orr et al., 2011) to measure each of the constructs as detailed in Table 1.

Each construct or latent variable described in the conceptual framework is intended to be measured by the questionnaire items with a four-point Likert scale. Respondents assess it based on how much they concur with these assertions (Hair et al., 2011).

3.4 Statistical treatment

The PLS-SEM was used in this study to ascertain the relationships between exogenous, endogenous, and mediating variable. PLS-SEM involves two phases:

1 measurement model

2 structural model (Henseler et al., 2009; Hair et al., 2011).

The measurement model involves determining the validity and reliability of each construct. The construct validity was measured through its convergent and discriminant validity. The validity and reliability of each construct should be established first before the relationships between them can be measured. The structural measurement, on the other hand, involves quantifying the direct and indirect effects between these constructs. In this study, the indirect or mediating effect of business sustainability on the relationship between green management and competitive advantage is ascertained (Hair et al., 2011).

Table 1 Likert scale items

Constructs	*Questionnaire items/indicators*	*Source*
Green management	In our performance management system and reviews, we employ green performance indicators.	Tang et al. (2018)
	Our company gives executives and staff members obligations related to the environment.	
	Managers at our company receive green goals, and these goals are reflected in their evaluations.	
	Our organisation issues reprimands for non-compliance or failing to reach environment management goals in the performance management system.	
	Our company's personnel act in accordance with a clear development vision that directs environment management.	
	Employees at my company are encouraged to share knowledge and best practices for being environmentally conscious.	
	Our company's staff members take part in quality improvement and environmentally friendly problem-solving	
Business sustainability	We use our vast resources, expertise, abilities, and experiences to address environmental, societal, or economic concerns.	Dyllick and Muff (2016)
	The benefits that our goods and services offer to the community and the environment.	
	By transforming our business practices, we can offer tangible solutions to pressing societal and environmental problems.	
	We can improve our governance systems and become more open to the needs of society.	
	In order to reconcile the conflicting demands of the current economic system, we participate in efforts to alter the game's rules.	
Competitive advantage	Market share expansion	Vorhies and Morgan (2005), Orr et al. (2011)
	An increase in sales revenue	
	Increasing sales to current clients	
	Getting new clients	

4 Data analysis

4.1 Measurement model evaluation

The reliability and convergent validity test results are shown in Table 2. All survey items measuring each construct considerably exceeded the required Cronbach's coefficient value of at least 0.70. This evidence the reliability of each construct.

Table 2 Construct validity and scale reliability

Construct	*Items*	*Cronbach's α*	*Loadings*	*Ave. var. ext.*
Green management	1	0.868	0.718	0.717
	2		0.77	
	3		0.738	
	5		0.65	
	7		0.776	
	8		0.655	
Business sustainability	1	0.901	0.787	0.805
	2		0.77	
	3		0.867	
	4		0.806	
	5		0.793	
Competitive advantage	1	0.801	0.713	0.729
	2		0.769	
	3		0.74	
	4		0.694	

Notes: Cronbach's alpha should be larger than 0.70 for reliability. All loadings must be more than or equal to 0.50 for convergence validity, and all Average Variance Extracted should be => 0.50 when extracted.

In establishing convergent validity, the standard is that all loadings and all average variance extracted (AVE) should be =>0.50 (Ringle et al., 2020). Based on the analysis, the relevant constructs' items exceed these standards. As a result, these items were valid in measuring each construct.

Items that were found unsatisfactory were excluded from the survey instrument.

4.1.1 Discriminant validity

Table 3 shows the results of discriminant validity to determine if respondents can distinguish one variable from the other and grasp the differences between the variables, which is known as discriminant validity. The square root of the AVE (SQRTAVE), shown in bold figures, must be greater than the correlations of each variable to establish discriminant validity among the constructs (Fornell and Larcker, 1981; Henseler et al., 2015). This validity test measures whether respondents can distinguish one variable from another and identify their differences. Therefore, as exhibited in Table 3, each construct meets the standard; thus, the constructs meet discriminant validity.

Table 3 Discriminant validity for reflective constructs

Constructs	*1*	*2*	*3*	*Discriminant validity*
Green management (1)	*0.683*			Yes
Business sustainability (2)	0.456	*0.648*		Yes
Competitive advantage (3)	0.423	0.255	*0.532*	Yes

Note: the square root of AVE (italics figures) should, for divergent validity, be higher than the correlations between constructs (diagonal figures).

The measurement model is deemed appropriate considering the findings of reliability, convergent reliability, and discriminant validity. Therefore, structural relationships can be pursued.

4.2 Structural model evaluation

4.2.1 Structural path results

Figure 1, Table 4, and Table 5 present the estimated results of the hypothesised correlation of the structural model.

Figure 1 Structural equation model with estimates

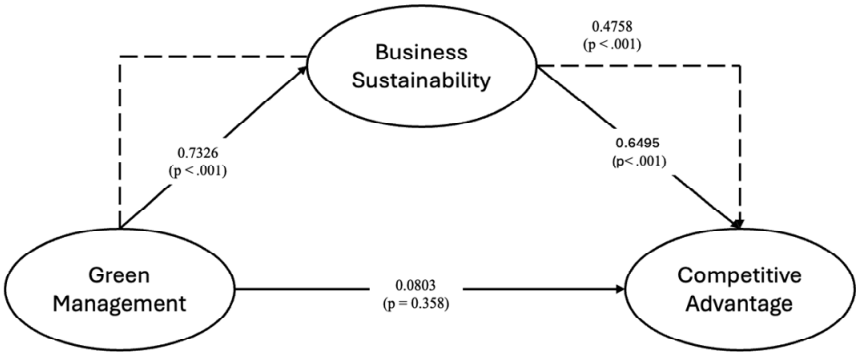

Table 4 Direct path evaluation

Direct path	*Estimate*	*SE*	*Z*	*p*	*Interpretation*
Green management to business sustainability	0.7326	0.1142	6.414	< 0.001	*H1 Accepted*
Business sustainability to competitive advantage	0.6495	0.0819	7.927	< 0.001	*H2 Accepted*
Green management to competitive advantage	0.0803	0.0874	0.918	0.358	*H3 Rejected*

Notes: If the p-value is lower than 5% or 0.05, it is statistically Significant. If the p-value is greater than 5%, the result is statistically non-significant.

Table 4 shows the direct path evaluation results. The findings show green management positively affects business sustainability ($\beta = 0.7326$; $p = < 0.001$). The results evidence the probability that business sustainability increases around 0.7326 for every 1-level increase of green management. Thus, H1 is accepted.

On the other hand, the result indicates that business sustainability affects competitive advantage positively ($\beta = 0.6495$; $p = < 0.001$). The results evidence the probability that competitive advantage increases around 0.6495 for every 1-level increase in business sustainability. This supports the acceptance of H2.

However, the effect of green management on competitive advantage ($\beta = 0.0803$) was not found significant, where $t(179) = 0.918$, $p = 0.358$. In this case, H3 is rejected.

5 Mediating effect of business sustainability on the relationship between green management and competitive advantage

Mediation analysis was conducted to assess the intervening effect of business sustainability on the relationship between green management and competitive advantage, as shown in Table 5. The indirect effect of green management on competitive advantage with business sustainability as a mediator is found to be significant ($\beta = 0.4758$, $t(179) = 6.18$, $p = < 0.001$) which supports the acceptance of H4. This depicts that business sustainability positively influences the relationship between green management and competitive advantage. However, since the results of direct analysis in Table 4 exhibit that green management has no direct effect on competitive advantage, this is a case of full mediation (Sarstedt et al., 2021). It infers that green management can only lead to competitive advantage if business sustainability exists. It means that green management efforts of Garment manufacturing companies may lead to a competitive advantage if they observe sustainable practices. If business sustainability is ignored, green management may not lead to the competitiveness of these firms.

Table 5 Indirect effect analysis through the mediation of business sustainability

Effect	*Estimate*	*SE*	*Z*	*p*	*% mediation*
Indirect	0.4758	0.0769	6.18	< 0.001	85.6
Direct	0.0803	0.0874	0.92	0.358	14.4
Total	0.5561	0.1001	5.55	< 0.001	100

Notes: If the p-value is lower than 5% or 0.05, it is statistically Significant. If the p-value is greater than 5%, the result is statistically non-significant.

Table 6 Fit indices

Measures	*Values*
X^2	25.8
X^2 p	< 0.001
AIC	234
BIC	259
Adj. BIC	231
SRMR	0.05
RMSEA	0.027
RMSEA p	< 0.001

The fit indices in structural equation modelling determine whether the model is generally satisfactory (Shi et al., 2019). X^2 got a total value of 25.8 which is statistically significant ($p < 0.001$). This supports the idea that there is indeed an association among the model variables. The values of AIC = 234, BIC = 259, and adj. BIC = 231 are values for comparison with other models. SRMR is below 0.08, which infers that it has a good model fit as far as the difference between observed correlation and implied correlation is concerned (Henseler et al., 2014). The RMSEA value of 0.027 shows that the model has good fitness compared to the hypothesised model (Ximénez et al., 2022). This implies that the structural model generated has overall fitness.

6 Theoretical implications

6.1 For theory development

Green Management alone cannot directly lead to the competitiveness of firms. It must be accompanied by business sustainability. Sustainability practices can create a more resilient and forward-thinking business that can better adapt to market adjustments and new opportunities. Green management entails ingenious methods for minimising waste, lowering energy consumption, and optimising processes. These innovations can result in substantial cost savings while promoting product and process enhancements.

6.2 Business and management practice

Manufacturing companies must implement green management practices to remain competitive in today's global marketplace. By incorporating sustainability principles into their operations, businesses can reduce costs, increase resource efficiency, and adapt to shifting consumer preferences. This can subsequently enhance their competitiveness. When sustainability mediates the link between two variables, the garments manufacturing industry must prioritise sustainability to ensure long-term survival and success. Organisations will understand the significance of linking sustainability aims with business objectives. To fulfil its potential for creating a competitive edge, green management should not be considered a distinct endeavour but included in the entire company plan.

6.3 Readers

Incorporating sustainability practices ensures that manufacturing companies remain pertinent and viable in shifting environmental, social, and economic conditions. This perspective is indispensable for sustained competitiveness. Environmental regulations are becoming stricter worldwide. By proactively implementing green management practices, manufacturing companies can reduce non-compliance risk and associated fines, ensuring long-term competitiveness. Encouraging garment companies to develop and implement procedures that benefit the environment will help boost their competitive advantage over their key competitors.

7 Conclusions

7.1 Green management on business sustainability

Based on the evaluation of results, it concludes that when a company has a green performance management system and appraisal, it develops its products using sustainable raw materials and processes. The previous study supported the result of linking business sustainability and green management (González-Benito and González-Benito, 2005). Thus, if producing green results is included in appraisals for managers, they change their production processes to offer immediate, quantifiable answers to the pressing problems in society and nature. This is a contributory finding since there has not been much research

on the connection between green management and business sustainability in the management and business literature.

7.2 Business sustainability on competitive advantage

Business sustainability is perceived to have a positive effect on competitive advantage. Sustainable practices in garment manufacturing may provide a strategic edge for the firm. Therefore, market share and sales revenue grow when products are produced with sustainable raw materials and manufacturing methods and provide goods and services that benefit people and the environment. This is supported by the findings of various studies that conclude that sustainable business practices increase a company's competitiveness (Grimstad and Burgess, 2014; Cantele and Zardini, 2018; Ahmadi-Gh and Bello-Pintado, 2022).

7.3 Effect of green management on competitive advantage

While some studies discussed the possible effect of business sustainability on competitive advantage (Fletcher et al., 2000; Wagner, 2009), the results of this study show that green management has no significant impact on competitive advantage. It implies that green management implementation may not automatically lead to competitiveness. This may be supported by the claims of other literature that greening management practices will not have a direct appeal to customers or clients (Gürlek and Tuna, 2018; Papadas et al., 2019). In fact, Wang (2019) claims that for green management will not have an immediate impact on stakeholders unless it is technologically advanced, entrepreneurially oriented, and socially progressive. In conclusion, green management in the garments industry is not expected to affect competitive advantage directly.

7.4 Mediating role of business sustainability

Mediation analysis supports the idea that green management does not directly impact competitive advantage. However, business sustainability is perceived to impact competitive advantage positively. Considering the aforementioned statements, business sustainability fully mediated the relationship between green management and competitive advantage. Only through sustainable practices can green management efforts of garment manufacturing translate to their competitiveness. In other words, green management can still contribute to competitive advantage if sustainable methods are implemented. The results indicate that investing in sustainability efforts may lead to significant competitive benefits.

In conclusion, if business sustainability mediates the link between green management and competitive advantage, this highlights the importance of sustainability as a strategic success driver. Garment manufacturing should prioritise implementing green management practices and guarantee that these practices result in measurable gains in sustainability, which add to their competitive advantage.

7.5 Theoretical implications

Based on the findings of this study, it can be inferred that the competitive advantage of garment manufacturing firms resulting from green management cannot be achieved without the existence of sustainable practices. This somehow contradicts Porter's green competitive advantage, in which environmental practices will directly generate a competitive advantage. On a certain level, the findings support the claim of Barney's (1991) resource-based theory in which competitive advantage can only have value if it is sustainable. The dynamic capabilities theory of Teece et al. (1997) emphasises that firms need to adapt to changing environments. This statement can also be linked with the moderating role of business sustainability in the relationship between green management and competitive advantage. It means that any attempt to gain competitiveness will be futile, if not in the context of sustainability or persistence amid changing demands.

Declarations

Ethics approval and consent to participate

The objectives, contents, and conclusion of this research were evaluated by a Research Ethics Board of a University and were found meritorious. No violations of research ethics standards were found, as the researchers were cautious and courteous in their data-gathering. There is no potential conflict of interest to declare. Informed consent was secured from the participating companies before data gathering.

Availability of data and materials

Research data is gathered through an online survey which is available upon request.

Acknowledgements

This research has not been funded by any institution. It was the fruit of the collaborative effort of the contributors as part of their academic requirements.

HW conceptualised the research objective based on industry experience and made the initial review of the literature. HW also wrote the Introduction and summary of all reviews of the literature. HW also wrote the concluding parts of the paper. EP is the one in charge of the whole research methodology and statistical analysis. EP also wrote the statistical interpretations. HY and EP wrote the review of related literature and contributed to the concluding parts of the paper.

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