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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

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Abstract: The current study aims to evaluate the role of environmental orientation (EO) on green dynamic capabilities (GDCs), organization green culture (OGC), and green innovation (GIN) toward business sustainability (BUS) in the context of Chinese textile and apparel manufacturing firms. Natural resources-based view (NRBV) and dynamic capabilities view (DCV) were used as the theoretical lenses of the research. This study is quantitative, and a purposive sampling technique was employed to collect data from the managers working in textile and apparel manufacturing firms in China. The sample size consisted of 339 managers. Partial least-square structural equation modeling (PLS-SEM) was employed to analyze the data. The study's findings show that EO significantly and positively influences OGC and GDCs. However, the positive influence of EO on GIN was insignificant. Moreover, the result indicates that GIN is a significant mediator in the relationships between OGC and BUS and GDCs and BUS. The results demonstrate how the Chinese textile and apparel industry EO improves GDCs, GIN, and OGC, which, in turn, benefits achieving long-term business sustainability.

Keywords: environmental orientation; green dynamic capabilities; organization green culture; green innovation; business sustainability

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1. Introduction

Around the globe, businesses are under pressure to prioritize environmental issues and implement green policies to promote environmental sustainability [1,2]. Many countries face significant environmental pollution challenges, but China is particularly vulnerable [3]. Despite the Government implementing various environmental regulations and laws, Chinese manufacturing activities continue to pose a significant environmental threat [3,4]. The Chinese manufacturing sector contributes to environmental pollution in several ways, such as it has the highest energy consumption (23%) and carbon emission rates (27%) among all emerging countries [4]. The Chinese manufacturing sector has significantly contributed to the nation's development and urbanization but is also facing significant pressure to adopt green policies due to heightened environmental concern [5].

A business can attain long-term sustainability if it provides higher value than its rivals in the market [6,7]. Given the intensifying competition and rapid developments, an organization that has insufficient business may risk being rapidly overtaken by its competitor

in the industry [3,7]. This is especially true in the era of "green manufacturing", where environmental concerns and related issues are increasingly important to manufacturing organizations [8,9]. Researchers pointed out the significance of firms' strategic policies that involve EO, OGC, GDCs, and GIN to achieve BUS [10,11]. GIN has received much attention in recent years to lessen the adverse effects of production on environmental issues [12,13]. The adoption of GIN involves developing green technologies and practices that minimize environmental impact, reduce greenhouse gas emissions, conserve natural resources, and promote sustainable growth [14,15]. Researchers also argued that GIN could result in cost savings and reduces business expenses on waste disposal and energy consumption [3]. In addition, GDCs also have a pivotal role in influencing GIN and attaining BUS. GDCs facilitate assessing all green processes and products that contribute to the company's environmental impact reduction [16]. Advancements in GDCs have prompted companies to modify policies to adopt more sustainable business practices. An increasing number of studies recognize the importance of utilizing GDCs to enhance the environmental performance of their entire production [17]. As a result, manufacturing organizations are now emphasizing GDCs to improve BUS [17].

Past studies have shown that EO significantly affects OGC, GDCs, GIN, and BUS but failed to present a comprehensive framework that depicts the significant role of organizations' EO on OGC, GDCs, and GIN toward BUS. Liboni et al. [13] partially verify the mediating effect of GIN between EO and BUS. Chen and Cao [11] used the NRBV framework and studied the green competitive advantage (CA) of 112 Chinese manufacturing firms. The study findings show that a firm's environmental identity has significant influence on GIN and competitive advantage. Zameer et al. [18] explored the mediating impact of GIN between EO and CA in the context of Chinese manufacturing companies. Their findings revealed that EO significantly impacts GIN, but its impact on CA was weak. However, empirical findings confirmed that GIN was a significant mediator between EO and CA. Moreover, Fatoki [19] conducted a study and evaluated South African hospitality businesses' competitive advantage. The findings of the study revealed that EO has a significant and positive impact on CA. Further, the study reports a partial mediating effect of GIN between EO and CA. Moreover, past studies that consider green innovation as an aspect of a company's sustainability initiatives have predominantly concentrated on the factors that motivate green innovation and its impact on gaining a competitive edge [11,13,18,19]. Therefore, it is crucial to examine the influence of factors affecting manufacturing firms' GIN and BUS. Hence, the current study addresses the following research questions:

1. Does EO influence OGC, GIN, and GDCs toward BUS?
2. Does GIN mediate between OGC and BUS and GDCs and BUS?

Two predominant reasons motivated this study's undertaking in the context of the Chinese textile and apparel industry. Firstly, the Chinese manufacturing industry is one of the world's largest and fastest-growing industries [18]. After 40 years of rapid development, Chinese manufacturing has grown to become a global leader. In 2018, its GDP exceeded CNY 26.4 trillion, accounting for almost 30% of the Chinese economy [20]. However, it faces a high level of uncertainty regarding whether GIN attempts truly match with current market demand and drive tangible benefits [11]. Secondly, researchers have argued that this industry has high carbon dioxide emissions due to unsustainable production processes [19]. The NRBV suggests that in order to attain BUS, firms should prioritize their environmental performance [20]. By implementing GIN, firms can potentially achieve financial benefits while simultaneously enhancing operational efficiency by prioritizing waste reduction and reducing the adverse impact of unsustainable production on the environment [21,22]. Similarly, GDCs are dynamic processes that involve the allocation of resources toward GIN [13]. Additionally, firms adopting GIN often display their willingness to implement substantial resource changes, which leads to achieving BUS [23]. However, there exists a gap in knowledge regarding the organizational factor that plays an effective role leading to BUS. More precisely, a limited number of empirical studies have examined the nexus between GDCs and GIN [13,24] and its impact on BUS [3,9]. Hence, to fill this gap, the

current study will assess the impact of EO on OGC, GDCs, and GIN toward BUS. The conceptual framework of the current study is novel in two ways. First, the study evaluates the impact of EO on OGC, GIN, and GDCs. However, past studies have confirmed that EO influences GIN, CA, and corporate performances [13,19], but the nexus between EO, OGC, GDCs, and GIN is scarce in the past literature. Second, the indirect role played by GIN in the relationship between OGC and BUS and GDCs and BUS has rarely been examined in the relevant literature.

The remaining sections of this study are as follows: the next section presents the theoretical framework and background literature explaining the proposed model relationships, followed by the hypotheses development and conceptual model. Subsequent sections will discuss the methodology and results. Lastly, we will address the theoretical contributions, practical implications, limitations, and future research directions of the current study.

2. Literature Review

2.1. Business Sustainability (BUS)

The concept of BUS encompasses a firm's ability to sustain over time, including factors such as productivity and financial performance, as well as the effective management of its social and environmental assets [25]. Bansal and DesJardine [26] defined BUS as a firm's capacity to address its immediate financial requirements while safeguarding its ability, as well as that of others, to fulfill future needs. In a nutshell, "*business sustainability is the business of staying in business*" [27]. BUS entails caring for various internal and external stakeholders [28], with a specific focus on the triple bottom line: planet, people, and profit [29]. The concept of BUS is related to corporate sustainability that has undergone evolutionary changes, leading to varying definitions that continue to be subjects of debate [30–32]. Initially, the focus of corporate sustainability was primarily on the environmental aspects, where it was defined as ecological sustainability [33]. However, as the concept evolved, it became evident that corporate sustainability encompasses three distinct dimensions: environmental, social, and economic [30,34]. Hence, the concept of corporate sustainability is interconnected with BUS, and the main focus of both is the triple bottom line.

2.2. Natural Resource-Based View (NRBV)

The NRBV theoretical framework, introduced by Hart (1995) [22], serves as the foundation for analyzing how EO and OGC affects a firm's GIN and its ability to achieve BUS [35]. The NRBV framework expands the well-known resource-based view theory (RBV) [19,22,36], which asserts that utilizing organizational resources and capabilities is vital to enhance performance and gain a CA [22,23]. According to the NRBV, resources must possess four qualities: value, rarity, limited mobility, and inimitability [37,38]. Having a distinct OGC can offer a competitive edge, as it should possess unique qualities that set it apart from other firms [39]. As an intangible asset, it should be challenging for competitors to replicate an OGC [40]. An effective OGC helps employees in understanding the company's environmental strategy and fosters GIN, thus, improving its green performance [39] and achieving BUS [3,41]. Based on the NRBV theoretical foundation, the current study posits that a firm's EO and OGC are essential to drive GIN and contribute toward BUS.

2.3. Dynamic Capability View (DCV)

Dynamic capabilities enable organizations to identify, incorporate, and cultivate appropriate decisions at the appropriate time and location, guiding their competencies [1,42]. Dynamic capabilities refer to a firm's ability to manage and adapt to changes in a dynamic business environment [42]. In addition, dynamic capabilities have emerged as a successful approach for companies to achieve BUS [3,12]. Researchers indicated that a company's resources include both its tangible (physical) and intangible (culture, process, and knowledge) assets that facilitate GIN and achieving sustainable development [4,12]. In line with this, an organizational approach integrating EO, GDCs, and GIN helps to capitalize on market opportunities and achieve BUS. EO helps businesses proactively identify their customers'

needs and desires and introduce innovative eco-friendly processes to reduce environmental impacts and achieve BUS [43,44]. Based on the DCV theoretical foundation, this study posits that EO leads firms toward GDCs, improves GIN, and ultimately, contributes to BUS.

Figure 1 shows the current study's conceptual framework based on the theoretical foundations of the NRBV and DCV. Accordingly, this study posits that the EO of firms influences OGC, GDCs, and GIN toward BUS.

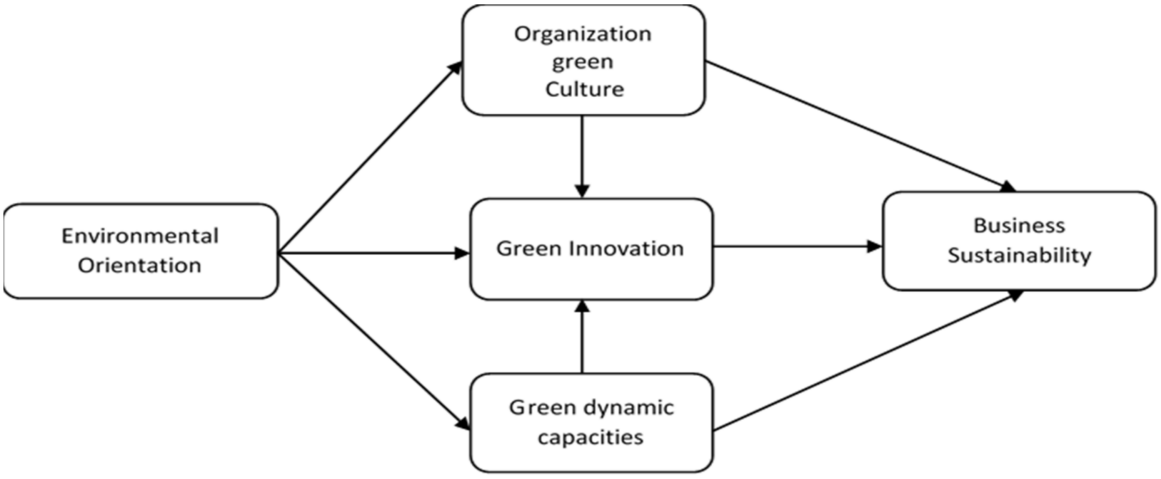

Figure 1. Conceptual model.

2.4. Environmental Orientation (EO)

EO refers to an organization's commitment to sustainable development and environmentally friendly practices [35]. In this regard, Banerjee [1] asserts that an EO signifies a sense of responsibility toward the environment and demonstrates a firm's commitment to minimizing the impact. It is similar to the corporate social responsibility concept, as it involves caring for the environment and addressing the concerns of stakeholders [10]. It also refers to the set of organizational values and cultural practices that promote proenvironmental management [45]. The way an organization thinks can be influenced by its EO, and members of the organization play a crucial role in driving changes to this thought process [46]. Based on past studies, it can be assumed that EO positively influences OGC. Hence, we hypothesized that

H1: *EO has a positive and significant influence on OGC.*

EO signifies the degree to which a company integrates environmental concerns into its strategic planning, aiming to minimize the adverse effects of its activities on the environment [35]. EO also helps to focus on innovative ways to reduce the carbon footprint through the development of green products, processes, and technologies [45]. Researchers found that EO positively influences the environmental performances of organizations as it relates to values, ethical standards, and a company's employees and management dedication to protecting the environment [35,47]. Zehir and Ozgul [48] conducted a study on 253 manufacturing firms in China to examine how EO affects green innovation. The study's findings show that EO has a positive influence on green innovation. Based on the evidence of past studies regarding the significant influence of EO on GIN, it can be assumed that EO positively influences GIN. Hence, we hypothesized that

H2: *EO has a positive and significant influence on GIN.*

By adopting EO, organizations can implement procedures that enable them to adapt effectively to evolving business environments [18]. Researchers emphasized that enhancing a company's EO can lead to better strategic solutions to environmental issues [48]. Researchers indicate that EO is a crucial component of an organization's policies, which is

central to shaping a business's sustainable practices [35]. Based on past studies, it can be assumed that EO can positively influence GDCs. Hence, we hypothesized that

H3: *EO has a positive and significant influence on GDCs.*

2.5. Organization Green Culture (OGC)

OGC refers to the values, beliefs, and practices that prioritize sustainable operations within an organization [49]. An organization's commitment to promoting environmentally sustainable practices and values within its organizational culture can motivate and inspire its employees to develop innovative green solutions that help to reduce the carbon footprint, decrease waste, and promote eco-friendliness [50]. Organizational culture will grow if managers demonstrate greater care for environmental sustainability [51]. A transition to GIN is an organization transformation from traditional practices to green practices that promote GIN [39]. In this regard, researchers pointed out that organizations with a strong green culture are likely to invest in R&D for sustainable technologies, implement green practices, and seek partnerships with organizations committed to environmental sustainability [52,53]. Recently, researchers argued that green culture within an organization is positively related to the adoption of eco-friendly and sustainable manufacturing practices, leading to increased GIN [54,55]. They found that an organization's green culture significantly impacts green product, process, and organizational innovations. In the context of manufacturing firms, past studies have indicated the positive and significant impact of OGC on GIN [56,57]. OGC facilitates the understanding of eco-friendly initiatives among employees and creates an environment that supports the implementation of GIN [56]. Based on past studies, it can be assumed that OGC will have a positive and significant influence on GIN. Hence, we hypothesized that

H4: *OGC has a positive and significant influence on GIN.*

OGC provides a sustainable CA by enabling organizations to comply with regulatory requirements and meet the growing green product demand [58]. The study conducted by Zhu et al. [59] indicates the positive influence of OGC on performance. Wang [39] found a significant positive impact of OGC on business performance. In this regard, Ahmad and Nisar [60] posit that for successful environmental practices, firms must cultivate an OGC. Hence, we hypothesized that

H5: *OGC has a positive and significant influence on BUS.*

2.6. Green Dynamic Capabilities (GDCs)

Dynamic capabilities are a company's internal strength to integrate, develop, and restructure internal and external competencies in response to increasing environmental issues [20,24]. It also includes the organization's ability to design, develop, and implement products, processes, and services that reduce their environmental impact and promote the efficient use of resources [42,61]. Past studies highlight that organizations with GDCs are more likely to engage in GIN in the form of developing green products, services, and technologies that promote environmental sustainability [43,62]. Similarly, other researchers posited that organizations with GDCs are better positioned to meet consumer demand for sustainable products and comply with strict environmental regulations [63,64]. They posited that these organizations invest in innovative technology and processes to enhance GIN. Based on these findings, we assumed that GDCs positively influence GIN. Hence, we hypothesized that

H6: *GDCs have a positive and significant influence on GIN.*

GDCs refer to an organization's ability to develop and implement sustainable practices and initiatives that promote environmental sustainability. GDCs can also be defined as the ability of an organization to use its existing resources and knowledge to renew and grow its

green organizational capabilities to respond to a dynamic green market [64]. Organizations with GDCs have the resources to build sustainable products and meet market demands [63]. However, a recent study conducted in the Chinese manufacturing sector reports that two important factors, which demonstrate an organization's green dynamic capability (i.e., green relational capital and green structural capital) have an insignificant impact on BUS [3]. In order to better understand the influence of GDCs on BUS, we assume that GDCs have a positive and significant impact on BUS. Hence, we hypothesized that

H7: *GDCs have a positive and significant influence on BUS.*

2.7. Green Innovation (GIN)

Innovations across operational processes, product developments, and organizational structures improve BUS [60]. Researchers argue that GIN combines green products, process innovation, and organizational green culture, including energy usage and pollution emissions reductions, recycling, and green product designs [65]. Process innovation is the application of innovative business methods that improve organizational resource utilization and increase efficiency in achieving BUS [66]. It involves the application of equipment and supplies that will enhance an organization's efficiency, resulting in financial and non-financial benefits [67]. Green product innovation denotes an organization's capacity to create and produce green products that satisfy consumer needs [68]. Researchers revealed that product innovation in the manufacturing industry is crucial to businesses' sustainability [69]. Similarly, implementing innovation at the organizational level is essential to businesses' success [70]. Improvements in green organizational innovation may be classified into four different groups: structural, workplace, business practice, and external policies [71]. Researchers indicated that GIN helps to alleviate carbon footprints [72] and fosters potential chances to either boost performance or decrease organizational costs [73]. Businesses achieve sustainability by implementing GIN, which reduces costs and increases efficiency, productivity, and product quality [74]. Past studies indicated that GIN could effectively boost resource productivity and decrease environmental costs for businesses [75]. Researchers posited that GIN helps to protect the environment and improves organizational performance [76]. Green practices in the production process can improve the efficiency and effectiveness of the entire process and contribute to organizational performance [77]. In addition, organizations that adhered to sustainability goals by minimizing and controlling waste contributed to their long-term performances [78]. Hence, we hypothesized that

H8: *GIN has a positive and significant influence on BUS.*

2.8. Green Innovation (GIN) as a Mediator

Fatoki [19] studied the mediating effect of GIN between EO and competitive advantage in the context of the South African hospitality industry. The study results revealed that GIN is a significant mediator between EO and CA. Gürlek and Tuna [40] found a significant mediating effect of GIN between OGC and CA. The study conducted by Astuti and Datrini [79] revealed that GIN mediates between environmental pressure and firm performance. Similarly, Deluca et al. [80] found a significant mediating effect of GIN between EO and performance. However, the findings of Wang [39] depict that the mediating effect of GIN between OGC and performance was insignificant. Past studies depict that GIN is an innovative solution for organizations to reduce costs and environmental impact production processes and, as a result, contribute to BUS [3,20,81]. Therefore, we assume organizations implementing GIN strategies to develop green products and implement green practices improve environmental and business sustainability. Hence, we hypothesized that

H9: *GIN mediates the positive and significant relationship between OGC and BUS.*

Singh et al. [76] conducted a study to assess the financial performances of small and medium-sized (SME) manufacturing firms and found that GIN mediates between GDCs and firms' financial performances. Kiranantawat and Ahmad [24] studied GDCs and SME performances. The study's results revealed the significant mediating impact of the GIN of SMEs between GDCs and firms' performances. Li et al. [3] argued that organizational GDCs were composed of green human, green relational, and green structural capital. They found that GIN mediates between GDCs and BUS. Therefore, we assume that GIN significantly mediates between GDCs and BUS in the context of Chinese apparel and textile firms. Hence, we hypothesized that

H10: *GIN mediates the positive and significant relationship between GDCs and BUS.*

3. Materials and Methods

3.1. Research Design and Approach

The current study uses cross-sectional research design. The study is quantitative, and survey technique was employed for the data collection. A deductive approach was used to verify the causal relationships among the constructs [82].

3.2. Data Collection

The main aim of this study is to understand how manufacturing firms' environmental orientation will affect OGC and GDCs toward BUS. Moreover, this study examines the role of GIN as a mediator. We selected textile and apparel manufacturing companies in China as units of analysis due to their implementation of green practices. Researchers explained that the textile and apparel industry has strongly committed to environmental sustainability [83]. Therefore, to fulfill the aim of the study, data collection from the textile and apparel industry best serves the purpose. We collected data by physically visiting the managers working in the organizations and reaching out to HR managers of companies where obtaining contact information for managers proved challenging.

3.3. Sampling

This study employed purposive sampling to target managerial-level employees, ensuring that only individuals with a strong understanding of the target variables completed the questionnaire. In the past, researchers used purposive and convenience sample techniques to ensure that participants possessed the necessary knowledge and understanding of the variables [3,18]. The employees working in the textile and apparel manufacturing companies in Guangdong, Jiangsu, and Zhejiang provinces were contacted. Specifically, 288 managers from companies located in Humen town and Dalang town in Dongguan city of Guangdong Province, 247 managers from the companies located in Changshu city and Shengzu town in Jiangsu province, and 215 managers from Keqiao district and Datang town in the Zhejiang province were approached for the data collection. The questionnaire was shared with managers who possessed sufficient knowledge of the targeted variables and were involved in the production department. Initially, a pilot survey was carried out among 35 managerial employees to test the reliability and appropriateness of the survey tool. Once we confirmed its reliability and suitability for collecting additional data, we administered the questionnaire to 750 managers. Out of 750 distributed questionnaires, we received 381 responses with a response rate of 50.8%. After removing outliers and missing values, 339 were considered for further analysis.

3.4. Profile of the Participants

The data were obtained from managers of Chinese textile and apparel manufacturing companies. Table 1 shows the participants' demographic information. More than 200 managers are male, which accounts (for 70.8%) of the study's participants. Regarding age, 173 (51.0%) managers are between the age ranges of 40 to 50 years. Education-wise, 156 managers have bachelor's degrees, which accounts for 46%, followed by 141 managers

(41.3%) with master's and Ph.D. degrees. Regarding managers' experience in the industry, 113 managers have 11 to 15 years of experience, accounting for 33.3%. Table 1 shows the participants' details.

Table 1. Participants' profile.

	Demographics	Frequency	Percent
Gender	Male	240	70.8
	Female	99	29.2
Age	Less than 40 years	118	34.8
	40 to 50 years	173	51.0
	More than 50 years	48	14.2
Qualification	High school	43	12.7
	Bachelor	156	46.0
	Master's and PhD	140	41.3
Experience	≤5 years	49	14.5
	6 to 10 years	65	19.2
	11 to 15 years	113	33.3
	>15 years	112	33.0

3.5. Research Instrument

Choosing the appropriate measurement variables is pivotal to data collection and empirical analysis. It can significantly impact the reliability and validity of the outcomes. This study's main identified variables are environmental orientation, GDCs, OGC, GIN, and BUS. The measurement scale of environmental orientation employed four items borrowed from Chan et al. [2], while GIN was assessed using four items adapted from Wang and Juo's [84] study. Four items were retained from Ullah et al.'s [9] study to measure BUS (Appendix A).

Meanwhile, the scale for measuring OGC adopted five items from Wang's [39] study. Finally, to assess GDCs, a five-item scale adopted from Chen et al. [85] and Chen and Chang [86] was employed. The observable constructs were evaluated using a five-point Likert scale in which participants could indicate their level of agreement or disagreement. The scale ranged from 1 for strongly disagree to 5 for strongly agree, with 2 indicating disagree, 3 representing neutral, and 4 indicating agree. Four academic professionals were tasked with verifying the use of appropriate academic language and eliminating discrepancies caused by ambiguous wording and poor layout in the questionnaire. After the finalization of the questionnaire, it was disseminated among the intended audience. Measuring items and sources for each construct are shown in Table 2.

Table 2. Constructs' measurement and sources.

Variables	Item	Item's Content	Sources
Environmental Orientation	EO1	Our company strive to ensure that every employee understand the importance of environmental conservation through collaborative actions.	Chan et al. [2]
	EO2	Our company has well-defined policies that promote environmental awareness throughout in every area of operations.	
	EO3	Our company employees place a high value on preserving the environment.	
	EO4	Environmental preservation is a central corporate value of our company.	

Table 2. *Cont.*

Variables	Item	Item's Content	Sources
Green Innovation	GIN1	Our company uses less or nonpolluting/toxic materials.	Wang and Juo [84]
	GIN2	Our company uses eco-labeling.	
	GIN3	Our company uses recycle, reuse, and remanufacture material.	
	GIN4	Our company uses cleaner technology to make savings and prevent pollution (such as energy, water, and waste).	
Organizational Green Culture	OGC1	Our company makes a concerted effort to make every employee understand the importance of environmental preservation.	Wang [39]
	OGC2	Our company has a clear policy statement urging environmental awareness in every area.	
	OGC3	Environmental preservation is a high priority activity in our company.	
	OGC4	Our company links environmental objectives with our other corporate goals.	
	OGC5	Our company develops products and processes that minimize environment impact.	
Green Dynamic Capacities	GDC1	Our company has the ability that can fast monitor the environment to identify new green opportunities	Chen et al. [85]; Chen and Chang [86]
	GDC2	Our company has the ability to assimilate, learn, generate, combine, share, transform, and apply new green knowledge	
	GDC3	Our company has the ability to successfully integrate and manage specialized green knowledge within the company	
	GDC4	Our company has the ability to successfully coordinate employees to develop green technology	
	GDC5	Our company has the ability to successfully allocate resources to develop green innovations.	
Business Sustainability	BUS1	Business sustainability is necessary for our company to ensure long-term growth.	Ullah et al. [9]
	BUS2	Business sustainability helps our company to compete well in the industry.	
	BUS3	Sustainability increases the sales of our company as consumers are more attracted to sustainable products.	
	BUS4	Sustainability helps company firm to develop long-term strategies	

4. Results and Analysis

The reliability and validity of empirical research depend heavily on the methodology used to analyze the data. If an unsuitable method is used, the results may not be reliable. Empirical assessment requires careful consideration of a suitable analytical technique. This study used two statistical software programs: Statistical Package for Social Sciences (SPSS) 26.0 and SMARTPLS 4.0. SPSS were used to conduct descriptive statistics, while we used SMARTPLS in a two-stage analysis. Firstly, we evaluated the measurement model to confirm the construct's validity and reliability. Secondly, we tested the structural equation model to test the proposed relationships [87]. Finally, we employed the bootstrapping 2000 resampling technique to test the mediating relationships.

4.1. Data Examination

The validity of research findings may be compromised by common method bias (CMB), which arises when the measures used in a study share method variance, potentially resulting in an overestimation or underestimation of the relationship between independent and dependent variables. When both variables are measured using similar response biases, this is more likely to occur, particularly in cases where data collection occurs through a self-administered questionnaire. To detect CMB, researchers employ various methods. In this study, we used Harman's single-factor test. If a single factor accounts for over 50% variance in the data, CMB is likely to present a potential threat to the data. Conversely, CMB is less likely to be an issue if the variance is distributed among multiple factors. This research shows that a single factor accounts for only 29.74% of the variance in the data, suggesting that CMB is not a concern [88]. Total variance explained can be found in Appendix B.

4.2. Validation of Measurement Model

The measurement model was assessed in order to ensure that the scale had sufficient reliability and validity. The measurement model was evaluated by measuring the reliability (i.e., Cronbach's alpha and composite reliability), convergent validity (i.e., outer loadings and the average variance extracted), and discriminant validity (i.e., Fornell–Larcker criterion, heterotrait/monotrait ratio, and cross loading).

4.2.1. Assessment of Convergent Validity

Reliability refers to the internal consistency of the data. The internal consistency of the data was assessed using Cronbach's alpha and composite reliability (CR). Cronbach's alpha was used to measure the internal consistency of the data, and all constructs had alpha values above the minimum threshold of 0.70. The CR method was also used, and all constructs had CR values above the minimum acceptable threshold of 0.70, indicating a high level of internal consistency [87]. Convergent validity was also evaluated using the average variance extracted and outer loading values. The results indicate that both values fell within the acceptable range, with AVE values exceeding 0.50 and CR values exceeding 0.70. This suggests that the data are similar to other tests that measure the same construct, indicating good convergent validity [89]. Table 3 shows the reliability and convergent validity.

Table 3. Validation of measurement model (reliability and convergent validity).

Constructs	Items	Loading	Cronbach's Alpha	CR	AVE
Environmental Orientation	EO1	0.770	0.799	0.867	0.621
	EO2	0.739			
	EO3	0.817			
	EO4	0.822			
Green Innovation	GIN1	0.751	0.849	0.899	0.690
	GIN2	0.862			
	GIN3	0.848			
	GIN4	0.857			
Organizational Green Culture	OGC1	0.891	0.900	0.926	0.715
	OGC2	0.824			
	OGC3	0.870			
	OGC4	0.849			
	OGC5	0.791			

Table 3. *Cont.*

Constructs	Items	Loading	Cronbach's Alpha	CR	AVE
Green Dynamic Capabilities	GDC1	0.886	0.859	0.898	0.638
	GDC2	0.766			
	GDC3	0.765			
	GDC4	0.725			
	GDC5	0.841			
Business Sustainability	BUS1	0.861	0.913	0.938	0.792
	BUS2	0.860			
	BUS3	0.912			
	BUS4	0.925			

Note: EO = environmental orientation, OGC = organization green culture, GDCs = green dynamic capabilities, GIN = green innovation, BUS = business sustainability, CR = composite reliability, AVE = average variance extracted.

4.2.2. Discriminant Validity

Discriminant validity assesses the degree to which a construct is independent of another construct in the research [90]. In this current study, we assessed discriminant validity via Fornell and Larcker criteria [91], the heterotrait/monotrait ratio (HTMT), and cross-loading values criteria. Discriminant validity is established when the square of the AVE values is higher than the corresponding correlation values [91]. Table 4 shows discriminant validity that depicts AVEs of the square root as higher than the corresponding correlation values. Second, we measured discriminant validity via HTMT values that must be less than 0.85. Table 5 shows that the HTMT values of all constructs are below 0.85, satisfying the requirement of discriminant validity [90]. Third, we assessed discriminant validity via cross-loading criteria, which states that each construct's items have cross-loading values greater than those of the other constructs. Table 6 shows the results of discriminant validity via cross-loading criteria.

Table 4. Descriptive statistics, correlations, and discriminant validity.

Constructs	1	2	3	4	5
Business Sustainability	**0.890**				
Environmental Orientation	0.319	**0.788**			
Green Dynamic Capabilities	0.407	0.362	**0.799**		
Green Innovation	0.432	0.267	0.467	**0.831**	
Green Organizational Culture	0.346	0.280	0.288	0.270	**0.846**
Mean	4.010	4.061	4.007	3.632	3.876
Standard deviation	0.695	0.582	0.659	0.767	0.770

Note: The diagonals (in bold) represent the square root of AVE, and off-diagonal values represent the correlations of each construct with other constructs. All correlations are statistically significant ($p < 0.01$).

Table 5. Discriminant validity Heterotrait/Monotrait Ratio (HTMT).

Constructs	1	2	3	4	5
Business Sustainability					
Environmental Orientation	0.353				
Green Dynamic Capabilities	0.436	0.420			
Green Innovation	0.485	0.314	0.542		
Green Organizational Culture	0.375	0.306	0.320	0.305	

Table 6. Cross-loading.

	BUS	EO	GDCs	GIN	OGC
BUS1	**0.861**	0.349	0.397	0.356	0.351
BUS2	**0.860**	0.197	0.305	0.350	0.193
BUS3	**0.912**	0.305	0.371	0.413	0.363
BUS4	**0.925**	0.268	0.365	0.412	0.299
EO1	0.315	**0.770**	0.336	0.244	0.330
EO2	0.164	**0.739**	0.212	0.140	0.192
EO3	0.241	**0.817**	0.278	0.218	0.156
EO4	0.247	**0.822**	0.283	0.213	0.157
GDC1	0.437	0.355	**0.886**	0.410	0.297
GDC2	0.348	0.265	**0.766**	0.411	0.213
GDC3	0.199	0.242	**0.765**	0.343	0.151
GDC4	0.181	0.276	**0.725**	0.327	0.234
GDC5	0.390	0.294	**0.841**	0.367	0.235
GIN1	0.363	0.247	0.371	**0.751**	0.177
GIN2	0.317	0.210	0.385	**0.862**	0.251
GIN3	0.417	0.208	0.417	**0.848**	0.227
GIN4	0.327	0.223	0.375	**0.857**	0.241
OGC1	0.312	0.301	0.290	0.265	**0.891**
OGC2	0.287	0.215	0.250	0.234	**0.824**
OGC3	0.271	0.273	0.219	0.264	**0.870**
OGC4	0.298	0.196	0.232	0.187	**0.849**
OGC5	0.297	0.177	0.219	0.176	**0.791**

4.3. Structural Model Measurement

The model's ability to make predictions and assess the structural relationships was analyzed by measuring cross-validated redundancy (Q^2), goodness-of-fit, and coefficient of determination (R^2). The bootstrapping process was used to evaluate the statistical significance of the path coefficient and determine the significance of the relationships in the model. The bootstrapping process involved generating 2000 random subsamples.

The R^2 value is the proportion of a predictor factor's influence on the dependent variable [89]. The R^2 value for the dependent variable BUS is 27.9%, representing low to moderate variances. We determined the cross-validated redundancy (Q^2) using the blindfold approach. When the value of Q^2 is greater than zero, the model's predictive validity is validated. The proposed model's Q^2 values for the endogenous constructs are above zero, indicating substantial predictive relevance [92]. The Q^2 values for OGC, GIN, GDCs, and BUS are 5.3%, 16.1%, 8.2%, and 21.2%, respectively. We have also evaluated the effect size (f^2). GDCs have the highest significant effect size (f^2 = 17.5%), followed by EO (f^2 = 15.1%), and OGC (f^2 = 8.5%). Following Henseler et al.'s [90] recommendations, we used standardized root mean square (SRMR) as an approach for model fitness. The SRMR value is 0.08, which is at par with the recommended threshold value for the structural model.

4.4. Hypotheses Testing

We employed the PLS-SEM technique with the 2000 bootstrapping sampling method to test the proposed hypotheses. This method involves generating 2000 random samples from the original dataset to obtain robust estimates of the model's parameters and testing the statistical significance of the hypothesized relationships among the variables [79]. The decision to accept and reject a hypothesis was based on the *p*-value and t-value presented in Table 7. H1 proposing the positive influence of EO on OGC was supported (β = 0.280; t = 4.850; $p > 0.05$). H2 proposing the positive influence of EO on GIN was not supported (β = 0.086; t = 1.546; $p < 0.05$). H3 proposing the positive influence of EO on GDCs was supported (β = 0.362; t = 6.447; $p > 0.05$). H4 proposing the positive influence of OGC on

GIN was supported (β = 0.131; t = 2.446; $p < 0.05$). H5 proposing the positive influence of OGC on BUS was supported (β = 0.209; t = 3.587; $p > 0.05$). H6 proposing the positive influence of GDCs on GIN was supported (β = 0.399; t = 7.529; $p > 0.05$). H7 proposing the positive influence of GDCs on BUS was supported (β = 0.219; t = 3.880; $p > 0.05$). H8 proposing the positive influence of GIN on BUS was supported (β = 0.273; t = 4.448; $p > 0.05$). Figure 2 shows the structural model.

Table 7. Hypotheses assessment summary.

Hypotheses	Beta	t-Value	*p*-Values	Decision
H1: EO- > OGC	0.280	4.850	0.000	Supported
H2: EO- > GIN	0.086	1.546	0.122	Not supported
H3: EO- > GDCs	0.362	6.447	0.000	Supported
H4: OGC- > GIN	0.131	2.446	0.015	Supported
H5: OGC- > BUS	0.209	3.587	0.000	Supported
H6: GDCs- > GIN	0.399	7.529	0.000	Supported
H7: GDCs- > BUS	0.219	3.880	0.000	Supported
H8: GIN- > BUS	0.273	4.448	0.000	Supported

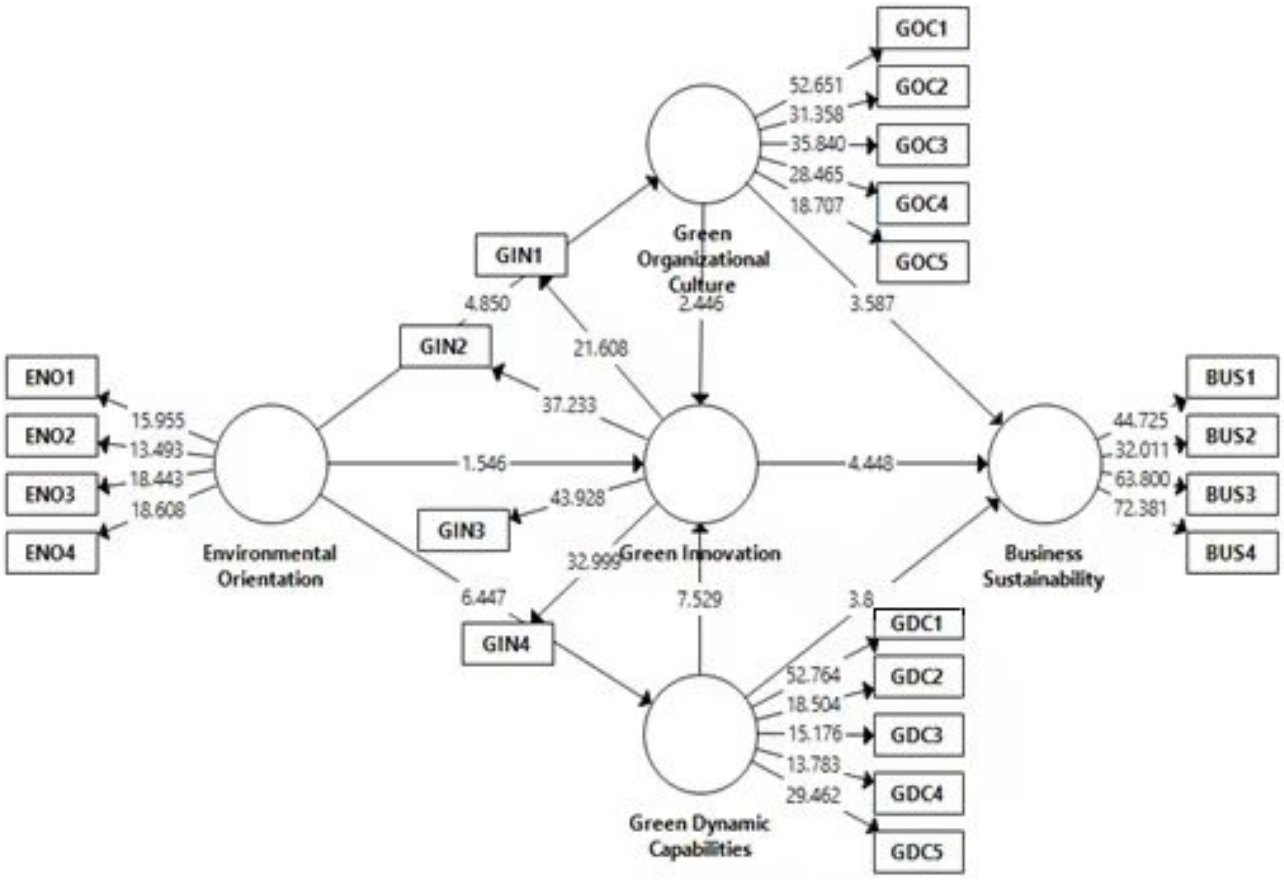

Figure 2. Structural model.

4.5. Mediation Analysis

In this study, we employed the methodology proposed by Preacher and Hayes [93] in conducting a mediation analysis. To examine the indirect effects (mediation effects), a bootstrapping procedure was utilized with 2000 resamples. The significance of the mediation was evaluated by examining the confidence intervals and t-values. A mediation effect was considered statistically significant if the confidence interval did not include zero and the t-value was greater than 1.96; the critical value for a two-tailed test at the alpha

level was 0.05. The results of the indirect effect revealed that GIN has a partially mediated relationship between OGC and BUS as well as between GDCs and BUS, thus confirming hypothesis 9 and hypothesis 10 (see Table 8).

Table 8. Indirect effect (mediation).

Hypotheses	Beta	t-Value	*p*-Value	CI	Decision
H9: OGC- > GIN- > BUS	0.036	2.300	0.022	0.010, 0.072	Mediated
H10: GDCs- > GIN- > BUS	0.109	3.679	0.000	0.058, 0.177	Mediated

Note: results are significant at $p < 0.05$.

5. Discussion

Increasing public awareness and strict regulations regarding environmental issues have a significance influence on businesses' green innovation and long-term sustainability [3,9]. Manufacturing firms have acknowledged the significance of environmental orientation driving GDCs, improving OGC, and enhancing green practices to reduce environmental pollution and protect the environment [4,8,13]. This study examines EO's impact on GDCs, GIN, and OGC toward BUS in Chinese textile and apparel manufacturing firms. The results of this study confirm the positive and significant impact of EO on both OGC and GDCs toward BUS. This suggests that the Chinese textile and apparel industry is cultivating environmentally friendly practices and implementing proactive measures to reduce the adverse effects of unsustainable production practices on the environment. The study's results are consistent with previous studies that explored the important role of EO on GIN and GDCs [8,13,94]. However, the positive influence of EO on GIN was insignificant, depicting that EO has no direct impact on GIN. These findings contradict previous studies where authors argued the importance of EO in promoting GIN in organizations [18]. The reason may be the high cost of adopting green innovation and large firms' compliance with traditional methods rather than environmental orientation. For instance, textile and apparel industry firms are only meeting minimum environmental standards and have a minimal tendency toward innovation. EO was found to have a high significant positive impact on GDCs. This indicates that manufacturing firms with EO continuously develop GDCs. The result is consistent with a past study exploring EO's significance in enhancing GDCs [18]. In terms of the positive influence of OGC on GIN, the study's findings indicate a positive and significant influence of OGC on GIN. The positive and significant influence of OGC on GIN indicate that organizational green culture fosters green innovative solutions to reduce organizations' environmental impact. This aligns with previous studies that explored the significance of OGC fostering GIN and BUS. They posited that companies that prioritize the environment and promote sustainability in the organization are more likely to develop green products and implement green practices and technologies in the organization [8,39,95]. In terms of the positives of GDCs, the results revealed that GDCs have the highest influence on GIN. The findings are consistent with past studies and signify that GDCs enable organizations to identify green opportunities in the market and invest in green technologies to foster BUS [3,18,95]. The study's findings also revealed the significance of OGC, GDCs, and GIN to enhance BUS. These findings align with past studies that categorize OGC, GDCs, and GIN as sustainable business strategies to foster organizations' long-term sustainability [8,18,95]. In terms of the mediating influence of GIN between GDCs and BUS, the findings are consistent with [30,79,80], where authors confirmed the significant mediating role of GIN between OGC and firms' performances. Finally, the results confirmed the mediating influence of GIN between GDCs and BUS. The results are consistent with past studies [3,36,81] that found the mediating influence of GIN between GDCs and BUS. The findings of past studies demonstrate firms' abilities to leverage GIN and improve BUS [3,36,40,79].

6. Conclusions

Past studies are not conclusive on how EO enhances GDCs, GIN, and OGC toward BUS [2,13,96], particularly in the textile and apparel industry context. Thus, this study presents a conceptual framework that illustrates the importance of an organization's EO orientation in enhancing its GDCs, GIN, and OGC for BUS in the Chinese textile and apparel industry. In addition, the study explored the mediating influence of GIN. The data of 339 managers working in China's textile and apparel manufacturing industry were gathered and analyzed via PLS-SEM. The study used the NRBV and DCV as underpinning theories to analyze the impact of EO on OGC, GIN, and GDCs. The study's findings revealed that environmental orientation significantly impacts the OGC and GDCs of manufacturing firms in China. The study's finding also demonstrates that green innovation is a significant mediator. This suggests that firms with strong OGC and GDCs are more likely to engage in green innovation, which helps them achieve BUS [24,97]. The findings of the current study are evidence that the textile and apparel industry in China has developed strong EO that helps in the implementation of GDCs and OGC and ultimately leads toward BUS. These findings have important implications for firms operating in the textile and apparel manufacturing industry, as the findings highlight the importance of adopting EO in promoting OGC and enhancing GDCs to achieve BUS. Organizations that invest in OGC and incorporate green practices into their operations achieve long-term sustainability [98]. Moreover, such organizations can benefit from cost savings and operational efficiencies from green and dynamic strategies. The significance of EO cannot be underestimated in a volatile business environment where sustainability issues drive business models and ensure long-term sustainability. Therefore, businesses need to prioritize EO to promote green culture, develop dynamic capabilities, and implement innovative processes to ensure their long-term sustainability.

7. Implications

This research has both theoretical and practical implications as it contributes to enrich the understanding of the relationships between EO, OGC, GDCs, and GIN. The study also provides a better explanation of how the OGC, GDC, and GIN mechanisms affect BUS. Moreover, the research presents significant managerial insights that can assist Chinese manufacturing companies in efficiently executing GIN strategies, fostering GDCs, enhancing OGC, and improving their BUS.

Theoretically, this research contributes to the NRBV and DCV theories. First, the study's findings confirmed the significant influence of EO on OGC and how OGC on GIN contributes to NRBV theory. This shows that OGC allows a firm to cultivate green innovation practices. GIN within the organization improves BUS [39]. Second, the positive and significant impact of EO on GDCs depicts that firms are more inclined to allocate resources toward more productive activities, such as GIN, rather than directly addressing environmental issues, which contributes to the DCV theoretical perspective. GDCs assist firms to proactively respond to market opportunities and introduce green innovative processes that reduce environmental impact and achieve BUS [30,34].

Practically, the current research has multiple implications for the managers of manufacturing firms. First, the positive influence of EO on OGC and GDCs has significant practical implications for organizations aiming to achieve BUS. EO fosters a culture of sustainability within an organization where employees' commitment to the organization increases [38]. This can lead to developing GDCs, which is the organization's ability to continuously adapt, offer innovative green products, and implement processes in response to environmental issues. GDCs enable organizations to respond quickly to changes in the regulatory environment and emerging technologies. By focusing on OGC and investing in GDCs, companies can improve their reputation, attract eco-conscious customers, and reduce environmental risk, leading to long-term financial sustainability [50]. Second, the study findings revealed that OGC significantly influences GIN and BUS. Therefore, businesses must adopt an OGC to drive GIN and achieve sustainable growth. OGC involves

a company's commitment to sustainability, environmental responsibility, and the well-being of its employees, customers, and stakeholders. This culture fosters a climate of innovation and creativity, leading to the development of environmentally friendly products and services and sustainable business practices. Third, the results confirm the positive influence of GDCs on GIN and BUS. Therefore, it is suggested that manufacturing firms invest in research and development and accept new technologies and practices that help create value for the organization while contributing to BUS. In addition, by improving OGC and GDCs in their business strategies, organizations can enhance their environmental performance and improve BUS and resilience in an increasingly environmentally conscious market. Finally, the findings of the study show that GIN has a significant impact on BUS. Therefore, it is recommended that manufacturing firms prioritize sustainability and offer products and services that attract environmentally friendly customers. Moreover, GIN can improve a company's reputation and brand image, increasing customer loyalty and opening new opportunities for the company's revenue generation.

8. Limitations and Future Research Directions

The study has some limitations that highlight the potential areas for future research. Notably, the study's major limitation is that the data are solely derived from a single country; thus, the results cannot be generalized. Although Chinese textile and apparel manufacturing is considered a world-leading industry and has a major share, the data collected from a single country will limit the findings. Therefore, examining the same conceptual model in alternative economic and cultural contexts that also prioritize environmental conservation would be worthwhile. This study used a purposive sampling technique and selected companies from three provinces. Future studies may use a random sampling technique to accurately represent the population. The current study's scope restricted the findings derived from cross-sectional data. Extended research is necessary to understand the lasting impact of environmental orientation on OGC, GDCs, and GIN, leading to BUS.

For this reason, future studies could utilize longitudinal data to monitor the dynamic outcomes of GIN. These studies would enable researchers to examine the causal connections between environmental orientation, OGC, GDCs, GIN, and BUS over an extended period. Finally, the questionnaire survey is limited to textile and apparel manufacturers in China, which may impact the research findings. In future studies, it would be valuable to explore the impact of diverse characteristics, such as organization size, age, and property rights, on the relationship between variables instead of treating them as control variables. These approaches could lead to a more thorough and holistic understanding of green innovation.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Environmental orientation Chan et al. [2]
• Our company strive to ensure that every employee understand the importance of environmental conservation through collaborative actions.
• Our company has well-defined policies that promote environmental awareness throughout in every area of operations.
• Our company employees place a high value on preserving the environment.
• Environmental preservation is a central corporate value of our company.
Green innovation Wang and Juo [84]
• Our company uses less or nonpolluting/toxic materials.
• Our company uses eco-labeling.
• Our company uses recycle, reuse, and remanufacture material.
• Our company uses cleaner technology to make savings and prevent pollution (such as energy, water, and waste).
Organization green culture Wang [39]
• Our company makes a concerted effort to make every employee understand the importance of environmental preservation.
• Our company has a clear policy statement urging environmental awareness in every area.
• Environmental preservation is a high priority activity in our company.
• Our company links environmental objectives with our other corporate goals.
• Our company develops products and processes that minimize environment impact.
Green dynamic capabilities Chen et al. [85]; Chen and Chang [86]
• Our company has the ability that can fast monitor the environment to identify new green opportunities
• Our company has the ability to assimilate, learn, generate, combine, share, transform, and apply new green knowledge
• Our company has the ability to successfully integrate and manage specialized green knowledge within the company
• Our company has the ability to successfully coordinate employees to develop green technology
• Our company has the ability to successfully allocate resources to develop green innovations.
Business sustainability Ullah et al. [9]
• Business sustainability is necessary for our company to ensure long-term growth.
• Business sustainability helps our company to compete well in the industry.
• Sustainability increases the sales of our company as consumers are more attracted to sustainable products.
• Sustainability helps company firm to develop long-term strategies

Appendix B

Total Variance Explained						
Factor	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	7.217	32.803	32.803	6.543	**29.740**	**29.740**
2	2.708	12.307	45.110			
3	2.104	9.565	54.675			
4	1.939	8.815	63.491			
5	1.549	7.039	70.529			
6	1.078	4.902	75.432			
7	0.930	4.228	79.659			
8	0.783	3.559	83.218			
9	0.572	2.600	85.818			
10	0.538	2.446	88.263			
11	0.421	1.915	90.179			
12	0.402	1.827	92.006			
13	0.318	1.448	93.454			
14	0.299	1.357	94.811			
15	0.240	1.089	95.900			
16	0.223	1.014	96.915			
17	0.170	0.774	97.689			
18	0.148	0.674	98.363			
19	0.122	0.555	98.918			
20	0.102	0.464	99.382			
21	0.094	0.428	99.811			
22	0.042	0.189	100.000			

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