

Sustainability of Industrial Competitiveness of the Textile and Apparel Industry in Asian Countries—A Systematic Review

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Abstract

This study investigates the sustainability of competitiveness in the textile and apparel industry across Asia following the 2005 conclusion of the Agreement on Textiles and Apparel (ATC). It aims to evaluate how sectoral competitiveness is understood and maintained beyond cost savings alone. A systematic review of the literature was conducted using PRISMA 2020 guidelines, analyzing 48 peer-reviewed journal articles from reputable sources published between 2001 and 2024. The selection process involved multiple stages of screening and thematic categorization, focusing on individual country case studies, competitiveness measures, indicators, analytical frameworks, and methodological approaches. A Risk of Bias assessment was conducted using the Mixed Methods Appraisal Tool (MMAT) to evaluate the methodological quality of the included studies. The findings highlight seven strategic pillars for sustaining competitiveness in the textile and apparel industry: shifting toward higher value-added manufacturing; integration into Global Value Chains (GVCs); technological innovation; adaptability; supply chain collaboration and organizational networks; responsible manufacturing; and government support. Moreover, the review includes a Co-occurrence analysis of all seven pillars. The analysis shows that supply chain collaboration and organizational networks serve as central pillars, often combined with adaptability and technological innovation. These findings demonstrate that maintaining industrial competitiveness in the textile and apparel industry no longer depends solely on cost efficiency but increasingly relies on strategic capabilities, ecosystem collaboration, and institutional support. The study offers a comprehensive framework to enhance the long-term competitiveness of textile manufacturing, particularly in Asia, contributing to the broader literature on transforming industries to stay competitive.

Keywords: Asia; industrial competitiveness; sustainability; textile and apparel industry



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1. Introduction

The textile and apparel industry played a crucial role in early industrialization mainly because of its low capital needs, simple technology, and labor-intensive processes [1]. In the eighteenth and nineteenth centuries, textiles were the first sector to industrialize in the UK, Japan, and the US. The UK's garment industry was crucial to both domestic and export markets, with industrial centers like London and Lancashire playing major roles [2,3]. Britain's reliance on colonial raw cotton, early mechanization, labor shifts, and the use of sewing machines helped the industry meet the growing demand for ready-made apparel [2].

As exports grew, the UK, Western Europe, and Japan became leaders in the global textile and garment division of labor [3]. In Japan, post-Meiji Restoration industrialization was supported by imported technology and government investment, making textiles a major export sector [4,5]. In the US, textile production started in New England but moved south after the Civil War due to lower labor and land costs. By the 1920s, the South had become the main textile hub, a trend that intensified between 1920 and 1930 as the region's cotton textile and apparel industry expanded due to these cost advantages [6].

Since the 1950s, increasing labor costs in the US and Japan have shifted textile production to East Asia. The first migration moved to Hong Kong, South Korea, and Taiwan, followed by a second migration to newly industrialized countries like Indonesia, Malaysia, and Thailand [7]. This shift was driven by the US trade liberalization and later limited by the Multi-Fiber Arrangement (MFA) in 1974, which set export quotas on major producers [8,9]. In 1995, the MFA was replaced by the Agreement on Textiles and Clothing (ATC), which gradually phased out quotas over ten years. After China joined the World Trade Organization (WTO), global trade patterns changed dramatically, and by the late 2010s, China had become the world's leading textile exporter [10].

The conclusion of the ATC in 2005 further disrupted global trade dynamics. The removal of quotas led buyers to consolidate their sourcing, resulting in decreased foreign direct investment (FDI) in smaller countries [8,9]. This shift has been especially clear in Asia, which has been the main center of textile production for the past thirty years. Since the early 1990s, according to Trademap statistics, Asian countries have experienced significant growth in export volumes, collectively dominating the global market. Asia's share of global textile exports increased from 50% in 1993 to 58% by 2022.

Asia's growing role in the textile and apparel trade emphasizes the region's strategic importance for studying industrial competitiveness and sustainability. This is evident from a significant increase in academic research examining the competitive dynamics of Asia's textile industries. However, despite extensive research on textile competitiveness, very few studies have systematically combined how competitiveness is defined and measured in relation to long-term industrial competitiveness, especially in the Asian context.

While the literature on textile competitiveness is limited, some research has examined the competitiveness of other industries. Some authors, such as [11–16], have reviewed literature discussing the relationship between productivity and company performance using various productivity indicators. Hilmla [11] concluded that firm competitiveness is no longer based solely on efficient labor and fixed capital. Furthermore, Iraldo [12] examined the relationships among environmental policies, environmental performance, and competitiveness in the manufacturing sector. It found that the effect of environmental policy on competitiveness may vary depending on the source and form of the regulation, as well as the environmental assets it aims to protect. Mota et al. [13] identified indicators and regional competitive frameworks affecting performance in the wine industry. Alvarez-Torres et al. [14] conducted a literature review on the impact of environmental responsibility practices on competitiveness. Meanwhile, Soledispa-Cañarte et al. [15] performed a similar review focusing on the role of logistics as an additional dimension to environmental responsibility in the agribusiness sector. Agazu and Kero [16] focused their review on how innovation strategies influence firm competitiveness.

Previous literature reviews on competitiveness mainly focus on limited aspects such as productivity, innovation, environmental policy, and environmental responsibility practices. Although these reviews provide a broad overview of existing research, they often do not thoroughly examine the sources of competitiveness, which limits our current understanding. According to the Scopus scientific database, only one study specifically reviews textile competitiveness at the industrial level. Tewari [8] offers a comprehensive literature review

on the competitiveness of the textile and apparel industry post-MFA era. Challenging the traditional focus on cost and price competitiveness, Tewari argues that these factors alone are not enough for sustained export success. Tewari [8] emphasizes the growing importance of non-price factors such as product variety, quality, timely delivery, skills development, design, and innovation as key components of long-term competitiveness in the global textile and apparel industry. Given the long research gap, this study builds on Tewari's work by critically reviewing the competitiveness of the textile and apparel industry from a broader perspective. It aims to fill this gap through a systematic review of the academic literature on textile and apparel industry competitiveness, with a particular focus on factors that influence long-term industrial competitiveness.

Moving on to the contributions of this study, this review goes beyond just summarizing existing literature by evaluating and analyzing it thematically. It explores the dynamics of competitiveness within the context of specific countries' challenges in their textile industries. By incorporating evidence from various national contexts, especially in Asia, and examining the shift from cost-based to capability-based competitiveness, this paper contributes to the broader discussion on strategies for maintaining a competitive advantage in an increasingly complex global environment. To accomplish this goal, this study addresses the following research questions:

1. What indicators show competitiveness, and what factors influence them?
2. What major challenges do the countries reviewed face in enhancing the global competitiveness of their textile industries?
3. What strategic approaches were utilized to maintain or enhance their competitiveness?

2. Methods and Materials

The foundation of sustainable competitiveness is the theory of competitive advantage, originally developed by Porter [17], which shows that an industry's competitive edge comes from natural factors and a set of interconnected systemic conditions that change over time. According to Dudin et al. [18], competitiveness must be sustainable. This means that it is not enough to be competitive now; it must also endure and grow sustainably in the face of external challenges. Yang and Zhu [19] discuss how native-type industrial clusters can improve competitiveness and sustainability through knowledge management innovation. Zhang et al. [20] described the sustainability of competitiveness as a long-term capacity to preserve and enhance competitive advantages through financial development. Li [21] defined sustainability of competitiveness as a firm's ability to maintain long-term strategic advantages via ongoing innovation, productivity gains, and market strength. Soh et al. [22] characterized the sustainability of competitiveness in tourism as the capability to uphold tourism performance while reducing vulnerability and increasing resilience over time. Lukmandono et al. [23] explained that maintaining long-term advantages through collaboration, networking, and policy support is essential for the sustainability of competitiveness in the creative industry. Drawing on prior literature on sustainability and competitiveness, this study defines the sustainability of industrial competitiveness as the textile and apparel industry's ability, particularly in Asian countries, to maintain its long-term competitiveness amid economic challenges and global pressures. Following Lyon [24], sustainability is generally understood as the integration of complementary pillars, especially environmental, social, and economic dimensions, and is increasingly viewed as a cross-disciplinary approach that connects human and natural systems to address complex problems. Therefore, in defining the sustainability of industrial competitiveness, this study considers 'sustainability' as an overarching perspective that links long-term competitive performance with the capacity to meet environmental and social expectations, as well as economic pressures.

Following Snyder [25], this study uses an integrative literature review that evaluates, critiques, and synthesizes a scattered body of research to develop a coherent framework. This method is especially useful when previous studies do not agree on a single concept, and the review aims to create an initial categorization or structure that organizes evidence for clear comparison and future investigation. The development of this framework was done through two steps. First, the included articles were thematically mapped to show how the research on competitiveness in the textile and apparel industry has changed over time. Each study was categorized by sector focus (textiles or apparel), country context, analytical approach, and research method. Additionally, the review identified and classified how each study defined and measured competitiveness (such as performance indicators and capability-based measures) and the factors examined.

In the second stage, the extracted evidence was synthesized to develop strategic pillars representing the various dimensions of sustainability in industrial competitiveness. This synthesis focused on two elements: the competitive challenges identified in each article and the strategic responses reflected in the determinants, measures, methods, and discussions used to explain or improve competitive performance. Through a structured coding process, recurring combinations of challenges and strategic responses were identified and grouped into broader categories, which were then developed into seven strategic pillars. These pillars served as an operational framework for organizing the evidence and enabling structured comparisons across countries and studies.

The mentioned coding process began with a pilot phase in which each article was examined to identify the key constraints affecting textile and apparel competitiveness in its country context, along with the strategic approaches proposed or implied in the analysis. Based on this pilot, all included articles were then retabulated using article-level binary coding, resulting in a 48×14 matrix encompassing the seven pillars across two elements: challenges and strategic approaches. For challenge items, a score of 1 was assigned when the article explicitly identified the issue as a constraint to competitiveness; otherwise, the value was coded as 0. A broader evidence threshold was applied to strategic approach items to capture strategies expressed either through empirical operationalization (variables and measures) or through explicit discussion and implications, due to significant variation in reporting styles across quantitative, qualitative, and case studies. A strategic approach item was coded as 1 if the article operationalized the approach through corresponding competitiveness factors in its analysis. Additionally, a strategic approach item was coded as 1 when the approach was explicitly highlighted in the discussion as an important element for enhancing competitiveness, even if it was not directly implemented in the empirical model. After the coding process was verified through a second review of included articles, the 48×14 matrix was condensed into a 48×7 article-pillar matrix, where a pillar was coded as 1 only when both its challenge and strategic approach components were present. Consequently, a single article could contribute to more than one pillar.

To support a quantitative synthesis, co-occurrence analysis was conducted to measure how often two pillars appeared together within the same article. Co-occurrence counts were derived from an article-pillar matrix, where the off-diagonal C_{ij} represents the total number of articles in which pillars i and j co-occur. The analysis highlights the most frequent pillar pairs and identifies the most central pillar based on overall co-occurrence strength across all pairs.

To compile the database, this study followed the PRISMA approach to identify, screen, and select relevant articles on textile and apparel industry competitiveness [26]. To ensure quality, database sources were limited to trusted journal databases. A targeted title-based search was conducted across article databases, including Scopus, MDPI, Taylor & Francis,

and Emerald. The detailed PRISMA flow and the results of the systematic literature review are reported in the next sections.

3. Results

This section shows the results of the literature review, organized based on the steps outlined earlier in the methodology section.

3.1. Study Identification and Screening Process

The identification, filtering, and screening of studies followed the PRISMA guidelines [26]. The PRISMA flow diagram of the study selection process is presented in Figure 1, and the PRISMA checklist is provided in the Supplementary Materials. It begins by searching the literature based on the research objective, which explores the dynamics of competitiveness in the textile and apparel industry through a targeted query in the Scopus database, MDPI, Taylor and Francis, and Emerald. Search strings applied to a specific field were refined iteratively to maximize topical relevance while keeping the number of retrieved studies manageable. Accordingly, the search was conducted using a TITLE-search strategy to improve specificity and to prioritize studies that explicitly address competitiveness in the textile and apparel industry. Searches across sources required slight adjustments in the search strings because each platform uses different search fields and query syntax. All searches are conducted in the category TITLE. For the Scopus database, the string was: TITLE ((textile* OR garment OR cloth* OR apparel) AND (competi* OR performance)). The search was limited to papers written in English and included only studies published in journals. This initial search yielded 3109 articles. It was then narrowed to English-language articles published after 2000. The year restriction marks the end of the ATC and the emergence of Asian countries as global textile players. At this point, 2895 articles were identified. Searching in Emerald was conducted in alternating rounds using different combinations of strings reflecting textile and apparel terms paired with indicators of competitiveness or performance. One example is “textile AND competitiveness.” Overall, the Emerald search retrieved 88 articles. The MDPI search, using the same strategy, yielded 152 articles. Additionally, the search in Taylor and Francis used the string “textile OR garment OR cloth* OR apparel,” with results limited to articles, resulting in 386 articles. At this stage, the total number of articles identified was 3521.

The screening process employed an inclusion-exclusion strategy to filter the targeted literature by database source. In the Scopus database, irrelevant papers were excluded according to subject area, keywords, and source titles. In MDPI and Taylor and Francis, the screening used inclusion criteria for related “Subjects” and “Journal”. Meanwhile, in Emerald, no actions were taken during this process. A total of 2845 articles were removed across all sources, leaving 676 articles. The next step involves screening the articles using a structured Excel spreadsheet, removing duplicates, unpublished articles, and anonymous articles. The screening involved reviewing document titles and excluding articles unrelated to textiles or competitiveness, yielding 323 articles.

The process began with abstract screening to ensure that each paper examined competitiveness within a single-country context, excluding regional scopes (e.g., Europe or Asia) or economic groupings (e.g., developed versus developing countries). Inclusion was intentionally limited to single-country studies to facilitate comparison of country-specific competitiveness challenges and strategic responses within the same industry setting. The relevant evidence focuses on the unique strengths explaining why a country has become a leading textile or apparel producer, as well as constraints that weaken its competitive position relative to peers. These factors are typically described within institutional, industry, and policy contexts, which are more easily identifiable in single-country studies. In

contrast, regional or economic bloc analyses often rely on aggregate indicators and broad comparisons, providing limited detail for identifying country-specific strengths and weaknesses. Therefore, such studies were excluded to ensure that evidence interpretation and comparison align with the strategic pillars of this review. This screening phase excluded 177 papers and retained 146 articles, including 93 studies on Asian countries, 19 on the Americas, 22 on Europe, and 12 on African countries. The regional distribution shows that Asia accounts for the largest share of single-country case studies, emphasizing the importance of focusing on Asia's textile competitiveness. Later, the screening process was narrowed further to textile manufacturing by excluding studies mainly related to retail, resulting in a final pool of 84 articles.

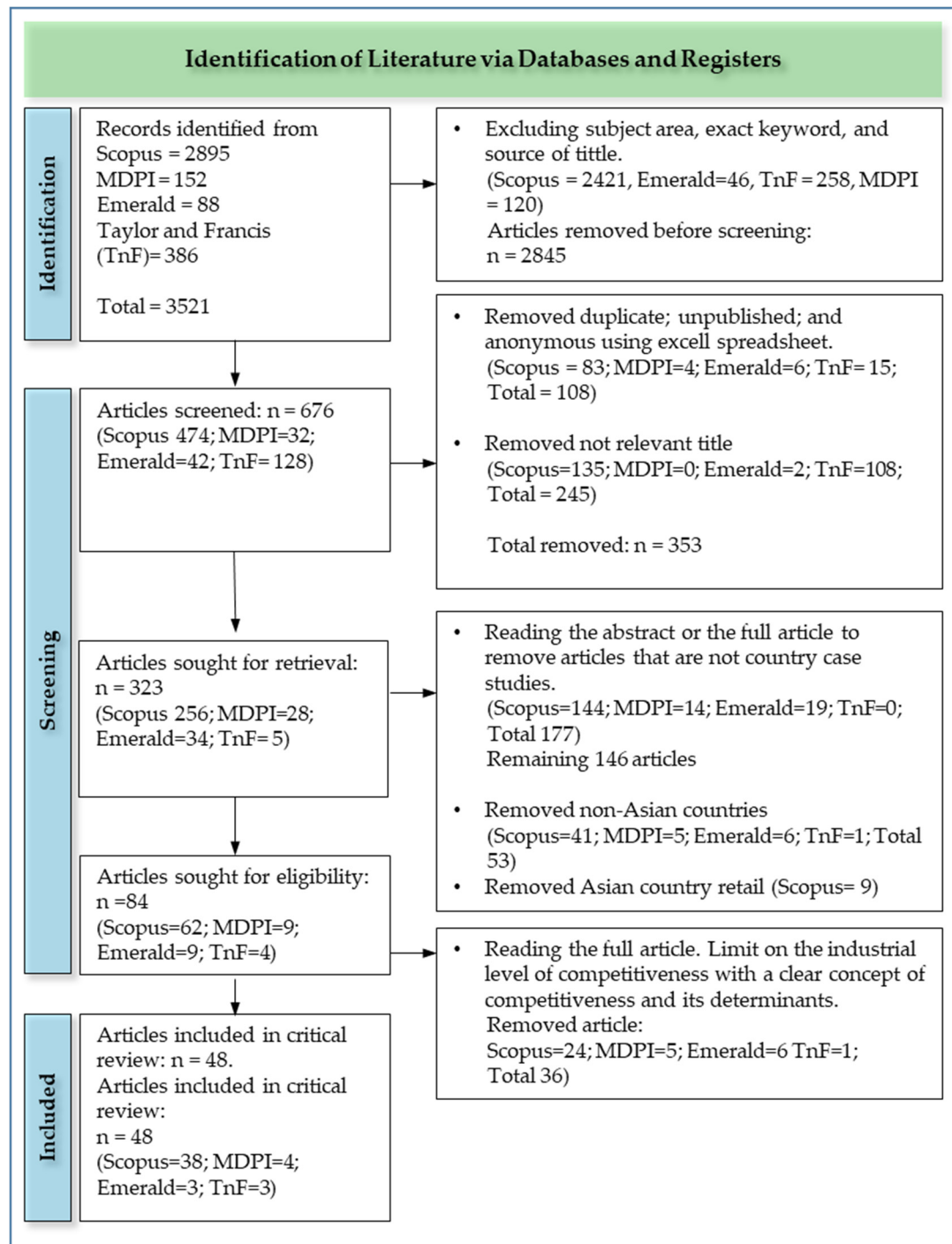


Figure 1. PRISMA flow diagram.

Finally, the articles are carefully reviewed and selected based on their content. The chosen articles explicitly discuss competitiveness, clearly define the concept, and identify influencing factors. Additionally, the articles must analyze industry-level competitiveness or evaluate industrial performance using firms as the unit of analysis. The final dataset includes literature focused on the competitiveness of the textile and apparel industry, specifically in textile or apparel manufacturing, not retail. This process resulted in 48 articles selected for in-depth review.

A risk of bias assessment was performed on the 48 included studies using the Mixed Methods Appraisal Tool (MMAT), chosen for its inclusion of qualitative, quantitative descriptive, quantitative non-randomized, and mixed-methods designs [27,28]. Two reviewers independently conducted the assessment, resolving any discrepancies through discussion until consensus was achieved. No automation tools were employed during the appraisal. The results of the assessment indicate that qualitative studies consistently exhibited high-quality profiles, while quantitative descriptive studies generally satisfied the primary assessment criteria. Mixed methods studies were deemed acceptable and provided valuable complementary insights. Although methodological rigor varied, particularly in non-randomized quantitative studies, most studies demonstrated adequate measurement, reporting of results, and analytical relevance. Overall, the reviewed literature offers a credible and informative basis for identifying key patterns and determinants of competitiveness within the textile and apparel industry. Given the methodological heterogeneity of the included studies and the absence of a meta-analysis, the review did not apply formal statistical or graphical methods to assess reporting bias.

3.2. Research Mapping

The risk of bias assessment indicated that the evidence included in this review was generally of sufficient quality to support synthesis and identify main patterns of competitiveness. Despite some variation in methodological rigor across studies, the overall evidence base provided a Figure 1 credible foundation for the review. Although differences in study design and analytical approaches limited direct comparability, the included literature offered important evidence on the key determinants of competitiveness in the textile and apparel industry.

Analysis of the literature shows that selected articles focused on competitiveness in the textile and apparel industry, with case studies in Asian countries, beginning to be published in 2001. The early publications mark the end of the quota regime in textile trade. Since the United States ended the quota policy, textile competitiveness has become a blend of business strategies and outcomes, and the growing literature on textile competitiveness has appeared in various dimensions.

Measuring the textile and apparel industry's competitiveness in Asian countries now depends not only on market share but also on how textile firms perform in those countries. The reviewed article discusses competitiveness from several different analytical frameworks and methods. Eleven similar methods are identified, and 48 reviewed articles use 29 analytical frameworks. The most common methods are PLS-SEM, empirical regression, surveys, and case studies. The most widely used analytical frameworks include the supply chain approach, Porter's Competitive Advantage "diamond", Global Value Chain theory, international trade theory, and organizational theory.

The development of research on the competitiveness of the textile and apparel industry from 2001 to 2024 shows a clear evolution in analytical focus, theoretical frameworks, and research methods as presented in Table 1. In the early phase until around 2012, competitiveness studies were dominated by a macro approach that viewed the textile and apparel industry as part of international trade and national economic performance, emphasizing ex-

ports, total factor productivity, and production efficiency. Frameworks such as international trade, Porter's Diamond, and efficiency analysis were widely used, while research methods remained relatively simple, consisting of surveys, empirical regression, and data envelopment analysis. From 2013 to 2018, the focus shifted toward global value chains and global production networks, highlighting the position of Asian countries in the international production structure, the relationships among actors, and the process of industrial upgrading. During this period, studies began to incorporate issues of quality management, innovation, and organizational capabilities, utilizing increasingly diverse methods, including in-depth case studies and quantitative approaches based on structural models. The 2019–2024 period shows a stronger shift toward the micro and meso levels, primarily focused on supply chain management and sustainability themes, where competitiveness is understood as the outcome of integrating firm capabilities, supply chain governance, regulatory compliance, and environmental and stakeholder pressures. Theoretical frameworks are becoming more pluralistic, including the resource-based view, stakeholder theory, resource dependency, and the concept of green competitive advantage, while PLS-SEM and empirical regression methods are emerging as the main approaches. Overall, textile and apparel competitiveness research is progressing from trade-based performance measures to a more dynamic understanding of long-term competitiveness rooted in firm internal capabilities, global supply chain connectivity, and sustainability requirements.

Table 1. Research Mapping by Study Object, Country of Analysis, Analytical Framework, and Research Method.

Authors	Textile	Apparel	Country	Analytical Framework	Research Method
Bheda et al. (2001) [29]		✓	India	Operation Management	Statistics <i>t</i> -test
Balaram et al. (2003) [30]		✓	India	International trade	Survey
Jin and Moon (2006) [31]	✓	✓	South Korea	Porter's Diamond	Survey
Hanif and Jafri (2008) [32]	✓		Pakistan	International Trade	Empirical regression
Lau et al. (2009) [33]		✓	China	Porter's Diamond	Exploratory factor analysis
Shafaei (2009) [34]	✓		Iran	Porter's Diamond	Analytic Hierarchy Process
Sharma et al. (2010) [35]	✓		India	Total factor productivity	Empirical Regression
Vixathep and Matsunaga (2012) [36]		✓	Vietnam	Efficiency Analysis Theory	Data Envelope Analysis
Kapuge and Smith (2012) [37]		✓	Sri Lanka	Total Quality Management	Statistics <i>t</i> -test
Kadarusman and Nadvi (2013) [38]		✓	Indonesia	Global Value Chain	Case study
Sukwadi et al. (2013) [39]		✓	Indonesia	Supply chain management	PLS-SEM
Hassan et al. (2014) [40]	✓		Pakistan	Total Quality Management	Factor Analysis
Chi (2015) [41]	✓	✓	China	Business contingency and firm performance	PLS-SEM
Butollo (2015) [42]		✓	China	Global Production Network	Case Study
Nimlaor et al. (2015) [43]		✓	Thailand	Organizational theory	PLS-SEM
Alam and Natsuda (2016) [44]		✓	Bangladesh	Global Value Chain	Survey
Nolintha and Jajri (2016) [45]		✓	Lao	Global Production Network	Empirical regression
Vu and Pham (2016) [46]	✓	✓	Vietnam	Porter's Diamond	Scoring and indexing
Bangun et al. (2017) [47]		✓	Indonesia	Global Value Chain	System dynamic
Kasornbua and Phimolsathien (2017) [48]		✓	Thailand	Networking capability and firm performance	Empirical regression

Table 1. Cont.

Authors	Textile	Apparel	Country	Analytical Framework	Research Method
Le and Wang (2017) [49]	✓	✓	Vietnam	Performance and productivity-based view	Data Envelope Analysis
Li and Wu (2017) [50]	✓	✓	China	Environmental Management System	Statistics <i>t</i> -test
Wadho and Chaudhry (2018) [51]	✓	✓	Pakistan	Innovation and firm performance	Empirical Regression
Venugopalan et al. (2018) [52]	✓		India	Supply chain management	PLS-SEM
Chowdhury et al. (2018) [53]	✓		Bangladesh	Intellectual Capital framework	Empirical Regression
Guan et al. (2019) [54]	✓	✓	China	Porter's Diamond	Empirical regression
Safeer et al. (2019) [55]		✓	Pakistan	Porter's Diamond	survey
Abeysekara et al. (2019) [56]		✓	Sri Lanka	Supply Chain Management	PLS-SEM
Srisuponvanit et al. (2019) [57]	✓		Thailand	Supply chain management	PLS SEM
Shahi et al. (2021) [58]	✓		India	Sustainable supply chain management	PLS-SEM
Suradi et al. (2020) [59]	✓		Indonesia	Supply Chain Management	PLS-SEM
Phan et al. (2020) [60]	✓		Vietnam	Resource-Based View (RBV)	PLS-SEM
Ye et al. (2021) [61]		✓	China	Supply chain management	Case study
Nazeer et al. (2021) [62]	✓	✓	Pakistan	Technology capability	PLS-SEM
Nepal and Deb (2022) [63]	✓		India	Resource Dependency Theory	Empirical Regression
Wang et al. (2022) [64]	✓	✓	Vietnam	Productivity theory	Data Envelope Analysis
Win and Kakinaka (2022) [65]		✓	Myanmar	Foreign Direct Investment (FDI) theory	Empirical Regression
Uddin et al. (2023) [66]		✓	Bangladesh	Sustainable supply chain management	PLS-SEM
Atif et al. (2023) [67]	✓		Pakistan	Sunk cost theory	Empirical Regression
Nuruzzaman et al. (2023) [68]		✓	Bangladesh	Stakeholder Theory	PLS-SEM
Pan et al. (2023) [69]		✓	China	Investment and firm performance	Empirical Regression
Khan et al. (2023) [70]	✓		Pakistan	Resource-Based View	PLS-SEM
Tran et al. (2023) [71]		✓	Vietnam	Organizational theory	Survey
Wan and Paulino (2024) [72]		✓	China	Porter's green competitive advantage theory	PLS-SEM
Jabeen et al. (2024) [73]	✓		Pakistan	Resource-Based View	PLS-SEM
Moin et al. (2024) [74]		✓	Bangladesh	Manufacturing flexibility	PLS-SEM
Situmorang et al. (2024) [75]	✓		Indonesia	Regulation theory	PLS-SEM
Widodo et al. (2024) [76]	✓		Indonesia	Supply Chain	PLS-SEM

The articles encompass various dimensions and indicators. A review of selected articles identifies eleven dimensions comprising 31 indicators, highlighting those most frequently used. Subsequently, the indicators are grouped into four primary measures of competitiveness: (1) productivity, (2) business performance, (3) international competitiveness, and (4) supply chain competitiveness. The grouping process involved classifying related measures into similar categories and assigning appropriate labels to each group.

Productivity measures how well firms utilize their resources to generate outputs and stay competitive both domestically and internationally [29,30]. Its related indicators include labor productivity, total factor productivity, technical efficiency, and productivity growth.

Business performance measures a company's ability to deliver goods or services that meet market quality standards while lowering costs or increasing appeal compared to

competitors [39,52]. Key indicators include cost efficiency, profitability, market success, pricing, product quality, and return on assets [39,42,46].

International competitiveness refers to an industry's ability to export goods, compete in global markets, sustain long-term growth, and enhance its international standing [25,38,44,50]. It also reflects the relative importance of an industry within a country's export structure compared to its global counterpart [26,37]. Indicators of international competitiveness include global market share, market growth, revealed comparative advantage, export growth, and export intensity [40,56,62].

Supply chain competitiveness pertains to a firm's ability to reorganize its operations to manage market uncertainties in demand and supply [61,74]. It highlights the firm's capacity to gain a competitive edge through on-time delivery, shorter lead times, and manufacturing flexibility [45,54,60]. Table 2 presents the results of research mapping across dimensions, factors, and competitiveness measures. The number in the cell under the Primary Competitiveness Measure column indicates the article associated with the author listed in the first column of Table 1.

Based on Table 2, the reviewed literature shows that competitiveness is primarily understood and measured as an outcome in international markets and business performance. Quantitatively, the measure of international competitiveness appears 99 times and includes 24 factors, making it the most prominent indicator compared to others. Business performance is mentioned 72 times across 22 factors. Measures based on operational capability, such as productivity and supply chain performance, are relatively rarely considered primary indicators of competitiveness. Therefore, this synthesis of findings indicates a trend toward emphasizing external market outcomes over capability-based measures.

Supply chain competitiveness measures are still rarely used as primary metrics in studies of Asia's textile competitiveness, mainly because trade-based macro indicators dominate the traditional measurement approach. In the set of articles reviewed, from the initial research phase until 2012, most were macro-focused and viewed competitiveness as part of national trade and economic performance. Additionally, there is a lack of comparable operational supply chain data across countries or companies. Looking at Table 1, all studies adopting a supply chain theoretical framework used the PLS-SEM method, with data based on respondents' perceptions. Therefore, even though the period of 2019–2024 saw a significant shift toward supply chain topics, many studies still favored more established, easily measurable themes, such as international competitiveness and business performance. Supply chain aspects appeared more often as explanatory factors rather than primary measures of competitiveness.

Among competitiveness factors, the Asian textile literature most often identifies labor as the primary determinant. It appears in 19 articles and is used across various competitiveness measures. Other commonly cited factors include production technology (13 articles), supplier relationships and organizational structure/commitment (12 articles), and product differentiation (10 articles). This pattern indicates that cost and productivity advantages related to labor remain central, while technological and firm-level capabilities, especially supply chain relationships, also contribute to competitiveness.

Several factors have become more prominent in the recent literature, especially during 2019–2025, alongside a shift toward micro- and meso-level analyses focused on supply chain management and responsible practices. Competitiveness is increasingly viewed as the integration of internal capabilities, supply chain governance, regulatory compliance, and environmental or stakeholder pressures, often drawing on RBV and related capability-based perspectives. As a result, the most important factors are related to collaboration, supply chain governance, and responsible manufacturing, indicating that competitiveness

is now connected not only to cost advantages but also to responsiveness, coordination, buyer–supplier collaboration, and meeting responsibility practice requirements.

Table 2. Research Mapping by Dimension, Factors, and Measures of Competitiveness.

Dimension	Factor of Competitiveness	Primary Competitiveness Measure			
		Productivity	Business Performance	International Competitiveness	Supply Chain Competitiveness
Firm Strategy	Cost efficiency		[39,41]	[38]	
	Product differentiation	[26]	[33,35,41,43,74]	[30,31,42,43]	
	Flexibility		[39,41,74]		
GVC	GVC participation	[65]		[31,38,47,54]	
Supply Chain Management	Logistic		[59]		
	Supplier relationship		[37,39,52,53,56,59,71]	[33,55,76]	[57,61]
	Customer relationship		[40,52,53,56,59,60]		[57,61]
	Cross-function integration		[56,60,71]		[57]
	Risk sharing		[56,59]		[57,61]
Responsible manufacturing	Responsible Manufacturing		[50,58,60,66,72,73]		
Demand condition	Domestic market		[48,71]	[31,33,34,46,47,54,68]	
	Foreign market	[45]	[36,71]	[31,33,34,46,68]	
Related supporting industry	Infrastructure	[35]		[31,33,34,44,46,55]	
	Related industry			[31,33,34,44,46,47,70]	
Industrial structure	competition			[46,70]	
	Business environment		[41]	[34,46,47,54]	
Factor condition	Material source	[35]	[71,74]	[32–34,54,55,68,76]	
	Entrepreneurship			[47,70]	
	Labor	[29,35,45,65]	[37,40,52,53,62]	[30–33,42,44,46,47,54,55]	
	Capital	[29,35,65]	[43]	[30,33,34,54,55]	
	Production Technology	[29,35,49]	[62,64,66,71]	[30,31,34,42,44,76]	
	Digital technology			[30,33,69]	[61]
	Innovation and R&D		[40,60]	[30,32,43,44,51,52]	
Government	Government policy/Regulation		[71]	[32–34,42,47,55,68,75]	
Firm characteristic	Age	[65]	[36,51,63]	[67]	
	Size	[49]	[36,51,63]	[67]	
	Organization structure/commitment	[45]	[36,48,51,53,60,63,71]	[30,45,70]	[61]
	Management quality		[37,40,66]	[33]	
Market environment	Market access			[33,44]	
	Foreign competition			[55]	

4. Discussion

The seven strategic pillars discussed in this section were derived from the iterative coding process outlined in the methodology. A comprehensive review of the selected articles identifies seven strategic pillars the industry should adopt to sustain its textile and apparel competitiveness, as shown in Table 3. The number in the cell in the first column of Table 3 indicates the article associated with the author in Table 1.

Table 3. Strategic Pillars for Sustainability of Industrial Competitiveness.

No.	Article Reference	Challenges	Strategic Approaches	Strategic Pillar
1.	[29–31,34,37–39,43,44,49,53,54,64,65]	• Rising labor costs • Dependency on imported raw materials • Lack of supporting industry • Low value-added production • Limited market	• Changing from fundamental factors to advanced factors: • Factor condition • Demand condition • Firm’s strategy • Supporting industry	Movement to higher value-added manufacturing
2.	[31,35,41,42,44,49,65]	• Consolidated sourcing conducted by a global buyer	• Participating in the global value chain • Connecting with major lead firms • Upgrading tier position • Functional upgrading	Integration into Global Value Chains
3.	[30,32,33,42–44,48,49,55,58,59,66,76]	• Labor shortage • Outdated technology • Limited RandD • Inefficiencies	• Technology upgrading • Investment in new technologies, machinery, and knowledge • Digital integration • Engagement in innovation activities	Technology innovation
4.	[26,28,30,32,35,37,39–42,45,46,52,55,56,59,61,70,71,74]	• Change in customer demand • Rapid technology advancement • Market complexity • Unfavored government policy	• Quick adjustment in business strategy • The enhancement of resilience, agility, and flexibility.	Adaptability
5.	[33,35–37,39,40,43,44,48,53,55,57–61,63,66,68,70–72,74,76]	• Limited vertical integration • Regulatory barriers and policy challenges • Supply-side and demand-side issues	• Implementation of supply chain management practice • The development of partnerships and relational skills • External networking • Interpersonal relationships	Supply chain collaboration and organizational network
6.	[40,44,50,53,58,60,66,72,73]	• Consumer awareness of environmental impact • The prioritization of social and ethical sourcing by global buyers • Limited adoption of eco-friendly practices • Policy and Regulation Pressure	• The assurance of fair wages and safe working conditions • Compliance with environmental standards and practices	Responsible manufacturing
7.	[29,30,33,34,39,41,45,47,52,54,65,68,72,73]	• Bureaucratic complexity • The need for industry support • Counter-effect of government policy	• Positive bureaucratic • The creation of effective policies	Government support

4.1. Strategic Pillar for Sustainable Competitiveness in the Asian Textile and Apparel Industry

The next section provides a detailed discussion of each strategic pillar mentioned above.

4.1.1. Movement Toward Higher Value-Added Manufacturing

Textile-producing countries rely heavily on inexpensive labor and imported raw materials, focusing on low-value activities. For example, China’s and Vietnam’s competitiveness has traditionally come from their ability to produce at low costs, due to large pools of skilled and low-wage labor. China’s industry benefits from economies of scale and has been supported by extensive government policies that promote exports [31]. Vietnam’s textile sector remains competitive due to significant government efforts to integrate into the global market through multiple free trade agreements (FTAs). However, weaknesses in supporting industries and limited technological innovation keep the industry at low-value production, making it vulnerable and unsustainable in the long run [44]. Rising labor costs, increased competition from other low-cost countries, and the need for technological upgrades pose significant challenges for competing in international markets. Porter’s Diamond framework highlights a set of interconnected determinants that influence industrial

sustainability and competitiveness in global markets, including factor conditions, demand conditions, government policies, the presence of supporting industries, and the nature of firm strategy and rivalry [17,27,38].

Specialized labor markets, education and training, local availability of raw materials, capital intensity, and infrastructure define factor conditions. These elements are the fundamental factors that determine the local operational environment of firms in the textile and apparel industry [27,43]. Basic factors like low labor costs and abundant labor initially enhance competitiveness by allowing cost-effective production [46]. In Vietnam, low wages and a large labor force offer immediate advantages in international markets where price competitiveness is crucial. However, long-term sustainability in the textile and apparel industry depends on advanced factors like skilled labor, technological development, and research and development (R&D) investments [27,42]. R&D drives product and process innovation, helping the industry move up the value chain to create higher-value goods instead of relying only on labor cost advantages. Skilled labor and increased productivity boost efficiency, reducing dependence on a large, low-cost workforce, which can become unsustainable as wages rise or labor markets tighten.

High levels of capital serve as an advanced factor condition that enhances sustainability by enabling firms to acquire technology, infrastructure, and specialized expertise. These investments not only boost productivity and efficiency but also act as practical enablers for the textile industry to adopt environmentally friendly practices. In many Asian countries, increasing environmentally friendly demands from international buyers are progressively shaping the foundation of sustainable competitiveness, translating into specific operational requirements such as cleaner production processes, monitoring systems, and compliance routines. Meeting these demands relies heavily on substantial capital investments, as maintaining environmental performance requires continuous upgrading, auditing, and process control. In this way, advanced capital is not just a financial input; it functions as a catalyst for capability development, reinforcing long-term competitiveness by strengthening firms' technological and managerial foundations.

Demand conditions shape the industry's growth potential and its ability to adapt to shifting market needs. China benefits from a large domestic market with diverse and sophisticated consumer preferences, fueling ongoing innovation and product development [54]. This high demand for variety and quality pressures firms to improve, promoting responsiveness and innovation within the industry [27,38]. Compared to Vietnam, the domestic market is smaller and less developed, but international demand for Vietnamese textiles has been supported by trade agreements that lower tariffs and expand access to major markets like the European Union and Japan [46]. International consumers are increasingly interested in medium- to high-end products, further increasing demand for various textile and apparel items. Sustainable demand conditions, therefore, require not just a large consumer base but also a market that encourages companies to improve quality, efficiency, and innovation [67].

Firm strategy and rivalry are vital for maintaining the textile and apparel industry's position in the global market. Product upgrading includes quality management, R&D innovation, advanced technology, and equipment [33]. A company's marketability strategy involves product differentiation, establishing a market presence both domestically and internationally, and managing the supply chain management [33]. A competitive business environment, marked by fierce local competition and robust company strategies, can foster innovation, reduce expenses, and boost productivity [27,42]. The textile market in Vietnam is very competitive, encouraging companies to boost efficiency and adopt new strategies despite limited resources. However, one weakness of the industry is its reliance on cut-make-trim production, which confines firms to low-value tasks and leaves marketing

and distribution to foreign partners. This restricts Vietnamese textile companies from developing higher-value products and building unique brands that could enhance their competitiveness globally.

The government and related supporting industries are characterized by industrial restructuring, clustering and market regulation, backward and forward vertical linkages, and opening markets to foreign countries [33]. These points examine whether the spatial proximity of upstream or downstream industries facilitates information exchange, provides ongoing opportunities, and encourages innovation. Strengthening its upstream sectors (e.g., cotton and yarn production) and downstream sectors (e.g., distribution and marketing) could reduce reliance on imports and increase value within the supply chain. Improved infrastructure enhances distribution efficiency and supports international trade transactions. Clusters of textile and apparel firms in specific regions can further foster innovation, improve supply chain efficiency, and encourage collaboration.

4.1.2. Participation in the Global Value Chain (GVC)

Since the 1990s, Indonesia's garment industry has been fully integrated into the global apparel supply chains of leading world brands, exporting to major and demanding international markets [31,39]. Export apparel production from Indonesia was coordinated by leading global brand marketers and retailers, especially from the US and the European Union, as well as international traders managing triangular manufacturing arrangements for such brands [31,39,66]. The learning and upgrading processes of Indonesia's firms involved in GVCs differ depending on the governance types in which they operate [38]. Indonesia's apparel companies strengthened their GVC links by gradually shifting from captive governance structures, where they rely on lead firms for detailed specifications and production oversight, to more relational or modular relationships that provide greater independence [31,39]. Firms in captive chains usually focus on process improvements, such as implementing quality control measures, streamlining workflows, and gaining production knowledge through technical support from trade agents. Companies transitioning from a captive to a relational chain adopt advanced production management practices, source inputs independently, and meet compliance standards through technical collaboration with global brands, leading to full-package production capabilities. Upgrading can also involve diversifying their GVC connections by balancing captive, modular, and market-based relationships. They develop products, build brands, and enter emerging export and domestic markets. These firms use modular chains for design flexibility and market-based chains for branding, while maintaining captive relationships in advanced markets for stability and learning. This diversification encourages functional upgrading, brand recognition, and increased control over value chain activities.

Upgrading in the context of GVC involves improving one's position in the value chain by boosting production efficiency and creating high-value-added products through technology and skilled labor [77]. Functional upgrading involves moving to higher-value activities, such as design and marketing. Firms that pursue major technology upgrades tend to have considerably higher productivity [45]. Meanwhile, firms engaged in new product development and adaptive capabilities can export more [36,37]. Upgrading in the global apparel industry involves inter-chain transformation, characterized by a shift from captive to more relational production linkages as suppliers develop from standardized cut-make-trim processes toward full-package manufacturing capabilities [77]. Full-package production fundamentally changes the relationship between buyer and supplier, granting the supplier more independence and fostering more opportunities for innovation and learning [44].

In buyer-led GVCs, social and environmental improvements are becoming increasingly important alongside economic progress [40,61]. In social upgrading, the focus is especially on social compliance, ensuring fair treatment of garment workers through fair wages and safe working conditions. When apparel companies meet these standards, they tend to attract global brands willing to pay higher prices for their products. Environmental upgrading involves efforts from manufacturers to reduce carbon footprints, recycle waste, control water usage, and adopt other eco-friendly initiatives. Large companies like Walmart have emphasized packaging improvements through their zero-waste initiative, which promotes less packaging across the entire supply chain and encourages the use of recycled or reused materials.

The sustainability of industrial competitiveness depends on the ability to improve value chain positions, overcome internal and external challenges, and maintain investment in human resources and infrastructure, all of which are essential for long-term survival and growth in global markets [47]. Long-term competitiveness depends on how effectively firms navigate their networks of relationships. Firms that heavily rely on captive value chains, where they depend on global buyers for specifications and inputs, may struggle to innovate or upgrade, especially as they need to meet social and environmental demands. This lack of autonomy can threaten their long-term competitiveness, as they remain limited to low-value tasks like basic assembly. Such firms might focus on domestic and emerging markets, where they have more control over production processes and can innovate more freely [38]. In the Lao apparel industry, technological upgrades, export levels, and regional connections are essential for maintaining competitiveness. Laos's companies with regional links beyond East Asia tend to have higher technological capabilities because of the demanding requirements of buyers in developed countries [45].

4.1.3. Technology and Innovation

Since the 2000s, the textile and apparel industries in India, Pakistan, and Vietnam have become major export sectors, contributing significantly to their social and economic growth [30,41,50]. The success of the textile and apparel industry in the country heavily relies on the availability of inexpensive labor. Additionally, Pakistan and India possess a diverse raw material base for cotton and various other natural fibers [44,47]. The robust spinning industry that converts local cotton into yarn enhances Pakistan's competitiveness in textile manufacturing [55]. Due to limited domestic raw materials and heavy reliance on imports, Vietnam has made significant efforts to integrate globally to compete in international markets [42,45]. Despite several positive factors, India still lags behind countries like China in modernization and scale [35]. A common problem for textile manufacturers with abundant labor and raw materials is low value-added output due to limited innovation. The industry has faced challenges with outdated technology, fragmented capacity, and small-scale production.

Sustainability of industrial competitiveness in the textile and apparel industry relies on ongoing improvements in resource efficiency, the adoption of new technologies, and systematic efforts to cut operational inefficiencies [35]. Firms that utilize resources efficiently are better positioned to reduce production costs, improve profitability, and survive external economic shocks [36]. Improving labor productivity and maintaining competitiveness in global markets requires innovation in both technological and non-technological areas [51]. Firms that invest in new technologies, machinery, and knowledge flows can remain competitive over the long term [51]. Investing in new technology involves using external technologies and innovating [62]. The success of the innovation process in promoting sustainable growth depends not only on technology transfer but also on internal capabilities to absorb and

adapt [62]. Technology investments are crucial for enhancing a company's performance and long-term competitiveness when backed by effective governance systems [69].

Firms employ various innovation strategies to improve their expected outcomes [51]. Investment in physical capital quickly impacts a firm's productivity, thereby enhancing the company's performance [69]. However, an increase in capital investment alone would not improve firm efficiency if labor productivity does not rise with higher capital intensity [36]. In other words, investing heavily in equipment that is underused or not effectively utilized to boost output would lead to a higher capital-labor ratio and decreased efficiency. To better utilize advanced technologies, appropriate skills training and human resource development should accompany investment in physical capital [36]. Investment in software technology has the greatest impact on firm performance because it optimizes operations and management. Additionally, information system software can support decision-making, improve the firm's response to the market and customer service levels, and enhance overall performance [69].

A company's choice to engage in technology innovation and allocate resources depends on the sector's competitive environment [51]. Exporting to foreign markets greatly enhances innovation and R&D efforts due to diverse consumer needs, especially at high export levels [51]. Access to information from foreign clients and collaboration both within and outside the firm promote innovation [51]. Consequently, the exporting firm has higher technical efficiency than firms limited to the domestic market [36]. The effect of competition on innovation commitment varies depending on where it occurs [51]. Domestic competition motivates companies to innovate more than overseas competition. External constraints, such as energy crises, undermine incentives for innovation. National subsidies surprisingly reduce firms' R&D investment, probably due to misallocation or inadequate oversight [51]. Larger firms are more likely to innovate because they have more infrastructure and human resources. They are more motivated to diversify operations or pursue vertical integration to enhance efficiency, spread risks, and make better use of funds [47,64]. Regarding firm age, younger companies are better at aligning their technology with that of more experienced competitors [36]. In terms of Environment, Social, and Governance (ESG) standards, firms implement software and information systems to translate ESG requirements into measurable operational controls. Information systems enhance managerial decision-making through dashboards and traceability, making indicators of productivity, waste reduction, and compliance consistently trackable over time and easier to verify for internal governance and external reporting.

4.1.4. Adaptability

The empirical data show that some countries have maintained their traditional comparative advantage as global textile producers, such as abundant, inexpensive labor, a domestic supply of raw materials, or technological capabilities. However, dynamic challenges arising from internal and external factors hinder the industry's sustainability [70]. The internal challenges may include geopolitical, technological, and socio-economic barriers that, in the case of Pakistan's textile and apparel industry, reduce its attractiveness as a trading partner and limit its market reach [70]. While the Iranian textile industry has strength in raw material capacity, its lack of local industrial support and domestic market demand reduce its overall competitiveness [34]. China's textile industry demonstrates how its adaptability has helped it sustain growth despite rising production costs, increased competition from lower-cost regions, and structural changes in the global textile market [33,34,43,49,60]. The apparel sectors of Bangladesh and other Asian countries face challenges due to business uncertainties, including supply chain disruptions, unpredictable demand shifts, and pressure to comply with environmental and social standards. Proactive

responses to environmental concerns, reductions in public complaints, and stronger community engagement enable firms to recalibrate their strategies and operational practices in line with external pressures [40].

The ways businesses respond to volatile international market environments depend on their strategy. For Chinese apparel firms, strategic responses to the turbulent business environment differ between high- and low-performing firms [41]. High performers focus on differentiation strategies by offering higher quality, better delivery performance, and greater flexibility. In contrast to low-performing firms, which prioritized low cost, quality, and flexibility, these firms were assigned certain weights. The textile and apparel industry in China's Pearl River Delta experienced steady growth despite rising production costs, driven by strategic recoupling processes where previously low-end exporters shifted toward domestic markets or upgraded to higher value-added export products, while relocating cost-sensitive activities to lower-cost regions [42]. In other cases, China's apparel companies adapt to an evolving consumer apparel market by modifying their supply chain strategies and operational processes based on various levels of market complexity [61]. The production strategy, such as fast-moving, high-volume, or high-product mix production, influences how supply chain management should evolve [61]. In Pakistan, supply chain agility practices enhance export performance because its textile companies are often pressured to stay cost-effective and lean, especially when serving cost-driven markets in Europe [70].

Adaptivity does not depend on firm size, as evidenced by successful adaptation in both large and small-to-medium enterprises [33,34]. Instead, the firm's commitment is the primary factor enabling it to be adaptive [61]. The firm commitment includes organizational leadership and teamwork [43]. Dynamic market conditions require flexible, responsive strategic approaches that depend on strong organizational commitment. In the Indian textile and apparel industry, limited efforts to improve quality awareness among leading firms during the post-Multi-Fiber Agreement period restricted their ability to stay competitive in quota-free trade environments [25,56]. While organizational commitment is a key factor for firms to be adaptable, the role of government ensures that the ability to respond to the global market operates at an industrial level [33,34,44]. For example, the success of strategic recoupling in China is closely linked to the government's role through industrial upgrading, spatial reconfiguration, and strategic market redirection [42]. As Chinese government-led industrial upgrading continued, export-oriented firms proactively shifted their strategies from a focus on cost reduction to a variety of value-adding differentiators in response to the changing characteristics of the business environment [41]. Government action plays a central role in improving business conditions by formulating and implementing policies that support the development of the textile and apparel industry [55].

4.1.5. Supply Chain Collaboration and Organizational Network

Empirical research shows that supply chain collaboration and organizational networking are essential for improving the competitiveness of the textile and apparel industry, as they streamline operations, encourage innovation, and promote adaptability in changing markets [42,46]. In the Sri Lankan textile and apparel industry, both vertical and horizontal collaboration are vital for increasing supply chain resilience, especially given the industry's frequent socio-political and business-environmental disruptions. By building trust and sharing information within partnerships, collaboration reduces risks and strengthens competitive positions [56]. To support the industrial strategic program, Indonesia's government has implemented a policy requiring a certain percentage of local components in final textile products [76]. Vertical integration provides a strategic advantage by simplifying processes and gaining more control over the domestic supply chain. Connecting with domestic

supply chain partners through vertical integration helps internalize production processes and decrease dependence on external suppliers, allowing firms to cut costs and reduce market risks [76].

In the context of Asia's textile and garment industry, competitiveness is shaped not only by production efficiency but also by firms' ability to build and manage networks of relationships within complex regional and institutional environments. The competitive performance of garment firms in Cambodia, Lao, Myanmar, and Vietnam (CLMV) markets is closely linked to the effectiveness of organizational networking and relationship governance, both within firms and across external partners, enabling adaptation to complex regulatory environments, access to key resources, and the formation of strategic alliances [48]. Well-developed internal relational structures strengthen firms' ability to mobilize external networks for resource coordination, risk reduction, and market expansion, particularly under conditions of regulatory fragmentation and logistical constraints [42,46,67]. Managerial support and interpersonal relationships strengthen collaborative ability in business settings where trust forms the foundation for transactional stability and long-term cooperation [71]. The setup and performance of external networks are also influenced by contextual factors, such as the level of government involvement and the uncertainty surrounding technological change [71]. In Vietnam, government-supported systems such as industry associations and international trade events provide official spaces for information sharing and network building [71]. At the same time, technological development has uneven effects on collaboration, reflecting the labor-intensive nature of the garment industry and the limited adoption of disruptive technologies [71].

In practice, supply chain collaboration and organizational networks can serve as key channels through which ESG standards shape sustainable competitiveness at the industrial and international levels [66]. Environmentally, close coordination between suppliers and buyers is necessary to implement green initiatives and carry out cross-firm programs such as zero-waste. Socially, collaborative networks help spread and enforce ethical and labor standards through long-term, mutually beneficial supplier relationships supported by transparency, accountability, and information sharing in ethical sourcing. From a governance perspective, collaboration also functions as a practical control system to reduce unfair procurement practices and enhance accountability through shared rules, audits, and oversight embedded in inter-firm relationships.

The success of collaboration relies on mutual trust and commitment among supply chain partners [42,47]. Trust underpins effective collaboration by enabling open communication and resource sharing, and is reinforced by consistent quality, transparency, and technologies that support reliable, real-time information exchange [45,62]. Transparent communication and the prompt sharing of accurate information among suppliers, companies, and customers are crucial for effective collaboration [47,57]. Other factors influencing the success of collaboration include technological integration, leadership, and organizational culture [57,62]. Strong leadership and organizational culture influence the success of collaboration [58]. Leaders who establish a clear vision, promote participative decision-making, and encourage teamwork create an environment that supports collaboration [40]. An organizational culture that emphasizes teamwork, adaptability, and trust further encourages collaboration [71].

4.1.6. Responsible Manufacturing Practices

Firms are primarily driven by the goal of achieving economic sustainability, with business managers prioritizing healthy cash flow, increasing profit margins, continuously improving product and process performance, and attaining sustainable competitiveness. Conversely, textile and apparel customers are increasingly aware of green manufacturing,

which causes minimal environmental damage and is socially responsible [58]. Globally, environmental responsibility has become a crucial issue for human societies, often described as making decisions that reduce businesses' negative environmental impacts. It is not just about reducing production waste or decreasing energy use in the textile and apparel industry; it also involves process development that could lead to sustainable businesses in the future [66]. Social responsibility involves recognizing and managing a company's effects, both positive and negative, on people. It requires actively addressing a firm's impact on employees, stakeholders, and communities, as its long-term success depends on ethical conduct, fair treatment, and strong community connections [66].

The Bangladesh apparel sector has historically thrived on low-cost labor, but rising competition from countries such as Vietnam, Cambodia, and Myanmar challenges its dominance [66]. The industry has a history of labor rights violations, including low wages and unsafe working conditions. The Indian textile and apparel industry is widely regarded as a major polluter, consuming large amounts of water, chemicals, and energy [58]. Indian textile companies frequently face hefty penalties for breaking environmental laws, which can hurt their financial results. Global organizations are becoming increasingly attentive to the labor conditions and environmental impacts of manufacturers in developing countries. Moreover, many international brands, like H&M and Zara, emphasize ethical sourcing. Companies that ensure fair wages, safe working environments, and environmental responsibility are more likely to secure contracts with premium brands. As a result, traditional competitive advantages such as Porter's cost leadership and product differentiation strategies are insufficient to sustain the competitiveness of textile and apparel producers in Bangladesh and India, which depend heavily on global brand buyers. To stay competitive, they need to adopt responsible manufacturing practices. The textile and apparel industry must now see responsible manufacturing not just as following regulations but as a strategic way to build long-term strength [60].

Developing countries such as India, Bangladesh, and Vietnam face many challenges in implementing responsible manufacturing practices, particularly in environmental compliance. Responsible manufacturing requires significant investments in cleaner technology, energy-efficient machinery, and environmentally friendly raw materials [50]. Many factories, especially small- and medium-sized enterprises, lack the financial resources to make these changes [56,58,59]. Furthermore, the connection between environmental responsibility measures and firms' performance goals may not be straightforward. It depends on whether investments in environmental responsibility lead to overall productivity gains. Regarding environmental compliance among Bangladeshi apparel companies, it has not had a positive impact on their competitive advantage [66]. Usually, Bangladesh's apparel companies are pressured by stakeholders to invest in effluent treatment, pollution control, and similar measures, which do not directly improve productivity.

The success of responsible manufacturing practices in the textile and apparel industry relies on several essential factors. Responsible manufacturing involves all stakeholders throughout the supply chain. Suppliers, manufacturers, and customers work together to implement responsible practices at every stage of production and distribution [58]. Another important factor is investing in advanced technology for supply chain operations [56,61]. Integrating advanced technology into supply chain processes helps companies improve energy efficiency, cut waste, and comply with international standards. Additionally, government support through policies, incentives, and regulations encourages businesses, especially small ones, to adopt responsible manufacturing practices. Indian policymakers promote responsible manufacturing through various initiatives, including environmental regulations [58]. Responsible manufacturing aligns with government goals, allowing firms to access subsidies, incentives, and international trade advantages [58].

4.1.7. Government Support

Researchers noted that some government policies aim to support the competitiveness of the domestic textile and apparel industry, as in many countries, this sector is a key part of the economy. For example, Pakistan's government policies, such as improving access to credit through a well-developed financial system, are crucial for boosting the competitiveness of Pakistan's textile and apparel industry in international trade [32]. In India, government efforts such as simplifying tax laws and encouraging capital investment aim to boost the textile and apparel industry's efficiency and expand its capacity [35]. Local governments in the Pearl River Delta, China, significantly enhance textile competitiveness by supporting industrial upgrades, spatial reconfiguration, and strategic market shifts, enabling garment companies to move toward higher-value-added production and adapt to changing economic conditions [42]. Vietnam's competitiveness in the textile and apparel industry comes from a combination of government support, trade agreements, and a fairly low-cost labor force [71]. Government institutions, such as the Vietnam Textile and Apparel Association and the Vietnam Chamber of Commerce and Industry, promote industry collaboration through events, exhibitions, and workshops. To boost domestic demand, Indonesia's government implemented a local content policy for finished textile products [76].

Though the government's role is to create an environment that supports productivity, it does not directly influence the competitive process or favor specific industries [17]. By influencing the "national diamond" factors, governments can enhance or restrict competitive advantage [17]. Strong policies improve infrastructure, education, and regulations, boosting domestic demand, innovation, and international competitiveness. However, interventions such as distorting competition or undermining market pressures often become counterproductive over time, as they can hinder necessary industrial upgrades. Therefore, the government has an important but limited role in supporting existing strengths and helping industries grow through sustained productivity improvements.

Consistent with Porter [17], the apparel industry in Bangladesh was affected by government bureaucracy in both positive and negative ways [68]. Government actions influence supply and demand barriers, affecting raw material procurement, export policies, and overall operations. Positive bureaucratic behavior helps reduce infrastructure gaps, shorten lead times, and enhance supplier-buyer coordination, thereby boosting Bangladesh's apparel competitiveness globally. Conversely, negative bureaucratic behavior worsens existing barriers, hindering the industry's ability to sustain its market position. In Indonesia, government regulations governing bonded zone facilities primarily affect competitiveness by lowering costs and improving efficiency. Although regulations enhance efficiency-based competitiveness, they do not directly boost product uniqueness or innovation [75]. A survey of India's apparel manufacturers showed that 90% of respondents considered government policy is the main challenge to their international competitiveness, not a solution [55]. Variations in India's policies, such as new taxes, increases in existing taxes or interest rates, and high duties on textile raw material imports, all raise the final apparel costs, creating problems for the industry and reducing competitiveness.

In the context of industrial competitiveness, government intervention serves as both an enabling and a challenging force rather than a source of excessive protection, applying selective pressure that encourages firms to develop sustainable competitive capabilities [17]. Effective government policy should focus on strengthening the core factors of competitiveness. Supportive government policies should enhance the strategic pillars identified for sustainable industrial competitiveness in the textile sector. Government policy should help domestic firms advance to higher-value-added manufacturing through industrial restructuring, improve infrastructure, and expand market access [33]. The government

should foster an environment in which firms can enhance their competitive advantages by adopting more advanced technology. The proper role of government policy in promoting a sustainable textile and apparel industry is to encourage companies to improve their value chain. Government policy facilitates ESG standard compliance by setting mandatory rules and enforcement mechanisms that promote responsible manufacturing practices, thereby reducing regulatory uncertainty and accelerating adoption at the firm level.

4.2. Co-Occurrence Analysis

Since strategic approaches are often implemented as integrated bundles, some overlap among strategic pillars is expected in how previous studies describe them. For example, productivity improvement may be discussed alongside adaptability, while technological innovation is often part of efforts to advance higher-value-added manufacturing. To move beyond this conceptual overlap and make the relationships between the pillars empirically visible, this study uses a quantitative approach to track which pillars co-occur across studies. This approach demonstrates how the literature empirically reflects their interconnectedness in explaining sustainable competitiveness.

Table 4 indicates that supply chain collaboration and organizational networks are the most connected pillars among the reviewed articles. They have the highest total co-occurrence strength of 31 and are also the most frequently discussed pillars, appearing in 25 articles. This suggests that collaboration and networking are commonly discussed together with other strategic pillars. In comparison, the next most connected pillars are movement to higher value-added manufacturing with a co-occurrence frequency of 21, discussed in 15 articles; technology innovation with a co-occurrence of 20, also discussed in 15 articles; and government support with a co-occurrence of 19, discussed in 14 articles. This indicates that capability upgrading and institutional support are often integrated into the literature's explanations of sustainable competitiveness. Regarding the strongest pillar pairings, the most frequent co-occurrences are between adaptability and supply chain collaboration and organizational networks at 9, followed by technology innovation and supply chain collaboration and networks at 8, and responsible manufacturing with supply chain collaboration and networks at 7. This pattern suggests that the literature often frames competitiveness and sustainability through a combined focus on relational coordination, adaptability, and technological innovation. Meanwhile, integration into global value chains shows the lowest overall co-occurrence frequency at 11, and responsible manufacturing remains relatively less connected overall at 12, indicating these themes are less frequently linked with multiple pillars across the studies.

Table 4. Strategic Pillar Co-occurrence Diagonal Matrix.

Strategic Pillar	Movement to Higher Value-Added Manufacturing	Integration into Global Value Chains	Technology Innovation	Adaptability	Supply Chain Collaboration and Organizational Network	Responsible Manufacturing	Government Support
Movement to higher value-added manufacturing		6	3	3	3	1	5
Integration into Global Value Chains	6		3	2	1	1	4
Technology innovation	3	3		2	8	2	4
Adaptability	3	2	2		9	1	4

Table 4. Cont.

Strategic Pillar	Movement to Higher Value-Added Manufacturing	Integration into Global Value Chains	Technology Innovation	Adaptability	Supply Chain Collaboration and Organizational Network	Responsible Manufacturing	Government Support
Supply chain collaboration and organizational network	3	1	8	9		7	6
Responsible manufacturing	1	1	2	1	7		1
Government support	5	4	5	4	6	1	
Frequency of co-occurrence	21	11	20	18	31	12	19
Frequency discussed by the article	15	9	15	14	25	9	14

4.3. Theoretical Implication

The definition of sustainability of industrial competitiveness in this study is grounded in the competitive advantage theory [17] and prior studies on sustainable competitiveness [18–24], which emphasize that competitiveness should not only be achieved in the present but also maintained and strengthened over time with the capacity to meet environmental and social expectations, as well as economic pressures. However, the existing literature has generally explained its drivers through partial and separate perspectives. This study proposes an integrative framework that conceptualizes the sustainability of industrial competitiveness as a multidimensional construct shaped by interrelated capabilities and contextual conditions. The co-occurrence analysis contributes to the theoretical development of this framework by showing that the sustainability of industrial competitiveness in the textile and apparel industry in Asian countries is shaped by seven interconnected strategic pillars, with supply chain collaboration and organizational networks emerging as the central pillar.

The seven strategic pillars form an interconnected set of mechanisms that support and maintain competitiveness in the textile and apparel industry. Government support shapes the operating environment by aligning incentives, strengthening enforcement, improving infrastructure, and guiding industrial policy [40,73,74]. This aligns with institutional theories that suggest rules and enforcement capacity influence firms' investment behaviors and upgrading opportunities [71]. In this supportive context, transitioning toward higher-value-added manufacturing and technological innovation fosters strategic capabilities. These improvements are more likely to support sustained competitive performance when supply chain collaboration and organizational networks are enhanced, consistent with relational and network perspectives that emphasize inter-firm coordination as key to performance and resilience [41,46,50,51]. Participation in global value chains broadens market access and promotes knowledge transfer. However, its benefits depend on domestic upgrading, as literature suggests that buyer-driven coordination can keep suppliers stuck in low-value activities if capability development lags [36,45]. Adaptability underpins the entire framework, highlighting the importance of sensing and reconfiguring swiftly in response to demand shocks, regulatory shifts, and technological disruptions [37–39,59,72]. Lastly, responsible manufacturing further defines the limits of sustainable competitiveness, in line with stakeholder perspectives that see environmental and social compliance as prerequisites for market access and safeguards against reputational risk [56,58,70].

5. Conclusions

In the 48 reviewed studies, the focus of research on textile and apparel competitiveness has gradually shifted from cost- and price-based measures to broader performance indicators that reflect manufacturing capabilities, logistics and supply chain efficiency, value chain positioning, digital and technological readiness, responsible practices, and the role of regulation. Methodologically, the field also shows increasing diversity. This study captures this evolution through a two-step integrative literature review. Building on this review, the study aligns with most previous research by demonstrating the changing nature of competitiveness in Asia's textile and apparel industry. The study contributes in three ways. First, it maps how competitiveness is defined, measured, and explained across different studies, offering a structured overview of the field's development in Asia's textile and apparel sector. Second, it consolidates fragmented evidence into an integrated framework for sustainable industrial competitiveness by organizing various drivers into seven strategic pillars. Third, it uses co-occurrence analysis to identify recurring connections between pillars and the centrality of each pillar, providing a relational view of how competitiveness drivers are connected across the literature. This study contributes to the literature by showing that the sustainability of industrial competitiveness in Asia's textile and apparel industry is shaped by interdependent strategic pillars that combine economic performance, industrial upgrading, institutional support, and responsible manufacturing-oriented capabilities.

6. Policy Implication

Based on a review of articles in case studies of Asia's textile and apparel industry published over the past two decades, policy recommendations relevant to the sustainability of industrial competitiveness can be outlined as follows: Governments in Asia should prioritize policy packages that accelerate capability upgrading across key areas. Policies should promote a shift toward higher-value-added manufacturing, technological innovation, and digitalization. These policies should combine investment incentives, skills development, bureaucratic simplification, logistics improvements, and support for clusters and industry associations to foster supply chain collaboration. ESG regulations must be clear and implemented gradually to prevent becoming a sudden burden on SMEs.

For textile and apparel firms, these recommendations suggest a shift from a cost strategy to an integrated strategy. Firms should prioritize establishing long-term partnerships and relational governance, invest in digitalization and process improvements, expand value-added functions to move up the global value chain (GVC), and incorporate environmental and social practices into daily operations.

7. Limitations and Future Research

This study thoroughly synthesizes the strategic pillars needed to enhance sustainable industrial competitiveness in Asia's textile and apparel industry. The findings open new avenues for further research. One promising approach is developing quantitative models to assess how the seven pillars and their combinations affect sustainability outcomes across different countries and contexts. These models could help policymakers and firms prioritize interventions based on their relative impacts. However, the findings do not differentiate among development paths or competitive positions across Asian countries. Another recommendation for future research is to distinguish pillar priorities and strategy combinations between Tier-1 leaders (e.g., China, India) and CLMV economies, exploring how each pillar may differ across these groups. This extension would generate more context-specific insights and reduce the risk of over-generalizing policy and managerial advice across diverse national trajectories.

Besides its advantages, this study has several limitations. First, the evidence base is methodologically diverse, with significant variation in study design and how outcomes are measured, which restricts comparisons across different datasets. Second, the search strategy focused on internationally indexed sources, which may underrepresent locally published Asian evidence and create coverage bias.

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Abbreviations

The following abbreviations are used in this manuscript:

GVCs	Global Value Chains
UK	United Kingdom
MFA	Multi-Fiber Arrangement
ATC	Agreement on Textiles and Clothing
WTO	World Trade Organization
FDI	Foreign Direct Investment
MMAT	Mixed Methods Appraisal Tool
PLS-SEM	Partial Least Squares Structural Equation Modeling
RBV	Resource Based View
R&D	Research and Development
CLMV	Cambodia, Lao, Myanmar, Vietnam
SMEs	Small and Medium-sized Enterprises
ESG	Environment, Social, and Governance

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