Article

Revolutionizing the Textile and Clothing Industry: Pioneering Sustainability and Resilience in a Post-COVID Era

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Abstract: The COVID-19 pandemic disrupted global supply chains, posing significant challenges to the textile and clothing industry. However, amidst these threats, there is a unique opportunity to rebuild a more sustainable and resilient fashion industry. This paper explores the shift from pre-COVID-19 business models and consumption values towards a renaissance characterized by real sustainability. By examining the transition from eco-efficiency to eco-effectiveness and from cradle-to-grave to cradle-to-cradle approaches, this study emphasizes the need for the active involvement of key stakeholders in co-creating value for all. Through a comprehensive analysis of the post-COVID era, this study aims to understand textile and clothing industry professionals' perceptions and attitudes towards sustainable design practices and identify challenges in implementing such strategies. The findings contribute to the knowledge of sustainability in the post-COVID era and provide insights and strategies for textile and clothing industry players to thrive in a sustainable and transformed landscape.

Keywords: the COVID-19 pandemic; global supply chains; sustainable and resilient textile and clothing industry; sustainability

1. Introduction

The COVID-19 pandemic unleashed unprecedented disruptions across all sectors of the global economy, with no exception for the apparel and textile industry [1]. The pandemic has generated one of the vital disturbances experienced during the past 50 years, "breaking many global supply chains" [2].

The apparel and textile sector relies heavily on complex global supply chains. However, in response to the pandemic, countries implemented full or partial lockdown measures, which led to severe challenges for the industry. One of these included the plummet in demand for apparel and textiles, causing major international retailers to defer, cancel, or refuse payment for orders already placed [3]. This had a devastating ripple effect, resulting in mass layoffs and joblessness for thousands of garment factory workers [1,4], particularly in Asian developing countries [5], which were heavily dependent on the apparel and textile trade. In light of this, a question that should be asked is, "How to rebuild a more sustainable textile and clothing industry after COVID-19?" Despite the threats that COVID-19 has brought to businesses, it presents an opportunity to create a real, resilient, and sustainable renaissance. Consumers and producers have started to rethink

and doubt the relevance of pre-COVID business models and consumption values [5]. There is increased energy in a quest for transformation from eco-efficiency to eco-effectiveness and from a cradle-to-grave to cradle-to-cradle approaches to improving sustainability in the textile and clothing industry [6]. However, this would require the involvement of many key stakeholders to co-create value for all [7]. This research paper examines the far-reaching consequences of COVID-19 on the sector, shedding light on the supply chain disruptions and workforce hardships experienced by key industry players with an eye toward improvements for the future.

The textile and clothing industry is widely known for its contribution to environmental degradation, and alarming statistics highlight its adverse effects. Recent research indicates that the global textile and clothing industry ranks second in terms of water usage, accounting for approximately 20 percent of total global water waste [8]. Additionally, it is responsible for a staggering 10 percent of global greenhouse gas emissions annually [9]. These figures underscore the urgent need for a fundamental shift towards more sustainable practices in textile and clothing production.

Given the urgent climate crisis, it is crucial for both individuals and organizations to acknowledge the environmental impacts of the textile and clothing industry and take proactive measures to reduce it. All key stakeholders in the industry need to shift their focus from a linear economy to a circular economy that minimizes waste and maximizes resource utilization. To establish a sustainable textile and clothing ecosystem, it is imperative that closed-loop supply chains are adopted to facilitate the reuse, recycling, and repurposing of materials [10].

Moreover, the COVID-19 crisis has further accentuated the need for transformation within the textile and clothing industry, shedding light on the significant inequalities prevalent in the labor market [4]. The pandemic exposed vulnerabilities and inequities, making it increasingly evident that a sustainable approach is essential not only for environmental preservation but also for achieving social justice. The industry can no longer ignore or disregard these pressing issues.

In response to the pandemic, numerous industry insiders recognized the opportunity for a reset and a shift towards sustainability. Businesses and fashion designers have begun exploring innovative strategies to break the cycle of overconsumption and overproduction. They are actively seeking sustainable alternatives, such as environmentally friendly fabrics and production methods, in order to foster a more responsible and ethical fashion ecosystem. This period of reflection and transformation presents a unique opportunity for the textile and clothing industry to redefine itself and align with principles of sustainability. By reassessing traditional business models, embracing circularity, and prioritizing sustainable practices, the industry can pave the way for a more resilient and environmentally conscious future. However, achieving this transition necessitates collaborative efforts from all stakeholders, including consumers, manufacturers, retailers, and policymakers. Consumer awareness and demand for sustainable textile and clothing products must be met with transparent supply chains and responsible manufacturing processes. Furthermore, governments and regulatory bodies can play a significant role by implementing policies and incentives that encourage sustainable practices and hold the industry accountable for its environmental and social impact.

The textile and clothing industry's detrimental impact cannot be disregarded, and the urgency to embrace sustainable practices has been further magnified by the COVID-19 crisis. By seizing this opportunity and embracing sustainability as a guiding principle, the industry can not only mitigate its ecological footprint but also address social injustices within its supply chains. The time for change is now, and through collective efforts, a textile and clothing industry that combines style with sustainability can be created.

The primary objective of this research paper is to delve into the perceptions and attitudes of textile and clothing industry professionals towards sustainable textiles and clothing. Specifically, it seeks to explore their knowledge, beliefs, and opinions regarding sustainable design practices in the context of the post-COVID-19 period. The study also

aims to identify the challenges and barriers encountered by industry practitioners when attempting to implement sustainable design strategies in their work.

This paper is structured as follows: The second section reviews the literature on sustainability in the textiles and clothing sectors, looking at studies pre- and post-COVID-19. It also examines the impact of the COVID-19 pandemic on the textile and clothing industries, including its effects on production, supply chains, consumer behavior, and overall market dynamics. The third section details the research methodology employed in this study. The fourth section presents the key findings of the research. The fifth and final section concludes the study and provides recommendations for future actions and areas of further exploration.

2. Literature Review

2.1. Sustainable Practices in Fashion, Pre-COVID-19

Sustainable fashion consumption and manufacturing have been advocated for long before the pandemic [11]. The concept has been developing over the past decade [12] and refers to clothing that is acquired, used, reused, and disposed of in ways that align with the concept of sustainable development [11]. Sustainable fashion, which has been used interchangeably with terms such as eco-, green-, and ethical-fashion, is part of the slow fashion movement, centered around sustainable values such as good working conditions and reducing environmental destruction [12]. Numerous studies have looked into sustainable practices for the industry, for example, on the reuse and repurposing of fashion as well as upcycling, which is incorporated into the concept of the circular economy [13–15]. The concept of circular economy centers around closed-loop production systems, which aim to prolong the utilization of resources and reduce waste to promote sustainability [15]. The model encourages the end-use of products, the recovery and regeneration of materials, and focuses on livelihood, employment, and education aspects [15].

Studies have also sought to identify the key barriers and drivers for sustainable practices [15,16]. Adapted from de Aguiar Hugo et al. (2021), Monyaki and Cilliers' (2023) framework outlined various categories of drivers and barriers that impact the adoption of sustainable practices in the clothing industry [15,16]. These include market/economic, social/cultural, institutional/regulatory, technological, and stakeholder, which will impact different stakeholders at different stages of the supply chain, including designers, manufacturers, and consumers.

In the market and economic category, it refers to driving factors such as the supply and demand for sustainable fashion products and barriers such as limited consumer knowledge of eco-friendly products (cost to consumers) and organizational complexities, which can impact the profitability of businesses manufacturing and selling upcycled products [15,17]. This category would also include issues concerning the costs and resource efficiencies of used garments for facilitating a circular system, the availability of skilled labor [18], and fair labor [19,20].

In terms of social and cultural factors, it addresses consumers' beliefs, values, and norms toward sustainable fashion. In the literature, several studies have investigated topics such as sustainable fashion consumption [21–23], which is outlined as being practiced by ethical consumers who purchase and consume products that do not negatively impact the environment [24]. The roles of consumer beliefs and values [21,25] and social and personal norms [18] have been discussed as determinants of ethical consumer behavior, as well as factors such as price, quality, availability of sustainable products, and skepticism [26]. In Hong Kong, Chan and Wong (2012) found that Hong Kong consumers' environmental attitudes influence their sustainable consumption of fashion [21]. Consumers who are open to environmental protection are more willing to pay premium prices for eco-fashion to protect the environment.

Institutional and regulatory factors are related to organizational strategies and governmental support [15]. Studies have emphasized the importance of government support. For example, in developing countries, it can be a major factor in inhibiting sustainable con-

sumption practices [24]. In developing countries, one of the concerns with governmental support is the lack of trust in the government due to issues with corruption [27], which therefore affects governmental effectiveness in regulating ethical practices [24]. Receiving governmental support can benefit the industry; for example, the availability of government subsidiaries for equipment purchases could aid upcycling activities [18]. Aside from government support, any form of institutional support, such as partnerships with large-scale retailers to ensure a consistent supply of materials for upcycling, can also facilitate circular fashion practices [15,17]. In Hong Kong, governmental support for sustainable development has been acknowledged to some degree; however, more support and promotion are needed, particularly in educating society regarding sustainable fashion [28].

Monyaki and Cilliers' (2023) model also refers to technological and stakeholder factors [15]. The technological factors refer to the technical and cost-related issues in the recycling of materials for remanufacturing, and stakeholder factors highlight the lack of consumer awareness, which poses a barrier to sustainable practices. However, it also emphasizes the consumer pressure on manufacturers for environmental and ethical change, which is a driver for sustainable practices [15]. Interestingly, one of the categories not mentioned in Monyaki and Cilliers' model is environmental. Considering the importance attached to the textile and clothing industry regarding environmental protection and sustainability, this category would be a significant driver for implementing sustainable practices in the industry. This category could refer to topics concerning the environmental impact of clothing manufacturing [29] and the use of environmentally friendly materials and processes [30], which would both be drivers for implementing sustainable initiatives.

In summary, the industry has been seeing the implementation of sustainable practices along the different stages of the supply chain since the COVID-19 pandemic began. The topic of sustainable fashion has been rigorously investigated from different stakeholder perspectives, e.g., consumers, manufacturers, and organizations. However, since the pandemic, a thread of literature has explored the disruption of the pandemic on sustainable practices in industry during the pandemic, possibly changing the landscape. The following section reviews the literature on the impact of the pandemic on the industry.

2.2. The Impact of the COVID-19 Pandemic on the Global Textile and Clothing Industry

The pandemic had far-reaching repercussions on various sectors of the global economy, with non-essential spending industries being particularly hard hit. The textile and clothing industry, including apparel and footwear, suffered a significant blow, with the global industry estimated to contract by up to 30% in 2021. The luxury market was expected to be even more severely affected, with a projected contraction of up to 39% [31]. Despite a rebound in 2021–2022, the outlook for the industry in 2023 remains bleak, where 84 percent of industry leaders expect market conditions to decline or remain the same due to various economic, political, and social factors [31]. In the literature, studies have examined the impact of the pandemic on the change in the operation of the fashion industry [4,5]. There have also been studies on the changes in consumer behavior [1,11,32]. Both of these areas will be addressed in the following paragraphs.

As the COVID-19 pandemic enforced lockdown and isolation measures worldwide, the textile and clothing industry's design and manufacturing teams faced significant challenges. The measures had disrupted traditional workflows and operations, raising concerns about their future impact on this segment. Assessing the impact of the pandemic from different areas, Brydges et al.'s (2020) sustainability framework assessed five key areas of the industry in terms of design, raw material production and manufacturing, retail marketing and storage, consumption, and end-of-life [5]. From the design aspect, the study highlighted that the industry is reconsidering existing design processes due to the pandemic; for example, organizations are exploring a new, slower fashion system with fewer trends, seasons, fashion weeks, and collections [5], as opposed to the existing fast fashion system. As a result of the pandemic, there will be more mainstream recognition to engage in new design practices in the industry [5]. This view has been reflected in other similar studies,

where industry experts have contemplated ways to rebuild the textile and clothing supply chain in a more ethical and sustainable manner [1], with a focus on ending the cycle of overconsumption and overproduction after the pandemic [31].

Apart from the recognition for the rebuilding of industry practices for sustainability, the challenging circumstances brought on by the pandemic have had a cascading effect throughout the textile and clothing supply chain, leading to layoffs of garment workers across Asia [5]. Some countries were severely affected, e.g., Bangladesh, where textile and clothing production has high societal impacts [4]. Businesses evidently experienced severe losses in revenue [5], and designers faced a heavy burden with substantial unsold inventory [10]. In retail, brands are seen further adapting to the new reality by embracing online sales channels [32] and establishing direct connections with customers, for example, by engaging customers via social media [1,4,32].

In some countries, such as Finland, textile and clothing brands saw a rise in demand for second-hand textiles and clothing during the pandemic [4]. These transformative efforts align with the United Nations' Sustainable Development Goals (SDGs), particularly SDG 12—Responsible Consumption and Production [33]. This crisis spurred discussions on managing the textile and clothing supply chain through scientific approaches, leveraging emerging technologies, promoting responsible sourcing practices, and reducing waste through measures such as reduction, reuse, prevention, and recycling.

Studies have investigated the changes in fashion consumer behavior after the pandemic [1,11,32]. Research has indicated that the pandemic has affected consumer attitudes toward clothing consumption [11]. Consumers prefer minimalistic styles, clothing longevity, and a more environmentally conscious mindset [11], for example. However, there are studies that do not find considerable differences in consumer behavior regarding their sustainability attitudes [1].

Despite the impacts of the pandemic on the fashion industry, the pandemic may have presented a unique opportunity for the textile and clothing industries to reset and reimagine their practices [4,5]. In the existing literature, there is little timely reporting on how industry practitioners perceive and evaluate the impact on sustainable practices and the feasibility and effectiveness of rebuilding the global textile and clothing supply chain post-COVID-19. This research aims to address this gap by providing insights from designers, manufacturers, and supply chain experts on their perspectives regarding sustainable practices and their potential role in reshaping the textile and clothing industry in a post-pandemic world. By examining the experiences and viewpoints of industry practitioners, this study aims to contribute to the body of knowledge on rebuilding the textile and clothing supply chain after the COVID-19 crisis. Findings from this research will shed light on the feasibility and effectiveness of sustainable practices and provide valuable insights for stakeholders seeking to navigate the challenges and opportunities presented by the pandemic.

3. Methods

The fashion industry is a dynamic and multifaceted domain that undergoes constant evolution and innovation. Gaining a comprehensive understanding of this industry necessitates exploring the viewpoints of experts actively engaged in the fashion retail market, manufacturing, and fashion design.

This study aimed to contribute to the existing body of knowledge by employing a qualitative approach, specifically through in-depth interviews with experts in the fashion industry. By delving into the opinions and perspectives of these experts, this research seeks to illuminate the intricate landscape of the fashion industry.

This research paper adopted a qualitative approach, employing the case study method, to investigate the perspectives of experts in the field of fashion. The study conducted in-depth interviews with twenty participants, consisting of four retail operation directors, four chief operation directors, four business controllers, three fashion design managers, three senior technical designers, and two product developers. The insights and opinions provided by these experts proved invaluable, given their extensive involvement in the

fashion industry, encompassing both the fashion retail market and manufacturing and design aspects. Participant selection was based on their ability and willingness to furnish information relevant to the research questions [34]. Leveraging the importance of research trustworthiness in qualitative studies, this study employed member checks and peer review as means to establish credibility, transferability, dependability, and confirmability. The participants were requested to validate the findings, requiring them to critically assess and evaluate the accuracy and appropriateness of the outcomes throughout the study [35].

3.1. Research Design

The study utilized a qualitative research approach to provide a comprehensive understanding of the underlying influences of human behavior and social dynamics in a real-world setting. This approach allowed for the exploration of people's interpretations of events and actions, as well as the investigation of challenges faced by both researchers and industry practitioners [36]. Through interviews, the study focused on examining the changes in business operations and demand for sustainable products following the outbreak of COVID-19. The main interview questions were categorized into five sections: 1. sustainable fashion and design concept; 2. sustainability in the textile and clothing industry; 3. perceived public attitudes toward sustainable textile and clothing post-COVID; 4. sustainability in education; 5. government support for sustainable textile and clothing (see Appendix A, Table A1).

A purposive sampling method was used to recruit twenty professionals from the textile and clothing industry in Hong Kong. The interviewees had varying levels of experience, ranging from 10 to 26 years, and worked for large textile and clothing retailers and trading firms with international operations (Table 1). The participants held different job positions, such as designers, design managers, technical design managers, technical designers, and founders of the company. Thirteen of the interviews were conducted face-to-face, while the remaining interviews were conducted remotely via phone or online. Each interview lasted approximately one hour and was recorded and later transcribed for data analysis. A content analysis was conducted to identify and examine the common themes within the data.

Table 1. Interviewee Profiles.

Interviewee	Type of Company	Job Position	Number of Years Working in the Fashion Industry
1	Fashion Retailer	Retail Operation Director	17
2	Manufacturer	Chief Operation Director	12
3	Textile Trader	Design Manager	14
4	Textile Trader	Senior Technical Designer	18
5	Fashion Retailer	Product Developer	13
6	Manufacturer	Chief Operation Director	22
7	Fashion Retailer	Retail Operation Director	18
8	Fashion Retailer	Retail Operation Director	20
9	Fashion Retailer	Senior Technical Designer	24
10	Manufacturer	Chief Operation Director	38
11	Fashion Retailer	Retail Operation Director	26
12	Fashion Retailer	Business Controller	12
13	Textile Trader	Design Manager	18
14	Textile Trader	Business Controller	15
15	Fashion Retailer	Product Developer	13

Table 1. *Cont.*

Interviewee	Type of Company	Job Position	Number of Years Working in the Fashion Industry
16	Fashion Retailer	Senior Technical Designer	24
17	Manufacturer	Chief Operation Director	16
18	Fashion Retailer	Business Controller	23
19	Fashion Retailer	Business Controller	25
20	Manufacturer	Design Manger	32

3.2. Sample Selection

The purposive sampling technique was employed to select participants for in-depth interview sessions in this study. This technique allowed for the selection of individuals who possessed extensive experience and active involvement in the fashion industry. They have specific characteristics and knowledge related to the current topic, thereby enhancing the transferability of the findings [34].

The study comprised twenty industry experts with substantial practical knowledge who offered valuable insights. The participants were chosen based on their capability and willingness to provide relevant information to address the research question. The selection criteria for the expert panel included factors such as their background, relevant work experience, willingness to contribute to the study's validity, diverse perspectives, and up-to-date knowledge on the subject being investigated, as suggested by Powell (2003) [37].

3.3. Data Collection

In this study, experts' insights on the research issue were gathered through in-depth interviews. The interviewees consisted of twenty professionals who have direct and practical involvement in the fashion and textile manufacturing, trading, and retailing industries.

Before conducting the interviews, a set of semi-structured interview questions was developed and validated by three experts, including content experts, linguists, and field experts. The interview questions were divided into two parts: Part A focused on sustainability in the fashion industry, while Part B explored consumer attitudes and behaviors towards fashion sustainability. However, this article specifically presents a summary of the interview data collected for Part A, which focuses on the benefits associated with the utilization of sustainable practices in producing sustainable fashion designs.

These interviews were conducted in person, with each session lasting approximately one hour per interviewee. Semi-structured interviews were conducted with the participants to enable a comprehensive examination of various aspects pertaining to the fashion industry. The interview questions were designed to elicit detailed responses addressing the research questions.

3.4. Ensuring Research Trustworthiness

Research trustworthiness is of paramount importance in qualitative studies. To enhance the credibility, transferability, dependability, and confirmability of this research, two key strategies were employed: member checks and peer review.

3.5. Member Checks

Member checks were utilized to establish research trustworthiness by involving the participants in the verification of research findings. The participants were presented with the findings and given the opportunity to assess their accuracy and appropriateness. This process ensured alignment between the outcomes and the participants' perspectives and experiences.

3.6. Peer Review

Peer review, another strategy implemented to enhance research trustworthiness, involved subjecting the research findings to critical evaluation by experts in the field. These external reviewers scrutinized the study's methods, analysis, and interpretations, providing valuable insights and ensuring the rigor of the research.

3.7. Data Analysis

The data obtained from the interviews with experts were manually analyzed in accordance with established procedures. Initially, the researcher transcribed the interview data verbatim and conducted this process concurrently with the data collection phase. To derive meaningful insights from the data, several steps were followed, as recommended by Creswell [34]. These steps included transcribing the data, coding, and theme formation.

The compiled data were carefully reviewed through repeated readings, with a focus on selecting information directly relevant to the research question. A specific coding system was then applied to categorize the relevant data, ensuring a well-structured and simplified framework for the researcher's analysis. The themes were named in a manner that avoided any overlap with other themes, in accordance with the guidelines proposed by Merriam [35,36].

4. Results and Discussion

The insights gained from the interviews with fashion industry experts provided a comprehensive understanding of the intricate dynamics within the industry. The findings were validated through member checks and peer review, further enhancing the trustworthiness of the research outcomes.

This study employed a qualitative approach, conducting in-depth interviews with experts in the fashion industry to gain valuable insights into the field. Through the inclusion of member checks and peer review, research trustworthiness was enhanced, ensuring the credibility, transferability, dependability, and confirmability of the findings. By employing these strategies, this study contributes to the existing body of knowledge on the fashion industry, providing a comprehensive understanding of its various dimensions. Future research endeavors should continue employing rigorous methodologies to advance our understanding of this dynamic field.

4.1. Consumer Shift toward Sustainable Textiles and Clothing

The outbreak of COVID-19 has brought notable changes to the textile and clothing industry. From the interviews, industry professionals in Asia observed that the industry's operations significantly slowed down, and many brands integrated sustainable or responsibly sourced materials into their collections. From a retail operations and design perspective, two interviewees observed similar behaviors from consumers. For example, Interviewee 3 commented that:

> *"The pandemic has made our consumer more conscious of the environmental impact of their fashion choices. Our company now actively seek out sustainable materials and designs."* (Interviewee 3, Design Manager.)

Similar responses were collected from other interviewees, e.g., product developers and business controllers, for example:

> *"COVID-19 served as a wake-up call for consumers to prioritize sustainability in their wardrobe. They want to support brands that use environmentally user-friendly material and align with their values."* (Interviewee 5, Product Developer.)

> *"The pandemic has shown us the interconnectedness of our world. Choosing sustainable textile and clothing materials and design is a way to contribute to a healthier planet and society."* (Interviewee 9, Senior Technical Designer.)

The use of responsibly sourced materials in response to consumer demands clearly suggests that after the pandemic, customers are actively seeking brands that use sustainable materials and prioritize ethical sourcing and environmentally friendly practices. The findings from this study reflect those in the recent literature where a change in attitude among post-COVID consumers can be seen. For example, pre-COVID, Iran et al. [11] observed the least positive attitude toward sustainable clothing consumption among Hong Kong and Iranian consumers. However, their study found that during the pandemic, the attitude of Hong Kong consumers changed [11]. The findings from this study also reflect this shift in consumer attitudes and acceptance of sustainable textiles and clothing, as observed by industry professionals.

The shift is driven by consumers' increased awareness of the social and environmental impacts of clothing and textile production. Consumers are reassessing their favorite brands in regards to social and environmental responsibilities [38]. This reflects the behavior addressed in previous research, where consumers have shifted toward value-oriented consumption [39], consuming products from brands that share similar social and environmental values and thus aligning with the consumer's ideal self-concepts [1]. It is also noted that consumers' increased awareness of sustainability has led to conscious shoppers who have shifted towards purchasing durable textile and clothing products instead of fast fashion [1]. Consumers may "feel good" for 'doing their bit' or contributing to sustainable fashion, as stated by one interviewee:

> *"The health crisis made consumer realize the importance of sustainable fashion. It's not just about looking good, but also feeling good about the impact they have on the planet."*
> (Interviewee 8, Retail Operations Director.)

Brands with strong sustainability values will have gained a competitive advantage in the market. For example, even before the pandemic, several major textile and clothing brands had implemented sustainability initiatives. One prominent example is H&M's "Conscious Collection", which sells clothing made from recycled materials and organic fabrics. The collection has been well-received by customers in Hong Kong, indicating a growing interest in sustainable textiles and clothing. Brands like H&M can further strive to promote and lead the sustainability initiative in Asia in response to this consumer shift.

The interviewees also commented that customers now prioritize sustainable pieces and focus on elements such as minimal design, daywear, loungewear, and machine-washable clothing. One interviewee outlined that:

> *"COVID-19 made consumers rethink their shopping habits. They now focus on quality over quantity and invest in timeless, sustainable pieces that will last."* (Interviewee 18, Business Controller.)

Increasing interest and desire for sustainability in consumers' textile and clothing purchases were explored [11,40]. A shift towards minimalism was identified, where respondents desired to consume less or buy what was necessary and wear the clothing more frequently and in multiple ways [11,40]. In terms of design, the findings support recent literature regarding the role that design can play in supporting sustainability [41].

4.2. Corporate Social Responsibility and Sustainable Textile and Clothing

After the pandemic, the industry has shifted to adopting more sustainable practices. The findings indicate a connection between sustainable textiles and clothing and corporate social responsibility (CSR).

> *"We believe that the fashion industry needs to shift towards sustainability for the sake of future generations. COVID-19 reinforced this belief and motivated us to make more responsible choices."* (Interviewee 15, Product Developer.)

> *"After the outbreak, we became more aware of the connection between human health and the environmental impact of the fashion industry. Choosing sustainable materials and designs is a way to protect both."* (Interviewee 4, Senior Technical Designer.)

A number of the interviewees emphasized that sustainable textiles and clothing have become an integral part of their companies' CSR. The respondents also viewed sustainable textile and clothing as an integral part of CSR practices for textile and clothing companies. By prioritizing sustainability, companies can improve their reputation, attract socially conscious customers, and contribute to positive social and environmental impacts. Textile and clothing companies that prioritize sustainability can also focus on educating consumers. It is suggested that businesses have a role in educating consumers holistically about sustainability, including economic, societal, and environmental aspects [1]. Patagonia, an outdoor apparel brand, is widely recognized in Hong Kong for its commitment to sustainability and ethical practices. The company has been vocal about its mission to minimize environmental harm and promote fair labor practices. Patagonia's CSR efforts, combined with its sustainable product offerings, have garnered strong brand loyalty and a dedicated customer base not only in Asia but globally.

When asked about which Sustainable Development Goals (SDGs) their companies focused on, responses from interviewees were SDG 8 (decent work and economic growth), SDG 12 (responsible consumption and production), SDG 14 (life below water), and SDG 15 (life on land). These goals were seen as important for promoting employment, responsible production, minimizing environmental damage to marine and terrestrial ecosystems, and preserving biodiversity. The SDGs align with textile and clothing industry literature that concentrates on Corporate Social Responsibility and the triple bottom line theory as revealed by Li and Zhao [42].

4.3. Sustainable Design Techniques and Practice in the Industry

The COVID-19 pandemic accelerated changes in the textile and clothing industries, prompting companies to rethink their design processes and incorporate sustainable design techniques and materials. The majority of the interviewees stated that they implemented sustainable design techniques in their design processes. Examples of sustainable design techniques mentioned include using sustainably sourced materials, creating classic and timeless clothing, and producing custom-made and high-quality textile and clothing products. The interviewees reported acquiring knowledge about sustainable design techniques from various sources, such as the internet, competitions, clients, in-house training programs, industry associations, trade shows, and professional magazines. From the supply chain aspect, the findings showed that retailers and brands seek to work with suppliers or manufacturers who share the same sustainable values. For example, one interviewee commented that:

> *"The crisis highlighted the vulnerabilities in fashion supply chains. My company now prioritize suppliers that are transparent about their sourcing and production practices."*

(Interviewee 19, Business Controller.)

At the same time, manufacturers themselves, who may outsource some of the production to other suppliers due to large orders, were found to also select outsourcing partners who share the same sustainable practices:

> *"As our received orders were consistently in large quantities, there were instances where our primary suppliers may choose to outsource the fulfillment of those orders. It is crucial for us to monitor the outsourcing process and ensure adherence to good production practices, as these factors serve as key performance indicators (KPIs) for our operations"*

(Interviewee 10, Chief Operation Director.)

From the findings, it is evident that sustainable practices are embodied in the supply chain for the design and manufacturing of fashion products. This could be evident in fast fashion retailers and brands, but also in luxury fashion. For example, Stella McCartney has long been at the forefront of sustainable fashion. The brand is known for its use of organic cotton, recycled materials, and innovative manufacturing techniques with minimal environmental impact. Stella McCartney's commitment to sustainability has positioned the

brand as a leader in the industry and a prime example of how sustainable design can be integrated into high-end fashion.

4.4. Government Support

While there is an increasing level of awareness towards sustainable fashion in the Hong Kong fashion industry and society, the interviewees expressed dissatisfaction with the government's support and promotion of sustainability. Several of the interviewees expressed:

> *"It's disheartening to see the lack of government support for sustainable fashion in Hong Kong. Without their backing, it's challenging for the industry to thrive and make a positive environmental and social impact."* (Interviewee 14, Business Controller.)

> *"The government's limited understanding of sustainable fashion hinders its progress in Hong Kong. We need their support to create policies and initiatives that promote sustainable practices and encourage responsible consumption."* (Interviewee 11, Retail Operations Director.)

The interviewees outlined that the level of government support for sustainable fashion and the promotion of sustainability initiatives is not adequate. The findings reflect those reported in a similar study conducted in Hong Kong [28]. In this study, the interviewees believed that the government should play a more active role in collaborating with stakeholders and industry practitioners to strengthen Hong Kong's position as a regional fashion and textile trading center. Support from the government can benefit the industry tremendously [18]. In some countries, the government has taken significant steps to support sustainable textiles and clothing. For instance, the French government has introduced legislation that requires large textile and clothing companies to disclose information regarding their environmental and social impacts [43]. This mandatory reporting aims to increase transparency and accountability in the industry in their country. Although much of the manufacturing of textiles and clothing occurs across different Asian countries and not within Hong Kong, the local government could still follow suit by introducing similar requests to encourage local retailers and brands to disclose information on the environmental and social impacts of their supply chain. If such requests are required from the retailers and brands in Hong Kong, it may help encourage more suppliers and manufacturers, who are not already sustainably involved, to become engaged with sustainable practices. At the same time, such requirements will also help encourage more smaller local retailers and brands to adopt sustainable practices.

4.5. Education and Sustainability

One of the factors in the findings is the need for greater emphasis on sustainability in textile and clothing education. The findings showed that interviewees felt that the education on sustainability in their time was limited or nonexistent, specifically outlining that in their degree programs, it lacked sufficient coverage of sustainability topics. Now recognizing the value of having a strong awareness of sustainable textiles and clothing as it enhances one's capabilities in the workplace, one interviewee commented on educating themselves:

> *"The pandemic has given me time to educate myself about sustainable fashion. I now understand the significance of choosing eco-friendly materials and supporting ethical brands that I did not learn from my studies."* (Interviewee 2, Chief Operation Director.)

In terms of education today, several interviewees noted a lack of emphasis on sustainability in the local degree programs:

> *"I feel that there is a significant gap in our fashion education programs in Hong Kong when it comes to sustainability. It's crucial for our future fashion professionals to have a strong foundation in sustainable practices to address the environmental and social challenges of the industry."* (Interviewee 7, Retail Operation Director.)

> *"There seems to be a lack of emphasis on sustainability in our bachelor degree fashion programs in Hong Kong. As the industry evolves, it's essential for educational institu-*

tions to prioritize teaching sustainable design principles and ethical production methods." (Interviewee 12, Business Controller.)

It was suggested that vocational training programs and fashion degree programs in Hong Kong should include modules on sustainability to enhance awareness and skills in sustainable textile and clothing practices. Globally, fashion schools and institutions around the world have begun integrating sustainability into their curricula. For example, the London College of Fashion offers a master's program in Fashion Futures, which focuses on sustainable and ethical design practices. At Kent State University in Ohio, USA, all fashion majors are required to complete a Sustainable Fashion Thinking course with a laboratory component. By incorporating sustainability into fashion education, future designers will be equipped with the knowledge and skills to create positive change in the industry.

Although the literature has examples of infusing sustainability into the curriculum dating back more than ten years [44], recent pedagogical articles continue to strive to increase sustainability in the apparel and textile curriculum [44–47]. These additional insights and real-life examples provide a deeper understanding of the interview findings and shed light on the current trends and developments in the textile and clothing industry's approach to sustainability.

5. Conclusions

The COVID-19 pandemic has brought about a profound transformation in the textile and clothing industry, accelerating the shift towards sustainability. The disruption caused by the pandemic led industry professionals to reevaluate their design processes, supply chains, and overall business models. This study has delved into the perspectives of industry professionals in Hong Kong, a vibrant fashion hub known for its dynamic market and manufacturing capabilities. It helps facilitate the promotion of a sustainable textile and clothing industry in the post-COVID-19 era. Practical strategies will be proposed as follows to enhance public awareness of sustainability, foster collaboration among stakeholders, and drive positive change.

The findings of the study shed light on the proactive response of industry professionals in Hong Kong towards sustainability, as their perspectives imply their approach being adopted to reduce waste. The study revealed that these professionals are actively incorporating sustainable design techniques and materials into their practices. By prioritizing durability and longevity in clothing design, they aim to create garments that are simple to wear and can reduce the overall environmental impact. This approach aligns with the principles of circular economy and responsible consumption, emphasizing the importance of extending the lifecycle of products. Furthermore, the study highlighted the growing emphasis on customization as a strategy to reduce waste in the industry. By offering personalized and made-to-order options, industry professionals aim to minimize overproduction and excess inventory, which are common issues in the fast fashion model. Customization allows consumers to actively participate in the design process, fostering a sense of ownership and attachment to their garments, which in turn encourages longer and more meaningful product usage.

More importantly, the study underscored the growing demand for sustainable fashion among Hong Kong consumers and revealed a significant shift in this consumption behavior, thus forming the momentum for driving change. Increasingly, consumers are becoming more conscious of the environmental and social impact of their fashion choices. They are seeking sustainable and ethical alternatives, favoring brands that prioritize responsible practices and transparent supply chains. This consumer demand for sustainable fashion has prompted industry professionals to adapt their strategies and cater to this evolving market segment. As consumers become more educated, their choices have the power to shape the future of the fashion industry. This consumer-driven demand for sustainability is compelling industry professionals to embrace sustainable practices and innovate to meet the evolving needs of the market. Although the industry acknowledged that the demand for sustainable and ethical fashion is steadily increasing, this shift in consumer values

and preferences presents both an opportunity and a challenge for those involved in the production process to uphold sustainable principles while meeting consumer expectations for aesthetics, quality, and affordability. The findings of this study not only demonstrate the responsiveness of industry professionals in Hong Kong to the sustainability imperative but also underline the significance of consumer preferences in driving change.

5.1. Recommendations and Practical Implications

Overall, the industry professionals in Hong Kong demonstrated a strong awareness of the significant environmental impact associated with the global textile and clothing industry. However, they highlighted several challenges that hinder the seamless integration of sustainability into the fashion design process. They recognized the urgent need for sustainable practices and acknowledged the growing consumer demand for products that align with ethical and environmental values. The findings in this study emphasize the industry's commitment to sustainability and the need for continued collaboration between industry professionals, policymakers, and consumers to foster a more sustainable and responsible fashion ecosystem. The paper offers valuable insights into potential areas for improvement and suggests some areas to promote sustainability effectively:

At the individual and company level, industry professionals identified barriers such as limited knowledge and skills in sustainable design, as well as the perception that sustainable practices may increase production costs. Overcoming these challenges necessitates a shift in mindset and a commitment to continuous learning and improvement. One key recommendation highlighted in the paper is the importance of education in promoting sustainability. Education and training programs that focus on designs for sustainability play a vital role in equipping designers with the necessary knowledge and skills to effectively address the difficulties they confront. Industry professionals recognized the potential of education to shape the mindset and practices of future designers, thereby driving positive change in the industry. By incorporating sustainable design principles into the curricula and raising awareness about the environmental and social impacts of fashion, educational institutions can help shape a new generation of designers who prioritize sustainability.

Furthermore, the research findings highlight the role of the government in providing stronger regulatory frameworks and incentives that encourage sustainable practices throughout the industry. These include measures such as tax incentives for sustainable fashion brands, stricter regulations on environmental standards, and support for research and development of sustainable materials and technologies. By aligning policies with international sustainability goals, the government can provide a clear roadmap for industry professionals to follow, facilitating the transformation of the sector. Meanwhile, industry professionals also emphasized the need for clear guidelines and standards that encourage responsible production and consumption. They suggested that the adoption of a business model guided by the United Nations' Sustainable Development Goals (SDGs) could provide a framework for integrating sustainability into the industry. By adopting a business model guided by the SDGs, implementing effective policies and regulations, and promoting sustainability-focused education, industry professionals can pave the way for a more sustainable and responsible fashion industry in Hong Kong and beyond.

The findings of the study align with the expectations that the pandemic has acted as a catalyst, accelerating the integration of sustainability principles into fashion consumption and production. It is encouraging to note that the majority of industry professionals in this study not only recognize the importance of sustainability but also acknowledge their potential to contribute to the sustainable development of the textile and clothing industry. While the perspectives of industry professionals provide valuable insights into promoting sustainability in the textile and clothing industry, it is essential to recognize that improving design practices alone is insufficient to address the environmental and social challenges embedded in the global textile and clothing supply chain. This supply chain is complex, extensive, and often lacks transparency, making it necessary to adopt a holistic approach that involves collaboration among key stakeholders such as designers,

manufacturers, policymakers, consumers, and civil society organizations to address the prevalent sustainability issues. This approach enables the identification of unsustainable practices at various stages of production, such as raw material extraction, manufacturing processes, transportation, and waste management. By working together, stakeholders can collectively develop and implement strategies to mitigate the adverse impacts associated with these practices.

The practical implications of the study are multifaceted. Firstly, industry professionals need to recognize the importance of sustainability and align their design processes and supply chain management with sustainable principles. The actions involve sourcing sustainable materials responsibly, implementing circular and regenerative design and production practices, and considering the entire lifecycle of products. By doing so, companies can reduce their environmental footprint, position themselves as leaders in the sustainable fashion market, and attract environmentally conscious consumers.

Secondly, education and awareness play a pivotal role in promoting sustainable practices. Design schools and training programs should integrate sustainability into their curricula to equip emerging designers with the necessary skills and knowledge for sustainable fashion. Additionally, fostering awareness among consumers about the environmental and social impacts of fashion consumption through marketing campaigns, labeling initiatives, and transparent supply chains can drive demand for sustainable products.

Thirdly, the study highlights the need for supportive government policies and regulations. The government can incentivize sustainable practices through tax breaks, grants, and subsidies while implementing regulations that promote transparency and responsible production. By creating an enabling environment, the government can encourage businesses to prioritize sustainability and facilitate the transition to a more sustainable textile and clothing industry.

Finally, collaboration and partnerships among stakeholders are crucial for driving sustainability in the industry. Designers, manufacturers, policymakers, and consumers need to work together to establish industry-wide standards and initiatives that promote sustainable practices. The cooperation may include sharing best practices, engaging in dialogues, and supporting regulatory measures that encourage responsible production and consumption. By implementing the above recommendations, the industry can move closer to achieving a more sustainable and responsible future.

5.2. Limitations and Future Research Directions

While this study provides valuable insights, it is important to acknowledge its limitations. The research focused on the perspectives of industry professionals in Hong Kong, which may limit the generalizability of the findings to other regions. Future research could explore the perspectives of professionals in different geographical locations to obtain a more comprehensive understanding of sustainable design practices in the textile and clothing industry. Further investigation is also needed to examine the specific strategies and techniques employed by industry professionals to incorporate sustainability into their design processes. Understanding the challenges and barriers they face in implementing sustainable practices can inform the development of targeted interventions and support mechanisms.

The effectiveness of government policies and regulations in promoting sustainable fashion and supporting the industry should be assessed. Analyzing existing policies, identifying their strengths and weaknesses, and exploring alternative approaches can provide insights into improving the regulatory framework for sustainability. Furthermore, research should examine the impact of sustainability-focused education and training programs on emerging designers. Assessing the knowledge and attitudes of designers who have undergone such programs and evaluating their subsequent contributions to sustainable practices can help gauge the effectiveness of educational initiatives.

Additionally, exploring the role of technology and innovation in driving sustainable design in the textile and clothing industry is an important area for future research. Investigating the potential of emerging technologies, such as block chain for supply chain

transparency, 3D printing, and advanced recycling techniques, can shed light on their potential to transform the industry. Understanding how technology can be harnessed to enable sustainable practices and enhance overall sustainability would be of great value. Lastly, to gain a comprehensive understanding of the societal shift towards sustainability, future studies should investigate the perspectives of consumers. These can involve examining whether the pandemic has influenced public attitudes, perceptions, and purchasing behaviors towards textile and clothing sustainability, thus providing valuable insights into the long-term impact of COVID-19 on consumer demand.

By addressing these limitations and conducting further research in these areas, stakeholders in the textile and clothing industry can work towards establishing a more sustainable and responsible ecosystem. Collaboration among researchers, designers, and policymakers is essential to signaling the right direction for combating environmental and social challenges. The collective knowledge gained from these studies could ultimately pave the way for an eco-friendly future.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of School of Professional Education and Executive Development, The Hong Kong Polytechnic University, Hong Kong (protocol code: UGC/FDS24/B07/22) under Institutional Review Board Statement.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data supporting reported results will be made available on request.

Appendix A

Table A1. Interview protocol.

Category	Questions
Sustainable fashion and design concepts.	- Are you familiar with the concept of sustainable fashion? How do you define it? - Have you implemented any sustainable design techniques in your design process? - Where did you acquire knowledge about sustainable design techniques? - Do you believe sustainability has become a more critical issue following the COVID-19 outbreak? If so, why?
Sustainability in the fashion industry.	- Have you observed any changes in the industry since the onset of COVID-19? - Has there been a noticeable difference in the level of awareness towards sustainable fashion within Hong Kong's fashion industry after the commencement of the pandemic? - Does your company provide sustainability training? - Is sustainability integrated into your company's business strategy? - Have there been any alterations in the design process following the start of COVID-19? - In comparison to the pre-COVID-19 period, are there any particular aspects of the design process that you now prioritize or incorporate? - Which Sustainable Development Goals (SDGs) do you consider or focus on more?
Perceived public attitudes toward sustainable fashion post-COVID.	- Do you perceive a disparity in the level of awareness towards sustainable fashion within Hong Kong's society compared to the pre-COVID-19 era? - Do you believe consumers exhibit greater acceptance of sustainable fashion following the outbreak? - Are consumers more willing to pay a premium for sustainable fashion post-pandemic?

Table A1. *Cont.*

Category	Questions
Sustainability in education.	• Was sustainability discussed in your fashion degree program? • If so, did the knowledge you gained about sustainability further your interest in the subject? • Do you feel that sustainability education enhances your workplace capabilities?
Government support for sustainable fashion.	• Do you believe the Hong Kong government has provided increased support for sustainable fashion prior to or after the start of the COVID-19 pandemic? • In your opinion, has the Hong Kong government been effective in promoting and educating the public about sustainability following the outbreak? • Do you think the Hong Kong government has developed an effective plan to promote sustainable fashion since the onset of the COVID-19 outbreak?

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