International Economic Law Clinic

CIRCULAR ECONOMY AND TRADE IN TEXTILE SECTOR IN PAKISTAN

Challenges and Opportunities in Complying with the EU Ecodesign Proposed Regulation

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Submitted by

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For,

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Table of Contents

List of Tables

List of figures

Abbreviations

APTMA	All Pakistan Textile Mills Association
BCI	Better Cotton Initiative
CEAP	Circular Economy Action Plan
CSR	Corporate Social Responsibility
Directive 2009/125/EC	Ecodesign directive
DPP	Digital product passport
EPR	Extended producer responsibility
ESPR or "proposed regulation"	Proposal for a regulation establishing a framework for setting Ecodesign requirements for Sustainable Products
EU	European Union
FTA	Free trade agreement
GBG	Green banking guidelines
GG	Greenhouse gas
HS	Harmonised system
ILO	International Labour Organization
IO	International Organisations
ITC	International Trade Centre
KEPZ	Karachi Export Processing Zone
MNC	Multinational corporations
NCCP	National Climate Change Policy
NHWM	National Hazardous Waste Management
PEPA	Pakistan Environmental Protection Act
RTA	Regional Trade Agreement
SBP	State Bank of Pakistan
SEMP	Smart Environmental Management Practices
SME	Small and Medium enterprises
SMEP	Sustainable Manufacturing and Environmental Pollution
SPI	Sustainable Product Initiative
UNCTAD	United Nations Conference on Trade and Development

WWF Worldwide Fund for Nature

Executive Summary

In 2022, the European Commission introduced the Ecodesign for Sustainable Products Regulation (ESPR) as an extension of the Green Deal to reduce the environmental impact of products on the European market. The ESPR aims to enhance product sustainability through factors such as durability, reliability, reusability, recyclability, and eco-friendliness. This report focuses specifically on the provisions concerning the textile and apparel industry of Pakistan and divides the requirements of the proposed regulation into three divisions - product, process, and information requirements. Product requirements enhance the durability and recyclability of final products. Process requirements relate to resource-efficient production methods to limit environmental impact. As part of informational requirements, the policy introduces the Digital Product Passport (DPP) for product traceability and transparency.

To provide a clear understanding of ESPR's implications for Pakistan's textile industry, the report first explores the textile value chain in Pakistan, textile trade with the European Union (EU), and existing circularity practices in the industry. After an analytical review of these systems, the report identifies gaps and provides policy recommendations to complement the industry's compliance with the ESPR.

Textile and Apparel Industry of Pakistan

The EU is a vital trading partner for Pakistan, contributing 23% of its global exports ($7.3 billion), with 75.2% of it from the textile and apparel industry. An in-depth analysis of the textile value chain reveals cotton and man-made fibres (MMF) as the primary raw materials. Despite Pakistan being a significant cotton producer, the industry remains heavily reliant on imports, making the traceability of raw materials difficult. Moreover, environmental issues resulting from pesticide use, water-intensive farming practices, and the production of polyester, notably contribute to pollution and are potentially incompatible with the process requirements of the ESPR.

At the textile production stage, the use of old machinery results in energy and resource inefficiency and greenhouse gas emissions. Additionally, processes such as dyeing, bleaching and production of polyester yarn contribute further to water pollution and release of microplastics. Furthermore, several stakeholders even raised concerns about the cost-effectiveness of sustainable raw materials.

In addition to these environmental challenges, the textile industry features an oligopolistic market structure. While small and medium enterprises (SMEs) make up 90% of the firms, they only account for 10% of export value. Outdated technology, particularly in the value chain, impedes performance and efficiency. Funding constraints among SMEs limit investments in sustainable technologies, compounded by the high costs of sustainable materials. The industry also faces challenges in enforcing sustainability-focused policies and lack of skilled labour which impedes the transition towards more sustainable practices.

Mapping the Gaps

Despite the challenges highlighted previously, multiple initiative exists aimed at fostering circularity and sustainability within the industry. However, a significant gap pervades these efforts - initiatives primarily target encouraging compliance with the process requirements of the ESPR, leaving informational or product requirements mostly unaddressed. These efforts, while important, are also scattered and lack a unifying policy or guiding framework at the national level.

Likewise, product requirements of the policy also present an array of challenges. Specifically, anticipatory planning becomes a difficult task due to the current vague nature of the product requirements. Furthermore, specific guidelines regarding these new provisions have not yet been published (delegated acts). Moreover, Pakistan-based manufacturers largely lack influence over design decisions as they are provided by multinational companies placing orders from other parts of the world, and this means they have limited control over product requirements being met.

With regards to informational requirements, the situation is similar. There is a stark scarcity of initiatives aimed at encouraging transparency and traceability, further complicated by the predominantly informal nature of the industry. Consequently, many businesses would require specialized technical assistance to navigate the tracking of necessary product information for the digital passport. Addressing these gaps efficiently is essential for converting potential challenges into competitive opportunities.

Recommendations

In line with the findings elucidated above, the report puts forward a set of recommendations under three categories - domestic policy measures, bilateral measures, and private sector measures.

1. Domestic policy measures include four primary regulatory interventions. First, the national textile policy could incorporate sustainability and circularity principles, including strategies like technology upgradation, financing options and skill development. Second, an eco-modulated Extended Producer Responsibility (EPR) Scheme, paired with binding targets can be introduced to encourage private investment, reduce government waste management costs, support a sustainable textile industry, and motivate circularity practices. Third, the government can introduce green public procurements by purchasing sustainable goods and enforcing disclosure requirements to promote circularity practices and ESPR compliance. Lastly, government licensing requirements could enforce a mandatory data disclosure clause to enhance the textile sector's circularity practices.

2. Bilateral measures aim to foster EU-Pakistan relations by leveraging trade agreements for technology transfer and increasing collaboration via partnerships and joint ventures. It also recommends promoting skill development via technical assistance provisions in future trade deals, mirroring the EU-India Joint Declaration, to address industry challenges and enhance SMEs capabilities.

3. Private sector measures explore the significance of industry associations in promoting collaboration between the textile industry, voluntary initiatives, certification bodies and private labels. Industry associations, while not having enforcement power over sustainability standards, can advocate for their implementation. Voluntary sustainability standards and private labels can address sustainability issues like pest management, water conservation, fair pricing, and income generation.

1. Introduction

The textile and apparel industry are the second most polluting industry in the world, accounting for a staggering 10% of the total greenhouse gas emissions and 20% of global wastewater production (United Nations, 2019). In the face of the burgeoning triple planetary crisis, overlooking the environmental impact of this single sector is both economically and ecologically unviable. Recognizing the urgency of the situation, the European Union (EU) has introduced the ambitious proposal for Ecodesign for Sustainable Products Regulation (hereafter referred as "ESPR" or "proposed regulation"), advocating for a sustainable transformation across all industries, including textile and apparel.

However, the implementation of this policy will have significant repercussions for developing countries, particularly those whose economies are reliant on exports to the EU. In this context, approximately 23% of Pakistan's total exports are directed to the EU, with 75% of these exports originating from the textile and apparel industry (European Commission, 2021; PBS, 2022). As a result, navigating the requirements of the ESPR will be critical for Pakistan to continue to access the EU market.

Against this background, the report sets out an analysis and develops a strategic roadmap for Pakistan's textile and apparel industry to comply with the ESPR, organized into five key sections First, the report provides a background on the environmental impacts of the textile and apparel industry, emphasizing the importance of transitioning towards a circular economy and exploring its potential impacts on the global textile industry. Second, the report elaborates on a detailed analysis of the proposed ESPR, discussing its requirements concerning the textile and apparel industry and the compliance mechanisms involved. Third, the report offers an overview of the textile trade between Pakistan and the EU and current circularity and sustainability practices within Pakistan's textile industry. Fourth, the report performs a gap analysis to assess the challenges facing Pakistan's textile and apparel industry in its transitions to comply with the proposed regulations.

Fifth and finally, based on the analysis performed in the preceding sections and the leverage points identified, the report provides various recommendations designed to guide Pakistan's textile and apparel industry towards a successful transition to a more circular model, ultimately resulting in compliance with the proposed ESPR.

2. Background

Textiles and clothing are an integral part of our daily lives, and one could not imagine getting by the day without using a piece of textile. From clothing to cars to household furnishings, to agricultural applications, and our bedding, we use textiles almost every minute of our lives. The global textile market size is valued at more than $1.3 trillion and is only anticipated to grow with a booming fashion industry, rising rates of consumerism and a global rise in income per capita. Globally, the textile & apparel industry employs more than 300 million people along the formal, and informal value chain. The production of cotton alone is responsible for generating employment for up to 7% of the population in certain low-income countries (Ellen MacArthur Foundation, 2017).

In 2021, textiles were the 7th most traded product category, with total goods worth nearly $882 billion being exchanged beyond national borders. The global textile trade increased by a whopping 13.2%,

from $779 billion in 2020 to $882 billion in 2021. Textiles represent nearly 0.042% of the total global trade (OEC, 2021b). Textile and apparel export is largely dominated by Asian countries such as China, India, Bangladesh, Vietnam, and Pakistan, with a few European countries featured on the list. Rich and developed countries such as the United States of America, Germany, France, the United Kingdom, and Japan are some of the largest importers of textiles globally.

Figure 1 below illustrates the introduction of the proposed ecodesign regulations as part of the larger package of policies and schemes under the EU Green Deal, "a set of proposals to make the EU's climate, energy, transport, and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels"(European Commission, 2021.).

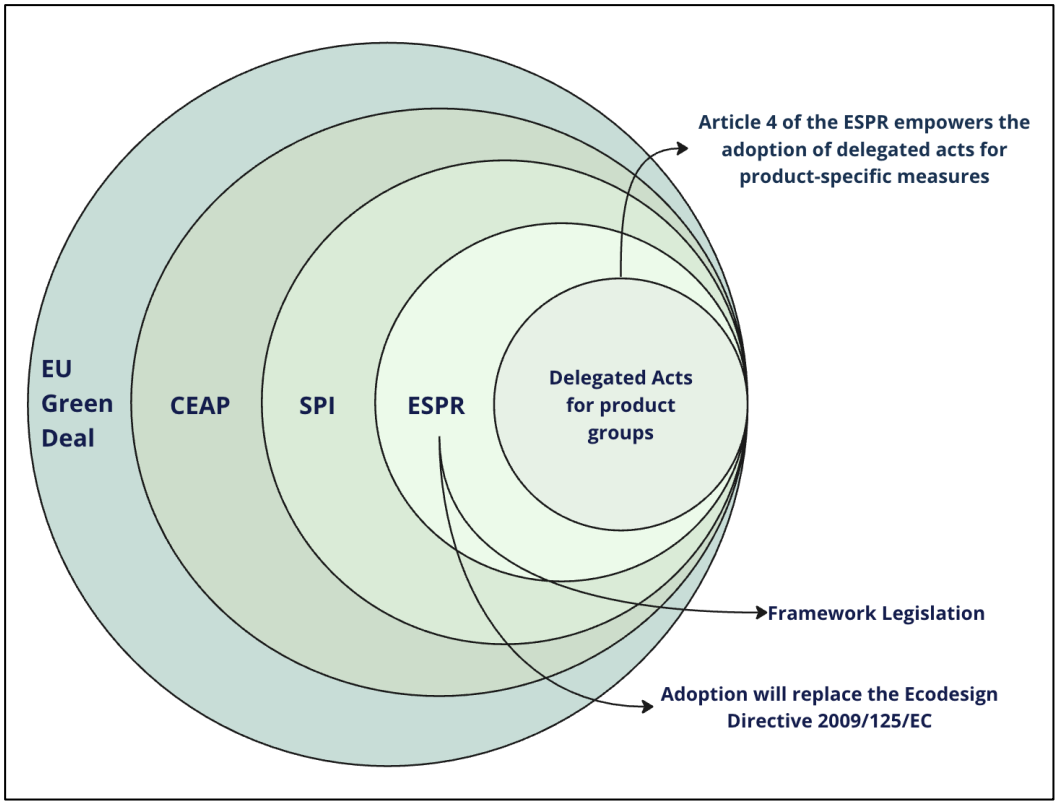

Figure 1: The EU Green Deal Policy Framework, Source: Author's research, (Author's Illustration)

2.1. The need for transitioning to a circular textile economy

The existing economic model on which the textile industry operates is the linear economy, also known as the 'take-make-waste' model. Historically, most products sold across the world follow the linear economy model. Non-renewable resources are extracted or harvested, they are made into products, consumed, and then discarded without recovering the full material value. This economic model is unsustainable, as it leads to resource depletion, and pollution, while also contributing to higher greenhouse gas emissions.

In particular, the textile and apparel industry contribute greatly to the triple planetary crisis of climate change, biodiversity loss and pollution. The industry has many far-reaching and tangible negative impacts on human and environmental health, as well as on biodiversity, and can be grouped into the following sub-categories:

a. Greenhouse gas emissions
b. Waste generation
c. Freshwater use and contamination
d. Microfibre leakage
e. Land use
f. Biodiversity loss
g. Damage to human health

Many of these environmental impacts are interlinked and overlapping, for example – microfibre leakage through washing clothes during its use phase is one of the causes of freshwater contamination. However, water contamination can happen in other ways too, such as usage of pesticides for cotton farming, and chemicals and additives used in dyeing and bleaching of fabrics etc.

A global transition towards circular textiles and apparel could address and minimize the environmental implications of the linear textiles and apparel industry. There are three strategies for a circular economy that can be leveraged:

a. 'Narrowing the loop' is the concept of resource efficiency. In general, it relates to creating products and services that provide consumers with (at least) the same level of performance but also with a lower environmental burden (Jensen, 2018). For textiles and apparel, one simple example of narrowing the loop is by designing a product with the same, or even more functionality while using a smaller volume of natural or manmade fibre for the same product. There are large amounts of non-renewable resources used to produce textiles and clothes (Ellen MacArthur Foundation, 2017). The 'resource use and resource efficiency' requirement explained in section 3.1 below is also linked to narrowing and regenerating resource loops. Greening the production process by reducing the use of resources can help to narrow the resource loops (Van der Ven, 2022). Resource use had been identified as the first pathway to increase circularity in the raw material and production phase (Eionet Portal, 2021). As explained further in the report, better use of the resources is not only better for the environment but can also be an opportunity in other aspects, like in the economy. Furthermore, as stated below in the policy recommendations (Section 6.1.2) this can be covered in the EPR to foment resource efficiency and therefore, prepare the producers to comply with this requirement.

b. 'Slowing the loop', in other words, extending a product's useful life to slow down the overall flow of resources. The strategy refers to "the extended use and reuse of products and material over time, through the design of long life and lifetime extension activities. Extending the lifetime of products is assessed to reduce the environmental impacts compared to new products as production and distribution can be postponed and waste amounts are being reduced."(Jensen, 2018) Some common examples of slowing the loop for textiles can be designing products that are reusable, repairable and/or upgradable, ultimately leading to the same products with the same or similar materials being utilised for an extended duration than earlier. The current system in the textile and apparel industry is not designed to repair. Spare parts may be available, but there is no system to enable consumers to access them easily (ECOS, 2021). The current linear economy and the "fast fashion" industry focuses on buying new products instead of repairing them.

c. ‘Closing the loop’ focuses on the recycling of the materials and ultimately on eliminating ‘leakages’ from the system (Ellen Macarthur Foundation, 2014). As the final step to achieve a circular economy model, ‘closing the loop’ is the concept of reintegrating waste into the supply chain. In other words, any waste that was generated shall be used as material that can be reused as feedstock or recycled into the same or another product. Closing the loop can happen at three levels: upcycling, recycling and downcycling. Upcycling is an activity where the waste material is converted into something of a greater value than its origin, for example, small scraps of cloth from a garment manufacturing facility, which would otherwise have been disposed can be converted into reusable cloth bags. Recycling is the activity where waste material is converted into a product of the same value as it originally was, for example, cotton to cotton recycling. Finally, at the bottom of the hierarchy is the activity where waste material is converted into something of a lesser value than it originally was, also known as downcycling. A few common examples of downcycling in the textile industry is when waste fabric is used for carpet paddings or as stuffing for mattresses.

2.2. Environmental impacts of the global textile value chain

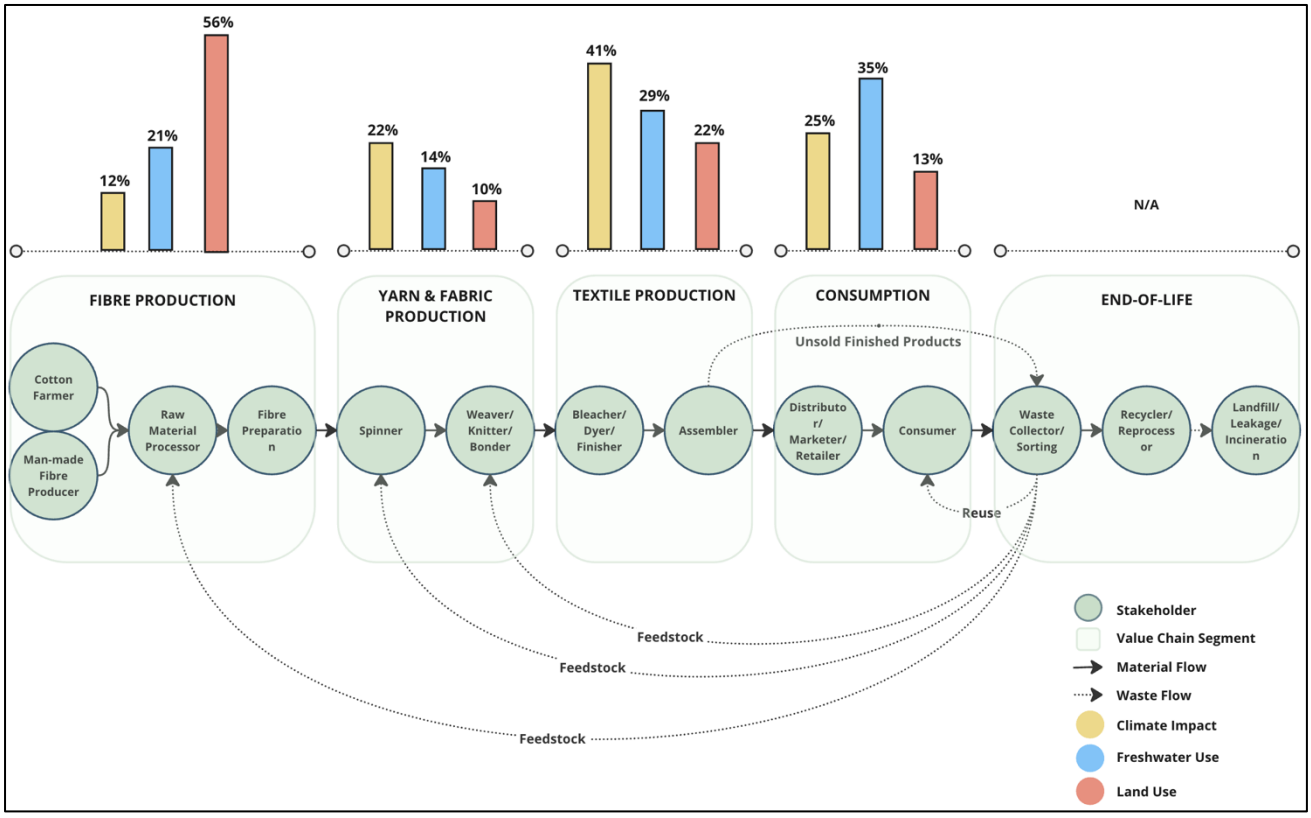

Figure 2: Environmental impact of the textile value chain, Source: Sustainability and Circularity in the Textile Value Chain, UNEP (Author’s Illustration)

As explored previously, the global textile industry plays a significant role in the global economy, also having substantial environmental impacts throughout its entire value chain. One of the primary environmental concerns associated with the textile industry is the extensive use of natural resources. The production of textile fibres requires vast amounts of water, particularly in the cultivation of cotton,

which is one of the most widely used fibres. Water-intensive processes, such as irrigation and textile dyeing, contribute to water scarcity in regions where water resources are already strained. The global textile industry is estimated to consume approximately 792 to 931 billion cubic meters of water annually in its production processes, accounting for approximately four percent of global freshwater extraction. This freshwater consumption constitutes not only cotton farming but also dyeing and treatment processes. (Ellen MacArthur Foundation, 2017)

Additionally, the textile industry relies heavily on non-renewable resources, such as petroleum for synthetic fibres and chemicals for dyeing and finishing processes, leading to resource depletion and further environmental degradation. The manufacturing stage of the textile value chain is also responsible for various environmental impacts. Energy consumption during textile production contributes to greenhouse gas emissions and exacerbates climate change. The combined greenhouse gas emissions from textiles production amount to nearly 1.2 billion tonnes per year, surpassing the emissions generated by the entire global aviation and maritime shipping industries combined. (Ellen MacArthur Foundation, 2017)

Moreover, the release of pollutants into the air, water, and soil during the manufacturing processes can have detrimental effects on ecosystems and human health. Chemicals used in dyeing and finishing, such as heavy metals and toxic substances, can contaminate water bodies and soil, leading to water pollution and ecosystem disruption. For instance, nearly 20% of all industrial water pollution globally can be attributed to the dyeing and treatment processes in the of textile value chain. (Kant, 2012)

Another significant environmental concern is waste generation and disposal. The textile industry produces a substantial amount of waste at various stages, including fabric scraps, unused materials, and end-of-life products. Improper disposal of textile waste, such as landfilling or incineration, contributes to pollution and further strain on natural resources. “A new textiles economy”, a report published by the Ellen Macarthur Foundation warns that in a business-as-usual scenario, nearly 150 million tonnes of clothing would be disposed of in landfills or burned by the year 2050. It estimates that the collective weight of these discarded garments would surpass current global population weight nearly ten times, reflecting the accumulation between 2015 and 2050 (Ellen MacArthur Foundation, 2017). Additionally, the decomposition of synthetic fibres releases microplastics into the environment, also posing a threat to aquatic life and potentially entering our food chain.

3. Proposal for a Regulation establishing a framework for setting Ecodesign requirements for Sustainable Products (ESPR)

This section contains a comprehensive roadmap of the legislative process and an introduction of the ESPR presented by the European Commission in 2022. Furthermore, it contains the key obligations and provisions concerning Pakistan’s textile and apparel industry, divided into product requirements (3.1), process requirements (3.2), and information requirements (3.3) for a better understanding. Finally, the section ends by exploring the compliance of the ESPR (3.4).

The European Union has been a front-runner in promoting sustainable growth. In March 2022, the European Commission presented the proposed regulation as part of their Sustainable Products Initiative (SPI). The primary objective of the SPI is to “make sustainable products the norm in the EU” by increasing their durability, reusability, reparability, recyclability, and energy efficiency.

The proposed regulation aims to improve the environmental sustainability of products by ensuring that all the products placed in the internal market of the EU comply with a set of ecodesign requirements and product parameters Parliament (Ellen MacArthur Foundation, 2017). The ESPR provides a general framework to set the ecodesign requirement and achieve circularity in all products recognized as a key priority by the Circular Economy Action Plan (CEAP), including textiles (European Commission, 2020). These ecodesign requirements on products will be applicable to all textile products, including those produced in the EU as well as those that are imported from third countries such as Pakistan.

Regarding the legislative process, the proposed regulation is now in the first reading stage of the ordinary legislative procedure. The Council of the European Union has adopted a general approach regarding the proposal to enter into negotiations with the European Parliament (Council of the European Union, 2023). The next step is that the European Parliament may accept Council's position, in which case the regulation is adopted, or it may adopt a different position and communicate it for a second reading. The ordinary legislative procedure can have up to three readings and the regulation is adopted once the proposal is approved by both the Council and the Parliament. According to EU Commission consultation[1], the regulation is expected to be adopted by 2024.

Once the proposed regulation is adopted, the Commission must prepare and then adopt the delegated acts where the specific requirements are going to be set. The ESPR empowers the Commission to set the ecodesign requirements in these delegated acts and they cover specific products or horizontal ecodesign requirements for a wider range of products groups in the same delegated act, such as for textiles. In this sense, the SPI recognized textiles as a key priority and it will cover by the delegated acts, as the ESPR itself mentioned it in the preamble.

To sum up, as of June 2023, the proposed regulation is under discussion and has yet to be adopted. After that, comes the preparation and adoption of delegated acts. The ESPR states that the transition period of the delegated acts should be a minimum of 18 months after the entry into force, which can be more depending on the impact assessment. Finally, after the transition period, the regulation is completely in force. Thus, the average expected for the proposed regulation to be in force is 5 years from now, subject, to variations. Figure 3 below shows the process of adoption and situates in which stage of adoption is the proposed regulation now:

[1] Consultation with a representative from the European Commission

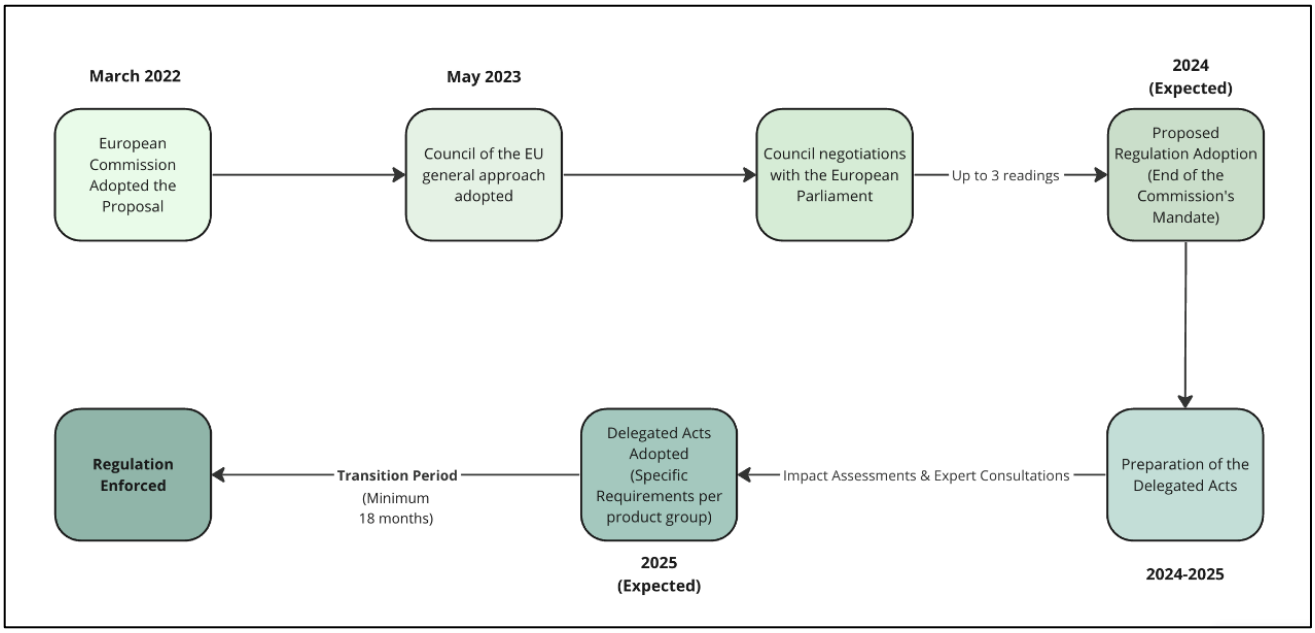

Figure 3: Estimated timeline and process of adoption of the ESPR, Source: Author's research (Author's Illustration)

This section focuses on the key obligations set out in the draft ESPR.[2] The proposed regulation contains different obligations and requirements that, for a better understanding, this report divided into three: product requirements, process requirements, information requirements, and compliance. While the process requirements are concerning the process of production, the product requirements concern the final product. The ESPR set most of the ecodesign requirements and product parameters in this part. Since the aim is to archive product sustainability and circularity, the final product plays a key role.

Another important part of the ESPR is the information requirements, which will help to archive circularity by helping with traceability and transparency. A core innovation in this regard is the digital product passport (DPP), which introduces technology as a useful tool. And finally, compliance refers to how an EU importer can prove that they fulfilled all the requirements under the ESPR. Figure 4 below illustrates the different obligations set out in the ESPR:

[2] The ESPR contains 71 articles with some provisions for member states and the Commission. This project focus only in the provisions concerning Pakistan.

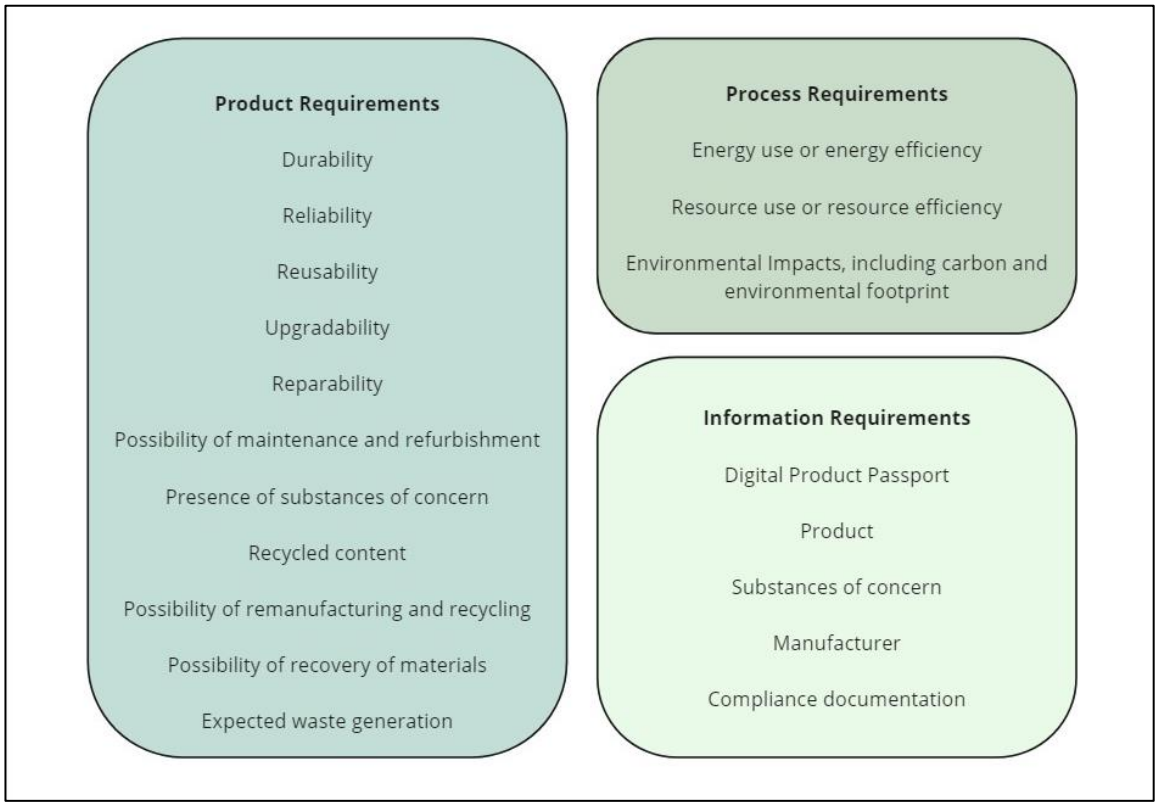

Figure 4: Breakdown of all general requirements set out under the ESPR, Source: Author's analysis (Author's Illustration)

3.1. Product requirements

While mitigating the environmental impact during the product manufacturing process is crucial, achieving circularity requires a focus on the quality and other attributes of the final product. According to the proposed regulation (Council of the European Union, 2023), ecodesign requirements related to the product can be identified as follows:

- Durability & reliability
  The ability of a product to function as required under given conditions of use, maintenance, and repair, for a given duration without limiting event. This can be expressed through a product's guaranteed lifetime, technical lifetime, the mean time between failures, an indication of real-use information on the product, and resistance to stresses or ageing mechanisms. The increase in textile durability allows for longer use and reuse of product (ECOS, 2021). For example, 60% of the textiles and clothes discarded are due to lack of quality (ECOS, 2021).
- Ease of repair & maintenance
  The reparability of a product refers to the ability to carry out actions that return the defective or waste product to the normal condition for its intended use. Maintenance is when those actions are carried out to keep or extend the use of the product. This can be expressed through characteristics, availability and delivery time of spare parts, modularity, and compatibility with commonly available spare parts; use of standard components; ease of non-destructive disassembly and reassembly, etc. The quantity, characteristics, and availability of consumables needed for proper use and maintenance.
- Ease of upgrading, reuse, remanufacturing, and refurbishment
  This requirement also refers to the ability of the product to achieve these characteristics.

- Ease and quality of recycling
  Use of easily recyclable materials. This requirement refers to the ability of the product to be recyclable.
- Recycled content:
  the product needs to use or contain an amount of recycled content that will be decided within the performance requirements.
- Environmental footprint including carbon and environmental:
  The quantification of a product's environmental impacts, whether in relation to a single environmental impact category or an aggregated set of impact categories based on the Product Environmental Footprint method. The carbon footprint of the product means the sum of greenhouse gas (GHG) emissions and GHG removals in a product system, expressed as CO2 equivalents and based on a life cycle assessment using the single impact category of climate change.
- Use of substances:
  The use of substance covers the whole life cycle of the product, from the process to the final process, since the ESPR states that this is a key element to identify and promote products that are sustainable. An important clarification is that the proposed regulation does not restrict all substances. Indeed, as explained below in this section, the requirement is to disclose, especially when there is a substance of concern. The requirement goes throughout their life cycle so it will help to track and communicate this information. However, as the Council suggested in their general approach, the delegated acts may restrict the use of certain substances that hinder the circularity of the product. This means the substances that make the reuse, or recycling process substantially more complicated, costly, environmentally impactful, or energy- or resource-demanding. Also, the substances that impair or reduce the value of the recycled material. Furthermore, performance requirements may also restrict the use of these types of substances (Council of the European Union, 2023).
- Expected generation of waste materials:
  Amounts of waste generated, including plastic waste and packaging waste and their ease of reuse, and volume of hazardous waste generated.

To improve those product parameters, the ESPR state that performance requirements shall be set. This is, how a product can achieve a certain level of performance in relation to those product parameters. This can be divided in two that can be set together or separate:

- The performance requirements may include minimum or maximum levels of performance in relation to the product parameter. For example, with the requirement related to the recycled content. In this sense, the performance requirement will state the minimum of recycled content needed to fulfil this.
- Non-quantitative requirements to improve performance in relation to one or more product parameters. An example of a non-quantitative requirement is the prohibition of a specific technical solution that is detrimental to product reparability.

3.2. Process requirements

The process requirements are the ones concerning the process of production of the product. The intervention is established in the process by setting requirements that will help to reduce the environmental impact throughout the life cycle of the product.

While the Ecodesign Directive (European Commission, 2009) for energy-related products focuses exclusively on the final product, the ESPR empowers the Commission to adopt process-oriented requirements as well. It also includs the processes taking place throughout the product's value chain in the definition of ecodesign requirements (Council of the European Union, 2023).

It is important to clarify that the division of whether the ecodesign requirements are going to be set in the process or in the final product, is yet to be defined by the delegated acts. According to EU consultation[3], the intervention is going to be set where it is more effective in order to reach and improve the sustainability of the product. This decision is going to be taken after an impact assessment during the preparation of the delegated acts.

According to the ESPR general ecodesign requirements and product parameters (Council of the European Union, 2023), the process-related are identified as the following:

- Energy use and energy efficiency, resource use or resource efficiency
  This requirement refers to the use and consumption of resources such as energy, water, land, and other resources in one or more life-cycle stages of the product. The ESPR seeks to reduce the negative environmental impact of the product during the process of production, by greening the process with the efficient use of the resources. As an example, in order to make one pair of jeans it requires between 10,000 to 20,000 litres of water to produce it (Van der Ven, 2022).

- Avoidance of technical solutions detrimental
  To reuse, upgrade, repair, maintain, refurbish, remanufacture, and recycle products and components. This requirement bans every technical solution that can be used in the process of production that can have an impact in the final quality of the product.

- Presence of substances of concern:
  Use of substances, on their own, as constituents of substances or in mixtures, during the production process. The ESPR empowers the Commission to set limits to the concentration of these substances, especially the ones that hinder the sustainability of the product or have significant adverse effects on human health.

3.3. Information Requirements

The ESPR establishes information requirements to promote transparency and traceability, as it states that data is key for improving product sustainability and circularity. These information requirements cover the whole life cycle of the product from the production process to the product's post-consumption.

[3] Consultation with a representative from the European Commission

The information requirements shall be available in the Digital Product Passport (DPP), which will make the information digitally accessible to all actors along the entire value chain. The DPP shall include information related to the product, information related to the substances of concern, the manufacturer, and the importer, compliance documentation such as conformity assessment, manuals, instructions, warnings, and/or safety information. All the information must be accessible for all actors of the value chain, in particular consumers and competent authorities, in a manner that is understandable. The Commission should set up a user-friendly web portal where all stakeholders can easily access to the information (Council of the European Union, 2023).

Moreover, the DPP must be connected to a unique product identifier and should guarantee the compatibility of the unique identifier with external components such as scanning devices. It will help and facilitate the verification of the product compliance with the ESPR (Council of the European Union, 2023).

Also, the Commission shall set up and manage a digital registry storing in a secure manner at least the unique product identifiers, the unique operator identifiers, and the unique facility identifiers by two years after the entry in force of the regulation. The Commission will set in the delegated acts the additional information that, besides being included in the DPP, must be stored in the registry. And finally, an important addition of the Council's general approach is that the Commission shall set up and maintain a web portal allowing stakeholders to search for information included in product passports (Council of the European Union, 2023).

An important mandatory requirement is that the DPP must contain information, is the disclosure of substances of concern. This information requirement includes a broad mandatory disclosure such as name, concentration, location, and others. This shall enable the tracking of all substances of concern throughout the life cycle of products. All these innovations regarding the DPP will provide a level of traceability and transparency in a way that has not been seen before, it will help authorities with the control as well as to the consumers to make better, sustainable decisions.

Finally, besides the DPP that is the minimum required, other information requirements may be requested. Some products may also contain information related to:

- Performance of the product in relation to the product parameters.
- Information for consumers and other end-users on how to install, use, maintain, and repair the product to minimize its impact on the environment and to ensure optimum durability, as well as on how to return or dispose of the product at end-of-life.
- Information for treatment facilities on disassembly, recycling, or disposal at end of life.
- Other information that may influence and improve performance in relation to product parameters.
- The carbon footprint and environmental footprint.

The proposed regulation states that all these information requirements shall be provided in the DPP, where available.

3.4. Compliance with ESPR

The way to demonstrate compliance with the requirements set in the ESPR is through a conformity assessment, which is usually done by a third party. The EU declaration of conformity shall state that

the fulfilment of ecodesign requirements specified in the applicable delegated acts that will be adopted has been demonstrated and by drawing up the EU Declaration of Conformity, the manufacturer assumes the responsibility for the compliance of the product (Council of the European Union, 2023).

The proposed regulation establishes that for the purposes of compliance and verification of compliance with ecodesign requirements, tests, measurements, and calculations shall be made using harmonized standards or other reliable, accurate and reproducible methods that consider the generally recognized state-of-the art methods. Moreover, the ESPR establishes a presumption of compliance for those tests, measurement or calculation methods referred, which are in conformity with harmonized standards or parts thereof, the references of which have been published in the *Official Journal of the European Union.* Furthermore, the ESPR also states a presumption of compliance for products covered by the delegated acts which have been awarded by the EU Ecolabel and also nationally, regionally or officially recognized EN ISO 14024 type I environmental labels, insofar as the criteria established by those labels are covered by and are at least as strict as those requirements (Council of the European Union, 2023).

4. Potential impacts of the ESPR on textile trade between the EU and Pakistan

4.1. EU-Pakistan trade

Pakistan's total exports reached 31.8 billion USD in 2021, out of which exports into the European Union accounted for 23%. The EU is Pakistan's second largest trading partner, absorbing nearly 28% of the country's total exports. Of all Pakistan's EU exports, textile and apparel products comprised 75.2% (European Commission, 2021). However, analysing historical data, according to World Bank, total export market share of Pakistani firms has declined since the 2000s, specifically over the last decade (Frederick & Daly, 2019).

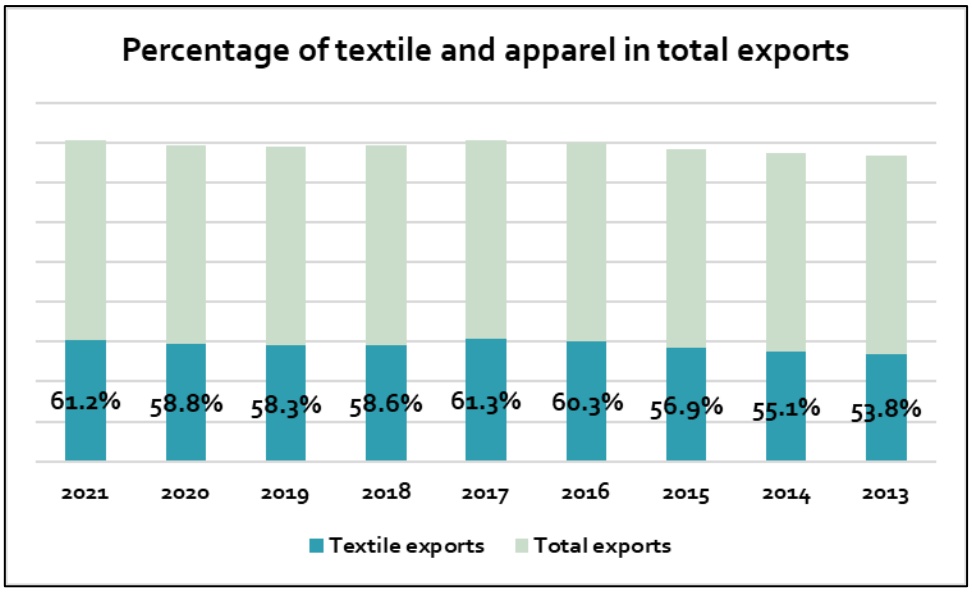

Figure 5: Share of textile and apparel in total exports from Pakistan, Source: Pakistan Bureau of Statistics

In contrast, the data analysed by the authors reveal an overall increase in the share of exports in textile and apparel over 2019, 2020 and 2021 (Figure 5); where, the growth is predominantly concentrated in a few products, specifically harmonized system (HS) codes 63, 62, 61, 55, and 52 (Figure 6). Among

these two-digit HS codes, the top exported products are 6110, 6104, 6203, 6204, 6302, and 6307 (figure 6). A more detailed analysis of the six-digit HS codes identifies 611020, 620342, 630231, and 630221 as the top products (Figure 7) exported to Europe.

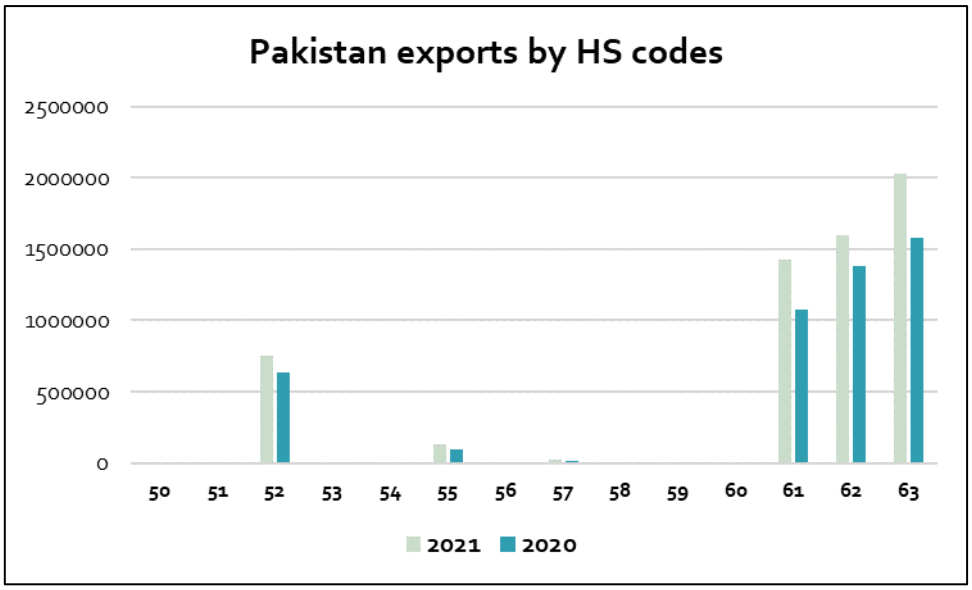

Figure 6: Pakistan exports by HS codes, Source: ITC Trade Map

Top 5 products exported to the EU by HS codes	
HS Code	***Category***
63	*Other made-up textile articles; sets; worn clothing and worn textile articles; rags*
62	*Articles of apparel and clothing accessories; not knitted or crocheted*
61	*Articles of apparel and clothing accessories, knitted or crocheted*
52	*Cotton*
55	*Man-made staple fibres*

Table 1: Pakistan's exports by HS codes and descriptions, Source: ITC Trade Map

Although the data points suggest a broad increase, from further analysis, it can be noted that growth has been narrow and concentrated around men's trousers, women's trousers, and bed linens. Further, from the below table, it is evident that all the top five exported products from the industry are composed of cotton. This trend indicates that Pakistan's exporters mainly specialize in producing standard, low-quality items (Frederick & Daly, 2019).

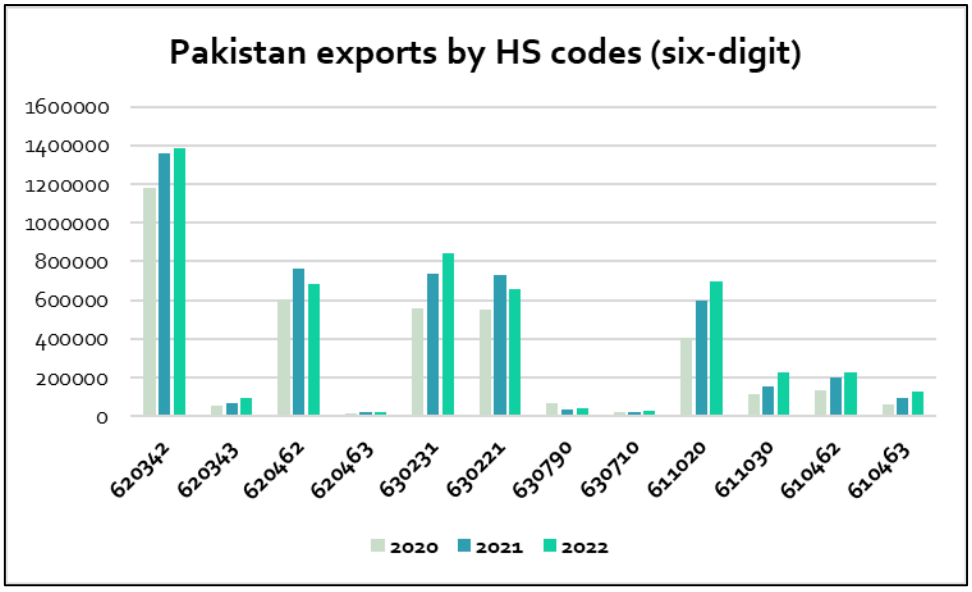

Figure 7: Pakistan's exports to the EU by HS codes (six-digit), Source: ITC Trade Map

HS code	***Description***
620342	*Men's or boys' trousers and shorts, of cotton, not knitted or crocheted of cotton*
620462	*Women's or girls' trousers and shorts, of cotton, not knitted or crocheted of cotton*
630231	*Bedlinen of cotton (excluding printed, knitted, or crocheted)*
630221	*Printed bed linen of cotton (excluding knitted or crocheted)*
611020	*Jerseys, pullovers, cardigans, waistcoats, and similar articles, of cotton, knitted or crocheted (excluding wadded waistcoats)*

Table 2: Top five products exported to EU by HS code (six-digit), Source: ITC Trade Map

Between 2020 and 2022[4], the growth of jerseys and cardigans made of cotton (611020) reached 19.83%, while cotton bed linens (630231) grew by 14.89%. In contrast, the top exported product, men's trousers (620342), experienced a slower growth of 5.58% during the same period, despite previous literature indicating significant expansion (Frederick & Daly, 2019). Moreover, cardigans made from manmade fibres (611030) experienced a 25.17% growth, aligning with the Government's Textile and Apparel Strategy of 2020-25, aiming to expand textile production using manmade filaments.

Moreover, since 2014, Pakistan has benefitted from the GSP+ status granted by the European Union. This agreement permits exporters from the textile and apparel sector to avail a 20% reduction in tariff rates (European Commission, 2012). During stakeholder consultations, numerous exporters indicated that their competitive position would be compromised, or exporting may become unfeasible without the GSP+ scheme. Therefore, the GSP+ scheme underscores a crucial trade linkage between Pakistan and Europe.

[4] Author's calculations

In this regard, the ESPR as explored in section 3, will condition EU market access on compliance with ecodesign and product performance requirements. Failure to comply with the ESPR could jeopardize Pakistan's market access to the EU, despite the benefits offered by these preferential treaties.

To comply with the proposed ESPR, Pakistan will have to modify how textile and apparel products are made (process), the properties of the final goods (product) and data transparency across the full value chain (information). While such regulatory developments can often shake up the industry and may have many negative impacts, it also presents an opportunity for Pakistan to adopt a strategic approach and gain a competitive edge over other apparel exporting countries by upgrading production and developing capacity to comply with the ESPR requirements. To better understand the implications of the ESPR on textiles and apparel trade between the EU and Pakistan, the next section will set out an overview of key characteristics of Pakistan's textile and apparel industry, followed by an analysis of alignment and gaps between the ESPR requirements and Pakistan's textile and apparel industry.

4.2. The Textile and Apparel industry in Pakistan

Pakistan's textile industry, as highlighted above, is a major contributor to the country's GDP, its workforce, and the biggest contributor to its total exports. Readymade garment exports from Pakistan constitute approximately 20% of the total textile exports. To gain a comprehensive understanding of the pivotal processes and dominant products within the Pakistani textile industry, the following analysis presents a breakdown of all textile product exports, categorized by product type, for FY 2020-21 (Board of Investment, Pakistan, 2019).

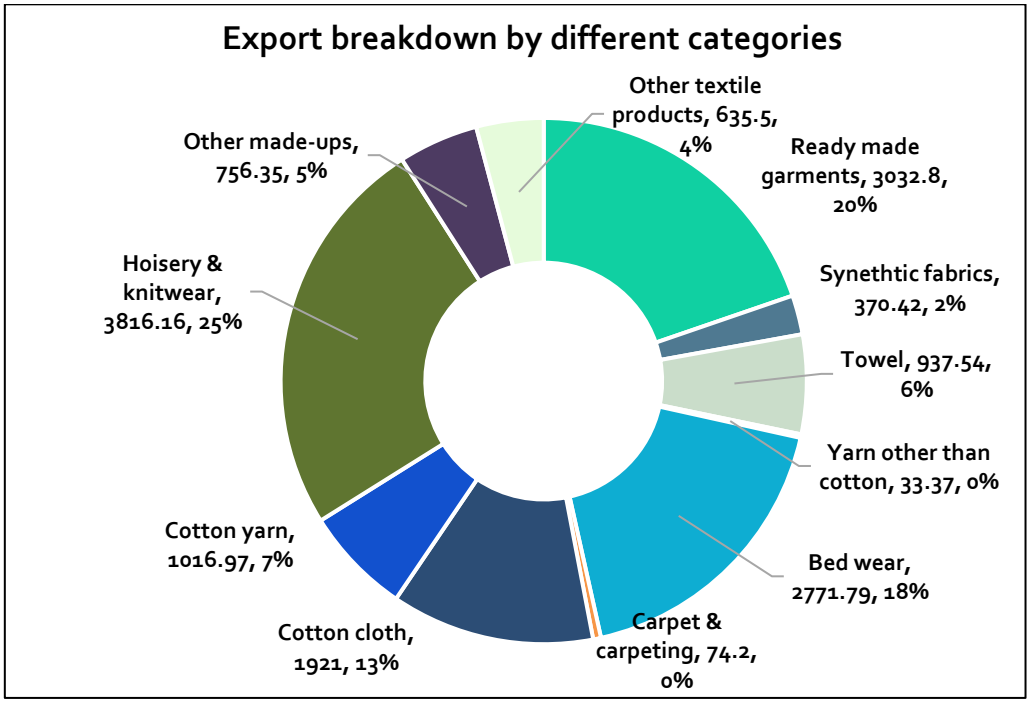

Figure 8: Export breakdown by different categories, Source: Pakistan Bureau of Statistics

Furthermore, the industry is dominantly spread across three cities: Karachi (Sindh), Faisalabad (Punjab) and Lahore (Punjab), with a total of 517 textile units as of June 2020 (Government of Pakistan, 2020). These units are spread across the value chain in functions, from cotton farming,

ginning, spinning, dyeing, and finishing to assembly. Numerous international brands partner with Pakistan's textile mills, leveraging their capacities across diverse segments of the value chain (Board of Investment, Pakistan, 2019). The subsequent sections provide a linear representation of the conventional textiles value chain, slightly modifiable based on the raw material and the final product's required properties, but largely consistent across most material types as illustrated below (Figure 9).

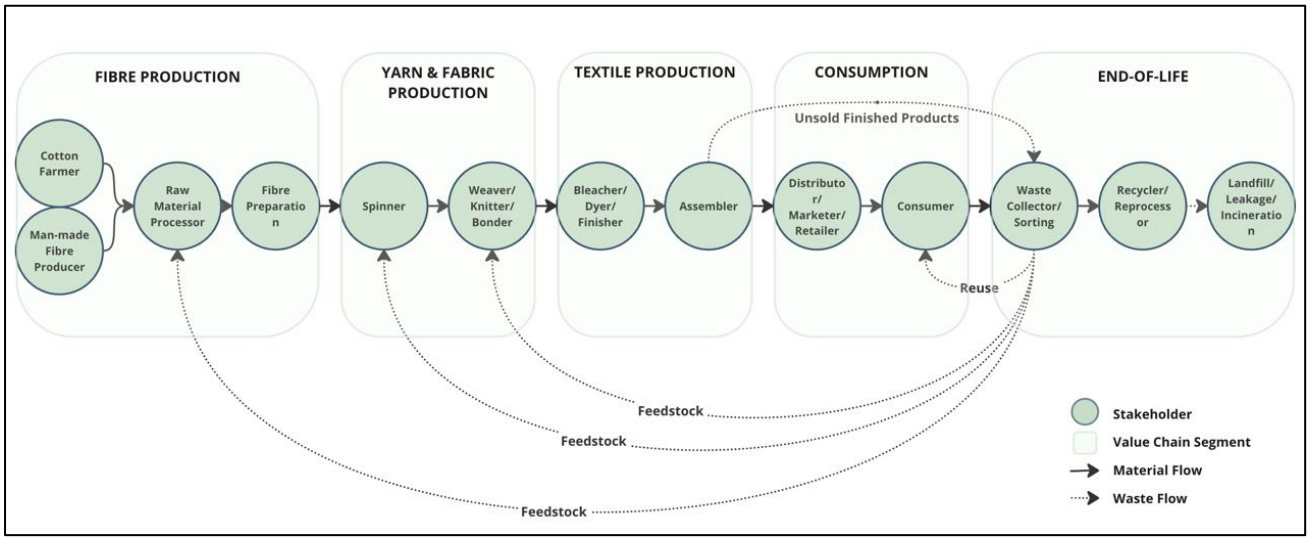

Figure 9: A linear representation of the textile value chain, Inspiration: Sustainability and Circularity in the Textile Value Chain, UNEP (Author's Illustration)

The following section divides the textile value chain in Pakistan under 5 major stages: fibre production, yarn and fabric production, textile production, consumption and end-of-life, as highlighted in the figure above.

4.2.1. Stage 1: Fibre production

Pakistan is involved in fibre production. This involves raw material production, material processing and sourcing and fibre preparation. The primary raw materials used in the textile and apparel industry are cotton and man-made fibres (MMF).

Cotton, grown predominantly in the provinces of Punjab and Sindh, possesses the fifth largest cotton production capacity worldwide, with a 6% share in the world cotton production in 2019-20 (Agricultural Statistics of Pakistan, 2022; ICAC, 2019). Despite possessing the potential for self-sufficiency in most input resources to get a competitive advantage, this is far from the case. Though Pakistan is a major producer, the production has been fluctuating and decreasing consistently as the table 2 illustrates, mainly due to the high price of pesticides, heat stresses and climate change-related factors (IFC, 2021). This has forced many manufacturers to import their cotton from other South Asian countries (OEC, 2021a). Tracking the backward linkages, out of the top ten imports of 2016-17, cotton, in three different forms top the list (Table 3). Notably, the country's cotton farming practices are also water and pesticide-intensive, further exacerbating environmental challenges (Naqvi et al., 2018).

Year	*Area (Hectares)*	*Production (Bales)*	*Yield (Kgs/Hectare)*
2016-17	*2489*	*10671*	*729*
2017-18	*2700*	*11946*	*753*

2018-19	*2373*	*9861*	*707*
2019-20	*2517*	*9148*	*618*

Table 3: Cotton Production in Pakistan, 2017-2020, Source: APTMA

HS Code	***Product***	***Share of import value***
52010090	*Cotton, not carded or combed (Other categories)*	*14.5%*
39269099	*Plastic materials*	*5.1%*
55041000	*Artificial staple fibres*	*5.1%*
39021000	*Polypropylene*	*3.0%*
55032010	*Synthetic staple fibres*	*2.8%*
29053100	*Ethylene glycol*	*2.8%*
84463000	*Weaving machines*	*2.7%*
52010060	*Cotton (length exceeding 28.5mm but not 31 mm)*	*2.7%*
54023300	*Textured yarn of polyester*	*2.6%*
52010050	*Cotton (Length exceeding 24.5 mm but not 28.5 mm)*	*2.1%*
	Total	***43.4%***

Table 4: Top ten inputs by textile and apparel exporters, 2015-2016, Source: World Bank

In contrast, MMF is almost entirely imported due to local regulatory measures favouring the production of polyester staple fibre (PSF), a component in MMF manufacturing (APTMA, 2018). The demand for MMF has also been increasing within the industry as they are cheaper and more durable compared to cotton. In 2016, roughly 64% of Pakistan's aggregated material imports were for MMF (World Bank, 2021). Furthermore, the government has also been pushing to switch to synthetic textiles to sustain export growth momentum, mainly from the United States (SBP, 2018). However, as explored above, top products exported to Europe comprise mainly of cotton, though some products are made up of MMF.

4.2.2. Stage 2: Yarn and fabric production

In the value chain, Pakistan's most substantial global involvement lies in the second segment—yarn and fabric production. It ranks as the third-largest producer of yarn, the third most prominent consumer, and the second-largest exporter of yarn globally. The total number of installed spindles in the country is around 8.3 million with production of 1.5 million tonnes (SMEDA, 2008). Around 50% of total yarn production is based on coarse and medium-count cotton yarn. From the breakdown, it is also evident that more than 30% of the yarn produced is polyester which is unsustainable due to its environmental impact, including the discharge of microplastics from the process into local water bodies[5], adversely

[5] Consultations with exporters from Pakistan

affecting aquatic life (Vivek, 2022). Furthermore, as addressed during stakeholder consultations[6], the machinery used in the textile and apparel industry of Pakistan is outdated, making them energy intensive and resource inefficient.

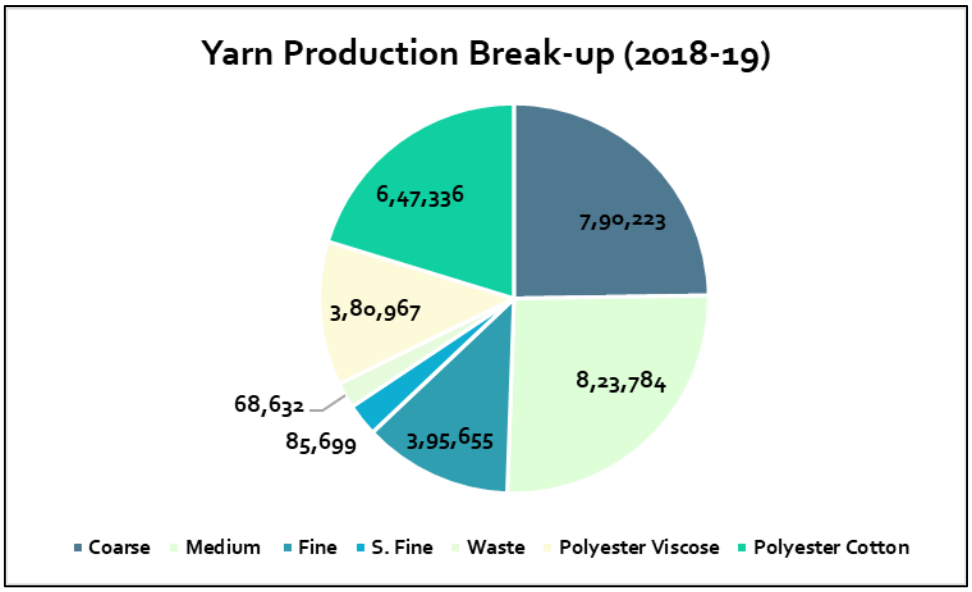

Figure 10: Yarn Production Breakdown (2018-19), Source: APTMA

4.2.3. Stage 3: Textile production

In textile production, the yarn or material that is sourced from the previous chains is subject to chemical and mechanical processing (finishing) to produce textiles with desired qualities. Following this, the fabric is cut and sewn into the final product. In between these stages, the fabric or yarn might also be dyed into various colours which require a substantial amount of water. In Pakistan, the textile industry consumes 49% of the total water used for industrial purposes, meaning that the textile industry contributes to around 11.3% of the total country-level industrial level water consumption (APTMA, 2022a).

Consultations with exporters also revealed a preference for unsustainable dyes due to their profitability, despite their environmental implications. The wastewater from this process, laden with harmful chemicals, is discharged into local water bodies, posing a threat to aquatic life. Additionally, the recurrent issue of outdated, energy-intensive, and resource-inefficient machinery, as emphasised during stakeholder consultations, remains prevalent in this stage of production as well.

[6] Consultation with exporters from Pakistan

4.2.4. Stage 5: End-of-life

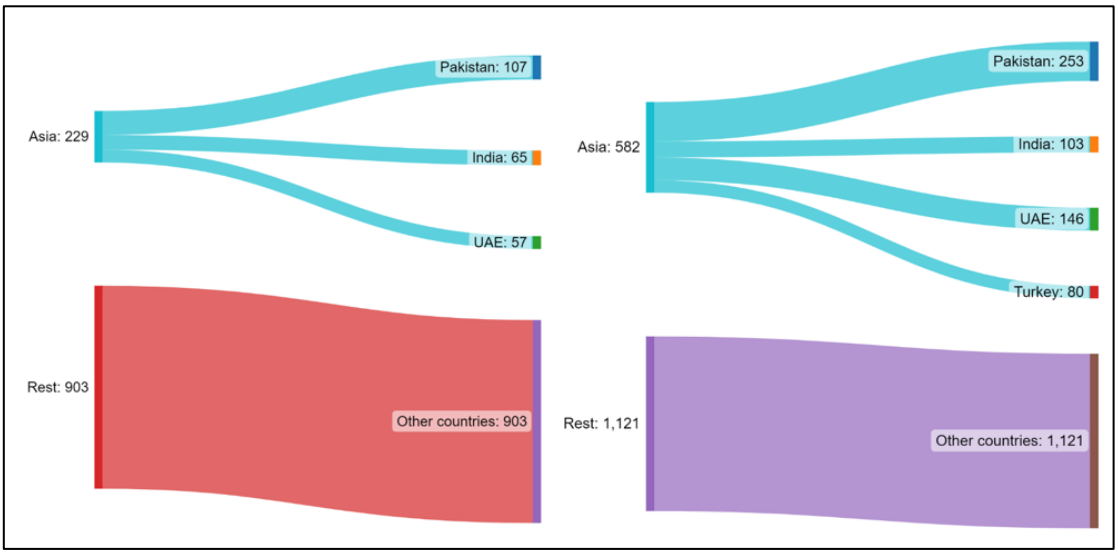

Figure 11: EU27 exports of used textiles, by receiving countries in Asia, 2010 & 2019, million kg, Source: UN Comtrade via European Environmental Agency

Pakistan has emerged as a significant destination for post-consumer textile waste discarded by the EU each year. Between 2000 and 2010, the country climbed from eighth to first place in Asia on imports of used textiles and maintained its position in 2019 (Eionet Portal, 2023). The import of second-hand textiles in Pakistan started relatively recently, with the first license granted in 2004 (Garson & Shaw, 2019). The latest data shows that there were 82 licenses in the country in 2018 (Garson & Shaw, 2019).

In this context, research shows that special economic zones attract second-hand clothing imports due to business incentives (Watson et al., 2016). For instance, the Karachi Export Processing Zone (KEPZ) is frequently cited as a significant hub for these imports. KEPZ handles used clothing for fibre extraction, remanufacturing into rags, or re-exporting to other developing countries (Watson et al., 2016). Another study indicates that 100% of imported textiles are sold in Pakistan in some form: 57% are recycled, 36% are exported as industrial wipes or slashed textiles for mechanical recycling, and 21% are mechanically recycled domestically (Watson et al., 2016).

However, the Pakistani government plans to reduce second-hand clothing imports, as outlined in the Pakistan Textile and Apparel Policy 2020-25 (Government of Pakistan, 2020). As elucidated in the report, new clothes are disguised as old clothes and imported into Pakistan hurting domestic manufacturers.

4.3. Overview of Pakistan's textile and apparel industry and its relation to ESPR

This section illustrates the environmental issues at each stage of the textile value chain that must be tackled to foster circularity and ensure compliance with the ESPR. In the following discussion, we analyse each of the issues, specifically with regards to the ESPR and its potentially violated requirement.

Stage of value chain	Environmental issue faced relevant to Pakistan	Non-compliance requirement (product/process/information)
Fibre production	Heavy reliance on import of cotton	Informational requirements
	Heavy use of pesticides while farming	Process
	Intensive water usage while farming	Process
Yarn and fabric production	Significant polyester production	Product and process
	Inefficient machinery used (resource and energy)	Process
	Discharge of water with microplastic (from polyester production)	Process
Textile Production	High usage of unsustainable dyes	Process and product
	Excessive usage of water	
	Emission of greenhouse gases	

Table 5: Overview of the environmental impact of Pakistan's textile and apparel value chain

In fibre production, Pakistan's textile and apparel industry is confronted with several challenges that might not be in line with the ESPR's requirements. The heavy reliance on cotton imports introduces a degree of uncertainty in tracing the source of fibres and their sustainability credentials, a requisite under the ESPR's informational standards (digital product passport). Additionally, the significant use of pesticides and intensive water usage during farming might contrast with the ESPR's process requirements.

With the yarn and fabric production stage, several environmental issues arise that directly infringe on the ESPR's process and product requirements. Polyester, a commonly used fibre in textile production, contributes to a substantial amount of greenhouse gas emissions, which might contradict the ESPR's process guidelines. The environmental footprint of this material is also different in meeting the ESPR's product standards. Furthermore, the polyester production process releases microplastics into water bodies, an explicit violation of the ESPR's process requirements. In addition, outdated and inefficient machinery employed during weaving and ginning stages compound these challenges, as they result in resource inefficiency and excessive energy consumption, potentially contravening ESPR's informational mandates.

Finally, the textile production stage presents its own unique set of hurdles. Here, ESPR's process-oriented guidelines concerning water consumption and usage of environmentally hazardous substances such as dyes are breached, as confirmed during stakeholder consultations[7]. The processes of dyeing and bleaching involve excessive water usage and the release of untreated wastewater, contributing to industrial water pollution in Pakistan. These factors, combined with the prevalent use of outdated

[7] Consultation with experts

technology, might also fall short of the ESPR's informational requirements. While some larger exporters are making strides towards sustainability, SMEs are grappling to adopt these practices, indicating a need for a concerted, industry-wide push towards circularity.

4.4. Current circularity practices in the Pakistani textile industry

Despite the growing emphasis on circularity and sustainability, Pakistan's textile and apparel industry has seen limited formal implementation of circularity practices and initiatives. The most notable policy, the Pakistan Environmental Protection Act (PEPA), amended in 2012, involves the textile and apparel industry, though, to a limited extent (Government of Pakistan, 1997). Recently, the government has also adopted national-level policies such as the National Climate Change Policy of Pakistan (NCCP) and the National Hazardous Waste Management Policy (NHWM) to regulate emissions and waste from various industries.

In addition, the Government of Pakistan's recent Textile and Apparel Policy 2020-25, although addressing sustainability as a significant concern, appears to inadequately address the industry's circularity and sustainability issues (Government of Pakistan, 2020). Notwithstanding, the policy outlines a clear intent to establish infrastructure to regulate the effluent treatment and water recycling within the sector, predominantly from the perspective of reducing operational costs. However, an examination of the policy's objectives reveals a dominant focus on enhancing business facilitation, curbing operational expenses, and augmenting export value among other initiatives. Furthermore, within the value chain, the policy seeks to ensure the stability of cotton prices, promote the use of man-made fibers, and facilitate technological upgrades within the ginning sector among other goals.

In contrast to the limited regulatory framework Pakistan's informal sector demonstrates a robust culture of micro-scale sustainable practices, including the creative downcycling of used clothing for alternative uses. The culture of repairing and reusing items, particularly textiles, is deeply embedded within the Pakistani society. Through stakeholder consultations[8], it becomes apparent that these practices are not only prevalent but also surpass similar practices in some developed nations. Reuse and repurposing of clothing items are essential in facilitating a move towards a circular economy.

Although there is no specific national strategy promoting circularity, various initiatives and partnerships have emerged in recent years. For instance, the national partnership to achieve Pakistan's objective of net zero carbon by 2050, the Net Zero Pakistan project was formulated with 22 out of the 23 signatories belonging to the textile and apparel industry. The signatories set net-zero targets, affirmed to measure and disclose transparently the levels and sources of GHG emissions and vowed to decarbonize value chains (APTMA, 2022b).

In addition to this, State Bank of Pakistan (SBP) issued the green banking guidelines (GBG) aimed at safeguarding against environmental risks emerging from banks and DFIs' businesses and operations (SBP, 2017). These guidelines enabled companies to access soft loans aimed at enhancing resource and energy efficiency. Through stakeholder consultations[9], the authors found that the initiative was initially voluntary, the government later imposed targets on other banks to distribute these loans.

[8] Consultation with Pakistan's ambassador/ Permanent Representative at World Trade Organization, Mr. Mujtaba Piranha

[9] Consultation with Mr. Sohail Naqvi from WWF Pakistan

However, due to recent financial constraints faced by the government, this program has been deprioritized.

Furthermore, the Better Cotton Initiative (BCI) launched the better cotton programme in 2009 to promote sustainable cotton production practices such as reducing water usage and eliminating harmful pesticides (Ghori et al., 2022). Similarly, the Archroma and Worldwide Fund for Nature Pakistan (WWF Pakistan) also launched a collaborative initiative, introducing eco-friendly dyes into textile production, mainly ginning and weaving for water conversation (Archroma, 2018). Similarly, WWF Pakistan also collaborated with International Labour Organization (ILO) intending to enhance the capacities of SMEs in the textile industry to adopt Smart Environmental Management Practices (SEMP) to reduce water usage, energy usage, hazardous chemicals (by 10%), air pollution, noise pollution and improve solid waste management (WWF Pakistan, 2019).

NAMA facility has initiated a project “Pakistan – Decarbonising Textile Manufacturing” which provides financial support to manufacturers in the country to adopt resource and energy-efficient technologies in textile production (Mitigation Action Facility, 2019). The International Finance Corporation has also signed a partnership with Gap Inc to boost resource efficiency and drive long-term sustainability through measures to reduce the use of water, energy, chemicals and other resources (IFC, 2018).

The United Nations Conference on Trade and Development (UNCTAD) introduced an initiative called "Sustainable Manufacturing and Environmental Pollution" (SMEP), which offers financial assistance to SMEs for the adoption of circular technologies, specifically targeting the reduction of plastic pollution (UNCTAD, 2015). Moreover, during a stakeholder consultation with the International Trade Centre (ITC), it was disclosed that a forthcoming programme, named the "SME Development Strategy," is in the pipeline. While this strategy is not directly tailored for the textile and apparel industry, it does address aspects of technical assistance and financing access for SMEs, thus potentially alleviating some of the industry's structural challenges.

The majority of exporters with whom the authors engaged during our research reported deriving benefits from civil society initiatives and association-led efforts. Specifically, the initiatives by WWF Pakistan were frequently cited as having a beneficial impact. This can be interpreted as a promising indication that these organizations are effectively addressing the gap in guidance towards sustainability for exporters, particularly given the absence of comprehensive governmental policies.

In order to promote sustainability among the manufacturers of textiles in Pakistan, many industry players have begun integrating environmental responsiveness into their operations, while textile associations such as the All-Pakistan Textile Mills Association (APTMA) are fostering partnerships and facilitating knowledge sharing to promote sustainability within the industry (APTMA, 2022b). Artistic Millners, for example, has incorporated recycled content into their denim products as part of their sustainability strategy, and other firms have followed (Andrew Olah, 2021). Likewise, Sarena Textiles, another one of Pakistan’s major exporters has encompassed responsible sourcing, water stewardship, energy conservation, carbon footprint reduction, and transparency into their corporate agenda (Sarena Textiles, 2022).

In Karachi, AGI denim, an exporter of jeans and premium denim became the first company in Pakistan to earn B Corp certification, a rigorous benchmarking system used to judge social, environmental, and

good governance practices (BCorp, 2022). In other parts of Pakistan, companies such as Crescent Bahuman Textiles have received crucial certifications including OCS, GRS, Higg index, ZDHC, ISO 14001, Cradle to Cradle, Oekko-Tex, GOTS and WRAP (Crestex, 2022). US Apparel and Textiles mapped its 2022 sustainability challenges and achieved a reduction in unsustainable water consumption, and waste generation and an increase in energy efficiency (USGroup, 2022).

Initiative/ Policy	Scope	Description	Product/ Process	Information/ Transparency	
Pakistan Environmental Protection Act (PEPA)	National Policy	The act provides protection, conservation, rehabilitation, and improvement of the environment, for the protection and control of pollution, and the promotion of sustainable development.	Process	No reporting mechanism	
National Climate Change Policy of Pakistan (NCCP)	National Policy	The policy outlines the vision and objectives required to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy.	Process	Some form of reporting mechanism (reporting unit)	Voluntary
National Hazardous Waste Management Policy (NHWM)	National Policy	The policy outlines the management of hazardous waste in the country through provisions such as federal action plans, the formation of a committee and directives.	Process	Some form of reporting mechanism (licenses, permits etc)	Mandatory for some
Green Banking Guidelines (GBG)	National Bank initiative of SBP	The guidelines aim to offer loans to companies working in clean energy and resource efficiency	Process	-	
Net Zero Pakistan	Partnership	Signatories have come forward to set net-zero targets, affirmed to measure, and disclose transparently the levels and sources of GHG emissions and vowed to decarbonize value chains	Process	-	
Better Cotton Programme	NGO initiative	To promote organic and sustainable production of cotton to reduce water and pesticide consumption and improve soil health	Process	Some form of reporting (farm-level monitoring)	Voluntary
MoU Archroma X WWF Pakistan	Collaborative partnership	Encourage the usage of eco-friendly dyes in ginning and weaving process to reduce water pollution	Process	-	
SMEP by UNCTAD	International initiative	The project aims to leverage scientific research to understand and mitigate the environmental and socio-economic impacts of Pakistan's textile and apparel industry, while promoting the	Process	Proper methods of monitoring applied	Mandatory if part of the programme

		adoption of innovative technologies and business processes to control pollution, manage plastic waste, and further sustainable manufacturing practices in line with several Sustainable Development Goals (SDGs).			
SME Competitive Strategy	International initiative		-	-	
IFC X Gap Inc	Collaborative partnership	Reduce emissions through the adoption of resource and energy-efficient technologies	Process	Some form of reporting mechanism	Mandatory if part of the programme
Pakistan – Decarbonising Textile Manufacturing	National initiative	Financial support to manufacturers to adopt resource-efficient and energy-efficient technologies	Process	Some form of reporting (compliance with NCCP)	Voluntary
International Labour and Environmental Standards Application in Pakistan's SMEs (WWF and ILO)	National initiative	The project aims to enhance the capacities of textile sector SMEs to adopt Smart Environmental Management Practices to reduce water usage, energy usage, hazardous chemicals (by 10%), air pollution, and noise pollution and improve solid waste management	Process	-	
Sarena Textiles	Company policy	Incorporate recycled fibres into denim they produce	Process	-	
AGI denim	Company Policy	Achieved B-Corp certification	Process	Must be recertified every three years	Mandatory
Crescent Bahuman Textiles	Company Policy	Achieved various certifications like OCS, GRS, Higg index, ZDHC, ISO 14001, Cradle to Cradle, Oekko-Tex, GOTS and WRAP	Process	Must be recertified at regular periods	Mandatory
US Apparels and Denims	Company Policy	Reduction in unsustainable water consumption, waste generation and increased energy efficiency.	Process	-	

Table 6: Consolidated list of circularity and sustainability initiatives in Pakistan, Source: Authors' research

However, the benefits of communal initiatives are not evenly distributed across the industry and consultations[10] with stakeholders have indicated enforcement and implementation shortfalls. Moreover, most policies and initiatives in Pakistan focus on process requirements rather than product requirements (Table 6), which are mainly addressed by larger exporters that have the financial means to do so.

4.5. Structural Challenges of the Industry

This section presents an examination of the structural challenges intrinsic to Pakistan's textile and apparel industry, which significantly impede its transition towards circularity. Addressing these critical issues necessitates targeted efforts and strategic solutions to enable the industry to chart an effective course towards compliance with the proposed ESPR.

4.5.1. Oligopolistic market structure

The industry mainly encompasses small, medium-sized enterprises (SMEs) and vertically integrated large-scale firms that operate across multiple segments of the supply chain. The sector is characterised by a small number of large firms generating most of the country's exports and thousands of smaller, localised firms accessing foreign markets in minimal volume (World Bank, 2019). Though larger firms hold the majority of the export market share, employment opportunities are generated by SMEs, employing 60-70% of the entire workforce in the textile and apparel industry (PBS, 2023).

In the year 2016-17, 4954 businesses exported textiles while 8 firms held 31% of the export share. As the table illustrates, though there are many SMEs in the industry, the export value is highly concentrated at the top making the sector bifurcated. Around 8 firms representing 0.2% of the market share of the entire textile exporters population hold 31% of the exporting, further reinforcing the top-heavy nature of the industry.

Threshold	**Number of firms (share)**	**Export Value (share)**
Over USD 100m	8 (0.2%)	USD 1.5B (31%)
USD 10-100m	64 (1.3%)	USD1.6B (34%)
USD 1-10m	401 (8%)	USD1.2B (25%)
Less than USD 1m	4481 (90%)	USD0.5B (10%)
Total	***4954***	***USD7.7B (100%)***

Table 7: Profile of Pakistani businesses exporting in the textile and apparel industry, 2016-17
Source: World Bank

This highlights the necessity of providing greater financial support to SMEs operating in the chain, enabling them to also benefit from the competitive market. As it stands, large exporters with substantial financial resources are dominating the industry. With the implementation of the ESPR, these well-funded exporters will find it comparatively easier to adopt new technologies and comply with the proposed regulations.

[10] Consultation with multiple exporters from Pakistan

4.5.2. Outdated technology

Over the years, Pakistan has consistently maintained its position as a leading global manufacturer of textiles and apparel. However, despite the growth of the textile industry, the country has not been able to keep pace with the development and innovation in textile machinery (Fibre2Fashion, 2017). As a result, the demand for textile machinery is predominantly met through imports, with a surge of 29.1% in 2022 alone (PBS, 2023). Research suggests that the use of outdated machinery in the industry leads to low productivity, higher energy consumption, and resource inefficiency in textile production processes (Tanveer et al., 2012). Stakeholders[11] have emphasized this point, particularly highlighting the struggle of SMEs to adopt the technology necessary for switching to sustainable manufacturing.

4.5.3. Lack of access to finance

Research[12] from Pakistan indicates that a drop in subsidized credit led to a significant decline in exports for small firms, but not large firms (Zia, 2008). Large firms were able to replace the subsidized credit with market-rate credit, thereby suggesting that small firms (SMEs) are credit constrained. In 2017, MSMEs in the country had a total financing gap of 16% (IFC, 2017). Given the oligopolistic nature of the textile and apparel industry, this has severe implications. Stakeholder consultations[13] underscored this concern, pointing out the financing gap as a potential deterrent for SMEs' compliance due to a decrease in initiatives offering financial support to SMEs, due to Pakistan's economic climate.

4.5.4. Lack of enforcement of Government policies

The primary government policy addressing environmental concerns in Pakistan’s textile and apparel industry is the Pakistan Environmental Protection Act (PEPA) of 1997. In addition to this, supplementing policies are the National Climate Change Policy of Pakistan and the National Hazardous Waste Management Policy. While there are various initiatives from other organizations and corporate social responsibility (CSR) activities by companies, these efforts do not guarantee a comprehensive framework for adopting sustainable and circular practices within the industry. Even when policies and frameworks are in place, enforcement and monitoring is absent for them. This inadequacy was underscored during stakeholder consultations[14], with multiple experts highlighting the absence of stringent oversight and enforcement of existing policies.

4.5.5. Lack of skilled labour

The poor state of human capital in Pakistan is a major hurdle towards achieving high growth and development (State Bank of Pakistan, 2020). (Abbas & Foreman-Peck, 2008) establishes that the rapid labour force growth was not matched by the expansion of secondary education in Pakistan during 1991-2000 resulting in a decline in the proportion of educated workforce. The paper points towards the decreased ability of Pakistan to benefit from the increase in world technologies. Furthermore,

[11] Consultations with exporters from Pakistan

[12] Important to note that the paper doesn’t not find that more productive firms were less affected by the credit drop. Thus, one cannot argue that small firms are less productive and hence, the inability to pay market rates (author’s opinion).

[13] Consultation with Mr. Sohail Naqvi from WWF Pakistan

[14] Consultations with WWF Pakistan and ITC

studies point towards higher productivity and innovation, bigger firm size and better marketing strategies for firms that have highly educated entrepreneurs and a skilled workforce. In this context, the textile and apparel industry struggles with shortages of trainer labour (Frederick & Daly, 2019).

4.5.6. Cost implications associated with circularity

Transitioning to a circular model in the textile and apparel industry is an investment-intensive endeavour that affects every segment of the value chain. As pointed out in section 4.2.2, the ginning and weaving stages are cited as the most challenging sectors to adapt to circularity principles. Comparative studies reveal that the cost of producing a low-fashion t-shirt ranges from $10 to $15, while fast fashion items cost between $1 and $5[15]. Nevertheless, the lower cost of fast fashion production often comes with environmental consequences, compromises in labour rights, and inferior product quality.

4.5.7. Overview of structural challenges and their relation to ESPR

The challenges facing Pakistan's textile industry is listed in the table below, highlighting and linking it to each of the requirements of ESPR and the opportunity the challenge presents with.

Challenge	Issues faced	Non-compliance requirement (Product/Process/Information)
Oligopolistic market structure	SMEs dominated by bigger players	-
Outdated technology	Inefficient processes, higher energy consumption, more waste	Product, process
Lack of access to finance	Difficulty in upgrading technologies, skilling labour	Product, process,
Lack of enforcement of government policies	No common framework guiding efforts	Product, process, information
Lack of skilled labour	Difficulty in implementation	Process
Cost implications	High upfront investment, costly dyes and chemicals, training for workers	Process, product, and information

Table 8: Overview of challenges and their relation to ESPR

The oligopolistic market structure poses a challenge in the textile industry as it disproportionately favours larger firms, leaving SMEs struggling to compete. However, this also presents an opportunity

[15] Stakeholder consultation

for industry regulation and the establishment of a level playing field that promotes healthy competition and innovation.

The industry's outdated technology results in inefficient processes, higher energy consumption, and increased waste, making it non-compliant with ESPR's product and process requirements. However, this challenge also provides an avenue for technological advancement. With the right investment, Pakistan can transition from outdated systems to resource- and energy-efficient technologies, similar to Kenya's successful technological transformation (Makhtar Diop, 2017). Such advancements can significantly boost the industry's global competitiveness.

The lack of finance restricts technological upgrades and labour skilling, hindering compliance with ESPR's product, process, and information requirements. Adequate governmental support can help level the playing field, preventing large firms from monopolizing the market. Encouragingly, this constraint signifies an opportunity for financial institutions to support sustainable growth in the textile industry.

Non-compliance with ESPR regulations is further exacerbated by the lack of enforcement of government policies. More effective policy implementation could provide a consistent framework, guiding efforts towards sustainability. Moreover, government initiatives that incentivize environmentally friendly practices can expedite the adoption of circular strategies in the industry.

The lack of skilled labour complicates ESPR compliance as it hinders efficient implementation. However, this can be seen as an opportunity to provide vocational training tailored to the industry's needs, thereby enhancing the workforce's skills and contributing to the overall economy's growth (Van der Ven, 2022).

Lastly, the financial implications associated with transitioning to sustainable practices represent a significant challenge. The costs include high upfront investments, expensive eco-friendly dyes and chemicals, and worker training. Despite the immediate financial burden, this challenge presents an opportunity for long-term cost-effectiveness and improved environmental sustainability. By investing in sustainable alternatives, the industry can reduce its environmental footprint, eventually leading to cost savings and improved market positioning.

5. Gap Analysis

5.1. Comparing current sustainability and circularity practices with requirements set out under ESPR

As highlighted in the previous section, the textile and apparel industry in Pakistan currently demonstrates limited circularity and sustainability practices. This section sets out a gap analysis between existing circularity practices and the ESPR requirements to identify areas for policy recommendations. The analysis is conducted by comparing the status quo of the Pakistani textile industry with all requisites set out under the proposed regulation, expanding on each of the subcategories of requirements – process, product, and informational. Finally, based on the findings, the report identifies priority areas that must be addressed promptly to bridge the gap between ESPR and current practices in Pakistan’s textile and apparel industry.

5.1.1. Process requirements

While most of Pakistan's sustainability/circularity initiatives are centred around greening the textile and apparel production process, these efforts are neither sufficiently specific nor sufficiently widespread to ensure complete compliance with the ESPR regulations. The focus of these initiatives, as detailed in section 4.3, and predominantly involves enhancing resource efficiency in the production process.

The ESPR stipulates specific process requirements that address the environmental impact of textile production, encompassing aspects like water usage, energy consumption, waste treatment, and microplastic release. These requirements pose significant challenges to Pakistan's textile and apparel industry, especially considering its heavy water dependency, outdated technology, and the environmental repercussions tied to specific stages of production. For instance, polyester-based yarn production, which constitutes about 30% of total yarn output, contributes to microplastic release. Furthermore, dyeing, and bleaching processes often result in wastewater laced with hazardous chemicals, posing risks to aquatic ecosystems.

Further, policies like the Pakistan Environmental Protection Act (PEPA) and the National Climate Change Policy (NCCP) seek to mitigate these impacts, focusing on environmental protection, pollution control, sustainable development, and cleaner production strategies. The National Hazardous Waste Management (NHWM) policy emphasizes responsible waste management and discourages reckless disposal of hazardous waste. During stakeholder consultation with WWF Pakistan[16], Mr. Sohail Naqvi mentioned the inconsistency in the enforcement and monitoring of these policies. Similar insights were gathered from other stakeholder consultations that were conducted with various stakeholders in the textile industry.

As mentioned in section 4.4.4., to foster sustainable growth and development in the Pakistani textile industry, the Ministry of Commerce issues dedicated 5-year-long strategies that comprise policy measures such as reducing costs of doing business, unlocking innovation and technology, supporting profitability and access to international markets, and facilitating investments in infrastructure to support the SMEs. The regulatory focus of the Government of Pakistan for textiles and apparel still seems to be focusing more on the linear growth of the industry, rather than introducing measures to reduce its environmental impacts. There seems to be a lack of regulatory movement to mandate sustainability and circularity principles from the government in the first place and does not require much from the businesses operating in the industry.

This report identifies new policies and regulatory measures as one of the most important and urgent leverage points, also highlighted in the system map above. While industry movement is much faster and nimble in creating transformations – policy interventions from the government to incentivise circularity, or disincentivise lack of sustainability-oriented measures by the industry can fuel immediate movement and action.

One such immediate policy instrument that has proven effective in many countries in inducing sustainability and circularity principles in the product and manufacturing process of various product categories is ‘Extended Producer Responsibility’ (EPR). Inspired by the Polluter-Pays-Principle, an

[16] Consultation with Mr Sohail Ali Naqvi from WWF Pakistan

EPR scheme mandates the manufacturers and/or marketers of any physical product to assume the responsibility for the full lifecycle of a product. An EPR scheme coupled with eco-modulated fees for producers can incentivise producers to adopt ecodesign principles into their product designs and manufacturing processes. While this policy instrument has successfully been applied to many other concerning product categories, demonstrating effectiveness and systemic change, discussions in various countries about adopting EPR for textiles is only recently gaining momentum. France is one of the first countries to have adopted an EPR scheme for textile waste.

In addition to nation-wide policies and regulations, civil society-led initiatives such as Net Zero Pakistan, the Better Cotton Initiative, and Sustainable Manufacturing and Environmental Pollution (SMEP) also aim to further reduce the industry's environmental footprint by advocating sustainable practices in key areas such as greenhouse gas emissions reduction, water conservation, and responsible chemical usage. Major industry exporters have also exhibited their commitment to sustainability through the acquisition of environmental certifications as detailed in section 4.3.

However, based on stakeholder consultations[17], many companies in the industry still lack adequate provisions for treating wastewater, primarily due to the prohibitive cost of wastewater treatment installations. The research underlines that the presence of sustainability and circularity initiatives across the Pakistani textile industry is rather patchy and unevenly distributed. Moreover, a large proportion of these private and voluntary initiatives to foster sustainability in their processes is undertaken only by medium-sized and large enterprises. The voluntary action is also sparsely spread across various parts of the textiles value chain and does not cover the full lifecycle of textiles and apparel. The industry's oligopolistic nature, with SMEs making up 90% of the market (in terms of the number of textile enterprises), meaning that these firms often have limited financial resources to adopt sustainable practices. Initiatives promoting technology adoption and offering financial support, such as low-interest credit and employee skill upgradation, could be pivotal in driving sustainability among these firms through programmes such as green banking introduced by the State Bank of Pakistan.

While the current efforts towards meeting the ESPR process requirements are noteworthy, they are insufficient and fragmented in coverage to ensure comprehensive compliance across the textile export industry. Hence, a more coordinated and all-encompassing approach is necessary for the industry's long-term sustainability and adherence to ESPR regulations.

5.1.2. Product requirements

The ESPR’s product requirements aim to prolong the life of products, ensuring they remain in use longer, delaying the need for reuse and recycling (Ashraf & Karkare, 2023). This is crucial for enabling consumers to use products longer and reduce consumption. Product requirements under the ESPR represent a relatively new concept, with few global initiatives and vague compliance criteria in the proposed policy.

Currently, no product-based initiatives relevant to circular textiles and apparel exist in Pakistan. However, the Textile and Apparel Policy 2020-25 of Pakistan highlights the Ministry of Commerce’s intention to establish a research and product development fund for improving product quality. Additionally, the policy outlines a plan to develop product standards across the value chain after

[17] Consultation with Mr Henrique Pacini, UNCTAD

consulting with stakeholders (Government of Pakistan, 2020). Regarding cotton, the Pakistan Cotton Standard Institute is responsible for establishing standards and implementing quality control measures.

As for a product's recyclability, Pakistan primarily exports cotton or cotton-based products, which presents an opportunity to enhance circularity since cotton is more easily recycled than other materials. The existence of a quality control institution for cotton further facilitates compliance with this requirement. Additionally, the requirement for incorporating recycled content in products could present a unique opportunity for Pakistan. This can be actualized by transforming second-hand textiles imported from the EU, as discussed in section 4.1.5., into recycled materials for use in the production of new textiles within the country. While seizing this opportunity would need significant investments, policy support, scaling up of recycling infrastructure, technical support, and capacity building, the market for recycled textiles remains a lucrative opportunity as the global market strives to transition to a circular economy, where the demand and attractiveness of virgin raw materials will only continue to decline. To add to that, the fact that Pakistan's textile industry is already oriented in a manner that it has its presence in many activities of the cotton textile production value chain, from cotton farming till final assembly of textile products – it can expand its activities vertically to capture the high-value add processes in the textile production. Other competitive textile producing countries such as and Vietnam do not produce a lot of cotton of their own, and are majorly producing textiles from synthetic materials, often imported from other countries. If utilised properly, this opportunity to expand the cotton recycling infrastructure and capacities can give Pakistan's textile industry a competitive edge as not only governments, but even consumers continuously become more aware and demand more eco-friendly materials that are durable, repairable, reusable, and recyclable.

However, these requirements pose significant challenges, as there are no national standards for final products besides cotton textiles. While private sector certifications typically focus on more efficient processes and reducing environmental impact from the manufacturing process, compliance with the ESPR will require Pakistani producers to also concentrate on demonstrating ecodesign principles in the final products to ensure durability, reliability, reusability, reparability, recyclability, and other factors.

In discussions held during stakeholder consultations, manufacturers noted that the import-focused brands in the EU primarily drive circularity within the product requirement, whereas Pakistani manufacturers have minimal involvement. Additionally, they emphasized that nearly all a product's environmental impact is established during the design phase (ECOS, 2021). Most of the control over product design, however, is driven by MNCs. This presents a complex challenge for Pakistan, requiring careful engagement with multinational companies to influence the design phase without deterring investment. Achieving this balance will be crucial in ensuring Pakistan's textile and apparel industry's adherence to ESPR product requirements, while simultaneously fostering a conducive environment for foreign investment. However, due to the unavailability of data and resources, the authors have not explored this in detail.

5.1.3. Informational requirements

The informational requirements under the proposed ESPR center on transparency and traceability of a product's environmental footprint, encapsulated in the digital product passport. The document currently available on the regulation points towards a meticulous recording and tracking of each product's source and sustainability credentials across the entire textile value chain. For instance, if

cotton is imported as raw material, manufacturers must validate its sustainable cultivation and document this data comprehensively. These practices bolster manufacturers' credibility in affirming their product sustainability while facilitating consumers' sustainable decision-making. The instrument also aims to ultimately provide all necessary information about the materials to textile waste recyclers to stimulate effective and efficient recycling of post-consumer waste.

Currently, Pakistan's textile and apparel industry lacks widespread formal initiatives that cater to these informational demands of the proposed regulation. Nonetheless, major exporters, such as Crescent Bahuman Textiles, are seeking certifications like the EU Ecolabel, which imposes stringent information requirements. Insights from stakeholder consultations indicate that the proposed regulation is predicated on existing frameworks like the EU Ecolabel, offering a preliminary understanding of the potential regulatory structure. Consequently, adherence to the current framework can facilitate smoother compliance for the industry.

The textile industry of Pakistan is predominantly informal, where the lack of digital infrastructure and the low technological adoption pose as great hurdles, making data collection a daunting task. To meet the informational requirements of the ESPR, substantial investments, training and education, and capacity building will be required. A special emphasis needs to be placed on facilitating these support mechanisms for the informal actors and SMEs within the Pakistani textile industry, as these are the actors that are mostly present at the beginning of the textile value chain.

Brink et al. (2021) underline the challenge posed by the lack of information regarding the processing of post-consumer textiles in Pakistan, which in turn complicates the assessment of their environmental impact. They further attribute this informational gap to the fact that the management of post-consumer textiles predominantly occurs within the informal economy (Brink et al., 2021).

Finally, another critical challenge that the Pakistani textile industry might face in complying with the informational requirements and complete adoption and implementation of the digital product passport is the access to information of imported raw materials from third parties. As highlighted in the report above, the Pakistani textile industry, over and above its domestic raw material stock, also imports substantial volumes of raw materials such as cotton, polyester, viscose, and rayon. It needs to ensure that the full chain-of-custody from the source of these raw materials can be captured in the digital product passport, to ensure compliance.

Compliance with all requirements set out in the proposed regulation is crucial for the future of the Pakistani textile industry, as non-compliance may result in the creation of a non-tariff trade barrier with the EU. The proposed regulation surpasses the rigor of all existing regulations and voluntary standards globally, encompassing all – process, product, and information requirements. To comply with the proposed regulations and convert potential non-compliance challenges into a competitive edge, the Pakistani textile and apparel industry needs to address these gaps effectively, and urgently.

6. Recommendations

Based on the preceding analysis, this section provides various recommendations for Pakistan to consider preparing the Pakistani textile industry on how to comply with the proposed regulations. Specifically, it focuses on domestic measures, bilateral measures, and private sector initiatives.

6.1. Domestic Measures

6.1.1. Introduce sustainability and circularity-oriented policies into the 'Textile and Apparel Policy'

Based on the analysis performed, currently, there are no comprehensive policies that address sustainability and circularity in the textile and apparel industry of Pakistan. While Pakistan's 'Textiles and apparel policy for 2020-25' mentions skill upgradation, it is crucial to align these initiatives with circular economy principles for a more comprehensive and effective approach.

Specifically, Pakistan can consider embedding circular economy principles into its textile and apparel strategy, by focusing on areas in which they have a comparative and/or competitive advantage, such as yarn production and fibre production stages of the textile value chain.

A comprehensive industry-wide strategy with government support should create incentives for all players to transition, ensuring no one is left behind. Additionally, to address the structural challenges faced by the industry, there should focus on upgrading technology, enhancing workforce skills, and improving infrastructure to support a circular textile economy. Specifically, investments should be directed towards resource and energy-efficient technologies for textile and yarn production. In addition to this, infrastructure development should be prioritised facilitating access to finance for SMEs such as low-interest debt and other forms of investments that are suitable for small enterprises.

Some countries have started to link sustainability and circularity into sector-specific industrialization strategies. For instance, it is worth noting efforts in this area, where two Chinese textile hub cities have integrated circular economy development strategy into their textile and apparel industry. By aiming to transform by 2025, SwitchAsia initiative, funded by EU promotes sustainable management, resource efficiency, and the adoption of circular economy principles (SwitchAsia, 2021). Other countries that have made efforts to integrate circular economy principles into their core industries include Tajikistan and Finland (Sitra, 2019; UNECE, 2022). Pakistan could consider similar approaches to accelerate the transition towards a more sustainable and circular textile and apparel industry. Doing so appears to be in line with the direction the Pakistani government wants to move into (Government of Pakistan, 2020).

6.1.2. Extended Producer Responsibility for textiles

The adoption of the EPR has grown rapidly across the world, primarily at a national level, but also in many local, regional, and industry-level contexts. While EPR schemes have predominantly focused on materials such as plastics, packaging and batteries, the rising textile waste globally is now forcing governments to consider introducing these schemes for textiles.

Globally, much of all textile waste is not collected separately and ends up being incinerated or landfilled. The cost of solid waste management across Pakistan has been conventionally imposed onto the local, provincial, and national governments. Most of it is in the hands of the informal sector. Adopting an EPR scheme for textiles in Pakistan can mobilise private finance and reduce the burden on government budget earmarked for waste management. In particular, an EPR scheme could have the following implications:

- Increase private funding for capacity building and institutional development/support.

- Improved collection rates for segregated textiles
- Enhance economic feasibility of collecting large volumes of textile waste.
- Increased supply of feedstock for recycled fibres
- Enhanced economic value retention of materials earlier deemed as 'waste'.
- More resources available to finance research and development for innovation and better infrastructure
- Higher income and better working conditions for formal and informal waste workers.
- Reduced need for primary fibres, leading to lower environmental impacts from the 'fibre production' segment of the value chain.
- Incentivises producers to design better products through ecodesign measures to reduce compliance cost.
- Enhanced transparency and traceability across the textile value chain.

Today, most global EPR schemes for various materials focus heavily on downstream measures to avoid leakage and mismanagement of material waste. However, the Government of Pakistan can additionally introduce requirements that are rooted in ecodesign measures such as reusability, recyclability, recycled content, and eco-modulated fees. Imposing the responsibility of post-consumer textiles onto the producers can help scale the transition of textile industry to be more sustainable and circular. "EPR needs to go beyond the coverage of waste management costs in the current system. It is a powerful tool to provide the "necessary costs" for building the large-scale infrastructure, including research and innovation, that is required to collect and process all textile waste in scope, in accordance with the waste hierarchy" (Ellen MacArthur Foundation, 2022).

While policy instruments such as EPR will likely increase compliance and operational costs for the textile industry, it could also increase the flow of foreign revenue for scaling the textile waste management system from MNCs that have set up subsidiaries in Pakistan or are the owners of the design and/or textile products being made manufactured in Pakistan through job-work. Directly, or indirectly, a successful EPR scheme for textiles in Pakistan could incentivise producers to pivot towards more circular practices that have cross-cutting implications in meeting the product, process, and information requirements of ESPR. Pakistan's Ministry of Commerce or any other relevant ministry that governs the waste management, environmental concerns and/or trade should consider initiating the design of an EPR scheme, with a diligent focus on how eco-modulation requirements can be designed for direct equivalence with the ecodesign principles set out under ESPR. The EPR scheme must allocate liability to all economic actors that are responsible for design and production of textile articles at a federal level. This would result in added compliance costs for large MNCs that outsource the production of textile products in Pakistan and sell globally. While the manufacturers in Pakistan and MNCs such as Zara and H&M will only be liable to pay EPR fees on all product volumes sold within Pakistan, they will be incentivised to improve product design. Additionally, this also paves the way for mobilising private finance from large MNCs, often headquartered abroad, to take the financial and material responsibility for the waste that will be generated during and after production.

In addition to that, to be able to capture maximum financial investments from MNCs, the governing ministry could also explore the option of introducing an EPR scheme for post-industrial waste. This funding collected by PROs and/or the government must be mobilised for scaling resource-efficient

infrastructure for manufacturing of textiles, capacity building and better waste collection, sorting, and management infrastructure within Pakistan.

That said, it must be noted that introducing an EPR scheme will not automatically ensure that textile and apparel products manufactured in Pakistan will comply with the ESPR. Indeed, as noted earlier, the ESPR sets out stringent product performance, ecodesign and transparency requirements, whereas EPR ensures that the manufacturer is responsible for the waste that is being produced, thereby seeking to internalize the costs, and incentivizing a more resource-efficient production process. However, for the reasons mentioned, introducing a domestic EPR scheme in Pakistan that covers the textile and apparel sector would pave the way for more circular and sustainable textile production.

6.1.3. Inclusion of sustainability criteria in public procurements

The process by which public authorities purchase works, goods, or services from companies, known as government procurement or public procurement, can also help with the transition to a circular textile and apparel industry and to foster sustainability (Van der Ven, 2022). As governments are usually large consumers and buyers in an economy, the inclusion of sustainability criteria or discrimination in public procurements will encourage and promote circularity within the domestic industry that will prepare companies to comply with the ESPR in the long-term.

The ESPR also includes a provision on green public procurement (hereafter referred to as "GPP"), stating that this will incentivize the supply and demand for environmental sustainable products (Council of the European Union, 2023). There are a lot of developed countries that already adopted GPP criteria such as the United Kingdom, Netherlands, Sweden, Spain, Germany, Japan, and others. Furthermore, there also developing countries that had introduced it, like South Africa that is currently a leader in this regard, having a lot of policies implemented in favor of GPP. For example, the Nelson Mandela Bay Green Procurement Implementation Strategy with the main aim to incorporate environmental aspects into all the metropolitan's procurement activities, through the incorporation of sustainability criteria consideration in the procurements processes. In this policy, they also proposed the "Green certificate" that can be awarded to companies with certain certifications like ISO and others (Nelson Mandela Bay Municipality, 2011). While other countries like Paraguay, in their new law of Public Procurement of 2022, included a specific provision regarding the promotion of sustainable public procurement and circular economy, as well an inclusion of sustainability and environmental impact in the evaluation criteria (Paraguayan State, 2022).

The specific inclusion of the sustainability criteria in public procurement, even broadly, will allow and empower public entities in Pakistan to buy products that contribute to the transition to a more circular textile industry. This will increase the demand in the local market for sustainable product and will ultimately align and prepare them for the ESPR. The Pakistan government through public procurement can have a preference to buy sustainable products or easy-to-recycle products and to ask for broad information requirements in this regard. An example of this can be when the government buys uniforms, they can have a preference to buy uniforms made with only one material or to put minimum recycled content criteria. By doing so, they will indirectly promote circular and sustainable practices and therefore, foster compliance with the ESPR.

6.1.4. Mandatory data disclosure

Another policy that can be implemented by the government to foster traceability and transparency and therefore, increase the information to set up new policies, is a mandatory data disclosure requirement, in line with the information requirements set in the ESPR. An example is, whenever the Government has to grant an environmental license, or other necessary license to export, operate, permission, concession, subsidise or other interventions, they can take the opportunity to impose new information requirements to foster traceability and transparency, as well to prepare companies for the compliance with the ESPR. The inclusion of mandatory disclosure of data in the textile and apparel industry will have a double impact in Pakistan. First, it will help the companies, especially SMEs to get organized for compliance with the broad disclosure requirements set by ESPR. And secondly, will also help the government to gather information in a more efficient way, without deploying significant capital, resources, and efforts in collecting data.

In our stakeholder consultation[18], some exporters highlighted that the information required for obtaining an import/export license may vary depending on the product, but generally include tax details, banking history and details and other corporate documentation including SEC Registration, etc. Among the usual requirements, the government can also request some information requirements like the ones asked in the ESPR (Section 3.3) including information of the process and through all the value chain. Also, this can be done in multiple areas not only limited it to exporters, since there are usually already reporting to big brand and thus information requirements are not going to be so challenging for them to comply.

Mandatory disclosure can play an important role for SMEs, since it is the sector that will struggle more with the compliance of the ESPR. Another way to do so, as WWF-Pakistan already recommended in 2018, make mandatory for SMEs to have an environmental management system along with mandatory capacity building. This can be after linked and help to develop a standardized computerized system at provincial and national level for collecting, sustaining and utilizing data of compliance and enforcement of environmental laws and regulations in Pakistan (Sial & WWF Pakistan, 2018).

Another example of this, can be linked to access to finance, also called “Green loans” which can be given to SMEs as well as to all stakeholders that present a certain amount of detail information about their sustainability practices, including the information of the process. An example of this, is the Brazilian banks with a measure imposed by the Brazilian Federation of Banks (Febraban) are being asked to meet minimum information requirements to help combat illegal deforestation when offering credit lines to meat processors, aligned with the EU Regulation on deforestation-free products that is now in the transition period (Laier & Reuters, 2023).

Another important aspect to take into consideration is the challenge of informality in the industry. According to our expert consultation and also reflected in a Dutch study (Brink et al., 2021), there is a big informal sector usually compose of SMEs that are participating in the textile industry without any license or that are not enrolled and registered in the competent government agencies. While this

[18] Consultation with multiple exporters from Pakistan

can be seen as a challenge, it can also be an opportunity. A way to address this is to identify the informal areas where the textile and apparel industry is involved and convert these informal initiatives to formal ones through tax incentives or exemptions. By doing so the government will have accurate data on these initiatives and this will help with traceability and transparency. An example of this is if waste management or recycling is done only or mostly in an informal manner, through a tax incentive of deduction the Pakistan government can access the exact number in this regard. While this incentive can cost some money to the state, having no data is even more costly. Joint forces in these regards can be done, through institutional cooperation of the Ministry of Climate Change and the Ministry of Commerce.

6.2. Bilateral Measures - Leveraging EU-Pakistan relationships

Trade between Pakistan and the EU takes place under the GSP+ Regulation, under which a subset of Pakistani export products, including textile and apparel, receive duty-free market access benefits when accessing the EU market. However, this scheme does not address compliance with unilateral EU sustainability frameworks such as the ESPR. Since Pakistan and the EU do not have a reciprocal free trade agreement in place, Pakistan can seek to leverage initiatives and agreements outside the context of an FTA or RTA.

In this regard, various cooperation initiatives are already in place. For instance, the EU and Pakistan have signed a Cooperation Agreement that includes articles related to trade and commercial cooperation, development cooperation, environmental cooperation, economic operation, and others (European Community & Islamic Republic of Pakistan, 2004).

Furthermore, the EU and Pakistan have signed a 5-year engagement plan in 2012, which includes references to technology transfer especially related to industrial applications (EU-Pakistan, 2010). Pakistan can consider negotiating a cooperation agreement with the EU specific to the textile and apparel industry and the EU's upcoming EPSR, to mitigate the risk that the ESPR creates a significant market access barrier. This enhanced cooperation agreement should, inter alia, include provisions that cover technology transfer and capacity building, as further elaborated upon below. An example of such a cooperation agreement relevant to the circular economy – although not sector-specific – is the EU-India Joint Declaration on Resource Efficiency and Circular Economy and the EU-India Trade and Technology Council (TTC) that is now engaging in meetings and negotiations.

6.2.1. Technology transfer

The necessity of collaboration through technology transfer was already recognized in the Cooperation Agreement in 2004. The article of economic cooperation, states that: "2. The Parties agree to cooperate in the following broad fields: (a) developing a creative competitive economic environment in Pakistan by facilitating the use of know-how and technology from the Community, including, in the fields of design, packaging, standards, such as consumer and environmental standards, new materials and products" (European Community & Islamic Republic of Pakistan, 2004).

Since important innovations like the DPP are introduced in the ESPR, technology will be a key element to take into consideration. Indeed, the Commission in the proposed regulation stated that when setting

the transition period, they will take into account in particular “the complexity of the ecodesign requirements including the introduction of the product passport” and also highlighted that they should ensure that this does not have to become a barrier for trade (Council of the European Union, 2023). But technology is important not only for the implementation of the DPP but also for the upgradation in many other aspects to archive other requirements such as resource efficiency, enhancing durability, recycling, among others.

This is a major challenge that has been already highlighted before, as Pakistan suffers of a lack of updated technology (section 4.2.2.). Also in our stakeholder consultation, exporters highlighted that technology upgradation requires a huge investment that is usually difficult for smaller players to access. To achieve technology transfer outside the context of an FTA,

Pakistan can consider including specific provisions dedicated to the textile and apparel industry as well as the creation of a sub-committee to facilitate, monitor and implement cooperation agreements.

Moreover, the EU can make available funds specifically focused on market access of upgradation of technology for Pakistani SMEs. Other project may involve research and development to collaborate in the gap analysis for setting technology transfer in the most needed areas and helping to identify the key technology needed to close the gap and facility compliance with the ESPR.
In addition, the establishment and creation of a cooperation center or a technology transfer Centre like the “Centre on Technology Transfer (CC TT)” of the EU can be considered. The CC TT provides technology transfer policy-related expertise and services to the European Commission, member states, and other institutions of the Union. (“Competence Centre on Technology Transfer - europa.eu”) A similar center can be established to make technology transfer faster and more effective from the short to the long term between the EU and Pakistan.

6.2.2. Technical assistance

6.3. Private Sector

Technical assistance is another key element to take into consideration to reduce the gap. However, technical assistance cannot be isolated from other aspects like technology transfer (section 6.2.1) and access to finance. They are interconnected because to access the relevant infrastructure and technology to increase sustainable practices to comply with the ESPR, companies also need to have access to finance and the necessary skills to increase their capacity building. As mapped in the gap analysis, in Pakistan there is a lack of skilled labor (section 4.5.5) as well as a problem of lack of updated technology that was pointed out in the previous section.

With the ESPR requirements, companies will need to adapt their practices to comply with the product, process, and information requirements. This will require a huge investment in the upgradation and honing of the skills of their human resources. Moreover, the new technology that will allow companies to increase their ability to recycle or reduce the use of resources comes also with a need to upgrade their skills. Thus, without proper access to finance and subsequence skills upgradation, Pakistan companies will be at a disadvantage in front of other exporters.

Furthermore, SMEs will also ultimately be affected since they participate in the value chain, and therefore, enhancing their capacity building is key for them to survive the new requirements imposed by the ESPR. These SMEs are huge contributors to the national economy of Pakistan, but they are at a disadvantage in front of huge players because due to a lack of resources, they cannot afford to pay for training to hone the skills of their workers. The quality of the human capital is key to increasing productivity and competitiveness. In their SMEs policy, Pakistan already recognized the importance of acquiring and upgrading the skills of the SMEs to foster their development (Ministry of Industries and Production & Government of Pakistan, 2021).

This report identified several ways that technical assistance can be provided within the EU-Pakistan relationship:

1. Enhancing technical assistance by providing help with traceability. In this sense, an important element to take into consideration is that the technical assistance provisions should be designed to cover the specific needs and challenges of the country. However, for many developing countries, there is a lack of updated data regarding those specific needs, challenges, and opportunities. This means, that one aspect that can be taken into consideration in the technical assistance provisions is funding studies that can determine those challenges in the textile and apparel industry (Van der Ven, 2022). This report identified a lack of updated and accurate data and the prevalent informality sector in SMEs. The EU can provide technical assistance by supporting specific studies that can help Pakistan design policies or enhance the enforceability of existing ones.
2. Providing training for skills upgradation directly from the EU Commission such as comprehensive guidance for complying with the ESPR, sharing of best practices, how to enhance capacity building, and how to recollect and manage data in their business, among others. This training should not only be focused on Pakistan exporters, SMEs, and economic operators but it has been focused on government officials of Pakistan. Capacity building in the public sector is as important as in the private sector. To have effective laws and policies, compliance and enforcement are key. Developing countries due to other concerns, usually cannot afford to pay for training for their government officials. This is a problem because to have a good level of compliance, strong institutions, and prepared officials are needed. The WFF already highlighted “One of the main reasons of ineffective compliance of existing environmental legislation is that Pakistan did not make appropriate investments in developing the capacity of professional cadres of Environmental Managers, Lawyers, Specialists, and Experts to administer and implement these laws and policies. The EPAs were ignored in budgetary allocations for training and no Environmental Laboratories with advanced equipment to monitor and evaluate data were set up” (Sial & WWF Pakistan, 2018). Big changes can be achieved with prepared human capital, both from the private and public sectors.
3. Share successful cases: within technical assistance, a way to foster compliance with the ESPR and other environmental policies is by helping successful cases from SMEs from Pakistan and other developing countries. The EU and Pakistan can join forces to identify successful cases that already exist, from SMEs that become bigger exporters to the EU. This will motivate SMEs by showing that is possible for businesses to grow while supporting sustainability.

From how to organize the data through the value chain to comply with the information requirements to how to demonstrate compliance, technical assistance is key for Pakistan's companies to support the transition. To do so, technical assistance is a useful tool to import best practices from the EU and in that way archive circularity in the textile and apparel industry. However, the most important consideration in this regard is to enhance the dialogue and cooperation between the countries so that the EU can be aware of Pakistan's specific gaps and needs. In that sense, the EU can provide tailored technical assistance and take them into consideration, especially during the preparation of the delegated acts.

6.3.1. Voluntary sustainability standards

Building upon the leverage points highlighted above, to strengthen the collaboration between the textile industry and voluntary initiatives, certification bodies and private labels, the authors of this report identify industry associations as a key enabler for collaboration. Specifically, through encouraging the adoption of voluntary sustainability standards, they can help directly comply with the proposed EU regulations, they can help the industry gradually prepare to improve its processes across the value chain.

The four mains international VSS systems operate in the cotton sector in the South Asian region with varying levels of uptake: Organic, Fairtrade, Better Cotton, and the REEL Cotton Code. These VSSs include criteria related to pest management, water conservation, and prices and incomes, and, as such, could lead to improvements on these three issues of concern (International Institute for Sustainable Development, 2023). In this regard, discussions between the Pakistani government and the EU should focus on how compliance with a selection of existing sustainability standards could create a presumption of compliance with the ESPR.

7. Conclusion

The European Union's pursuit of a circular economy through the ambitious formulation and implementation of policies, such as the proposed regulation of ESPR, represents a significant step towards a more sustainable future. However, it is critical to ensure that the ESPR does not present a non-tariff barrier for trade with developing countries that are highly dependent on the EU market for textile and apparel exports, such as Pakistan. Indeed, as set out in this report, Pakistan will face considerable challenges in meeting the requirements of these policies due to its complex and lengthy value chain.

This report serves as a preliminary evaluation of Pakistan's textile and apparel industry's potential trajectory in the wake of the ESPR. Certain limitations had to be navigated, including the lack of actual information collected from the ground (stakeholder consultations) and the ambiguity surrounding the specific provisions and requirements of the ESPR, as the delegated acts on textiles has yet to be released by the European Commission.

Notwithstanding these limitations, this report identified six main challenges for Pakistani textile and apparel business to meet future ESPR requirements: inconsistency in policy enforcement, limited financial resources for SMEs, lack of product and information-based initiatives, limited involvement

of Pakistani manufacturers in product design, a mix of formal and informal actors in the system, and outdated technology and infrastructure.

To address these gaps, recommendations have been provided, divided into three sections: domestic, bilateral, and private sector. Domestic recommendations include the implementation of an Extended Producer Responsibility (EPR) for textiles, the introduction of sustainability criteria in public procurements (Green Public Procurement), and a mandatory disclosure of data as a requirement for government licensing. Bilateral recommendations emphasize the importance of leveraging the EU-Pakistan relationship, fostering key areas such as updated technology and technical assistance through trade agreements or other means of cooperation. Private sector recommendations highlight the potential of voluntary sustainability standards (VSS) in helping companies prepare and adapt to the new regulatory framework.

Achieving a transition to a circular economy will be a gradual process that necessitates sustained efforts from governments, private enterprises, and the EU. Consequently, fostering collaboration, providing necessary support, and devising targeted strategies for different stakeholders in the industry is concluded to be essential. As the EU continues to pursue policy initiatives to advance objectives under the Green Deal, it is critical that developing country considerations, like the ones set out in this paper, are properly addressed, to ensure that a circular transition does not come at the expense of development. The primary focus should be on an inclusive transition and careful consideration of any associated impacts should be addressed, for the sake of both sustainability and development.

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Stakeholder Consultations

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Henrique Pacini	Economic Affairs Officer, Sustainable Manufacturing and Environmental Pollution	UNCTAD
Sohail Ali Naqvi	Director	WWF Pakistan
Noreen Akhtar	Research Associate, Sustainable Development	All Pakistan Textile Mills Association (APTMA)
Alexander Kasterine	Head, Trade and Environment	International Trade Centre (ITC)
Hiba Batool	Associate, Sustainable Development Office	International Trade Centre (ITC)
Olivia Chassot	Associate Economic Affairs Officer, Economic Cooperation and Trade Division	United Nations Economic Commission for Europe (UNECE)
Farhan Latif	Director	Chenab Textiles, Pakistan
Sheri Ali	Senior Manager – HR and Compliance	Crescent Textiles, Pakistan
Khalid Mahmood	Executive Director	Mastertex, Pakistan
Mauricio Solalinde	Project Manager, Coordinator of the project for promotion of Circular Economy	Paraguay of IDB Lab Moises Bertoni Foundation

Table 9: List of persons interviewed

Annexure

Systems Thinking Approach

This section will offer a complementary approach to highlighting all the gaps already identified and elaborated in the Gap Analysis (Section 5.1) above. While this section uses an alternative, systems thinking approach, it only aims to complement and reinforce the gap analysis, and additionally, help visualise the interplay between the large number of actors in the system where the Pakistani textile industry is hypothetically compliant with the proposed regulation. It further breaks down all gaps by identifying the most relevant leverage points or 'levers of change', that if triggered effectively, can spur major systemic transformations within the industry to prepare for compliance with the proposed regulations. The systems map below is a visualisation of all the actors in the Pakistani textile industry in relation to its textile trade with the EU. It highlights some of the most direct and critical interplays between the textile industry of Pakistan, in a hypothetical situation where the industry is in a position to comply with the proposed regulations. In the process, it highlights some key leverage points in red, that when tapped, can potentially help the industry in preparing for compliance.

Systems Map

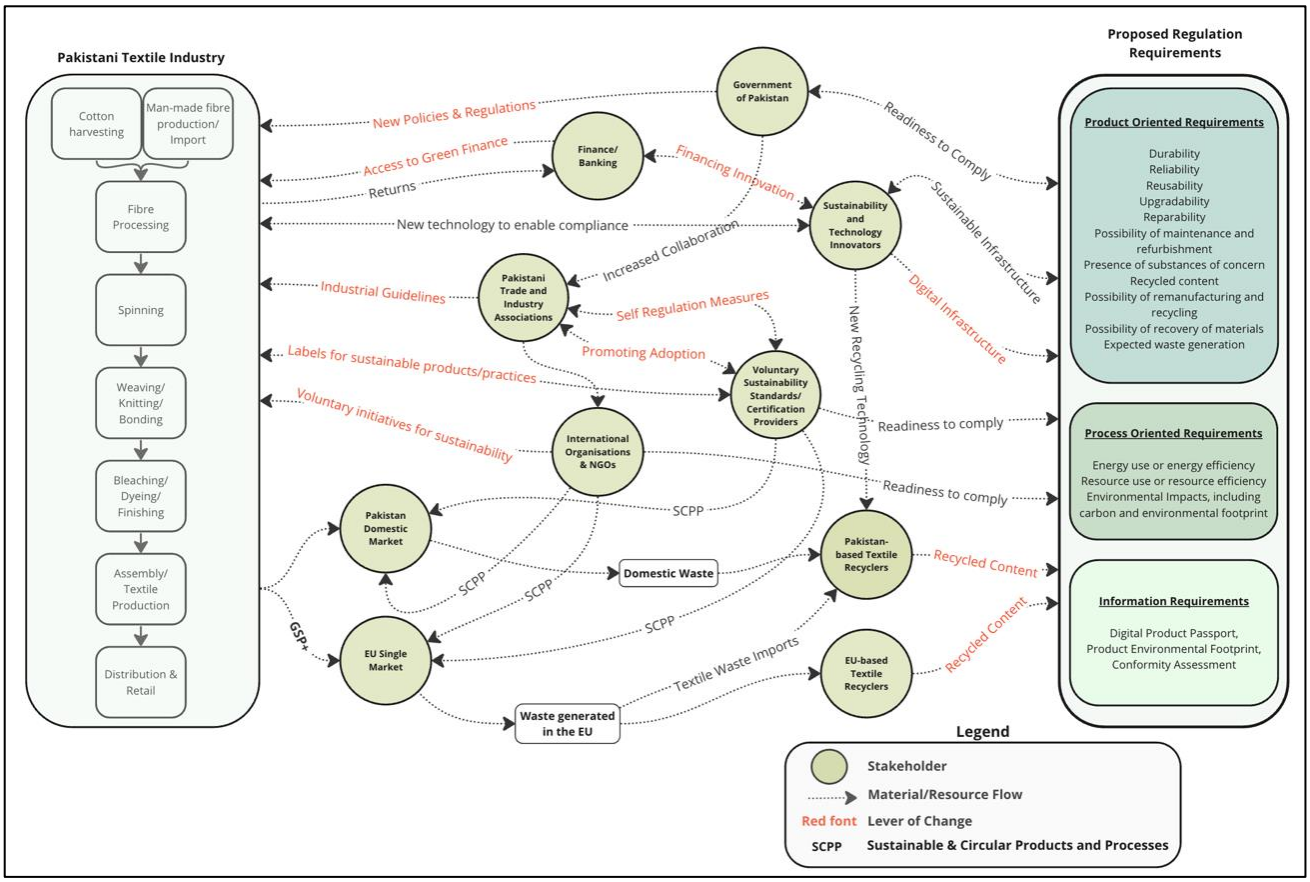

Figure 12: System map of trade flows from Pakistan's textile industry to the EU under the proposed regulations, Source: Authors' Analysis (Author's Illustration)

Key Leverage Points

The key leverage points identified using the systems thinking approach and the gap analysis are:

a) New Policies and Regulations
b) Access to Green Finance
c) Financing Innovation
d) Digital Infrastructure
e) Industrial Guidelines
f) Self-regulation measures
g) Promoting adoption of VSS
h) Voluntary initiatives for Sustainability
i) Recycled textile feedstock

Applying the Six Conditions of Systems Change Framework

Building upon the work on systems thinking and deriving information from the systems map developed by the authors, The 'Six Conditions of Systems Change framework, also known "inverted triangle" framework, has been used as the basis for background analysis of the systems map. The report 'The Water of Systems Change' elaborates on how shifts in the conditions of a system are more likely to be sustained when working at all three levels (Kania et al., 2018).

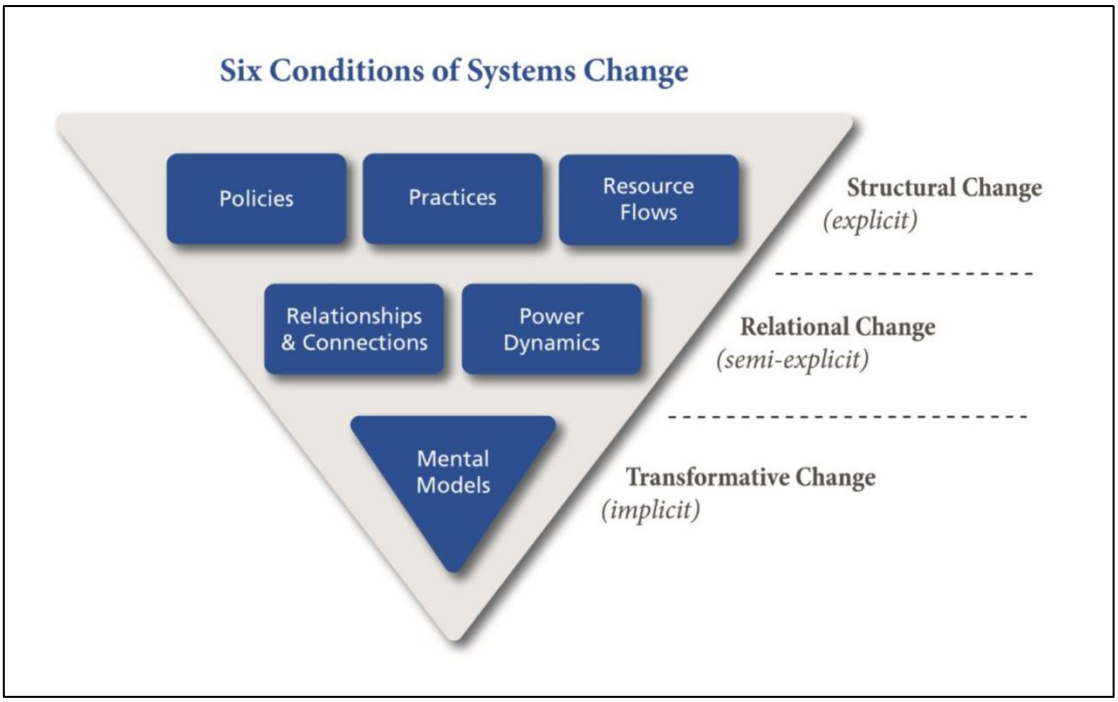

Figure 13: Framework for Six Conditions of Systems Change or 'The Inverted Triangle', Source: The Water of Systems Change, FSG, June 2018

To use this framework effectively for this report, the Pakistani textile industry is the main system, and an assessment of how the said system can transition to being more sustainable and circular to comply with the proposed EU regulations will be made.

Policies

To foster sustainable growth and development in the Pakistani textile industry, the Ministry of Commerce issues dedicated 5-year-long strategies that comprise policy measures such as reducing costs of doing business, unlocking innovation and technology, supporting profitability and access to international markets, and facilitating investments in infrastructure to support the SMEs. The regulatory focus of the Government of Pakistan for textiles and apparel still seems to be focusing more on the linear growth of the industry, rather than introducing measures to reduce its environmental impacts. There seems to be a lack of regulatory movement to mandate sustainability and circularity principles from the government in the first place and does not require much from the businesses operating in the industry.

In addition to the absence of dedicated regulatory frameworks to govern and mitigate the environmental impacts of Pakistan's textile industry, research and stakeholder consultations also suggest that proper compliance and enforcement of regulations has been challenging across the country, especially for environmental concerns.

This report identifies the introduction of new policies and regulatory measures as one of the most important and urgent leverage points, also highlighted in the system map above. While industry movement is much faster and nimble in creating transformations – policy interventions from the government to incentivise circularity, or disincentivise lack of sustainability-oriented measures by the industry can fuel immediate movement and action.

Practices

The report highlighted a handful of sustainability and circularity measures that are being undertaken, most at a voluntary level. While this list of initiatives/programs may not be completely exhaustive, it covers a majority of the relevant programs with considerable presence. Also highlighted in the systems map in section 5.2 above, there are primarily two kinds of stakeholders that run voluntary programs for capacity building, and technical financial assistance, as well as voluntary sustainability standard certifications. The research underlines that the presence of sustainability and circularity initiatives across the Pakistani textile industry is rather patchy and unevenly distributed. Moreover, a large proportion of these private and voluntary initiatives to foster sustainability in their processes is undertaken only by medium-sized and large enterprises. The voluntary action is also sparsely spread across various parts of the textiles value chain and does not cover the full lifecycle of textiles and apparel.

Resource Flows

For an industry, as complex and interconnected as the textile industry, to function smoothly – the uninterrupted flow of resources is imperative. The report identifies three key levers of change with respect to the flow of resources:

a. **Information**

The flow of information is required at all levels of interactions between all stakeholders highlighted in the systems map. To prepare for sustainable and circular practices in compliance with the proposed EU regulations, relevant and sufficient information flows can aid transformations in the industry. A few of the information flows that have been identified as crucial leverage points for the successful circular transition of the textile industry are:

- Sustainability & circularity expertise from NGOs and private voluntary sustainability standard developers and certification bodies to the industry will help improve upon the sustainability and circularity of products and processes and help prepare ahead of the anticipated adoption of the proposed regulations.
- Capacity expansion for sustainability and circularity-oriented practices across the textile production process to reduce impacts of the process and finished products.
- Value chain transparency and traceability will be mandated to a certain degree under the proposed EU regulations, as part of the Digital Product Passport. The industry can prepare for the proposed regulations by establishing sufficient digital infrastructure to enable disclosures where needed.

b. Technology

The importance of technology, especially concerning sustainability and a circular economy is paramount as it enables the flow of information, stimulates efficiency, helps reduce costs and supports mitigating the negative impacts on climate and the environment. The systems map above identifies stakeholders such as innovators in the technology and sustainability domains, and banks and other financial institutions as essential actors that can spur technological developments to speed up the transition of the Pakistani textile industry.

c. Financial Capital

Unlocking innovation, technology, infrastructural development, and rapid systemic transformations at scale require financing mechanisms that are suitable for the industry and cater to the needs of investees. Financial capital flows are necessary for most capitalising on all the leverage points mentioned so far, and for the ones mentioned ahead. Dedicated financial flows to scale up sustainability and circularity practices can accelerate the transition.

Relationships and Connections

To effectively support the transition towards more sustainable and circular practices, and to meet all product, process and information requirements set by the proposed regulations, it's necessary that all major actors, not just from the industry, but also from other industries where relevant, come together to formulate strategies and action plans. One such initiative to convene multistakeholder dialogues is led by GIZ under their umbrella project 'Promoting Sustainability in the Textile and Garment Industry (FABRIC)'. The initiative recently convened multiple stakeholders from the Government of Pakistan (Ministry of Commerce and Ministry of Climate Change), labour welfare associations, as well as participants from the textile industry, trade associations and academia. However, these efforts need to scale up and include larger participation from SMEs as well as relevant actors from other industries such as technology innovators, investors and sustainability experts for more meaningful engagement and collaboration to unlock the transition.

The report, through the systems-thinking approach also identifies a few existing relationships that can be bolstered either through collaboration on new initiatives/projects or by deepening the effectiveness of existing collaborations through capacity building and reinforcements.

A few of these key leverage points are mentioned below and expanded upon further in the 'Recommendations' (Section 6).

a. Increased engagement between the government and industry associations to improve policies.
b. Industry associations can engage more deeply with voluntary sustainability standards and certification bodies to gradually promote the use of such mechanisms that ultimately help improve processes within the industry,
c. The industry can leverage the expertise in sustainability and circular transitions that International Organisations (IOs) and other non-profit organisations have to offer, to ensure preparedness with the proposed regulations.
d. While innovation for sustainability and circularity across the value chain through technological interventions is on the rise, there seems to be a gap in scaling these innovations with appropriate, dedicated, and continuous capital support.
e. Sufficient financing is not available for SMEs in the Pakistani textile industry to fund the resources needed for more sustainable products and processes.

Power Dynamics

Like in most other countries, the Government of Pakistan possesses the maximum power to regulate and influence the dynamics of the textile industry. The Ministry of Commerce is one of the most integral stakeholders in altering the trajectories of the Pakistani textile industry and can leverage legal and/or non-legal instruments to facilitate changes. Oftentimes, the biggest players in the industry have the leverage to influence the strategies that the ministry undertakes. However, this leaves a void in the support offered to the SMEs due to the lack of participation in the development of the Textile and Apparel Policy and other engagements between the public and private sectors.
As mentioned earlier, one of the key levers of change for fuelling the transition to a more sustainable and circular textiles industry is to strengthen policies that aim to achieve the same. To achieve all-inclusive policies that prioritise the support for compliance of SMEs with the proposed regulations, participation of SMEs in multistakeholder dialogues as well as direct engagement with the government will be necessary. These active engagements between SMEs and the government, supported by the expertise of NGOs and IOs can harness the nimbleness and innovative nature of these small entrepreneurs, and drive innovation even further. Hence, active measures need to be undertaken to empower SMEs through engagement with the government as well as other actors of the system.

Mental Models

One of the most prominent and deep-rooted perspectives about sustainability is that it is expensive. The conventional objective of achieving 'economies of scale' to perpetually reduce costs and increase profitability is based on the premise that producing more quantities of a product will make the system more cost-efficient. This fundamental approach, while suitable for economic development may not be the most sustainable. While achieving economies of scale may cause some positive environmental

impacts through resource efficiency, the larger outcome of increased production has many negative environmental impacts.

Another mental model, also mentioned above in the report is directly linked with economies of scale is the issue of rising consumerism and ‘fast fashion’. While fast fashion was not always the norm, producers increasingly offering cheaper, and less durable apparel, with rapidly changing trends is creating more pressure on natural resources. Additionally, the escalating shift from natural fibres to man-made and fossil-based fibres is rooted on the premise that the textiles from these materials are cheaper and more volatile with multiple applications. Natural fibres such as cotton, jute and silk, while having major impacts on the environment such as water and energy in its production stage, are still recyclable and more circular if they are successfully reused, refurbished and/or recycled.

Lastly, the most dominant mental model resisting the move towards environmental sustainability is the thought that in developing countries such as Pakistan, economic development and poverty alleviation should take precedence over tackling sustainability issues. Governments, private-sector actors, and other relevant stakeholders may understandably prioritise linear economic growth, as it may solve the more pressing issues that their economy is facing.

To tackle these deep-rooted mentalities about sustainability and achieving a steady economic growth for prosperity, it needs systemic changes. The mental models within any system are undeniably the most rigid and difficult to tackle. It may require a combination of multiple interventions such as raising awareness, peer pressure, successful models, among many others to stimulate change, and can only be achieved in the long term. With that said, it is important to take these mental models into consideration when designing interventions to solve the problem. While it may be incredibly difficult to shift mental models, it also promises to be one of the most rewarding conditions for systems change over the long run.