



**Innovative Business Practices and Economic Models
in the Textile Value Chain (InTex)**

**Assessment of eco-innovation potential
in the textile sector in Tunisia**

August 2022

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1. Introduction

The market assessment study falls within the framework of InTex activities project relating to output 2: Implementation of circularity and eco-innovation in SMEs and work package II.1: Technical assistance to textile SMEs (deliverable D II.1.b). Eco-innovation is a methodology developed by UNEP that supports small- and medium-sized enterprises (SMEs) in the development and application of a business model, shaped by a new business strategy that incorporates sustainability throughout all business operations based on life cycle thinking and in cooperation with partners across the value chain. It entails a coordinated set of modifications or novel solutions to products (goods / services), processes, market approach and organizational structure which leads to a company's enhanced performance and competitiveness.¹

To define the textile markets with the highest potential for applying eco-innovation in Tunisia, CITET undertakes this study, following the steps and templates outlined in UNEP's eco-innovation manual (following PR phase and templates of UNEP eco-innovation manual and including an analysis of market and trends).

This activity goes beyond desk research and includes surveys or interviews to identify the nature and different trends of the textile market in Tunisia, international trends that are

¹<http://unep.ecoinnovation.org/>

already shaping the textile market in the country or might do so in the future, an analysis of the importance of sustainability in the textile sector (at present and projection into the future), growth perspectives, the characteristics of SMEs (which markets, which parts of the value chain, strengths and weaknesses and how these translate into opportunities or challenges for applying eco-innovation) and the competition amongst companies.

On the basis of this report conclusions, CITET and its local partners (Technical Center for Textile - CETTEX, competitiveness pole (MFC pole) and Tunisian Textile and Clothing Federation : FTTH) will be guided to identify target markets for the project on which CITET and its local partners can lean on to select 10 textile SMEs and provide them technical assistance to formulate a retrofitted business strategy, supported by top management, as a foundation for cascading into new business models and developing a roadmap for implementation.

Following consultation and sharing workshops with the local partners and based on the UNEP manual of eco-innovation and the supplement for textile sector, and taking into account the characteristics of textile sector in Tunisia, we have developed the current study.

The textile sector in Tunisia is the second largest manufacturing sector in terms of export and it is the first sector in terms of employment. The majority of textile enterprises are exporters and European Union is the main market. So existing and planned EU sustainability requirements directly influence Tunisian enterprises.

Thus, for the development of this market study we have adopted the following approach:

- Screening of the main European requirements on sustainability for textile products (eg: European strategy for Sustainable and Circular Textiles, eco-design, product environmental foot print...) are considered because the majority of Tunisian enterprises are totally exporters² to European Union
- we have completed the market study with information on the challenges, opportunities and threats faced by the textile sector in Tunisia based on feedback from the projects carried out with SMEs of the sector.

² Enterprises totally exporters are enterprises whose production is entirely intended for export

2. Overview of textile sector in Tunisia

The textile and clothing industry sector is considered strategic for the Tunisian economy. It is an important sector of the manufacturing industry in terms of exports (second industrial sector which represent 18.3% of the total of industrial export in 2021), employment (first industrial sector with 29.3% of the total of employment in 2021):

In fact, the sector has 1,456 companies employing 10 or more people and employs more than 150,000 people.

Among the 1,456 units in the sector, 80% of them produce entirely for export, which represent about 55% of all exporting companies established in Tunisia. 559 companies are in partnership, of which 383 units are 100% foreign-owned.

Exports in the sector increased from 6,765.1 of million Tunisian dinars in 2020 to 7,625.7 million dinars in 2021 (about 2,7 milliards dollars).³

About 90% of Tunisian textile companies are employing less than 200 people and are considered as small and medium enterprises (SMEs).

The sector is subdivided into 6 branches of activity, distributed as follows:

- The spinning industry;
- The weaving industry;
- The finishing industry;
- The hosiery industry;
- The clothing industry;
- The various industries of the sector.

The production of clothing represents 84% of the sector production.

Exports:

In 2017, warp and weft garments (trousers, jackets, skirt, work clothes, baby clothes,...) accounted for 62% of sector exports, 24% wereknitted garments (t-shirt, pull, underwear,...) and 14% wereother products (house linens, second-hand clothing, specialty fabrics, threads and yarns, accessories, etc.)⁴.

European market is the main export destination with 84% of the sector's export. The main customers are:France with 36%, Italy with 25%, Germany with 12%, followed by Belgium with 7% and Spain with 4%.

³Agency for the Promotion of Industry and Innovation - January 2022:<http://www.tunisieindustrie.nat.tn/>

⁴Agency for the Promotion of Industry and Innovation, 2018, "Textile sector monograph"

Imports:

In 2017, the main imported products by Tunisia are Cotton (31% of the total of import), Clothing (15%) followed by Synthetic Fibers (12%), knitted fabrics and other fabrics (9%) and finally second-hand items (5%).

The following graph shows the main suppliers of the textile sector in Tunisia in 2017⁵

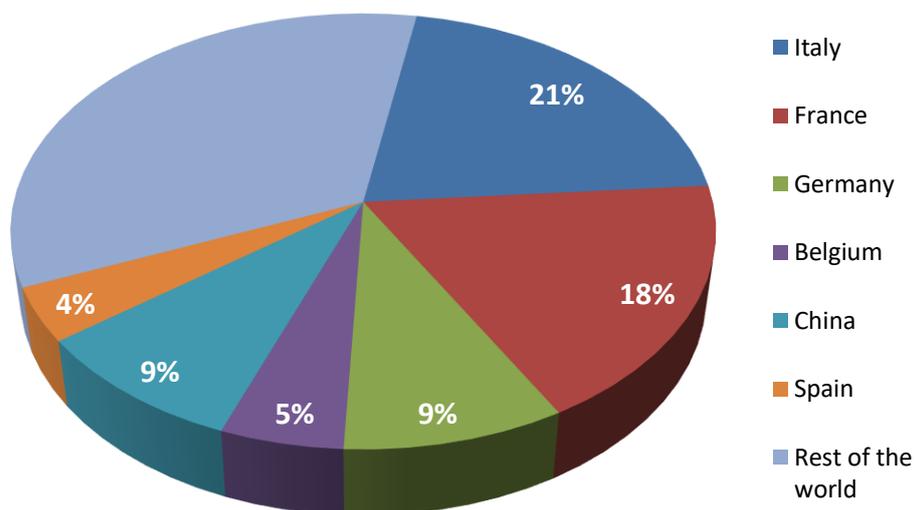


Figure 1: Main suppliers of Tunisian textile sector in 2017

For Cotton, the following graph shows the main suppliers of the textile sector in Tunisia in 2019⁶:

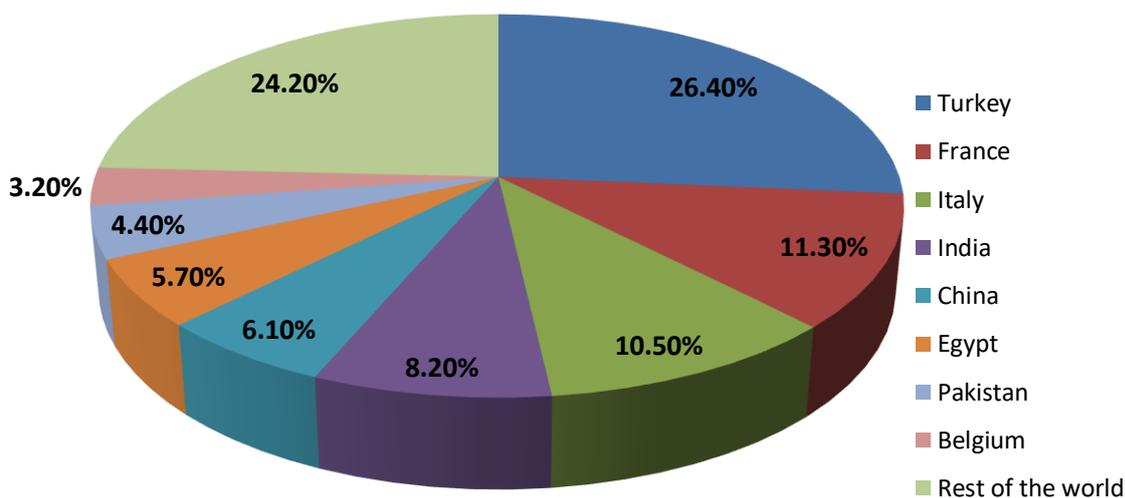


Figure 2: Main suppliers of cotton for Tunisian textile sector in 2019

⁵Agency for the Promotion of Industry and Innovation, 2018, "Textile sector monograph"

⁶National Institute for statistics, 2019, www.ins.nat.tn

Textile industry evolution in Tunisia:

The important development of the textile and clothing industry sector in Tunisia was justified during the 1970s by the extent of the strategic and structural choices made by economic decision-makers who aimed at encouraging exports and attracting foreign investment through fiscal and financial incentives and who took advantage of several factors:

- The abundance of labour;
- The low cost of labour;
- Geographical proximity to European market;
- The opening of the European market to exports (Treaty of Association of 1976);
- The establishment of the offshore regime in 1972 (which was later revised by Law 93-120): Tunisian offshore companies benefit from several advantages, namely the total reduction of corporate taxes over 10 years, the reduction of 50% of this tax from the 11th year. The non-salaried manager will also be exempt from social charges, tax on income from real estate securities as well as the possibility of repatriation of interest and dividends. Transactions from abroad do not impose limits and the transfer does not go through the central bank of Tunisia. By purchasing local goods and merchandise, these exporting companies also benefit from VAT (value added tax) exemption.

These factors, among others, have enabled manufacturers in this sector to adapt to the requirements of foreign partners and contractors and to rank fifth among clothing suppliers to the European Union in 2005. Tunisia is ranked ninth supplier of clothing to the EU with a market share of 2.53% in 2021.⁷

The vast majority of companies in the sector operate as subcontractors in the clothing sector for European customers (off-shore).

However, activities covering design, prototyping, supply, distribution and marketing are not very developed and few companies are experienced in these activities. This weakness at the level of certain activities negatively affects the competitiveness of the sector by not being able to offer a vertically integrated value chain which facilitates the transition to co-contracting and to the finished product with high added value in order to be able to withstand competition and changes in the global market.

⁷EU market analysis, April 2022, CETTEX

The total dismantling of the Multifiber arrangement (MFA)⁸ and the liberalization of trade in textiles and clothing in 2008 announced the intensification of competition in the world market. This liberalization caused the migration of the main investors and clients in towards other countries more competitive in terms of costs, and the proliferation of franchises and foreign brands, which disadvantaged the national product and encouraged imports.

The problems of this sector has increased after the 2011 revolution under the effect of the migration of foreign contractors, in addition to the problems relating to parallel markets and the informal economy.⁹

After these circumstances, companies in the sector gradually resumed normal activity and the sector recorded a recovery from 2014. Several policies and programs were established in order to support textile companies and enhance their competitiveness.

The covid 19 pandemic had a negative impact on the sector in 2020, but the sector registered a recovery in activity market by growth of exports with 12%in 2021.

⁸ MFA: The term Multi-fiber Arrangement (MFA) referred to an international [trade](#) agreement involving clothing and textiles. The MFA was established in 1974 and imposed [quotas](#) on the amount of clothing and textile that developing countries could export to developed nations.

⁹Agency for the Promotion of Industry and Innovation, 2017, Report "The textile and clothing industries remain a key sector of the Tunisian economy"

3. Evaluation of potential markets

3.1 Sector-level analysis

Sector name: Textile

A1 - To what extent does the sector contribute to global greenhouse gas emissions and climate change?

Major contributor, 2 points

Moderate contributor, 1 point

Contribution is negligible, 0 points

The climate impact of the global apparel industry is substantial, with over 3.3 billion metric tons of greenhouse gases (GHG) emitted across the value chain per year roughly exceeding the direct emissions of all international flights and maritime shipping combined¹⁰. The amount of GHG emitted by the sector represents between 2 to 8% of the world's emissions.

Score: 2 points for being a major contributor to global greenhouse gas emissions

A2 - To what extent does the sector contribute to global consumption of non-renewable resources and potable water?

Major contributor, 2 points

Moderate contributor, 1 point

Contribution is negligible, 0 points

Most synthetic fibres are produced from crude oil, a non-renewable resource. The production of plastic-based fibres for textiles uses around 350 million barrels of oil each year – which has more than doubled since 2000¹¹.

Production of synthetic fibres for the textile sector accounts for 15% of plastic production, which makes the sector the third largest user of plastic, behind packaging and construction.

The global apparel industry consumes approximately 215 trillion litres of water every year.⁶

Score: 2 points for being a major contributor (at international level)

¹⁰UNEP, 2021, Catalyzing Science-Based Policy Action on Sustainable Consumption And Production: The value-chain approach & its application to food, construction and textiles

¹¹ Changing Market Foundation, 2021, "Fossil Fashion - The hidden reliance of fast fashion on fossil fuels"

A3 - To what extent does the sector contribute to global pollution problems?

Major contributor, 2 points

Moderate contributor, 1 point

Contribution is negligible, 0 points

There are two potentially significant sources of pollution related to textiles: chemical release and microfiber release however, there is not a lot of research confirming this. Regarding chemical release, the textile industry is notorious for its negative impact on water systems¹².

Chemicals and solvents are used in the textile sector which include some harmful products (carcinogenic, endocrine disrupting, persistent and environmentally harmful) such as:

- Dyes (metals, including chromium, copper, zinc and lead; amines and arylamines released by azo dyes);
- Surfactants and detergents (nonylphenol ethoxylate);
- Antimicrobial agents (nanoparticles of silver, triclosan and triclocarban);
- Anti-wrinkle additives (formaldehyde);
- Printing (phthalates);
- Other halogenated flame retardants.

The textile sector is one of the main sources of chemicals that are discharged into nearby, often unfiltered, water bodies. Many bodies of water around the factories are heavily polluted, from where they can escape and further contaminate the rest of the ecosystem. In recent years, plastic microfibers from the washing of plastic-based textiles have been identified as a major contributor to microplastics in the ocean. In addition, clothing and textiles are the main source of primary microplastics in the oceans. Plastic microfibers also enter the oceans during the disposal stage of the textile supply chain.

Global cotton cultivation is estimated to require 4% and 16% of total global use of fertilizers and pesticides respectively¹³, which represent substantial quantities of chemicals released directly into the environment.

¹²UNEP, 2020, "Sustainability and circularity in the textile value chain, Global Stocktaking"

Regarding microfiber release, while the extent of global microplastic pollution and its exact sources are not yet known, we are finding more evidence of the impacts of microplastics (microfibers) derived from textiles.¹⁴

For Tunisia, cotton is the main imported raw material with a value of 1510 million dinars in 2017 (about 520 millions US dollars), which represents 31% of the total imported products of the sector.¹⁵

In Tunisia, more than half of the total textile waste is cutting waste. The non-knit cutting waste represents about 14,000 tons per year and knit cutting waste represent about 5,400 tons. About 25% of textile waste (31 thousand tons in 2019) is made up of pure fibres (pure cotton, pure synthetic,...) and nearly 40% of the total are cotton blends.¹⁶

Score: 2 points for being a major contributor.

A4 - How important is the sector for the national economy?

High importance, contributes over 15% of GDP or employs over 15% of workforce, 2 points

Medium importance, contributes over 5% of GDP or employs over 5% of workforce, 1 point

Low importance, contributes less than 5% of GDP and employs less than 5% of workforce, 0 points

The textile sector is considered a strategic sector for the Tunisian economy taking into account the following indicators :

1. The sector contributes to 30% of workforce in manufacturing industries in Tunisia (about 150000¹⁷ employees). 86% of the workforce are women, particularly in the clothing industry, and 80% of workers are young people (aged between 16 and 35). Less than 1% of the workforce are under the age of 16 (apprentices)¹⁸.
2. It is the second sector in term of export which represent 20% of the total of Tunisian exports in 2020 (over than 2 billion Euro);
3. The enterprises of the sector represent 29% of the total of industrial enterprises (about 1550 enterprises) and the sector represents 6% of GDP;
4. 83% of the textile enterprises are totally producing for export;

¹³UNEP, 2021, Catalysing Science-Based Policy Action on Sustainable Consumption And Production: The value-chain approach & its application to food, construction and textiles

¹⁴ January 2020, EcoTextile News

¹⁵ Agency for the Promotion of Industry and Innovation, 2018, "Textile sector monograph"

¹⁶ UNIDO/Switchmed/MEDTEST III, 2019, "Textile waste mapping in Morocco and Tunisia",

¹⁷ Agency for the Promotion of Industry and Innovation - January 2022: <http://www.tunisieindustrie.nat.tn/>

¹⁸ Tunisian forum for economic and social rights, 2014, "Violations of the economic and social rights of women workers in the textile sector"

5. Over 90% of the exports of the textile sector are destined to European markets.¹⁹

Score: 2 points for being a high important sector in Tunisia.

A5 - To what extent has this sector been targeted by Non-Governmental Organizations (NGOs) to encourage improvements in sustainability performance?

Major focus of sustained, global campaigns by NGOs, 2 points

Focus of occasional, local campaigns by NGOs, 1 point

No focus/attention from NGOs, 0 points

Among the textiles-relevant organisations in this category are international NGOs, including Clean Clothes Campaign (CCC), Greenpeace and People for the Ethical Treatment of Animals (PETA) that focus on worker's rights, environmental protection and animal rights respectively. While CCC works exclusively on the textile sector, Greenpeace and PETA work in multiple sectors. A relatively new organisation is Fashion Revolution, which campaigns for global brands to provide greater transparency into their supply chains.

There are several NGOs working more collaboratively with commercial stakeholders, such as the World Wildlife Fund (WWF). There are several more NGOs engaging both globally and locally with the textile sector.

In Tunisia, local campaigns of NGOs²⁰ to encourage improvements in sustainability performance are occasional but since the majority of companies in the sector are totally exporting to the European Union, they are increasingly under pressure from their clients to improve their sustainability performance.

Score: 2 points for major focus of sustained, global campaigns by international NGOs.

Total score for the sector: 10 points/10

Conclusion: The textile sector in Tunisia is very concerned by the approach of eco-innovation given the importance of the sector in the national economy in terms of employment and exports and the environmental challenges that the sector faces at global level (consumption of non-renewable resources and water, global pollution, greenhouse gas emissions,...)

¹⁹Agency for the Promotion of Industry and Innovation, 2018, "Textile sector monograph"

²⁰ National agency for Environmental Protection, 2022, "List and links of NGOs by region in Tunisia: http://www.anpe.nat.tn/Fr/societe-civile_11_147#"

3.2 Market-level analysis

More than 80% of textile enterprises produce entirely for export and European market is the main destination with 90%.

Apparel products represent more than 80% of the exports and the production value. Building on those both facts, we can maintain the choice of the apparel for European market for this market-level analysis. In Tunisia, Denim market is considered as an important textile segment knowing that Tunisia is the first exporter of jeans for Italy, the 4th exporter for France. In total, denim jeans sales to Europe reached 1322 million dinars in 2018.

Moreover Tunisia has 500 industrial companies specializing in the manufacture of jeans. 90% of production is exported to Europe and this activity employs 57,000 people.²¹

Description of the market: Apparel for European market (especially for denim products)

B1 - How strong is the growth of this market?

Strong (>5% per year), 2 points

Moderate (2-5% per year), 1 point

Weak (<2% per year), 0 points

COVID-19 pandemic has created major problems across many markets, including apparel, so assessing growth is uncertain. However, the years before the pandemic showed significant profit growth in the apparel industry according to McKinsey²². The growth of the second-hand market has also increased rapidly, and is expected to experience accelerated growth, as predicted in the 2020 Resale Report²³. This phenomena is observed for global market and affecting by the way the European market as well. This research defines second hand as both “traditional thrift and donations” - characterised by secondhand shops often run by charity organisations - and “resale”, predominantly e-commerce platforms for second hand merchandise.

The evolution of exports of Tunisian textile sector is reported in the following graph:²⁴

²¹"Tunisia the leading exporter of jeans to Italy", <https://www.realites.com.tn/>, May 25, 2019

²² McKinsey & Co, 2021, Global Fashion Index

²³ThredUp, 2020, Resale Report

²⁴Textile Technical Centre (CETTEX), december 2021, Monthly analysis of the Textile-Clothing situation

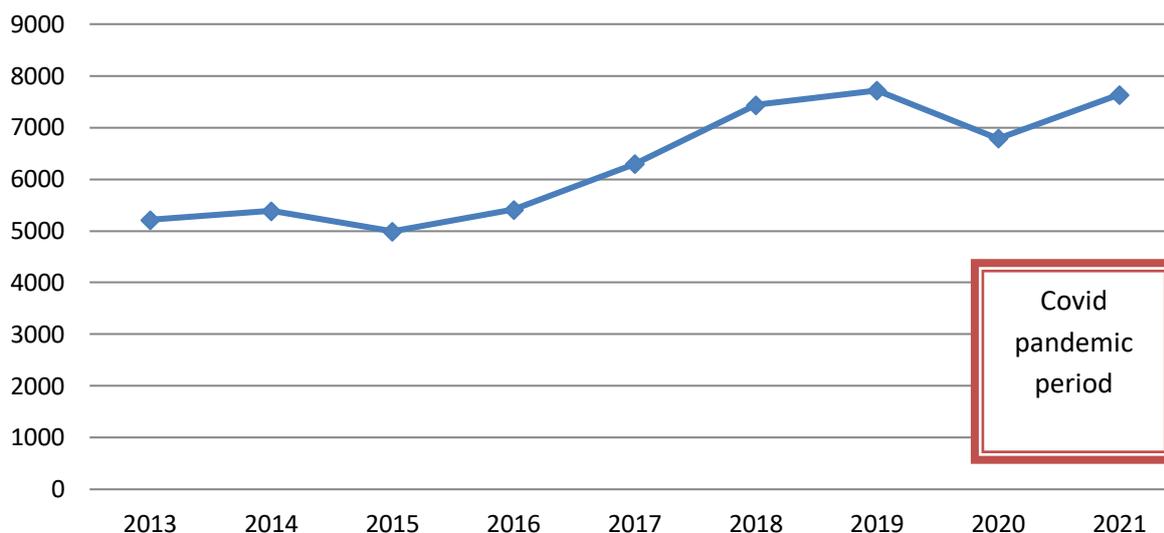


Figure 3: Evolution of Tunisian exports between 2013 and 2021 (millions dinars)

The previous graph shows a permanent evolution of the sector's exports between 2013 and 2019 before covid 19 pandemic (with the exception of 2015). For 2020, and because of covid 19 pandemic (reduction of the demand from European customers, shutdown production during several periods of confinement, disturbance of raw materials supply, etc.), the sector recorded a decrease of exports with 12% compared to 2019. For 2021, the sector recorded an export growth with 12.5% compared to 2020 which shows a rapid recovery to the almost normal business activity before the pandemic.

Score: 1 point for moderate growth (gradual recovery of textile sales after covid 19 pandemic)

B2 - How strong is the competition in this market?

Strong (6+ companies competing), 2 points

Moderate (2-5 companies competing), 1 point

Monopoly (1 company), 0 points

Globally, the B2C apparel market is crowded, with a large number of established brands and very low barriers to entry for new brands. Compared to companies operating in the secondhand market - including collection, sorting and resale services - competition is lower, however new actors and established retailers are increasingly entering this market²⁵.

²⁵Business of fashion, 2021

For Tunisia, the competition is high with companies of other countries (China, India, Bangladesh, Morocco, Egypt...) especially by textile producers (finishing, assembly). The total dismantling of the Multi-fiber arrangement (MFA)²⁶ and the liberalization of trade in textile and clothing in 2008 announced the intensification of competition on the world market.

Efforts have been made by the State to facilitate the access of Tunisian textiles to new markets (such as Russia, United States markets) through several initiatives:

- In an effort to enter the Russian market, for instance, the Export Promotion Centre organised a business-to-business trade show in Tunis in June 2018 that was attended by 25 Russian brands, primarily in the lingerie, swimwear, denim and ready-to-wear segments. As part of the project, training on the requirements of the Russian market is offered to Tunisian textile firms, while participants also benefit from a promotional campaign in Russia.²⁷

- Tunisian exports of Jeans to the American market, the world's second in terms of imports of this product, increased by +69.4% in number of pieces in 2021 compared to 2020, with 366 thousand pieces and an equivalent value of US\$9.33 million, an increase of +84.3% in 2021 compared to 2020, indicates the Textile Technical Center (CETTEX), in an analysis of the American Jeans market. The USA imported, in 2021, this textile product, mainly from Bangladesh, Mexico, Vietnam, China, Pakistan and Cambodia. These countries together cover 80% of USA market share in jeans.

The American market represents a definite opportunity for the textile-clothing sector in Tunisia, whose access today is hampered by import duties of 17%, notes CETTEX, in its analysis.

The center also believes that in the event of the signing of a preferential agreement, the Tunisian sector could drop out 3% of the total US jeans market share and generate positive export momentum and also job creation. According to this assumption, the value of exports will be around \$108 million. This will create nearly 15,000 direct jobs and 22,500 indirect.²⁸

Score: 2 points for strong competition (the competition in the market of apparel industry would be categorized as Strong).

B3 - To what extent is government policy encouraging and supporting moves towards improved sustainability performance?

Major support from policy, including financial measures, 2 points

²⁶ MFA: The term Multifiber Arrangement (MFA) referred to an international [trade](#) agreement involving clothing and textiles. The MFA was established in 1974 and imposed [quotas](#) on the amount of clothing and textile that developing countries could export to developed nations.

²⁷ http://www.cepex.nat.tn/actualites/B2B_Textiles_Russes

²⁸ <http://www.cettex.com.tn/storage/452/07-Revue-de-presse-du-21-au-25-f%C3%A9vrier-2022.pdf>

Moderate support from policy, but no financial measures, 1 point

No support from policy, 0 points

As a leading policy example, the EU's circular economy action plan (CEAP), adopted in March 2020, is one of the main building blocks of the European Green Deal and specifies textiles as a prioritised "key product value chain"²⁹ with the goal of increasing the uptake of sustainable textiles and easy access to re-use and repair. In this context, there will be regulatory requirements and measures for the European apparel companies and therefore their subcontractors including Tunisian companies, aiming to increase the product sustainability by reducing the losses of textile products and improving its lifespan and its circularity.

Tunisian textile companies always take care to respect the requirements and demands of their customers in terms of sustainable development (certifications, regulatory compliance, etc.). However, few Tunisian companies anticipate market needs and prepare in advance for the appearance of new requirements or restrictions in relation with sustainability which constitute an important issue for Tunisian companies: monitoring of future European market trends in term of sustainability.

Governments do actively support sustainability in the sector through providing funding to relevant initiatives, including through UN agencies and other international organisations. UNEP's InTex project, in the context of which this study is produced, for instance assists small and medium enterprises (SMEs) to adopt circular economy practices and sustainable business models. The OECD's Due Diligence guidance also provides recommendations on responsible supply chains in the garment sector³⁰.

In Tunisia, several policies and projects and initiatives are carried out or in progress in relation to sustainability in the textile sector such as :

- **Policies:**

- ✓ **National Strategy for Sustainable Development-NSSD**, by ministry of environment (2015-2020) aiming to the introduction of SCP patterns and SGD's in economic model with priority challenges to develop activities on products and services ecological qualities;
- ✓ **National Strategy of the Green Economy-NSGE**, by the ministry of environment (2015-2030): major implementation tool of the NSSD aiming to; create incomes and jobs through activities which reduce CO2 emissions; prevent the loss of biodiversity; reduce the ecological footprint; promote life cycle thinking, eco-designs; favour responsible production and consumption schemes. The strategy resulted in an action plan comprising 9 areas of intervention, one of which concerns the promotion of a clean industry with high added value through adoption of cleaner production approaches and energy efficiency. The

²⁹ European Commission, 2020, https://ec.europa.eu/environment/pdf/circular-economy/new_circular_economy_action_plan.pdf

³⁰ <https://www.oecd.org/industry/inv/mne/responsible-supply-chains-textile-garment-sector.htm>

implementation of this action plan has not yet been launched pending the creation of a structure or a steering committee to ensure its implementation.

- ✓ ***Sustainable Consumption and Production National Action Plan (SCP-NAP)*** developed under the coordination of the Ministry of Environment and Sustainable Development under the EU-funded SwitchMed programme, with advisory services and technical support from the (UNEP). The Plan is part of Tunisia's efforts to achieve Agenda 2030 and the Sustainable Development Goals (SDG12.1). The priority sectors are agri-food and tourism and the measures currently concern these two sectors but could be generalized for other sectors including textiles in a second place
- ✓ ***National action plan for Sustainable Public Procurement*** (2012 under UNEP coordination, updated on 2019 by the ministry of environment); Aims to set up an economic policy based on the sustainable consumption; Selection of target sectors (including textile); Reform of SPP regulations (Decree 1039 of March 13, 2014) by introducing rules of good governance and sustainable development objectives as criteria for SPP; Concrete deployment actions were led by CITET providing awareness and technical assistance to public buyers to integrate sustainability and circular economy criteria into the public procurement process.
- ✓ ***Roadmap for the establishment of innovation textile networks*** led by the Agency for Industry Promotion and Innovation (2019- under process) aiming to develop Textile cluster allowing R&D networking between public and private companies, universities and research institutions. Cluster is hosted within the MFCSOLE involved to implement action plans and build synergies with actors in R&D fields including circular economy.
- ✓ ***Stimulus plan for the textile and apparel sector (2019 -2023, by FTTH)*** based on strategic levers including offering quality product that meets international standard in the field of industrial zones management, Water & energy infrastructure. This plan allow specific incentives adapted to the expectations of the sector (including preferential pricing for energy, water and the environment, to establish program contracts with leading companies, to facilitate administrative procedures, to launch measures to rationalize imports (technical control, price trend, etc.), to establish fair competition between importers and manufacturers for the local market as well as to facilitate the marketing of 30% of the products of totally exporting companies on the local market.
- ✓ "As part of the 2019-20 economic recovery plan, a textile pact was signed in February 2019 between the government, the Tunisian Union of Industry, Trade and Handicrafts, and the FTTH. To boost the "Made in Tunisia" brand, in June 2019 the FTTH proposed a strategy called "Tunisia Sustainable Fashion". The project will accompany textile firms in establishing the necessary procedures to measure, evaluate, improve and communicate their environmental impact in order to develop a competitive advantage."³¹

³¹ <https://www.leconomistemaghrebin.com/2019/06/13/textile-habillement-tunisia-sustainable-fashion/>

- ✓ **Financing mechanisms:** There main financing mechanisms for energy saving and renewable energy and environmental protection projects are: the energy transition fund (FTE)³², the depollution fund (FODEP)³³ and the SUNREF program³⁴. In addition there are fiscal incentives for the importation of environmental protection and energy saving equipment: exemption from customs duties and taxes having equivalent effect for imported equipment having no similar manufactured locally and the total suspension of VAT, or its payment at a reduced rate, for equipment acquired locally.
- ✓ **The Global Textiles and Apparel Program (GTEX) and the Textiles Program for the Middle East and North Africa Region (MENATEX)** is implemented by the International Trade Center (ITC) over a period of 3 years (November 2018 to December 2021). It is co-financed by the Swiss Government within the framework of GTEX as well as by the Swedish Government within the framework of MENATEX. The GTEX-MENATEX program aims to increase export competitiveness in the textile and apparel (TH) industry. The retained impact of the program is to increase employment and income throughout the ITH value chain. To achieve this long-term objective, the program plans to achieve two major results. The first aims to improve the business environment and the performance of trade support institutions in the sector. The second objective is the enterprise level with in particular the improvement of the competitiveness of SMEs in the textile and clothing sector. Several events and training are organized for textile companies and young designers.³⁵
- **Projects :**
 - ✓ **Tunisian eco-label program** : It is established by CITET within the framework of «Life Third Countries Program» (2002-2008), aimed to set up a national program with its legal, institutional and technical bases and to raise awareness in order to encourage consumers to select environmental respectful products. In This context, it has been accomplished establishment of technical criteria of Tunisian ecolabel for textile product and the technical assistance of 5 companies of textile sector to implement the ecolabel (link for Tunisian ecolabel: <https://www.innorpi.tn/fr/eco-label/>);
 - ✓ **“Med Test”**, funded by the EU and implemented in cooperation with the UNIDO, is aimed to help companies to adopt the recycling and management of textile waste and thus create more circular value chains (link to the project: <https://switchmed.eu/fr/poles-nationaux/tunisie/>).
 - ✓ **Med Test III - Local recycling of 2nd quality jeans into new jeans in Tunisia** :It is a pilot project in collaboration with Swedish denim brand "Nudie Jeans" implemented in Tunisia under the lead of UNIDO. The collaborative pilot project with Nudie Jeans demonstrated that high-quality jeans can be manufactured:

³² <https://www.energiemines.gov.tn/fr/themes/energie/efficacite-energetique/fonds-de-transition-energetique-fte/>

³³ http://www.anpe.nat.tn/Fr/fodep_11_52

³⁴ <https://www.sunref.tn/?lang=ar>

³⁵ <https://www.facebook.com/gtextunisie/>

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- Using 100% organic cotton, 20% of which from recycled fibers from 2nd quality jeans;
 - implementing all the recycling processes locally in Tunisia;
 - saving on costs and CO₂ emissions compared to jeans made with virgin cotton or with recycled contenting global value chains.
- ✓ **STAND Up project (2020-2022)** : It is a regional project associating Tunisia, funded by the EU, focused on eco-innovative textile companies, providing training, technology transfer aiming to reduce environmental footprint (link of the project: <https://www.enicbmed.eu/fr/projets/stand-up>)

Score: 1 point for moderate support (lack of financial support).

B4 - Is this market affected by new or forthcoming legislation?

Major changes required to meet new or forthcoming legislative requirements, 2 points

Moderate changes required to meet new or forthcoming legislative requirements, 1 point

No new or forthcoming legislation, 0 points

One of many upcoming examples in the EU is the Waste Framework Directive³⁶, requiring that Member States set up separate collection for textiles by 1 January 2025. This may lead to EU member states adopting Extended Producer Responsibility (EPR) legislation, requiring companies selling textiles in the market to assume the responsibility for collecting and sorting discarded textile products, rather than being mixed with waste for incineration or landfill. This could lead Tunisian subcontractors companies to increase their efforts to adopt much more circular and sustainable practices through the whole textile value chain. As another example, the EU Environmental and Human Rights Due Diligence Law was adopted by the European Parliament in March 2021 and requires companies to conduct environmental and human rights due diligence along their full value chain or face fines, sanctions and/or civil liability. This legislation applies to all companies with global supply chains. Under the same requirements, Tunisian subcontractors companies are actually assessed by their European clients in this fields.

The French government announced an end to the destruction of unsold non-food stock, calling time on a practice that is common in the luxury retail sector. More than \$730 million of returns and unsold inventory are routinely thrown away or destroyed by consumer goods retailers in France, and the practice is widespread in the luxury sector in an effort to maintain label exclusivity. The current value of goods thrown away or destroyed is five times more than those given away. In a statement on 4 June 2019, the French Prime Minister Edouard Philippe outlined plans for a ban that would come into force by 2023, outlawing the

³⁶https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive_en

destruction of non-food goods including the clothing, accessories, and cosmetics that are mainstays of the luxury industry. Once in force, the plan would see manufacturers obliged to turn the stock over for re-use or recycling, although there will be “concessions” for luxury players, designed to help protect intellectual property.³⁷ France is the first market of Tunisian textile products, and Tunisian subcontractors companies should improve the durability of the product to be more reusable.

At national level, recovery plan for the textile and clothing sector for the period 2019 to 2023 has been put in place based on 6 strategic levers. The plan is also part of a sector-based public-private partnership pact. These both stakeholders are committed to respecting a certain number of requirements and measures at each level of leverage in order to enhance the competitiveness of the Tunisian companies and increase the export value.³⁸

Another roadmap is under implementation related to the Impact of COVID-19 in the sector and the imperative to promote a sustainable industrial policy by establishment of social dialogue and promoting corporate social responsibility.³⁹

Score: 1 point, using the examples provided changes to the market and new requirements for companies could be deemed as moderate.

B5 - How interested are the end customers of this market in improved sustainability performance?

Major interest – willing to switch products/suppliers or pay a price premium for better sustainability performance, 2 points

Moderate interest – information about sustainability performance is considered as part of the purchase decision, but not a deciding factor, 1 point

No interest, 0 points

Apparel holds importance in both cultural and individual identity, meaning customer's interests can incorporate more emotional and less rational weight than for other goods. Many international surveys and research reports on apparel consumers' attitudes show

37 <https://www.forbes.com/sites/katematthams/2019/06/06/france-moves-to-ban-the-destruction-of-unsold-luxury-goods-in-favor-of-recycling/?sh=5b22522b334e>

38 <https://www.tustex.com/economie-actualites-economiques/plan-de-relance-du-secteur-textile-2019-2023-un-engagement-ppp-qui-vise-une-hausse-des-exportation>

39 <https://library.fes.de/pdf-files/bueros/tunesien/18146.pdf>

increasing awareness and interest in sustainable fashion, especially amongst trend-driven younger generations⁴⁰⁴¹ although this trend certainly varies across and within markets⁴².

On the local market, manufacturers in the textile and clothing sector are subject to two rivalries, the first is internal and the second is external.

The internal challenge concerns the relationship between the producer and the consumer (offer and demand), a consumer who has more and more preference for products imported. According to the statistical data we find that the different types of imports of knitted and non-knitted garments and accessories hosiery, in which Tunisia has a comparative advantage, increased by 4% on average per year, with peaks recorded in 2016 (this type of import reached a total of 900.2 million dinars).

In other words, since the dismantling of the AMF, the Tunisian market is getting stuck in a change in consumption behavior that penalizes the national product to the detriment of the imported product (which is not always better quality) and this can be explained by two essential elements:

- The low price.
- The demonstration effect.

This demonstration effect may explain the exponential growth of certain brands in Tunisia and the thrift store. The thrift store that allows agents of a social group given to imitate the consumption of a group with a higher income, by wanting to a demonstration of their social status, and therefore will have a propensity to consume relatively stronger.⁴³

Thus, developing access to the local market for textile products made in Tunisia is a challenge for Tunisian companies.

On the basis of the surveys conducted by "Fashion Revolution" which interviewed 5,000 people between the ages of 16 and 75 in Europe's five largest markets to determine the influence of sustainability on consumer buying decisions: When buying clothes, more than one in three consumers surveyed said they take into account social (38%) and environmental (37%) impacts.⁴⁴

⁴⁰ <https://www.mckinsey.com/industries/retail/our-insights/survey-consumer-sentiment-on-sustainability-in-fashion>

⁴¹ <https://www.genomatica.com/survey-consumers-want-sustainable-clothing-need-more-info/>

⁴² Public link needed: INDIA SUSTAINABILITY REPORT 2020 Science and Sentiment

⁴³ Agency for promotion of Industry and Innovation, 2017, "Industries of textile and clothing remain a key sector of Tunisian economy"

⁴⁴ <https://www.modeintextile.fr/sondage-europeen-consommateurs-veulent-transparence-marques-de-mode/>

Online searches for sustainable fashion have increased by 66% since 2018, with a 187% increase in page views for sustainable denim brands⁴⁵. Consumers fall into three scoring groups: major, moderate and no interest. Overall, the level of interest could be rated as moderate, and on a path to become major.

Suggested score: 1 point for moderate interest

B6 - Are there trends that would encourage eco-innovation in this market?

Yes, several strong trends that would encourage eco-innovation, 2 points

Possibly, one or two weak trends that would encourage eco-innovation, 1 point

No relevant trends, 0 points

Influential stakeholders in the textiles value chain are also making visible endorsements and commitments toward ambitious sustainability goals, for example the UNFCCC Fashion Industry Charter for Climate Action⁴⁶, the Fashion Pact,⁴⁷ and the Circular Fashion System Commitment⁴⁸. Actions to fulfil such commitments would typically reverberate through those companies' value chains. Some of Tunisian companies have launched initiatives to switch towards much more sustainable product. Others companies are obliged by their European clients to be compliant to their requirements.

Score: 2 points for several strong trends.

B7 - Do you have existing customers, reputation and credibility in this market?

- Yes, significant number of existing customers and well known in this market. [2 points]
- Yes, some existing customers but not well known in this market. [1 point]
- No customers or reputation in this market. [0 points]

CITET and its partners (CETTEX and MFC Pole and FTTH) are well known in this market and have important number of enterprises which collaborate with them in several themes of sustainable development (carbon foot print, cleaner production, environmental management system,...).

⁴⁵Lyst (2019) *Searching for Sustainability*, <https://www.lyst.com/data/sustainable-ethical-fashion/>

⁴⁶ <https://unfccc.int/climate-action/sectoral-engagement/fashion-for-global-climate-action>

⁴⁷ <https://thefashionpact.org/>

⁴⁸ <https://www.globalfashionagenda.com/2020-commitment/>

CITET has established several projects with textile sector (more than 50 SMEs were assisted in the last 10 years) such as:

1/ Tunisian Cleaner Production Project (TCPP) (2010 and 2015): CITET was in charge of its implementation with technical support from UNIDO and 15 SMEs of textile sector were assisted to implement cleaner production approach.⁴⁹

2/ Support project for the competitiveness of the value chain of the Textile sector in Tunisia (COM-TEXHA) (2016 -2017): This project is funded by the SECO-Switzerland and coordinated by International Trade Center (ITC). CITET has realized the mission of diagnosis and training in cleaner production (CP) approaches for textile sector. The following activities are achieved:

- Training of 34 managers of companies on the CP approach;
- Training of 24 managers of companies on energy efficiency in the textile sector;
- Support for 8 companies in the implementation of the CP approach and establishment of action plans.

3/ BAT4MED “Boosting Best Available Techniques in the Mediterranean Countries” project (2012): It aims to analyse the potential impact of the introduction of the Integrated Pollution Prevention and Control with 8 partners from EU countries and from Mediterranean Countries (Egypt, Tunisia and Morocco). CITET represented Tunisia in this project and has developed and published one guidebook on Best Available Techniques (BAT) in textile applicable to the Tunisian context.⁵⁰

4/ Tunisian Ecolabel program established by CITET within the framework of «Life Third Countries Program» (2002-2008), aimed to set up a national program with its legal, institutional and technical bases and to raise awareness in order to encourage consumers to select environmental respectful products. Within the framework of this project, the following activities were carried out:

- Training of 20 experts and auditors on Tunisian ecolabel;
- Establishment of technical criteria of Tunisian ecolabel for textile product;
- Assistance of 5 enterprises of textile to implement the Tunisian ecolabel.

5/ Technical assistance to 2 enterprises of textile sector for the evaluation of carbon foot print according ISO 14067 (March 2021 - April 2022).

6/ CETTEX has assisted 7 SMEs of textile sector to implement cleaner approach in the switchmed project financed by European Union and implemented by UNIDO.⁵¹

Score: 2 points for significant number of existing customers.

⁴⁹ <http://www.citet.nat.tn/Portail/production-propre.aspx>

⁵⁰ <http://www.cprac.org/en/projects/bat4med>

⁵¹ https://switchmed.eu/wp-content/uploads/2020/04/Tunisia-NationalPublication_FR.pdf

B8 - Are the potential companies in this market similar to the types of organization that we normally choose to work with? Would they make good companies for our organization?

- Yes, exactly the type of company that we aim to work with. [2 points]
- Possibly, some similarities but some differences. [1 point]
- No, not the type of company that we aim to work with. [0 points]

Companies that we are used to work with, could be potential companies to participate in the eco-innovation component of the project considering the following factors:

- the majority of companies are SMEs totally exporting to the EU;
- companies have made considerable efforts in terms of sustainable development: wastewater treatment, solid waste management, recovery of fabric waste, automatic dosing of chemicals, ...
- These companies have a team of managers who are informed and aware of sustainable development issues (clean production, recycling of waste water, recovery of waste fabrics, etc.)

Score: 2 points

B9 - Do we have the necessary sector and market knowledge within our organization today to deliver eco-innovation services to this market?

- Yes, we have several staff with relevant sector and market knowledge [2 points]
- Possibly, we have one member of staff with some relevant sector and market knowledge. [1 point]
- No relevant sector or market knowledge. [0 points]

CITET and its local partners (MFC POLE and CETTEX) have knowledge on the sector (processes, environmental issues, potential for improving environmental and economic performance,...) thanks to its rich experience of assisting companies in the areas of sustainable development (cleaner production, wastewater treatment, carbon foot print,...). However, we need expert on green business plan to help CITET and its local partners to assist SMEs in order to change their business model towards a more sustainable model.

Score: 1 point, we have knowledge in the sector and textile processes and its environmental issues but we need one expert on green business plan

B10 - How easy would it be to collaborate with other organizations within this market

based on geographic location?

- Relatively easy—majority of market, including final customer, is within the same country [2points]
- Somewhat difficult – significant proportion of market or final customer is in a different country [1 point]
- Very difficult – majority of market, including final customer, is in a different country [0 points]

Since the majority of companies in the sector produce entirely for export to the European Union (more than 80%), the majority of market including final consumer are in different country (European Union: France, Italy and Germany are the main markets of Tunisian textile product).

Score:0 point, the majority of market including final customer are in the European Union

Total score for the market: 13 points/20

Conclusion for market level analysis: The market of apparel (especially for denim products) is interested by eco-innovation approach because there are more and more focused on sustainable development issues by European markets which are the first destination for Tunisian exports. CITET and its partners have important knowledge on the companies of the sector and its environmental issues.

4. Building the right external partnerships

After having exchanged with the local partners (CTTEX, MFC pole and FTTH) and based on the UNEP manual of eco-innovation and the supplement for textile sector, and taking into account the textile sector (clothing) in Tunisia, some external partnership opportunities were identified on the basis of the following needs:

- **Consumer attitudes and choices:** several of the stakeholders listed play instrumental roles in influencing the consumer in their purchasing and related behaviors.
- **Potential partnerships in the textiles value chain:** national institutions, NGOs, technical research centers, producers organizations,...
- **Compliance with international standards:** to respond to client increasingly demanding for more quality product but also for more ethical, sustainable, circular fashion, respectful of working conditions and concerned with reducing carbon emissions.

The following graph presents the main stakeholders of the apparel branch (especially for denim products) throughout the value chain with classification of each stakeholder into 3 levels according to the degree of influence of the company on this stakeholder and the influence of the stakeholder on the company:

- H: High;
- M: medium;
- L: low.

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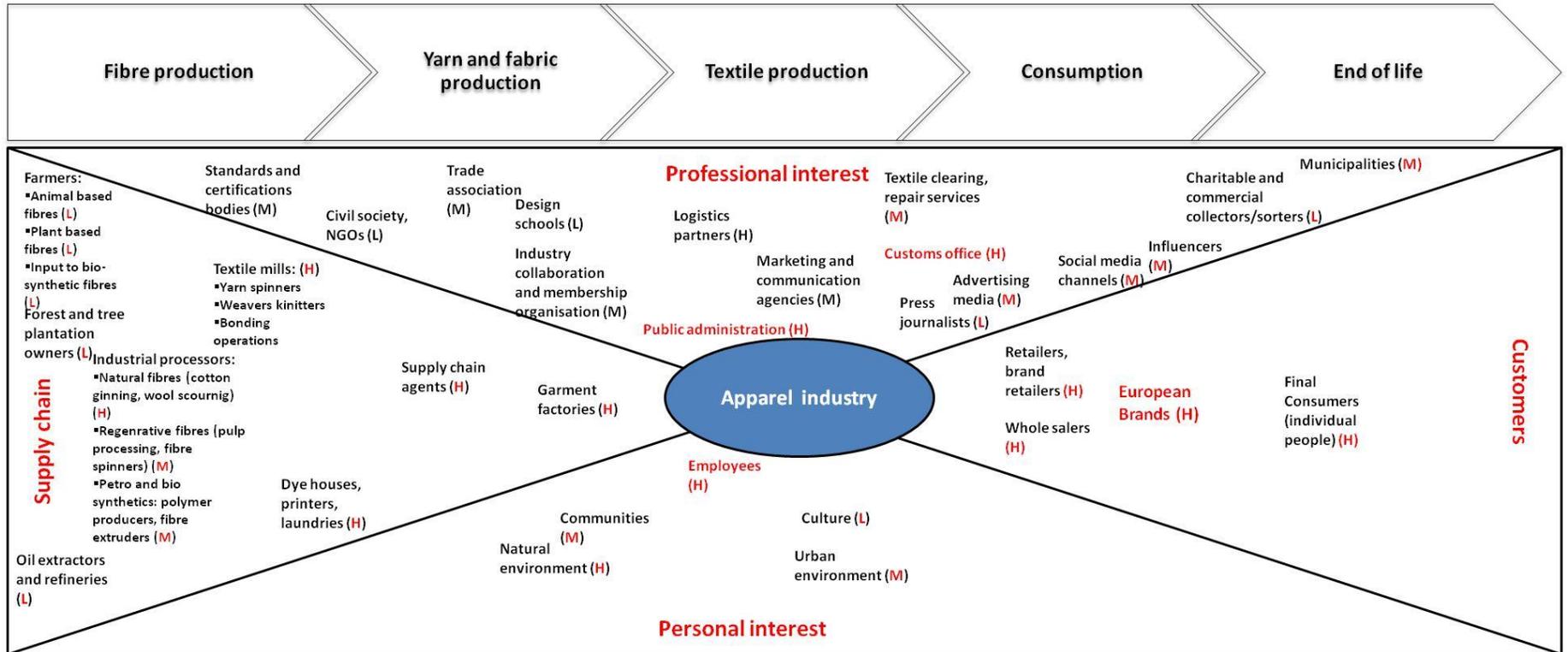


Figure4 : Externalpartnership of apparel especially for denim product)

Table1: Public administration in relation with textile sector in Tunisia

Institution	Attribution	Website
National environmental protection agency	Environmental control	https://www.anpe.nat.tn
National waste management agency	Solid waste management	https://www.anged.nat.tn
National sanitation Utility	Wastewater management	https://www.onas.nat.tn
Tunis International Center for Environmental Technologies (CITET)	Technical assistance in the field of environment (analysis, capacity building, environmental management systems, cleaner production,...)	https://www.citet.nat.tn
National agency for energy management	Energy management strategy in Tunisia	https://www.anme.tn
CETTEX	Technical assistance in order to improve quality and productivity (analysis, capacity building, environmental management systems, cleaner production,...)	https://www.cettex.com.tn
MFC pole	implementation of the smart specialization strategy driven by the State around the Textile & Clothing sector by targeting promising activities	https://www.mfcpole.com.tn
Ministry of Trade and Exportation promotion center (CEPEX)	<ul style="list-style-type: none"> • Inform, advise and guide exporters companies towards opportunities for international trade and commercial partnership by providing them with an information and competitive intelligence system • Support economic actors in their export process by supporting it administratively 	http://www.cepex.nat.tn

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	<p>and financially.</p> <ul style="list-style-type: none"> • Support exporters on foreign markets by organizing promotional actions, partnership meetings and prospecting missions. • Promote the export catalog of Tunisian products and services to the foreign target. 	
Health ministry- National Agency for Sanitary and Environmental Control of Products	Product inspection (sanitary and environmental aspects)	http://www.ancsep.rns.tn
Customs office	customs control (of incoming raw materials and exports)	https://www.douane.gov.tn/
Direction of safety - ministry of industry	industrial enterprise classification (approval of hazard study)	https://www.industrie.gov.tn/
Ministry of agriculture	Water management	http://www.agriculture.tn/
General Direction of work inspection - ministry of social affairs	Work inspection	-

Industry collaborations and membership organisations:

Tunisian Garment and Textile Federation (FTTH) is the professional federation for textile sector in Tunisia which have the following missions:

- ✓ Promotion of the Tunisian Textile Clothing sector;
- ✓ Defend the interests of its members with the public authorities;
- ✓ Prospecting new markets and encouraging investment;
- ✓ Negotiate and sign agreements on behalf of members;
- ✓ Any assistance to its members;
- ✓ Support training and participate in the development of programs.

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Around 102 textile enterprises in Tunisia are certified mostly in environmental management systems, quality management systems, CSR, oekotex standard⁵² to respond to client increasingly demanding for more ethical, sustainable, circular fashion, respectful of working conditions and concerned with reducing carbon emissions.

Moreover, some Tunisian textile companies are starting to gradually implement even stricter, more transparent European standards and regulations with better traceability.

Those measures are accentuated by the impact of COVID-19 pandemic.

Table 2: Main standards and certifications of Tunisian textile sector

Name	Brief description/area of advocacy	Link	Level of Requirement for Tunisian companies
Global Organic Textile Standard (GOTS)	GOTS was launched in 2006 as the result of collaboration between organic cotton producers, the textile industry, standard organisations, and certifiers to establish a harmonised organic textile standard that would be globally recognised. With over 10 000 certified facilities, GOTS is a leading standard to produce textile products containing organic fibre content, including not only cotton but all natural fibres subject to organic certification.	https://global-standard.org/	This certification is one of the most required from Tunisian exporters companies regarding to the use of organic textiles aiming the limitation of negative impacts on the ecology, as well as respect of social aspects (workers conditions).

⁵²<http://www.tunisieindustrie.nat.tn/fr/certifdbi.asp?action=list&idsect=02&pagenum=2>

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<p>Fairtrade International and Fair Trade USA</p>	<p><i>Fairtrade International</i> and <i>Fair Trade USA</i> are organisations promoting trade justice, sustainable livelihoods, community development funds, safe working conditions and environmental protection through their respective standards and product labelling schemes. Both organisations certify textile products, with Fairtrade International also providing specific certification for cotton itself as raw material. While Fairtrade International focuses on vulnerable smallholder producers in low income countries, Fair Trade USA also includes larger farms and plantations, as well as producers in developed countries including the US, to pursue a higher volume approach.</p>	<p>https://www.fairtrade.net/ https://www.fairtradecertified.org/</p>	<p>Several requests for information on environmental and social impacts are requested by international brands from Tunisian textile companies and this information may be used in the context of fair trade</p>
<p>EU EcoLabel</p>	<p>Established in 1992 and recognised across Europe and worldwide, the <i>EU Ecolabel</i> is a label of environmental excellence that is awarded to products and services meeting high environmental standards throughout their life cycle: from raw material extraction, to production, distribution, and disposal. The EU Ecolabel promotes the circular economy by encouraging producers to generate less waste and CO2 during the manufacturing process. The EU Ecolabel criteria also encourages companies to develop products that are durable, easy to repair and recycle.</p>	<p>https://ec.europa.eu/environment/ecolabel/</p>	<p>Not mandatory but it could represent an opportunity to accede to new markets</p>
<p>Textile Exchange</p>	<p><i>Textile Exchange</i> offers a handful of leading standards - including the Content Claim Standard, the Organic Content Standard, Global Recycled Standard, and Recycled Claim Standard - all supporting fibre content claims in final products through “chain-of-custody” management.</p>	<p>https://textileexchange.org/standards/</p>	<p>Not mandatory but it could represent an opportunity to accede to new markets</p>

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Oeko-Tex	<p><i>Oeko-Tex</i> consists of 18 independent research and test institutes in Europe and Japan. Their OEKO-TEX 100 standard is one of the world's best-known labels for textiles tested for harmful substances. For a textile product to carry the OEKO-TEX 100 label, every component, including threads, buttons and other accessories, have to be tested for harmful substances to ensure the product is harmless for human health.</p>	<p>https://www.oeko-tex.com/en/</p>	<p>The most adopted certification for Tunisian textile exporters companies.</p>
Tunisian Ecolabel	<p>The Tunisian Ecolabel attribution system is a voluntary certification system under which the Ecolabel is issued after verification of the product's compliance with a set of technical and ecological criteria throughout its life cycle. The "Ecolabel" certification offers the company better visibility and competitiveness of its products/services through credible information dedicated to consumers, better management of the environment through rational use of natural resources and reduction of its impact</p> <p>The technical and ecological criteria for the certification of textile products are established since 2010 by the order of the ministry of environment (22th January 2010) approving the technical and ecological criteria for awarding the Tunisian eco-label for the product category "textiles"</p> <p>On 2011, CITET has conducted a pilot assistance program for 5 textile enterprises till the mock audit phase. Implementation difficulties were identified on the basis of this pilot program related especially to difficulty of obtaining information about chemical substances and related risks from suppliers and along the value chain in addition to the hazardous waste management.</p> <p>A review framework should be launched on the basis of these conclusions and on the basis of recommendations of InTex project.</p>	<p>www.citet.nat.tn</p> <p>www.innorpi.tn</p>	<p>Tunisian Ecolabel for textile products, once revised and recognized by the Global Ecolabelling Network, will offer to Tunisian companies better visibility and competitiveness in the foreign market</p>

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<p>Management systems: ISO 14001, ISO 50001, ISO 45001 and CSR</p>	<p>Management system for environment (ISO 14001), for energy: ISO 50001, for safety and work security (ISO 45001) and social responsibility (ISO 26000, SA8000)</p>	<p>http://www.tunisieindustrie.nat.tn/fr/certifdbi.asp?action=list&idsect=02&pagenum=2</p>	<p>Not mandatory systems but they are the most adopted by Tunisian textile companies. Around 102 textile enterprises in Tunisia are certified (ISO 9001, ISO 14001, SA 8000).</p>
<p>ILO (International Labour Organization) standards</p>	<p>Tunisia has ratified all fundamental conventions related to ILO standards becoming an integrated part of the national regulation :</p> <ul style="list-style-type: none"> • Freedom of association and the effective recognition of the right to collective bargaining, • The elimination of all forms of forced or compulsory labour, • The effective abolition of child labour, and the elimination of discrimination in respect of employment and occupation. 	<p>https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:102986</p>	<p>They are mandatory as they are inserted into the national framework</p>

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<p>Better cotton initiative (BCI)</p>	<p>The Better Cotton Initiative (BCI) is a non-profit, multi-stakeholder governance group that promotes better standards in cotton farming and practices across 21 countries. BCI's "global definition" describes "better cotton" in terms of the behaviors of better cotton farmers.</p> <p>Better Cotton is produced by farmers who:</p> <ul style="list-style-type: none"> - minimize the harmful impact of crop protection practices; - use water efficiently and care for availability of water; - care for the health of the soil; - conserve natural habitats; - care for and preserve the quality of the fiber; - promote decent Work. 	<p>https://bettercotton.org/fr/</p>	<p>Not mandatory but followed by some Tunisian exporters textile companies for marketing purpose to strengthen external position and develop a partnership with foreign companies</p>
<p>Organic blended</p>	<p>The OSC standard (Organic Content Standard) applies to any non-food product containing 5 to 100% organic matter. It verifies the presence and percentage of biological materials in the final product. It tracks the flow of raw materials from origin to finished product and lets an accredited third-party auditor certify this process.</p>	<p>https://certifications.controlunion.com/fr/certification-programs/certification-programs/ocs-organic-content-standard-mixte</p>	<p>Not mandatory but followed by some Tunisian exporters textile companies for marketing purpose to strengthen external position and develop a partnership with foreign companies</p>

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<p>Global recycled standard (GRS)</p>	<p>The Global Recycled Standard (GRS) is a voluntary product standard for tracking and verifying the recycled content of an end product. The standard applies to the entire supply chain and addresses traceability, environmental principles, social requirements, chemical content and labelling. The GRS covers the processing, manufacturing, packaging, labelling, trading and distribution of all products made with a minimum of 20% recycled materials. It also sets requirements for third-party certification of recycled content, chain of custody, social and environmental practices, and chemical restrictions.</p> <p>The standard supports companies looking to verify the recycled content of their products as well as responsible social, environmental and chemical practices in the production of these products. Although GRS is owned by Textile Exchange, the product range is not limited to textiles and can include any type of product containing recycled content materials.</p> <p>The desired effect of GRS is to provide brands with a tool for more accurate labelling, encourage innovation in the use of reclaimed materials, establish more transparency in the supply chain, and provide better consumer information.</p>	<p>https://fr.scsglobalservices.com/services/global-recycled-standard</p>	<p>Not mandatory but followed by some Tunisian exporters textile companies for marketing purpose to strengthen external position and develop a partnership with foreign companies</p>
<p>Business social compliance initiative (BSCI)</p>	<p>BSCI, is a program of the Foreign Trade Association of Europe, is designed to improve working conditions for the suppliers of BSCI's participating member companies. SAAS has previously provided technical assistance and verification to BSCI as a means of promoting workplace conditions in accordance with human rights, ILO conventions and national labor law</p>		<p>Not mandatory but followed by Tunisian exporters companies who want to be compliant with international standards in the field of social and workers conditions</p>

Table 3: National innovation partners in textile sector in Tunisia

Name	Brief description/area of advocacy	Link
MFC pole	Implementation of the smart specialization strategy driven by the State around the Textile & Clothing sector by targeting promising activities	https://www.mfcpole.com.tn
National School of Engineers of Monastir (ENIM)	ENIM's Textile Engineering Department (DGT)	http://www.enim.rnu.tn/
Tunisian Association of Textile Researchers (ATCTEX)	Scientific association of professors, professionals and students interested in the textile research field	https://atctex.org/

5. Identifying of sustainability hotspots across the value chain

After having exchanged with the local partners (CTTEX, MFC pole and FTTH) and based on the UNEP manual of eco-innovation and the supplement for textile sector, and taking into account the textile sector (clothing) in Tunisia, we have identified the hotspots across the value chain.

5.1 Description of value chain of apparel:

The value chain of apparel product includes the following life cycle stages:

A/Raw materials acquisition and pre-processing:

The raw materials acquisition and pre-processing life cycle stage includes the processes starting with the extraction of the resources through the gate of the product's facility (processing and manufacturing plant).

There are different ways of categorising textile materials.

The first difference is between natural and manufactured (or man-made) materials. Each of these two categories can then be divided into two subsets, where naturally occurring materials are aligned between animal-based and plant-based, while manufactured materials are divided into petroleum-based and bio-based. Finally, each of these four "slices" can be divided into fiber and non-fiber materials. While non-fiber materials are technically not textiles, they are included in this overview as these materials are common in apparel.

Looking first across the fiber groups, animal-based fibers (upper left) are essentially of two types: animal hair - like sheep's wool, cashmere, angora, mohair and alpaca - and silk, which is a secretion from the silkworm. All of these fibers are made of protein.

By contrast, plant-based fibers are made of cellulose, with cotton being the most common. Within this fiber group are "bast fibers", which are taken from the stem or bark of plants like flax, ramie, jute and hemp. This cellulose group also contains fibers extracted from plant leaves, such as sisal (though these are not commonly used for apparel).

Manufactured (man-made) petroleum-based fibers are manufactured from synthetic polymers and include polyester, acrylic, polyamide (or Nylon), elastane and polypropylene. The manufactured bio-based fibers are often called regenerated fibers or Man-made Cellulosic Fibres (MMCF). These fibers are derived from cellulose pulp and include viscose (also known as rayon, or viscose rayon), modal, lyocell and Cupro.

There is one more group of manufactured fibers that can be placed between bio-based and petroleum-based materials. These fibers are "innovative fibers" and referred to as bio-synthetics. They are derived either entirely from bio-based, natural polymers, or combined with petroleum-based polymers. Bio-polyester fibers made with Polylactic Acid (PLA) are derived from corn or biomass, for example. Other examples include bio-polyamide made from natural polymers derived from castor oil and lab-grown spider silk.

Finally, non-fiber materials can be further divided into four groups: animal-based, plant-based, petro-based and bio-based. In the animal-based category, common materials in apparel include down, leather, furs and skins.

The most common petroleum-based, non-fiber material is polyurethane, which is often used as a synthetic substitute for leather. There are also several innovative bio-based materials, including materials derived from the mycelium of mushrooms and grown from kombucha, a fermented drink made from sea algae.

For the fibre production stage, the names of the fiber category already give an indication of the main activities and operations in their production processes. These can be summarised as:

- ✓ Natural, animal-based fibers:
 - for animal hair: livestock / animal husbandry, removal of the hair through shearing or combing, cleaning the fiber;
 - for silk: silkworm cultivation, removal of the silk filament from the cocoon.
- ✓ Natural, plant-based fibers: small or large-scale agriculture including sowing, fertilising, pest management, irrigation (not in all cases), harvesting and cleaning (for instance, ginning for cotton to remove seeds and impurities).
- ✓ Manufactured, petroleum-based fibers: oil extraction and refinement, polymerisation into granulates, extrusion;
- ✓ Manufactured, bio-based, regenerative (man-made cellulosic) fibers: Forestry (including logging) of either natural forests or tree plantations, cellulose extraction (dissolving into pulp), wet spinning (crystallisation into fibers in a chemical bath with extrusion).

B/Yarn and fabric production:

B.1/ Yarn preparation:

Making yarn from shorter, “staple” fibers- for instance cotton and wool fibers- typically involves initial steps like carding and combing, followed by drawing, spinning, and winding. For longer “filament” fibers- for instance polyester, viscose or silk - carding and combing are not necessary, while texturing is a common initial step, before the drawing, spinning, twisting and winding. On an industrial scale, yarn production is largely mechanical and not labour intensive.

B.2/Weaving, knitting and bonding:

While the terms weaving and knitting are likely self-explanatory, bonding may not be as clear. Bonding refers to fabrics often called “non-wovens” (although they are “non-knitted” as well) and instead of yarn as the input material, they are made by entangling fibers together through chemical, mechanical or heat treatment. Felt is a typical example.

There are a multitude of different techniques for both weaving and knitting, although the fundamental principles of both are the same. In some cases, the knitting process can be integrated with the subsequent assembly stage, as often is the case with socks.

For industrial scale operations, knitting, weaving and bonding are machine-intensive, so they require a lot of machines. They are not labour-intensive, however, so require fewer employees.

C/ Textile production:

C.1/Wet processing:

Wet processing operations can occur between Fabric Production and Assembly, since key steps such as dyeing are commonly applied to fabrics before being sent to garment assembly. However, wet processing steps - including dyeing - can also occur both earlier and later in the life cycle. Another example is 'sizing', which includes applying natural or chemical inputs on yarns to strengthen them, so that they can withstand the tension applied during the weaving process. After weaving, 'desizing' is performed to remove sizing chemicals from the woven fabrics.

The dyeing process, usually performed by production units referred to as 'dye houses' using a range of dyeing techniques, can be applied to fibers, yarns, woven, knitted or non-woven fabrics, and even to a finished garment.

Prior to dyeing, pre-treatment operations like bleaching, boiling, kiering, washing, mercerisation, optical brightening, etc. are common. Their objective is to increase absorbance and whiteness, while making the fiber- or yarn, or fabric - ready for dyeing.

Printing (including digital printing) is also considered a wet process, and imparts colour using inks and pigments. Printing is typically done on the fabric before garment assembly or on the finished garment.

'Finishing' is usually the final step in wet-processing operations and is used to improve the look, softness, or performance of the fabric or garment. Examples of finishing include stain resistance, water repellency and anti-microbial. Laundering is also common.

Though largely machine-driven, wet processing typically requires a moderate level of labour.

C.2/ Assembly:

This stage referred to with various names, including 'CMT' - for Cut, Make and Trims, 'Cut & Sew,' 'Garment Manufacturing' and 'confectioning'. This stage is labour-intensive and primarily involves cutting fabric, sewing, ironing and packaging, as well as laundering and printing.

D/ Distribution:

For the apparel market consumer, distribution to retail stores is generally handled through strategically located logistics hubs and distribution centres. Retail stores can operate independently or be a part of a chain, can be brand-owned (single brand), multi-brand or offer a combination of both, i.e, a branded store that also offers apparel products from other brands. E-commerce channels are typically supported by fulfillment centres and are often housed within distribution centres. Given the strong growth in e-commerce, the distribution and retail stage also includes handling customer returns, typically through the same distribution/fulfillment centres.

Brands are the primary drivers of product marketing and communication toward the consumer, although wholesalers and retailers - when these channels are employed - can also play a significant role. Collaboration is typical in these cases.

E/ Use:

This life cycle stage includes the consumer's transport to and from the store, garment care (washing, drying, ironing, mending and repairing) and of course the actual use and storage of garments, including related wear and tear from use.

This stage can include consumer-to-consumer channels where the apparel product changes ownership.

F/End of life:

F.1/Collecting and sorting:

Discarded textile products can be handled in different ways and by different types of organisations, They can be collected by charitable organisations as donations, by commercial organisations - including retailers - either as donations or in exchange for a 'reward', or by municipalities, either as a separated fraction or as unsorted waste. In all cases apart from the latter (unsorted waste), textile products have a chance to return into circulation in their current form - in which case the products can be considered to have reached end-of-use but not yet end-of-life. This also applies when the material is to some extent recovered and put into another use.

F.2/ Recycling, reuse and disposal:

Part of the end-of-life textile product is reused as a second-hand textile product, or as a raw material that will be mixed with fabrics for the manufacture of clothing.

Another part is recycled for other uses such as insulation, cleaning rags... The rest is disposed of in landfills or incinerated (in Europe).

F.3/ Landfilling, waste to energy:

Used textile products disposed of as unsorted waste can either be incinerated - potentially contributing to some degree of energy recovery - or be added to landfill. However, even sorted textiles can end up in incineration or landfill. For example, in cases of oversupply of second-hand garments where no markets or alternative use is available at a cost-efficient level, or when unsold retail stock is destroyed through incineration or sent to landfill.⁵³

5.2 Description of value chain of apparel in Tunisia:

For Tunisian apparel industry, some of life cycle stages take place in Tunisia especially from yarn and fabric production and textile production.

A/Raw materials acquisition and pre-processing:In addition to importing all of its fiber, filament and cotton raw material needs, Tunisia continues to import significant quantities of elaborate quality yarns.

In 2017, the main textile products imported by Tunisia are the followings:

- Cotton for an amount of 1,510.8 million dinars which represent 31% of the amount of import;
- Synthetic Fibres with a value of 636 million dinars (12%) and knitted fabrics and other fabrics with a value of 432 million dinars.

In 2017, Italy was Tunisia's main supplier with a 21% market share. Next come France with 18%, Germany with 9%, Belgium 5%, China with 9% and Spain with 4%.⁵⁴

The sector contributes to 30% of workforce in manufacturing industries in Tunisia (about 150000⁵⁵ employees). 86% of the workforce are women, particularly in the clothing industry, and 80% of workers are young people (aged between 16 and 35). Less than 1% of the workforce are under the age of 16 (apprentices)⁵⁶.

B/Yarn and fabric preparation:

B.1/ Yarn Preparation:

For yarn preparation, the main national production is intended to supply the weaving and knitting units. Although producing a wide range of products, the spinning branch is geared towards a predominance of cotton, followed by spinning of the long fibre synthetic type, particularly those of acrylic.

⁵³ UNEP, 2021, Eco-i manual Textiles supplement

⁵⁴ Agency for Industrial promotion and Innovation, 2018 Textile monograph

⁵⁵ Agency for the Promotion of Industry and Innovation - January 2022: <http://www.tunisieindustrie.nat.tn/>

⁵⁶ Tunisian forum for economic and social rights, 2014, " Violations of the economic and social rights of women workers in the textile sector"

The Tunisian yarn industry has 22 companies employing 10 or more people, of which 5 companies are totally exporting, the rest are the main suppliers of the country's weaving and knitting industries. The majority of employees are women.

In addition to cotton yarn, the manufacture of which is a tradition in Tunisia, the spinning branch also produces: carded woollen yarns intended for carpet craftsmanship, in particular yarns of discontinuous synthetic fibres, in particular pure and blended acrylic.

They are intended for weaving and knitting. It also produces linen yarn, natural silk yarn, textured continuous filament yarn and certain varieties of bast fiber yarn (jute, sisal, hemp, etc.).

B.2/Weaving, knitting and bonding:

This industry has undergone a profound restructuring in recent years, just as in spinning, production consists mainly of cotton fabrics, the quality of which has improved a lot in recent years thanks to upgrading programs for companies in the branch.

The branch has 26 companies employing 10 or more people, 11 of which are totally exporting. 15 companies are other than totally exporting and mainly produce for the local market. Many are integrated into Spinning-Weaving, Weaving-Finishing or even Spinning-Weaving-Finishing. The majority of employees are women.

In 2017, imports of impregnated fabrics which are generally quite high compared to special fabrics, with a value of 217.7 million dinars, or 54% of total fabric imports.

C/ Textile production (wet treatments and assembly):

In 2018, the Finishing branch had 43 production units, 30 of which are totally export-oriented. Most are integrated Weaving-Finishing or Knitting-Finishing or even Knitting-Finishing-Confection companies. For chemical products used in textile production, they are mostly imported from Europe (the value of importation of chemical products used in the textile sector is reached more than 40 million dinars in 2017)⁵⁷.

The garment industry is by far the most dominant of all the other branches of the sector in Tunisia. It is the most developed, and it is the one that has benefited the most from the upgrade program. This is also the branch where the partnership is the most developed.

D/ Distribution, use and End of life:

Tunisia's main customers for the clothing branch are at the same time its main suppliers and its main investor partners in the sector. The European Union is the main market of Tunisian apparel (more than 90%) as following:

⁵⁷Agency for Innovation and promotion Of Industry, 2018 "Monograph of chemical industries in Tunisia"

- France with (37%);
- Italy with (20%);
- Germany with (16%);
- Belgium with (7%);
- Netherlands with (7%);
- and Spain with (6%).

The majority of Tunisian apparel companies are suppliers of major international brands in Europe.⁵⁸ So the life cycle stages of distribution and use and end of life of apparel take place in European Union.

5.3 Sustainability Hotspots :

Taking into account the stages of the apparel's life cycles, and its context in Tunisia, the following graph presents the main hotspots of the product with an emphasis on cotton (main material imported from Tunisia) and that the stages of acquisition of raw materials, use, distribution and end of life mainly take place in the EU and that the other stages of life cycle take place in Tunisia (yarn and fabric production and textile production).

⁵⁸Agency for Industrial promotion and Innovation, 2018 Textile monograph

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Geographic Location	Main countries that Tunisia imports raw materials: Italy, France, Germany, Belgium, China, Spain				Tunisia	From European Union to Tunisia	Tunisia or import from other countries	Tunisia or import from other countries	Tunisia	Europe												
Emissions	GHG chemicals residues (pesticides and fertilizers)	GHG wastewater Residues of chemicals	GHG	GHG, Fibres losses, chemicals residues, impurities	GHG, packaging waste chemical waste	GHG	Waste water, GHG, yarn waste (losses), hazardous waste of chemicals	Waste water, GHG, fabric waste (losses), hazardous waste of chemicals	Waste water, GHG, hazardous waste of chemicals, microfibres release	Cutting waste, packaging waste, GHG	GHG	GHG, packaging waste product damaged	GHG Packaging waste product unsold product damaged	Packaging waste, product unsold, product damaged	GHG packaging waste Product return	Wastewater, GHG, residues of plastic micro fibres	GHG	GHG	Waste of the product GHG	GHG, waste	GHG, Waste of ash	GHG, residues of plastic micro-fibres
Key activities	Plant based fibres production (cotton)	Synthetic based fibres production : oil extraction and refinement, polymerisation into granulates, extrusion	Material processing and sourcing (non fibrous materials, textile accessories, packaging production,,)	Fibre preparation	Packaging production (plastic films, cardboard,,)	Transport of raw materials to processing plant	Yarn preparation (spinning)	Knitting, weaving, bonding	Wet processing (Bleaching and finishing)	Assembly (cutting fabric, sewing, ironing and packaging, as well as laundering and printing)	Transport of intermediate products between manufacturing processes	Transport from factory to Warehouse/Distribution Center in Europe	Transport from Warehouse/Distribution Center in Europe to retail/ stores	Sale at retailer	Transport from retail/ stores to Final client (customer travel)	Washing / cleaning	Drying/ Ironing	Transport from use stage to end of life	Collection and sorting	Recycling, reuse and disposal	Incineration (waste to energy)	Landfilling
Inputs	Water Fuel pesticides Fertilizers Trees	Fossil Fuel Electricity Petroleum Water Chemical products	Electricity, fossil fuel	Electricity, chemical products, water	Fossil Fuel Electricity Petroleum Water Chemical products	Fuel	Water, Electricity, chemical products (spinning conditioners and lubricants)	Water, Electricity, chemical products (sizing agents,,,,)	Water, Electricity, chemical products (dyes, detergents,,,,), natural gaz	Water, Electricity, natural gaz, packaging, chemical products	Fuel	Fuel	Fuel	Electricity	Fuel	Water, electricity, detergents	Water, electricity	Fuel	Electricity	Electricity	Electricity, fossil fuel	Fuel
Life cycle stages	Raw material acquisition and pre-processing					Yarn and fabric production		Textile production			Distribution				Use		End of life					

Figure 5: Lifecycle inventory across apparel's value chain

Energy use in the textile value chain (especially for the stages that take place in Tunisia):

The different sources of energy used in the textile value chain are described as follows:

1/ Natural gas : which is frequently used as fuel for steam and hot water boilers and it is provided by Tunisian electricity and gas company (public structure) ;

2/ Electricity: It is provided from thermal power plants of the Tunisian electricity and gas company and which operate mainly with natural gas as fuel.

3/ Fossil fuels: used used by the means of transport of goods and finished products;

4/ Renewable energy: Some Tunisian textile companies has implemented has implemented a photovoltaic installation of electricity production to cover part of their electricity needs (examples: DEMCO, ,...)

The detailed sustainability impacts (economic, social and environment) across the value chain of textile product are presented in the following table:

Table 4: Sustainability impacts of textile value chain

Phase	Activity	Environmental Impacts L (low), M (medium) and H (high)	Social Impacts L (low), M (medium) and H (high)	Economic Impact L (low), M (medium) and H (high)
Raw material acquisition and pre-processing	Plant based fibers production (cotton)	<ul style="list-style-type: none"> - Water use (H) - Use of fertilizers and pesticides: pesticides and fertilizer residues and soil and water pollution (H) - Emission of POP's (pesticides) into the air (H) 	<ul style="list-style-type: none"> - Hard conditions of work in the field (number of working hours, lack of means of protection like gloves, ...) (H) - Work of minors (H); - Gender discrimination; - Exposure of workers to chemicals (pesticides especially) (H) - Jobs creation (H) 	<ul style="list-style-type: none"> - Costs of fibre and transport impact the cost of the finished product (H) - Revenue for farmers (M)

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	Synthetic based fibers production : oil extraction and refinement, polymerisation into granulates, extrusion	<ul style="list-style-type: none"> - Use of energy (fossil Fuel and Electricity) (H) - Water use (M) - Waste water and chemicals residues (H) - GHG emissions (H) 	- Hard conditions of work in the factory (number of working hours, lack of means of protection like gloves, ...) (M)	Costs of fibre and transport impact the cost of the finished product (H)
	Material processing and sourcing (non fibrous materials, textile accessories, packaging production,...)	<ul style="list-style-type: none"> - Use of energy (electricity and fossil fuel) (M) - Packaging wastes (M) - GHG emissions (M) 	Hard conditions of work (M)	Cost of material processing and the their transport to the plant (H)
	Fiber preparation	<ul style="list-style-type: none"> - Use of energy (electricity) (M) - Use of water (M) - Waste of fibre (impurities) (M) - GHG emissions (M) 	Hard conditions of work (M)	Cost of fibres and the their transport to the plant (H)
Yarn & Fabric Production	Yarn preparation (spinning)	<ul style="list-style-type: none"> - Use of water (M), - Use of Electricity (M), - Waste water (M), - Hazardous chemicals residues released into environment (M), -GHG emissions (M), - Yarn waste (losses) (M) 	<ul style="list-style-type: none"> - Hard conditions of work (number of working hours, lack of means of protection like gloves, masks...) (M) - Professional diseases and accidents at work: exposure of workers to volatile compounds and dust from chemicals, Musculoskeletal Disorders or MSDs, noises... (M); - Work of minors (L); - Gender discrimination (M). 	Cost of yarn prepared (M)

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	Knitting, weaving, bonding	<ul style="list-style-type: none"> - Use of water (M), - Use of Electricity (H), -Use of chemical products (sizing agents,...) (H) - Waste water (M), - Hazardous chemicals residues released into environment (H), - GHG emissions (H), - Fabric waste (losses) (H) 	<ul style="list-style-type: none"> - Hard conditions of work (number of working hours, lack of means of protection like gloves, masks...) (M) - Professional diseases and accidents at work: exposure of workers to volatile compounds and dust from chemicals, Musculoskeletal Disorders or MSDs, noises... (M); - Work of minors (M); - Gender discrimination (M). 	Cost of production of fabric used for final product (M)
Textile production	Wet processing (Bleaching and dyeing and finishing)	<ul style="list-style-type: none"> - Use of water (H), - Use of energy (Electricity,gas) (H) - Use of chemical products (dyes, detergents,...) (H), -Waste water(H), - Hazardous chemicals residues released into environment, including microfibers (H) -GHG emissions (H) 	<ul style="list-style-type: none"> - Hard conditions of work (number of working hours, lack of means of protection like gloves, masks...) (H) - Professional diseases and accidents at work: exposure of workers to volatile compounds and dust from chemicals, Musculoskeletal Disorders or MSDs, noises...(M); - Work of minors (M); - Gender discrimination (M). 	High production costs especially for chemical products and energy (H)
	Assembly (cutting fabric, sewing, ironing and packaging, as well as laundering and printing)	<ul style="list-style-type: none"> - Use of water (L), - Use of energy (Electricity,gas) (L) - Use of chemical products (M) - Cutting waste (H), - Packaging waste, GHG (M) - Hazardous chemicals released into environment (M) 	<ul style="list-style-type: none"> - Hard conditions of work (number of working hours, lack of means of protection like gloves, masks...) (H) - Professional diseases and accidents at work: Musculoskeletal Disorders or MSDs, noises... (M); - High risk of fire (H) - Work of minors (M); - Gender discrimination (H) - Job creation (H). 	<p>High level of cutting waste which reduce the productivity</p> <p>- Rate of cut waste reused in the final product (M)</p>

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Distribution	Transport from factory to Warehouse/ Distribution Center in Europe (transport by sea and by trucks)	<ul style="list-style-type: none"> - Use of fuel (H) - GHG emissions (H) - Packaging waste (M) - Product damaged (L) 	Risk of road accidents (L)	Cost of transport by sea (M) Cost of damaged product (L) sometimes lengthy customs procedures which increase the cost of storage (L)
	Transport from Warehouse/ Distribution Center in Europe to retail/ stores (transport by trucks)	<ul style="list-style-type: none"> - Use of fuel (M) - GHG emissions (M) - Packaging waste (L) - Product unsold (L) - Product damaged (L) 	Risk of road accidents (L)	Cost of transport and costs of product damaged/unsold (L)
	Sale at retailer	<ul style="list-style-type: none"> - Electricity (M) - Packaging waste (M) - Product unsold (L) - Product damaged (L) 	Jobs secured at retailer (M)	Revenue to retailer (L) Revenue to distribution center (L)
	Transport from retail/ stores to Final client (customer travel)	<ul style="list-style-type: none"> - GHG (L) - Packaging waste (L) - Product return (L) 	Risk of road accidents (L)	Cost of product return (L)
Use	Washing/cleaning	<ul style="list-style-type: none"> - Use of water (H) - Use of electricity (M) - Use of detergents (M) - Wastewater (M) - GHG emissions (M) - Plastic microfibers released into the oceans(wash) and air (wear) (M) 		The quality of the product and the resistance to washing and drying operations and therefore its lifespan can influence the selling price of this product in the future (H)
	Drying / ironing	<ul style="list-style-type: none"> - Use of electricity (L) - Use of water (L) - GHG emissions (L) 		

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	Transport from user to end-of-life	<ul style="list-style-type: none"> - Use of Fuel (L) - GHG emissions (L) 	- Risks of traffic accidents (L)	Cost of transport especially if the distances are long (L)
End of life	Collection and sorting	<ul style="list-style-type: none"> - Use of electricity (L) - GHG emissions (L) - Waste of the product (M) 	<ul style="list-style-type: none"> - Hard conditions of work (M) - Possibility of donations to charities organizations for second hand use (M) 	The price of second hand clothes (M)
	Recycling, reuse and disposal	<ul style="list-style-type: none"> - Use of electricity (L) - GHG emissions (L) - Waste of the product (M) 	Hard conditions of work (M)	<ul style="list-style-type: none"> - The price of second hand clothes (M) - The recycling process is relatively expensive (manpower, energy, transport,...) and is only economically profitable in the case of the availability of considerable quantities of clothes to be recycled (M)
	Incineration (waste to energy)	<ul style="list-style-type: none"> - Use of Electricity (M) - Use of fossil fuel (H) - GHG emissions (H) -Waste of ash (M) 	Health impacts on local residents, communities from atmospheric emissions (M)	Energy costs for incineration (M)
	Landfilling	<ul style="list-style-type: none"> - Use of fuel (M) - GHG emissions (M) - Plastic microfibers released into the oceans (M) 	Impacts on local residents, communities from water discharges into the natural environment and odour nuisance (M)	- Cost of landfilling (M)

6. Identifying of the general opportunities and threats across the value chain

This activity in the eco-innovation methodology aims to identify macro, external issues and trends that will or could have an impact on the target value chain, either as a general threat or an opportunity. As stated in the manual, a PESTEL analysis is often used by a company to scan their environment for emerging issues and involves searching for significant issues or trends related to the headings: **political, economic, social, technological, environmental and legal (PESTEL)**.

This analysis is done for apparel industry in Tunisia. Since the majority of Tunisian companies are totally exporting to the European Union, any trend or requirement or European policy adopted for the textile sector and the protection of the environment has an impact on the Tunisian textile sector.

To explore the significance of the assembled trends and issues, the following aspects were assessed:

- **Time:** When will the issue start to have an impact on the value chain? 'Within 6 months', 'Within 2 years', or 'More than 2 years' time';
- **Impact:** What level of impact could the issue have on the value chain? Scale from 1-5 where: 1 = Potential to create limited change within a limited part of the value chain, and 5 = Potential to revolutionise or destroy the entire value chain.
- **Likelihood:** How likely is it that the issue will have an impact on the value chain? Scale from 1-5 where: 1 = Very unlikely, and 5 = Very likely.
- **Significance for the value chain:** Impact x Probability.

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Table 5: Identification of opportunities and threats across the value chain

Heading	Description	Timing (Month)	Impact	Likelihood	Significance
Political	EU and India to restart the long-halted free trade agreement (FTA): The agreement has been suspended since 2013; the restart will pave the way for lower tariffs, potentially even duty free ⁵⁹ . This agreement may cause an increase in European imports of clothing from India, which constitutes a threat for Tunisian companies whose European market constitutes more than 80% of exports.	0 - 6	2	5	10

⁵⁹Apparel Resources, 2021

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<p>EU Strategy for Sustainable and Circular Textiles:This strategy which adopted by European Commission in 30 march 2022, aims to create a coherent framework and a vision for the transition of the textiles sector whereby:</p> <p>By 2030 textile products placed on the EU market are long-lived and recyclable, to a great extent made of recycled fibres, free of hazardous substances and produced in respect of social rights and the environment. Consumers benefit longer from high quality affordable textiles, fast fashion is out of fashion, and economically profitable reuse and repair services are widely available. In a competitive, resilient and innovative textiles sector, producers take responsibility for their products along the value chain, including when they become waste. The circular textiles ecosystem is thriving, driven by sufficient capacities for innovative fibre-to-fibre recycling, while the incineration and landfilling of textiles is reduced to the minimum.</p> <p>Several actions are planned such as review of European ecolabel, establishment of criteria for green public procurement for textile products, establishment of eco-design requirement for textile product and environmental footprint of apparel .</p> <p>So Tunisian textile product which export to European Union must prepare themselves to improve their sustainability performance and measure their environmental foot print.⁶⁰</p> <p><i>innovative fibre-to-fibre recycling, while the incineration and landfilling of textiles is reduced to the minimum.</i></p>	7 - 24	5	4	20
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⁶⁰https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12822-EU-strategy-for-sustainable-textiles_en

Political	<p>Several national policies are in relation to sustainability of textile sector:</p> <ul style="list-style-type: none"> ✓ National Strategy for Sustainable Development-NSSD, by ministry of environment (2015-2020) aiming to the introduction of SCP patterns and SGD's in economic model with priority challenges to develop activities on products and services ecological qualities; ✓ The National Strategy of the Green Economy-NSGE, (by the ministry of environment 2015-2030): major implementation tool of the NSSD aiming to; create incomes and jobs through activities which reduce CO2 emissions; prevent the loss of biodiversity; reduce the ecological footprint; promote life cycle thinking, eco-designs; favour responsible production and consumption schemes. ✓ Sustainable Consumption and Production National Action Plan (SCP-NAP) developed under the coordination of the Ministry of Environment and Sustainable Development under the EU-funded SwitchMed programme, with advisory services and technical support from the (UNEP). The Plan is part of Tunisia's efforts to achieve Agenda 2030 and the Sustainable Development Goals (SDG12.1). ✓ National action plan for Sustainable Public Procurement (2012 under UNEP coordination, updated on 2019 by the ministry of environment); Aims to set up an economic policy based on the sustainable consumption ; Selection of target sectors (including textile); Reform of SPP regulations (Decree 1039 of March 13, 2014) by introducing rules of good governance and sustainable development objectives as criteria for SPP; Concrete deployment actions were led by CITET providing awareness and technical assistance to public buyers to integrate sustainability and circular economy criteria into the public procurement process. ✓ Roadmap for the establishment of innovation textile networks led by the Agency for Industry Promotion and Innovation (2019- under process) aiming to develop Textile cluster allowing R&D networking between public and private companies, universities and research institutions. Cluster is hosted within the MFCPOLE involved to implement action plans and build synergies with actors in R&D fields including circular economy. ✓ Stimulus plan for the textile and apparel sector (2019 -2023, by FTTH) based on strategic levers including offering quality product that meets international standard in the field of industrial zones management , Water & energy infrastructure. 	7 - 24	3	4	12
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Political	Textiles among prioritised sectors for EU: The European Green Deal, the Circular Economy Action Plan and the Industrial Strategy identified textiles as a priority sector in which the EU can pave the way towards a carbon neutral, circular economy, and announced an EU Strategy on textiles. The European initiative of Product foot print (PEF) studies which include apparel product can affect Tunisian companies which export to European Market in order to assess their environmental foot print and improve their competitiveness.	7 - 24	4	5	20
	Roadmap for the establishment of innovation textile networks led by the Agency for Industry Promotion (2019- under process) aiming to develop Textile cluster allowing R&D networking between public and private companies. Cluster is hosted within the MFCPOLE involved to implement action plans.	7 - 24	4	3	12
	Extended Producer Responsibility: The European Waste Framework Directive (WFD) requires that all EU Member States collect textiles separately by 2025 at the latest. In at least some jurisdictions, this is likely to entail that responsibility for waste management and recycling of textiles will be placed on the producers, based on the polluter pays principle. Thus, Tunisian subcontractors of European brands are increasingly forced to increase the circularity of the product and the use of its lifespan and the rate of recycled materials.	7 - 24	3	5	15
	Repair and reuse: The WFD also requires Member States to promote repair and re-use of textiles. Thus, Tunisian subcontractors of European brands are increasingly forced to increase the circularity of the product and the use of its lifespan and the rate of recycled materials.	7 - 24	2	5	10
Economic	Access to national and international funding mechanisms in the fields of environmental protection and energy management (depollution funds, SUNREF Tunisia, energy transition fund, carbon exchange,...): There are opportunities to benefit from grants and/or credits from financing mechanisms relating to energy management and climate change and waste management and wastewater treatment. These opportunities are not fully exploited due to a lack of knowledge of the advantages and conditions of granting.	0 - 6	4	4	16

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Economic	Growing market for denim jeans: The global market for denim jeans, estimated at US\$63.5 Billion in the year 2020, is projected to reach a revised size of US\$87.4 Billion by 2027, growing at 4.7% over the period 2020-2027 ⁶¹ . In Tunisia, Denim market is considered as an important textile segment knowing that Tunisia is the first exporter of jeans for Italy, the 4th exporter for France. In total, denim jeans sales to Europe reached 1322 million dinars in 2018. Moreover Tunisia has 500 industrial companies specializing in the manufacture of jeans. 90% of production is exported to Europe. The sector employs 57,000 people. ⁶²	0 - 6	1	4	4
	Significant growth projected for the secondhand apparel market: Projected to double in the five years 2021 - 2025, reaching \$77B ⁶³ .	0 - 6	5	4	20
	The permanent increase in the price of energy in Tunisia (electricity and fuel) is an important economic issue for companies in the sector which increase the cost of final product.	0 - 6	4	3	12
	Very high competition with countries in the region and Asian countries (Morocco, Turkey, Egypt, Bangladesh, Pakistan, China, India, etc.)	0 - 6	5	4	20
Social	Occupational health and safety conditions in some companies are difficult before lack of use of protective equipment, lack of operator awareness of good working practices,...	0 - 6	4	4	16

⁶¹Report Linker, *Global Denim Jeans Industry, May 2020*

⁶²Tunisia, the leading exporter of jeans to Italy, <https://www.realites.com.tn/>, May 25, 2019

⁶³ThredUp, *2021 Resale Report*

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Social	Work of women and minors in textile factories: The textile sector is the first manufactured sector in Tunisia in terms of employment and the majority of employees are women and some certain inequalities are noted in terms of working conditions, remuneration, promotion or granting of positions of responsibility	0 - 6	4	3	12
	Growing interest/demand for transparency: Fashion consumers increasingly expect companies to be transparent about how, where and by whom their products are made. In a culture where social media drives the consumer dialogue, not addressing these expectations can have a direct impact on brand value. ⁶⁴ More and more European brands are asking for sustainability requirements from their Tunisian subcontractors (ISO 14001, 45001 certification, corporate social responsibility), ...	7 - 24	2	5	10
	Prevailing stigmas and negative connotations among consumers: The concept of circularity is an abstract idea to most consumers and terms such as recycled, upcycled, repaired and refurbished still have negative connotations. ⁶⁵	0 - 6	2	3	6

⁶⁴Global Fashion Agenda.

⁶⁵McKinsey State of Fashion, 2021

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Social	<p>Better Work – is a collaboration between the United Nation’s International Labour Organization (ILO) and the International Finance Corporation (IFC), a member of the World Bank Group – is a comprehensive programme bringing together all levels of the garment industry to improve working conditions and respect of labour rights for workers, and boost the competitiveness of apparel businesses.</p> <p>As a result of their participation with Better Work, factories have steadily improved compliance with ILO core labour standards and national legislation covering compensation, contracts, occupational safety and health and working time. This has significantly improved working conditions and, at the same time enhanced factories’ productivity and profitability.</p> <p>Currently, the programme is active in 1,700 factories employing more than 2.4 million workers in nine countries (Tunisia is not currently part of this program). As well as advising factories, Better Work collaborates with governments to improve labour laws, and with brands to ensure progress is sustained. They also advise unions on how to give workers a greater say in their lives, and work with donors to help achieve their broader development goals.⁶⁶</p>	7 - 24	2	2	4
	<p>The OECD Due Diligence Guidance for Responsible Business Conduct provides practical support to enterprises on the implementation of the OECD Guidelines for Multinational Enterprises by providing plain-language explanations of its due diligence recommendations and associated provisions. Implementing these recommendations can help enterprises avoid and address adverse impacts related to workers, human rights, the environment, bribery, consumers and corporate governance that may be associated with their operations, supply chains and other business relationships. The Guidance includes additional explanations, tips and illustrative examples of due diligence.</p> <p>The application of this guidance by international brands can may have an impact on their Tunisian clothing suppliers in terms of respect for the control of environmental and social aspects.⁶⁷</p>	7 - 24	2	2	4

⁶⁶ILO, 2022, <https://betterwork.org/>

⁶⁷ <https://www.oecd.org/investment/due-diligence-guidance-for-responsible-business-conduct.htm>

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Technological	Growing rate of innovation in denim dyeing and finishing: Legacy processes for dyeing and finishing denim fabrics and products are being replaced with innovative, low-impact production methods, including, e.g., ozone bleaches, laser and enzyme treatments ⁶⁸ .The denim products are the main products exported by Tunisian companies to European Union. The companies whose work in finishing denim products are required to reduce the production cost to chemical products.	0 - 6	4	4	16
	Expanding array of solutions for digital tagging and product-level traceability: From embedded markers in fibres, to blockchain-based data ledgers, to product-level identifiers, a range of innovative techniques and solution providers have been introduced over recent years for digitally storing information on products, with several collaborations along textile value chains launched for piloting and scaling up.Some Tunisian companies whose export their products to European market are involved in the digital traceability of theirs products (composition, ...).	0 - 6	4	3	12
	Automatic preparation and dosing of chemicals in washing and dyeing processes to reduce product waste. Some Tunisian companies have installed an automatic preparation and dosing of the mainly used chemicals to the dyeing process and it begins to be adopted increasingly by the others companies of the finishing branch.	7 - 24	5	3	15
	Automated processes for making, cutting and knitting fabrics	7 - 24	4	3	12
	Growth of technologies of wastewater treatment which allow the reuse of more than 80% of waste water	0 - 6	4	3	12
	Growth of the technologies of solar energy with high productivity and low cost	0 - 6	4	4	16

⁶⁸Fashion United, March 2021

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Technological	<p>Application of cogeneration technologies for the production of electrical and thermal energy: Cogeneration is the combined production of electricity and heat from primary energies within the same plant. Large energy-consuming companies are in the process of studying or implementing cogeneration projects for the simultaneous production of electricity and steam.</p>	7 - 24	5	3	15
	<p>Valorisation of natural dyeing as an alternative to chemical dyeing (plant wastes, agrifoods industries wastes,...): Some pilot experiments have been conducted in Tunisia for the production of natural dyes following research work done by start-ups' such as "Natdyes" which produce some dyes from vegetal waste.</p>	7 - 24	4	3	12
Environmental	<p>Limited availability of organic cotton: Commercial participants in the Ellen MacArthur Foundation Jeans Redesign project report that limited market availability for organic cotton along with premium prices are significant barriers to scaling.⁶⁹Italy was Tunisia's main supplier with a 21% market share. Next come France with 18%, Germany with 9%, Belgium 5%, China with 9% and Spain with 4%.⁷⁰</p>	0 - 6	4	3	12

⁶⁹ The Jeans Redesign, Insights from the first two years

⁷⁰Agency for the Promotion of Industry and Innovation, 2018, "Textile sector monograph"

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<p>Environmental</p>	<p>ZDHC (Zero Discharge of Hazardous Chemicals Programme) is a multi-stakeholder organisation comprising over 170 contributors from across the industry including Brands, Suppliers, Chemical Suppliers, and Solution Providers.</p> <p>The Roadmap to Zero Programme, by ZDHC, leads the fashion industry to eliminate harmful chemicals from its global supply chain by building the foundation for more sustainable manufacturing to protect workers, consumers and the planet’s ecosystems.⁷¹ Currently, this organization does not have a strong presence in Tunisia but several international brands are part of the organization and can thus require their Tunisian suppliers to limit the use of certain harmful chemicals mentioned in the Manufacturing Restricted Substances List (ZDHC MRSL).</p>	<p>7 - 24</p>	<p>4</p>	<p>3</p>	<p>12</p>
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⁷¹ZDHC Foundation, 2022, <https://www.roadmaptozero.com/>

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<p>Environmental</p>	<p>The Higg Index is a suite of tools for the standardized measurement of value chain sustainability, and it is central to the SAC’s mission to transform businesses for exponential impact.</p> <p>It is comprised of a core set of five tools that together assess the social and environmental performance of the value chain and the environmental impacts of products, including the Higg Facility Environmental Module (FEM), Higg Facility Social & Labour Module (FSLM), Higg Brand & Retail Module (BRM), Higg Materials Sustainability Index (MSI), and Higg Product Module (PM).</p> <p>Across topics such as water use, carbon emissions, and labour conditions, consumer goods brands, retailers, manufacturers, governments, NGOs, and consumers can use the Higg Index to inform their individual sustainability strategies and drive collective industry transformation.⁷²</p> <p>Currently, this approach does not have a strong presence in Tunisia but several international brands are part of the sustainable Apparel Coalition (HM group, Levi's, ALDO,...) and can thus require their Tunisian suppliers to use the HIGG index for the evaluation of their environmental and social impacts.</p>	<p>7 - 24</p>	<p>3</p>	<p>3</p>	<p>9</p>
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⁷² Sustainable Apparel Coalition, 2022, <https://apparelcoalition.org/the-higg-index/>

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<p>Environmental</p>	<p>Recovery of fabric waste as raw materials in order to increase the rate of recycled materials in the final textile product: The capacity to recycle high-quality fibres in clothing is limited by the spinning capacity in the country. Most of the high-quality waste, 100% cotton and rich in cotton, is exported to Europe, mainly to Italy, Spain, and to Turkey, most of which is not shredded. (from 3 to 4ktons), the export classified as "recycled cotton" is minimal.⁷³</p> <p>Some circular initiatives are conducted by some companies in Tunisia for textile recycling such as: the company "SITEX" has implemented in 2021a recycling Unit of fibres and textile fabrics with a capacity of 150 tons per month.</p> <p>Knowing that the stakeholders of sector intend the creation of a cluster to ensure the recovery of all wastedenim from all operators in the country. And at the end of the chain, 15% of products are in sustainable product mode.⁷⁴</p>	<p>0 - 6</p>	<p>5</p>	<p>4</p>	<p>20</p>
<p>Legal</p>	<p>EU member state France to launch mandatory carbon labelling: France's parliament approved in 2021 an expansive climate bill that will introduce mandatory "carbon labels" for goods and services, including clothing and textiles, as part of an effort to inform consumers about the environmental impact of their purchasing decisions. Under the same requirements, Tunisian subcontractors companies will be increasingly forced to calculate the carbon footprint of their products and implement an action plan to reduce the impact on climate change. This will be a condition and criterion of competitiveness that will differentiate between clothing suppliers on the French market.</p> <p>In addition, there is a trend in Europe to set up a carbon classification and labeling system for products, such as energy labels, for the next few years and which are based on a life cycle analysis and/or Product environmental footprint (PEF).</p>	<p>7 - 24</p>	<p>3</p>	<p>5</p>	<p>15</p>

⁷³ UNIDO, Switchmed project, 2020, "Textile waste mapping in Tunisia and Morocco",

⁷⁴ Textile Competitiveness pole MFC, 2021

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Legal	<p>New Anti-waste Law Adopted in France (law n° 2020-105 of February 10, 2020), this law include a measure aiming the prohibition on the destruction of unsold clothing products. Manufacturers, distributors, and stores with unsold inventory will be required to donate or recycle it instead of incinerating it or dumping it in landfills. Additionally, the law expands incentives for manufacturers to design their products to be more easily recyclable.</p> <p>Therefore Tunisian subcontractors of French brands, are required to improve the recyclability of theirs products. Moreover, the orders rate will be better planned by the French brands in order to reduce the overstock and unsold textiles.</p>	7 - 24	3	3	9
	<p>Potential legislation to curb greenwashing: The European Green Deal states “Companies making ‘green claims’ should substantiate these against a standard methodology to assess their impact on the environment”. The 2020 Circular Economy action plan commits that “the Commission will also propose that companies substantiate their environmental claims using Product and Organisation Environmental Footprint methods.” Thus, Tunisian companies that export to the EU must prepare for the assessment of their environmental footprint by following the PEFCR guide in order to anticipate the demands of European international brands on their environmental footprint. This will be a condition and criterion of competitiveness that will differentiate between clothing suppliers on the European market.</p>	7 - 24	4	5	20
	<p>Mandatory Human Rights Due Diligence: The European Parliament adopted a legislative initiative report proposing a mandatory corporate due diligence obligation to identify, prevent, mitigate and account for human rights violations and negative environmental impacts in business’ supply chains. This legislation applies to all companies with global supply chains. Under the same requirements, Tunisian subcontractors companies are actually assessed by their European clients in this fields.</p>	7 - 24	2	5	10

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Legal	<p>EU member state Sweden to launch chemical tax on clothing: The Swedish government announced its plans to introduce a chemical tax on clothing and footwear with rollout in 2022. The tax proposal is intended to phase out hazardous chemicals in order to reduce health problems for consumers that are exposed to the chemicals, to reduce environmental impact arising during manufacture, washing and waste, and to increase the quality of recycled materials. The tax will apply to all clothing and footwear that are produced or imported into Sweden from abroad, with the exception of certain protective clothing and toys.</p> <p>Sweden is not main market for Tunisian textile products. However, other EU members states might follow Sweden, in which case it will impact Tunisian companies.</p>	7 - 24	3	4	12
	<p>Regulatory compliance, particularly with regard to the regulation of classified establishments and industrial wastewater and hazardous waste cf. regulatory references.</p>	0 - 6	4	4	16

Regulatory references :

- Decree No. 2006-2687 of October 9, 2006, relating to the procedures for opening and operating dangerous, unhealthy or inconvenient establishments
 - Decree No. 2005-1991 of July 11, 2005 relating to the environmental impact assessment and fixing the categories of units subject to the environmental impact study and the categories of units subject to specifications; Appendix 2 point N°16: Laundries using water for washing clothes and blankets;
 - Law 2009-11 of March 02, 2011: Code of safety and prevention of risks of fire, explosion and panic in buildings & implementing decrees:
 - Joint Order of the Ministry of the Interior and the Ministry of Industry of 20 February 2010 setting the ToRs for the hazard study
 - Decree No. 2009-2269 of July 31, 2009, amending Decree No. 2004-2144 of September 2, 2004, setting the conditions for subjecting energy-consuming establishments to mandatory and periodic energy audits;
 - Decree No. 2002-335 Setting the threshold from which water consumption is subject to a periodic and mandatory technical diagnosis of equipment, works and production methods related to the use of water, the conditions for appointing experts , the nature of the diagnoses and their periodicity;
 - Order of the Minister for Local Affairs and the Environment and the Minister for Industry and Small and Medium-Sized Enterprises of 26 March 2018, setting the limit values for effluent discharges into the receiving environment;
 - Law No. 96-41 of June 10, 1996 relating to waste and the control of its management and disposal;
 - Decree No. 2000-2339 of October 10, 2000, fixing the list of hazardous waste;
 - Decree No. 2010-2519 of September 28, 2010, setting the limit values at source for air pollutants from fixed sources.
 - Order of the Ministry of Industry of 15 November 2005 establishing the nomenclature of dangerous, unhealthy and inconvenient establishments (EDII) concerning the storage of certain substances.
- **For chemical and POPS regulation:**Tunisia signed the Stockholm Convention on Persistent Organic Pollutants on May 23, 2001 and ratified it by presidential decree on April 13, 2004. In application of Article 7 of the Convention, Tunisia has drawn up and submitted its first plan Implementation Plan for the Stockholm Convention (PNM) which was adopted in 2007a National Action Plan has been prepared for the implementation of the convention of Stockholm (POPOs -Tunisia project)⁷⁵ and regulatory framework is under process: regulatory texts relating to the use of PCBs;
 - regulatory texts relating to the use of pesticides;
 - The legal framework relating to products for Public Hygiene;
 - Pesticide quality control Framework;
 - Regulatory texts relating to dioxins and furans.

⁷⁵<http://www.cntppdz.com/uploads/pops/Pr%C3%A9sentation%20%20Tunisie.pdf>