

# Policy Paper

## **Accelerating action for a sustainable and circular garment and footwear industry:**

which role for transparency and traceability  
of value chains?



**United Nations Economic Commission for Europe**

United Nations Centre for Trade Facilitation and Electronic Business

**Policy Paper**

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and traceability of value chains?**



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## Foreword

The garment and footwear industry has one of the biggest environmental footprints and poses great risks for human health and society. At the same time, the complexity and opacity of the value chain makes it difficult to identify where such impacts occur and to devise necessary targeted actions. In the next decades, fast fashion trends, coupled with growing demand in emerging economies, are going to intensify the effects on the environment and human health of practices and processes, and on working conditions.

Key actors in the industry have identified traceability and transparency of the value chain as a priority to increase consumers' trust, better manage resources and relations with business partners, combat counterweights and handle reputational risks, while supporting more responsible consumption and production patterns, circularity and inclusive progress, in line with the Sustainable Development Goals (SDG) 12 and 8, of the United Nations Agenda for Sustainable Development.

In fact, many companies have a limited view of the network of business partners within their value chain and do not get the full story behind their products. Most can identify and track their immediate suppliers, but information is often lost about the suppliers of their suppliers. Considering that the value chain is global and fragmented, with at least 15 nodes between the production of raw materials to the end-user product, achieving progress is a complex issue. It requires the collaboration of all industry partners, the deployment of common approaches and reliable technical solutions in widely different environments.

UNECE, with its United Nations Centre for Trade Facilitation and e-Business (UN/CEFACT), has engaged with industry stakeholders, looked at such challenges and opportunities, and recommends the launch of a framework initiative to accelerate action for a sustainable and circular garment and footwear industry, through transparency and traceability of value chains.



Olga Algayerova  
Executive Secretary  
United Nations Economic Commission for Europe

## **The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT)**

### **Simple, Transparent and Effective Processes for Global Commerce**

UN/CEFACT's mission is to improve the ability of business, trade and administrative organizations, from developed, developing and transitional economies, to exchange products and relevant services effectively. Its principal focus is on facilitating national and international transactions, through the simplification and harmonization of processes, procedures and information flows, and so contribute to the growth of global commerce.

Participation in UN/CEFACT is open to experts from United Nations Member States, Intergovernmental Organizations and Non-Governmental Organizations recognised by the United Nations Economic and Social Council (ECOSOC). Through this participation of government and business representatives from around the world, UN/CEFACT has developed a range of trade facilitation and e-business standards, recommendations and tools that are approved within a broad intergovernmental process and implemented globally.

UN/CEFACT is committed to ensuring that the gender dimension is reflected in norms, roles, procedures, and access to resources. Government and trade are encouraged to promote equal opportunities for women and men within the scope of Trade Facilitation activities. UN/CEFACT specifically encourages the collection, analysis, and monitoring of gender disaggregated data in order to better understand and support women's engagement in international trade and transport facilitation.

This Recommendation encourages governments, business communities, development partners, international organizations, and other policymakers to follow UN/CEFACT's commitment to ensure inclusiveness for women.

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## Abstract

The garment and footwear industry is one of the main sectors in the global economy, but is also one of the industries with the highest environmental footprint and risks for human health and the society. At the same time, the complexity and opacity of the value chain makes it difficult to identify where such impacts occur and devise necessary targeted actions to address them. In the next decades, fast fashion trends, coupled to growing demand in emerging economies, are going to intensify the effects on the environment and human health of practices and processes, and on working conditions across the value chain.

Addressing the growing civil society's and consumers' demand for attaining sustainability in the sector and for trusted information about the products that consumers purchase, wear or use, is going to be a challenge for companies.

Key actors in the industry have identified traceability and transparency as crucial enablers of more responsible production and consumption patterns, and a core priority for immediate action. A sectoral framework for traceability and transparency of the value chain, that is interoperable and scalable can the response. It would allow an effective connection between producers and firms, firms and brands and retailers, and provide a rigorous way of collecting and exchanging information related to operations and products along the entire value chain.

This study shows that transparency and traceability are a key driver of sustainability and must be a collaborative effort. It looks into the key requirements for and components of robust transparency and traceability framework and provides a series of recommendations on possible measures that public authorities could devise to create a conducive environment and sustain the implementation of such a framework at the industry level.



## Introduction

Garment and footwear is one of the biggest economic sectors and is one of the industries with the highest footprint in terms of social, environmental and health impacts, mainly happening in raw material production and manufacturing in developing countries. Its value chains are both global and complex, with numerous stakeholders involved, driven by big retailers and traders, however constituted by an enormous amount of small and scattered production facilities all around the world (OECD 2017). Small brands making around half of the industry, are lacking the knowledge and resources to significantly improve their footprint. They also have little control over and transparency along their supply chains. Even when their intent is good, they lack the critical reach to effect change (BCG GFA 2017).

Important ingredients to mitigate sustainability risks and impacts in the sector, include: 1) Improving working conditions of employees in the raw material production and manufacturing stages, especially in the upstream segments of the value chain; 2) Improving the environmental footprint of products and production processes throughout the entire value chain, including aspects such as use, reuse and recycling, in line with a circular economy approach; 3) Moving consumers attitudes towards more intelligent and ethical consumption choices; 4) Ensuring that final consumers receive accurate and relevant information about the social, environmental and health risks and impacts of the apparel and footwear they buy (EC 2017).

Current patterns of production and consumption in the industry show that such risks are going to increase over the next decade (McKinsey & Company 2018), while the complexity and opacity of the value chain makes it extremely difficult to identify where they occur, and identify the necessary targeted actions to address them, and respond to growing consumers' and civil society's demand for attaining sustainability in the sector (Kumar, Agrawal, Wand and Chen, 2017).

The present study investigates on how enhanced traceability and transparency of value chains can help advance the sustainability performance of the garment and footwear sector. It supports the widespread view that traceability is a "tremendously impactful tool" for advancing sustainability patterns, but there is still much to do before it becomes an integral part of sustainable value chain management and is used widely by companies (UN Global Compact 2014). At present, only a very small percentage of commodities and production stages are traceable on sustainability attributes.

This study highlights that transparency and traceability must be a collaborative effort, and looks into the key requirements for and components of robust transparency and traceability schemes and provides a series of recommendations on possible measures that public authorities could devise to create a conducive environment and sustain the implementation of these schemes at the industry level.

Such efforts will support a transformation in the sector towards more sustainable business practices and informed and ethical consumers' choices, thus contributing to achieving relevant Sustainable Development

Goals (SDGs) targets of the 2030 United Nations Agenda for Sustainable Development, particularly under SDG 12 on responsible consumption and production, with targets 12.6 inviting Member States to encourage companies, and especially multinationals, to adopt and report on sustainability practices, and target 12.8, that is about ensuring that people everywhere have the relevant information and awareness for sustainable development and lifestyles.

## 1. Methodology

The analysis conducted for this paper is based on primary and secondary research activities and addresses the following research questions: 1. *How can transparency and traceability of the value chains help advance sustainability in the garment and footwear sector?* 2. *What are the key requirements for the business sector to put in place a robust transparency and traceability scheme?* 3. *What are possible measures that public authorities (national/regional/international) could devise to support traceability and transparency of sustainable garment and footwear value chains?*

**Traceability**, is understood as “the ability to trace the history, application or location of an object” in a supply chain (ISO, 2015). In this context, it is defined as the ability to identify and trace the history, distribution, location and application of products, parts and materials, to ensure the reliability of sustainability claims, in the areas of human rights, labour (including health and safety), the environment and anti-corruption (UN Global Compact 2014); and “the process by which enterprises track materials and products and the conditions in which they were produced through the supply chain” (OECD, 2017).

**Transparency**, relates directly to relevant information been made available to all elements of the value chain in a standardized way, which allows common understanding, accessibility, clarity and comparison (EC 2017)

**Sustainability**, in this context, is understood as the manufacturing, marketing and use of garment, footwear and accessories, and its parts and components, taking into account the environmental, health, human rights and socio-economic impacts, and their continuous improvement through all stages of the product’s life cycle (from design, raw material production, manufacturing, transport, storage, marketing and final sale, to use, reuse, repair, remake and recycling of the product and its parts and components) (UNECE 2018).

To answer the above questions, quantitative and qualitative analysis has been conducted through targeted interviews and field visits, and the collection of input through a Survey questionnaire (See Annexes 1 & 2).

For the purpose of this study the term *clothing* refers to both garment and footwear. The textile and leather companies that have participated in the Survey and interviews, are companies working in the garment and footwear industry.

The Survey questionnaire has been developed, consulted and piloted with policy makers, business associations, and standard setting entities, including EURATEX, Confindustria Moda Italia, COTANCE, ICEC and UNIC, Textile Exchange, GS1, Sustainable Apparel Coalition, the Italian Ministry of Economic Development, and several brands and manufacturers (See Annex 2). It consists of two main sections, enquiring about companies sustainability priorities and performances, and their views on traceability and transparency approaches for sustainable value chains (See Annex 1).

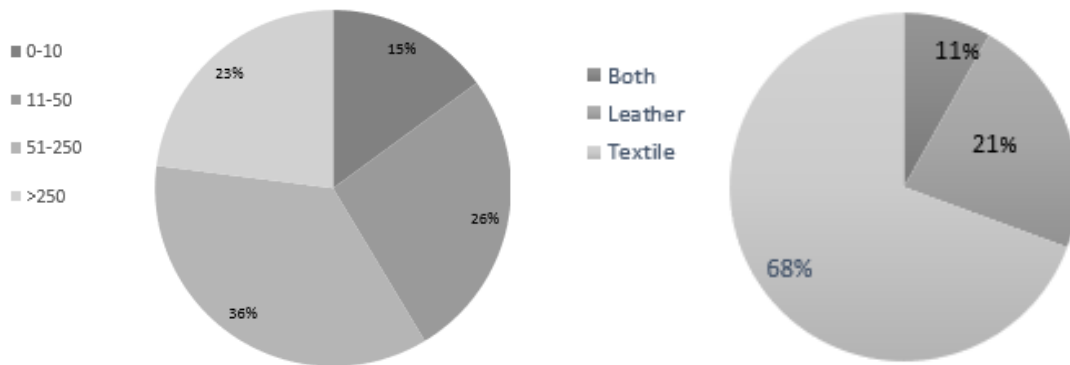
Interviews were held with individuals at business sector associations, companies, governments, NGOs, traceability schemes and standard setting bodies, who have significant experience in traceability and sustainable value chain management in the industry. In particular, interviews through physical meetings and phone calls, and field visits were conducted with 16 companies, 2 standard setting bodies for traceability, 6 Business Associations and 3 NGOs, 1 Certification Body, 2 Academic Institutes and 2 Ministries/International Cooperation Agencies in 9 different countries, using a standard interview template that was coded and analyzed for trends (See Annex 2).

Regarding the survey questionnaire, 100 companies have responded from all over the world. Companies represent the textile sector for 68%, while 21% of the respondents are from the leather sector, and 11% only cover both sectors. In terms of size (based on number of employees), about one fourth of the respondents (23%) are large companies, more than one third are medium companies (36%), and the rest are small and micro enterprises (41%)<sup>1</sup> (See Figure 1). Companies provide a fair representation of the entire value chains, with several of them covering multiple phases (tiers): agriculture/farming and extraction (9% for leather and 4% for textile), raw material processing (13% for leather and 28% for textile), material manufacturing (56% for leather and 56% for textile) , final product manufacturing and assembling (16% for leather and 23% for textile), agents and trading company (3% for both leather and textile) brand and retailing ( 19% for leather and 25% for textile).

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<sup>1</sup> Micro enterprises: up to 10 employees; Small enterprises: 11-50 employees, Medium enterprises:51 to 250 employees; and Large enterprises: 250 employees.

Figure 1  
Sample Overview



Source: UNECE, 2018

In terms of geographical coverage, more than 80% of the 100 companies that took part in the Survey are from the European Union (58 from Italy, 9 from Germany, 4 from The Netherlands, 3 from France, 4 from Belgium, 1 from Austria, 1 from Spain and 1 from Sweden), while the rest are from America (5 from Brazil, 2 from USA, 1 from Argentina and 1 from Columbia), from Africa (1 from South Africa) and from Asia (1 from China, 1 from India, 1 from Japan, 1 from Pakistan), with the rest having provided anonymous responses (See Annex 2).

In addition, the research has benefitted from a review of information, literature and case studies on supply chain management, transparency and traceability, sustainability, corporate social responsibility (CSR) and due diligence, with a focus on the garment and footwear sector, along with in-depth online research of numerous relevant stakeholders' websites, complemented by published documents, reports, statistics and studies carried out by organizations such as the UN, ILO, WTO, the European Commission, and the World Bank.

To answer the research questions, this study considers a product lifecycle approach, and looks at the sustainability risks along the value chain, related to the product, production process, transportation and logistics, packaging, and raw material. The novelty of the proposed approach is owing to two different aspects: the implementation of transparency and traceability as a means to assess and manage sustainability risks along the entire value chain, and the proposal of a decision-making approach at the policy and industrial level.

## 2. Key facts for the garment and footwear industry

Clothing is a fundamental part of our every day life, and for many people is an important expression of individuality. It is also an important sector in the global economy, as its market is valued at US\$ 3 trillion in 2017 and represents 2% of the world GDP (Euromonitor 2017, Fashion United 2015, BCG 2017)<sup>2</sup> and is expected to accelerate its pace, with an annual growth rate estimated at 2.1% between 2017 and 2022 (Euromonitor 2017). Globally, the industry employs more than 60 million workers (Fashion United 2018), with most of them occupied in the upstream part of the value chain and in LDCs, and up to 75% of workers being women (ILO 2017).

Currently, clothing represents about 5% of total manufactured goods exported in the world (WTO 2017), with China leading (36%), followed by the EU (28%), Bangladesh (6.4%), Vietnam (5.5%) and India (4%). And in 2018, the sector appears to have reached a tipping point, with more than half of sales of garment and footwear going to take place outside the mature markets of Europe and North America, in emerging markets located in Asia-Pacific, Latin America and other regions, as more people in such regions have joined the middle class. In five large developing countries—Brazil, China, India, Mexico, and Russia—apparel sales grew eight times faster than in Canada, Germany, the United Kingdom, and the United States (McKensey & Company 2018).

A key factor to this trend, and exponential growth over the last two decades, lies in the phasing-out of the Multi-Fibre Arrangement (MFA) that had governed the world trade of clothing from 1994 to 2004 through quotas on developing countries' exports to advanced economies (EC 2017). Coupled to the accelerated adoption of disruptive technology, digitalization across the value chain, adoption of innovative business models and proliferation of data, this has led to the globalization and fragmentation of the industry value chain, and a move towards faster and more flexible production models (McKensey & Company 2018).

The increasing delocalization trend of the upstream part of the supply chain has been certainly due to the opportunity to benefit from cheaper labour costs and less stringent and demanding legislation on labour rights, in developing economies (ILO 2017). Consumers have responded to lower prices and a greater variety by buying more items of clothing. The number of clothing items produced each year has doubled since 2000 and exceeded 100 billion in 2014: with approximately 14 garment pieces for every person (McKensey & Company 2018).

More recently, the fast fashion trend has been further shaping production and consumption patterns in the sector, as frequent purchase of products that will only last one season has led to the concept of disposable clothing. Given the rising demands of the industry, countries in sub-Saharan Africa (e.g. Ethiopia, Morocco) and Europe (e.g. Turkey) are expected to become a more important sourcing market for fashion companies (McKinsey 2014). These countries have the benefits of proximity to both raw materials and consumer markets

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<sup>2</sup> Market size estimates based on triangulation of Euromonitor International (Apparel and Footwear) 2017, Fashion United 2015, Boston Consulting Group 2017

in the West. This results in shorter lead and delivery times and higher flexibility in comparison to countries in Asia, where many fashion companies have their sourcing practices currently.

### 3. An overview of sustainability risks in the garment and footwear industry value chain

Such production and consumption trends for the industry, are coupled with increasing and well documented sustainability risks and impacts. Regarding the environment, while natural fiber cultivation involving pesticides (e.g. cotton) results in decreased soil fertility and water pollution, in the manufacturing stage, the industry has an environmental footprint mainly linked to discharge of pollutants and water consumption (79 millions m<sup>3</sup>/year of water consumption), and it is no secret that the clothing sector consumes very high levels of energy and plays a role in climate change (1,715 mln tons/year CO<sub>2</sub> emissions) (Strähle et al. 2015).

*Tier: for the purpose of this report, Tier refers to a main phase of the value chain.*

**Tier 1:** Final product manufacturing and assembly (or finished goods production). **Tier 2:** Material manufacturing (or finished materials production). **Tier 3:** Raw material processing. **Tier 4:** Agriculture, farming and extraction.

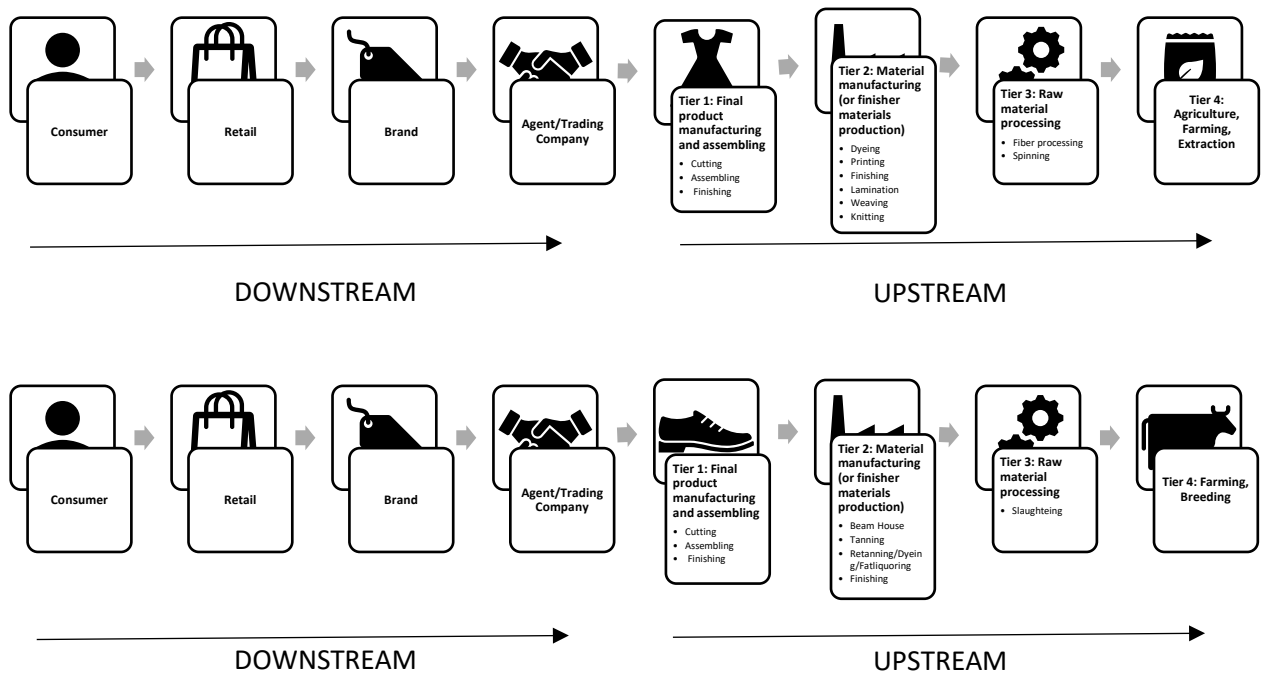
*Other tiers: E.g. Agent, Wholesale/Third Party, Brands, Chemical supplier (SAC 2018)*

This is particularly the case for cotton, which represents 45% of all fibers used in the industry, globally, and where the pesticides used for the growth of the cotton settle into the soil or enter the water supply. Making a pair of jeans requires 1 kg of cotton, which involves using up to 20'000 liters of water (GS1 2018). When it comes to the health risks associated with the handling of chemicals, and the illnesses that are a by-product of using such substances, it is reported that 10 % of textile-related substances are of potential concern to human health, and that 25 % of chemicals manufactured globally are applied in the clothing industry. The Italian Textile and Health Association (2016), reports for instance that about 8% of dermatological diseases are caused by the garment and footwear we wear.

Lastly, but not of less importance, social risks are plenty in garment and footwear value chains, as the production of garments is often outsourced to developing countries, where there are less stringent labor laws, and companies benefit from cost efficiencies by taking advantage of workers, failing to pay them a minimum wage. On average, it is estimated that minimum wages are half the level of leaving wages, there are 5.6 injured per 100 workers every year, and in certain countries, for 87% of the workforce (manly women), wages are lower than the minimum wage, which is well below living wages (ILO 2017).

This study has looked at the typical nodes in the garment and footwear value chains and provided a mapping of the key sectoral risks above discussed (See Figure 2 and Table 1).

Figure 2  
**Overview of the typical key nodes in the garment and footwear value chain**



Source: UNECE 2018, GS1 1018

Such risks and impacts are expected to grow, following an increase in global fashion consumption by 63% (from 62 to 102 mln tons) between 2015 and 2030, also due to fast fashion trends, that has led to an average increase from 2 to about 5 fashion cycles a year, with some European brands offering 24 new collections a year (McKinsey 2018). Technological developments, has made it easier than ever to buy new clothes through online platforms, which is increasing the rate of production and consumption (BoF 2018).

This has put great emphasis on the need to look into waste production and the issues of reuse and recyclability, starting from the fibre stage of the supply chain. Clothing utilization has, as a matter of fact, decreased by 36% in the last 15 years, meaning more clothes are being produced and then disposed of after a shorter period. Currently, 92 million tons of waste are produced each year, of which 20% only are recycled (Ellen Mac Arthur Foundation 2017).

**Table 1**  
**Mapping of key sector risks and impacts along the garment and footwear value chain**

| <i>Risks</i>          | <i>Brand/Retailer</i>   | <i>Tier 1:<br/>Final product<br/>manufacturing<br/>and assembly</i>   | <i>Tier 2:<br/>Material<br/>Manufacturing</i>   | <i>Tier 3:<br/>Raw material<br/>processing</i>  | <i>Tier 4:<br/>Agriculture, farming and<br/>extraction</i>  |
|-----------------------|---|---|---|---|---|
| <i>Environmental</i>  |   |   |   |   |   |
|                       | <ul style="list-style-type: none"> <li>- Fast fashion (from 2 to 5 cycles/year)</li> <li>- Greenwashing</li> <li>- Biodegradability</li> <li>- Waste (e.g. packaging, tags, hangers, bags)</li> <li>- Energy efficiency (e.g. lightning in stores),</li> <li>- Air pollution/CO2 emissions generated by goods transportation</li> </ul> | <ul style="list-style-type: none"> <li>- Manufacturing and finishing waste (cuts and sews, samples)</li> <li>- Dyeing waste</li> <li>- Water use (garment finishing)</li> <li>- Water pollution &amp; lack of waste water treatment</li> <li>- Energy efficiency of equipment/machineries</li> <li>- Hazardous chemicals and toxics (for prints)</li> </ul> | <ul style="list-style-type: none"> <li>- Hazardous chemicals and toxics (dyeing)</li> <li>- Dyeing waste</li> <li>- Pretreatment bleaching and washing waste</li> <li>- Finishing waste</li> <li>- Knitting waste</li> <li>- Water consumption (dyeing)</li> <li>- Water pollution</li> <li>&amp; lack of waste water treatment</li> </ul>        | <ul style="list-style-type: none"> <li>- Waste (spinning)</li> <li>- Energy consumption/ CO2 emissions (spinning, synthetic fibers processing)</li> <li>- Water consumption (fibers processing/cleaning/rinsing)</li> </ul>   | <ul style="list-style-type: none"> <li>- Use of insecticides and pesticides</li> <li>- Fertilizers</li> <li>- Soil and land degradation</li> <li>- Habitat loss/Deforestation</li> <li>- Water consumption</li> <li>- Biodiversity &amp; ecosystems depletion</li> <li>- Air pollution</li> <li>- Resource/Fossil fuel depletion</li> </ul> |
| <i>Social/Ethical</i> |   |   |   |   |   |
|                       | <ul style="list-style-type: none"> <li>- Fast fashion (from 2 to 5 cycles/year)</li> <li>- Low wages</li> <li>- Working hours</li> <li>- Limited social security</li> <li>- Temporary employment</li> <li>- Ethics and anti-corruption</li> </ul>   | <ul style="list-style-type: none"> <li>- Low wages</li> <li>- Non-compliance to minimum wage legislation</li> <li>- Health &amp; Safety on the workplace</li> <li>- Gender equality</li> <li>- Discrimination</li> <li>- Disciplinary practices</li> <li>- Right of association and collective bargaining</li> <li>- Working hours</li> </ul>               | <ul style="list-style-type: none"> <li>- Low wages</li> <li>- Non-compliance to minimum wage legislation</li> <li>- Prevalence of child labour</li> <li>- Risks of forced and compulsory labour</li> <li>- Health &amp; Safety on the workplace</li> <li>- Gender equality</li> <li>- Discrimination</li> <li>- Disciplinary practices</li> </ul> | <ul style="list-style-type: none"> <li>- Low wages</li> <li>- Non-compliance to minimum wage legislation</li> <li>- Prevalence of child labour</li> <li>- Risks of forced and compulsory labour</li> <li>- Health &amp; Safety on the workplace</li> <li>- Gender equality</li> <li>- Discrimination</li> <li>- Disciplinary practices</li> </ul> | <ul style="list-style-type: none"> <li>- Low wages</li> <li>- Prevalence of child labour</li> <li>- Risks of forced and compulsory labour</li> </ul>  |
|                       | <ul style="list-style-type: none"> <li>- Influence on responsible consumption patterns</li> <li>- Health &amp; Safety</li> <li>- Product Quality/Durability</li> </ul>  |   |   |   | <ul style="list-style-type: none"> <li>- Extensive land use vs use for food production</li> </ul>   |
|                       |   |   |   |   | <ul style="list-style-type: none"> <li>- Freedom from hunger, thirst and malnutrition, physical and thermal discomfort, pain, injury and disease, fear and distress</li> <li>- Freedom to express normal patterns of behavior</li> </ul>  |

Source: SA8000, OECD 2017, SAC 2018, GRI SRS 2018, BCG and GFA 2018, UNECE 2018

The lack of complete and transparent information about where and by whom materials are sourced, transformed and assembled, about the effects on the environment and human health of practices and processes, and on working conditions across the supply chain are key gaps (See Table 1). This is due to the high



complexity of the value chain, with multiple parties, nodes and processing stages in the various phases/tiers, upstream and downstream, often dispersed in different geographical locations (See Figure 2).

#### 4. Companies' strategies for sustainable production patterns

Due to the growing concerns about the industry footprint, and consequent pressures from civil society, media, non-governmental organizations, politicians and regulators, and final consumers, sustainability practices in the garment and footwear sector are receiving increasing attention from the industry. The question is how to ensure that the costs, associated for instance to land, air and water pollution, use of hazardous chemicals and pesticides, and CO2 emissions, are properly accounted for and internalized. But also how to guarantee a level playing field and fair competition for those companies that operate in highly regulated markets with strict rules enforcement, and suffer from unfair competition of companies exploiting poor labour conditions and less stringent environmental and health & safety legislation, particularly in developing countries.

Consumers, for instance, are getting more and more concerned about the ethical and environmental impacts of their purchases. In 2015, a survey of 30,000 consumers in 60 countries found that 66% of consumers are ready to pay more for products or services from companies committed to sustainability (Nielsen, 2015). And more recent studies show that conscious consumers increasingly leave in emerging economies, are educated, with high income and children below the age of 17 (Euromonitor International 2018). At the same time, challenges for the sector have intensified and new drivers have emerged – such as product safety, product authentication (anti-counterfeit), sustainability and Corporate Social Responsibility (CSR) and supply chain efficiency – requiring increased transparency between trading partners and with consumers (GS1 2018).

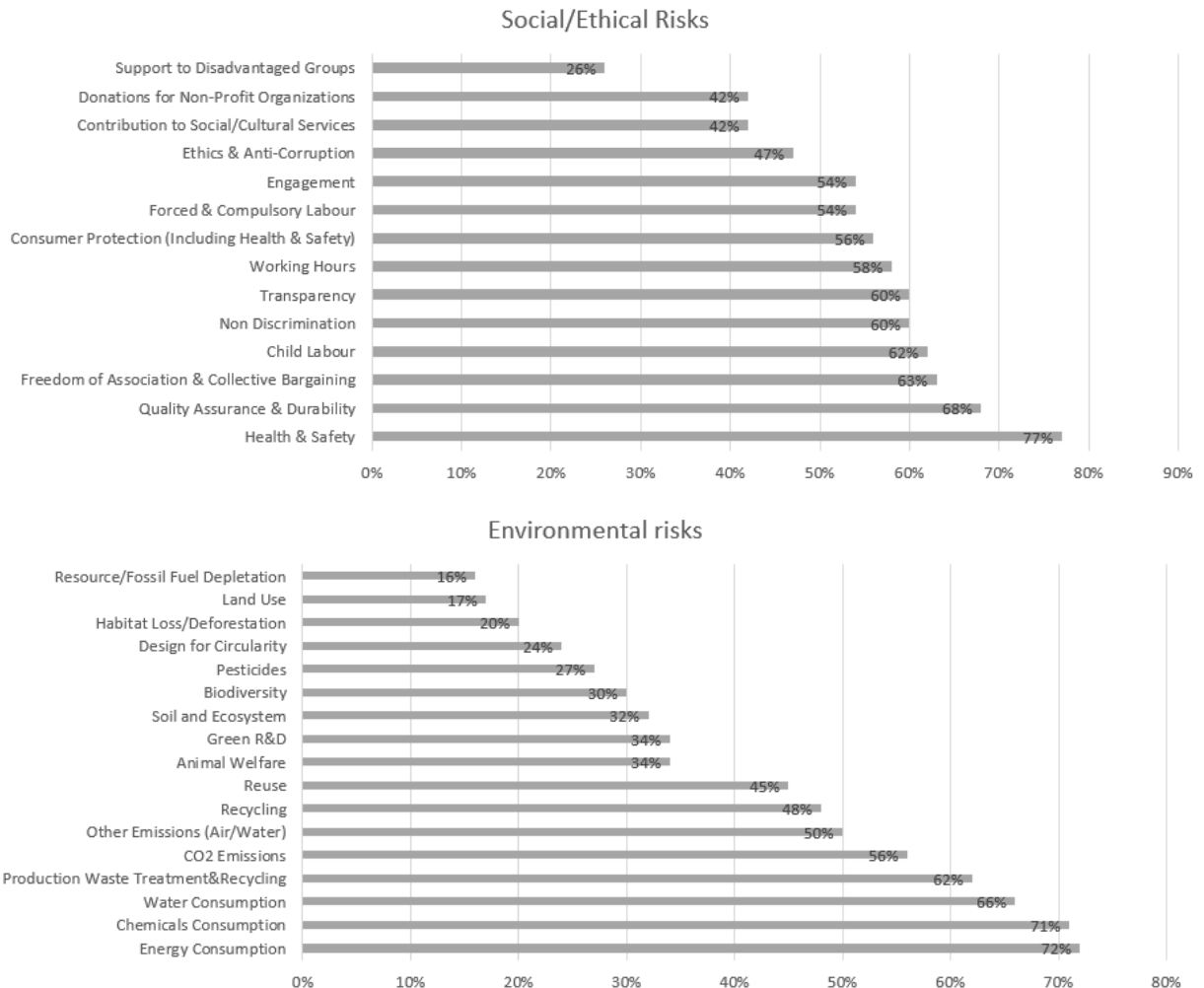
Companies are therefore starting to think the way they do business, not only in terms of economic profit, but also of sustainability, and of the societal values they create, as a way to manage reputational risks, enhance the value of their products, the efficiency of their production systems and overall operations, and their competitiveness on the market.

In fact, most of the companies surveyed for this study (75% of Survey respondents and above) have a formal sustainability strategy in place, which is especially focused on companies internal operations and own facilities, being at the level of raw material extraction and production, in the manufacturing and assembling process, or at the design stage. However, when it comes to addressing sustainability risks and impacts along the value chain, and requesting compliance with environmental and social standards to suppliers and subcontractors, such share is sensibly lower (less than 40%), while only one fifth of companies are starting to consider impacts for transport and logistics.

In terms of social and ethical risks for employees, according to this study (see Figure 3) key concerns for the industry relate to compliance with standards on health & safety on the workplace, freedom of association and collective bargaining, child labour, non discrimination, working hours and forced and compulsory labour.

Regarding consumers and communities, priorities mainly relate to quality assurance and durability of products, transparency and consumers protection.

Figure 3  
**Environmental and Social/Ethical Risks in Sustainability Approaches**



Source: UNECE 2018

Regarding the category of environmental risks, sustainability approaches mainly look into levels of energy and water consumption, use of chemicals, production waste treatment and recycling, and CO2 emissions in production processes. Increasing attention is also paid to circular approaches in terms of reuse, recycling and green R&D. However, there is less attention to impacts in the upstream part of the value chain, such as the environmental footprint of raw material production and extraction like resources, soil and land degradation, biodiversity and ecosystems depletion, habitat loss and deforestation, which are negative externalities often difficult to measure and account for.

When it comes to working towards compliance with such sustainability claims, 51% of surveyed companies mentioned they have voluntary certification/s on sustainability performances<sup>3</sup>. Also, it is worth mentioning that companies are becoming increasingly aware of the relevance of their sustainability approaches to achieving the SDGs of the 2030 Agenda for Sustainable Development (38% of respondents), particularly for advancing responsible consumption and production patterns - SDG 12, and combatting climate change - SDG 13. But they also mention about links with SDG 1 No Poverty, 2 Zero Hunger, 3 Good Health and Well-Being, and 8 Decent Work and Economic Growth.

## 5. Transparency and traceability as means to advance sustainability of the value chain

Brands, retailers, suppliers (product, component, packaging), processors, manufacturers, distributors, logistics providers and solution providers, regulators - and consumers - are all demanding fast, accurate and complete information that can be seamlessly accessed across traceability systems (GS1 2018). However, it is a challenge for companies to meet the ever-increasing demand for trusted information about the products consumers purchase and wear or use - without a framework to ensure that traceability systems are interoperable and scalable.

As shown in Figure 2, products for this sector, are the result of numerous production phases, and the interaction of multiple economic actors that exchange raw-materials, semi-finished goods, parts and components and finished goods, and large geographical and cultural distances between retailers and brands from one side and farmers and manufacturers on the other side. Therefore, sustainability can't be achieved in the boundaries of a company's own operations, but has to be pursued and traced throughout the entire value chain, with methodologies such as whole product life-cycle assessment and sustainable sourcing and evaluation practices (Winter and Lash 2016, OECD 2017).

Improving traceability and transparency are seen and as a key means to investigate and collect most of the data needed to qualitatively and quantitatively assess the environmental and social sustainability of a value chain, and as the first necessary step in the roadmap for scaling-up sustainable patterns (BCG and GFA 2018).

Traceability is the capacity to substantiate a claim via the collection of relevant data generated along the value chain (history, distribution, location and application of products, parts and materials). Its application allows the mapping of the business and production flows, from farming and raw materials extraction to semi-finished product and parts production to final product manufacturing, retail, and possibly use and reuse, in line with a

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<sup>3</sup> For raw materials: GOTS, FSC, GRS, OEKO TEX, Tessile e Salute are the most mentioned; for products: OEKO TEX, GOTS, USI 140001-S001-18001, Tessile e Salute, Serico, FSC, Detox are the most mentioned; for internal production: ISO 14001, OEKO TEX, Standard 100, GOTS, INDITEX, Tessile e Salute, FSC, Detox are the most mentioned.

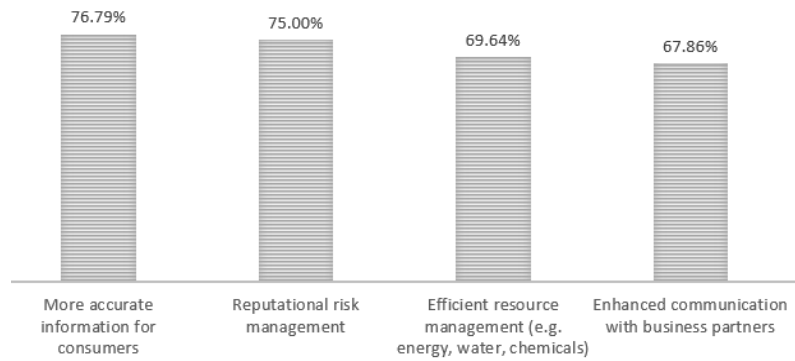
circular economy approach (Agrawal et al. 2016). This requires the active collaboration of partners involved in the same production network, which have to be willing to share internal information with other supply chain actors. By using this approach, each actor can include in its network the sustainable partners, which can adopt the same method for the selection of their own suppliers. The next step is Transparency, which relates directly to relevant information being made available to all parties and actors of the value chain in a standardized way, which allows common understanding, accessibility, clarity and comparison (EC 2017).

*But “How can transparency and traceability of the value chains help advance sustainability in the garment and footwear sector?”*

This is the first research question addressed in this paper. In fact, key actors in the industry have identified traceability and transparency as crucial enablers for change towards more responsible production and consumption patterns, and as the first core priority for immediate implementation (CEO Agenda 2018, BCG and GFA 2018). It actually allows connection between producers and firms, firms and brands and retailers, and provides a rigorous way of collecting information related to operations and products along the value chain. Figure 4 reports the results of the Survey conducted for this study, which highlights the business sector views on the key benefits of traceability in garment and footwear value chains.

According to respondents, traceability helps companies to build trust with consumers, along with stronger relationships and more solid networks with clients and suppliers. It also helps identify opportunities for efficient and sustainable management of resources, as well as risks for health, the environment and labour rights. Presenting the information in a standardized form, supports common understanding, accessibility, clarity and comparison, and fosters credible communication towards consumers and the general public. Tools such as the Higg Index (Sustainable Apparel Coalition), build on industry-wide collaboration and go exactly in this direction.

Figure 4  
The benefits of traceability



|  |   |
|--|---|
| <b>Consumers' trust</b>                              | <b>More accurate information to consumer's regarding product safety, due to availability of more robust, and complete product data used in B2B and B2C processes. This is to be coupled to more accurate and rapid detection and deterrence of counterfeit products.</b>                                |
| <b>Reputational risk management</b>                  | More efficient and accurate sustainability and CSR information, resulting from increased transparency and automated recording and sharing of traceability data. This allows to better address pressures from civil society, media, politicians and regulators, regarding products and operations claims |
| <b>Efficient supply chain/resource management</b>    | Costs savings resulting from simplified and automated business processes such as inventory management, but also from better information and control over resource use (water, energy, chemicals, etc.)  |
| <b>Enhanced communication with business partners</b> | More accurate and complete information exchange helps improve communication with business partners along the value chain.   |

Source: UNECE 2018, GS1 2018, Kumar et Al. 2017

To address this research questions, in addition to the Survey results, the Study has looked into research papers, reports and guidelines and has conducted face to face interviews with multiple stakeholders for the sector. Table 2 below compiles a selection of quotes on the benefits of traceability approaches highlighted by governments, international organizations, NGOs, and brands and companies in the garment and footwear sector. They highlight that traceability and transparency of the value chain are important pre-conditions for sustainability and are key for identifying and monitoring risks and impacts, sustaining the reliability of claims and companies' accountability, reducing public pressures and for making relevant information available to final consumers.

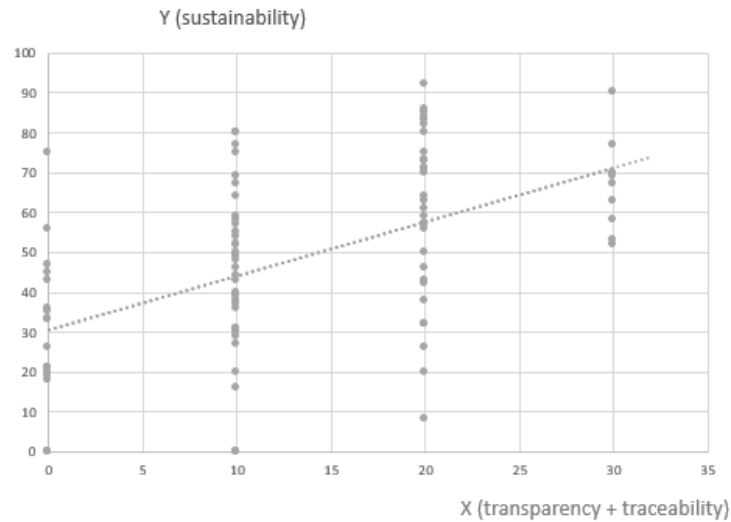
Table 2  
**Quotes on benefits of traceability for sustainable value chains in the garment and footwear sector**

|   |   |
|---|---|
| <b>Italian Ministry of Economic Development</b> |   |
| <b>European Commission</b>                      | “Traceability can turn the challenge of transparency into new opportunities for developing a reliable garment industry in which social and environmental standards are respected”   |
| <b>UN Global Compact and BRS</b>                | “There is no doubt that traceability schemes have become an important part of the sustainability landscape and are growing in impact and importance”  |
| <b>Sustainable Apparel Coalition</b>            | “To be able to gain knowledge, traceability, transparency and dialogue deep down the supply chain are a prerequisite for enabling change and improvements on environmental, social and ethical aspects in production patterns”                                  |
| <b>Greenpeace</b>                               | “Traceability is key for keeping control over the quality of textiles and ensuring information is available to evaluate the environmental footprint and social conditions of sourced materials”   |
| <b>Rank a Brand</b>                             | “Traceability and transparency further facilitate increased accountability of companies towards their consumers, owners, supply chain partners and other stakeholders”  |
| <b>Fashion Revolution</b>                       | “Traceability enables transparency and puts fashion companies in a position to collaborate more productively with their peers, supply chain partners and external stakeholders on sustainability”   |
| <b>Global Fashion Agenda, 2018</b>              | “Traceability equips brands to communicate with consumers about sustainability and the impact of their products in a credible manner, and it can help reduce public pressure on fashion companies. Transparency builds trust, and trust drives brand value”     |
| <b>IISD</b>                                     | “Traceability systems help ensure the integrity of claims by providing accountability between standard-compliant products produced and sold” ... “are the link between sustainability initiatives and claims”   |
| <b>Kumar et al.</b>                             | “The effective implementation of sustainability at industrial scale requires the participation of all supply chain actors, along with an efficient traceability scheme to monitor and analyze risks and impacts”  |
| <b>Johansson and Manson</b>                     | “Traceability is as an integral part of sustainability and helps track the product-related data need to be delivered to make accountable claims pertaining to sustainability “  |
| <b>Kering Group</b>                             | “Traceability is one of the crucial challenges to overcome in fashion’s complex global supply chains”   |
| <b>Burberry</b>                                 | “We believe that a continuing focus on transparency and traceability throughout the supply chain can help identify modern slavery risks”  |
| <b>Icebreaker</b>                               | “Complete traceability and transparency is the foundation of global stewardship”  |
| <b>Asket</b>                                    | “The main benefit associated with traceability for sustainable value chains is risk management across the entire supply chain and the surfacing of any non-confirmed locations or practices”  |
| <b>Eurojersey</b>                               | “Nowadays, traceability is a pre-condition for companies’ sustainability performance and competitiveness. Supporting policies and regulations play a key role in establishing common rules and leading the fashion industry in the direction of sustainability” |

Source: UNECE 2018

Finally, this Study has found that actions to advance transparency and traceability of value chains have a positive effect on companies’ sustainability performance. A regression of Survey’s data on companies responses regarding their traceability and transparency actions on one side and their sustainability reporting on the other side, shows a significant positive correlation, with a correlation coefficient of 0.5 (See Figure 5).

Figure 5  
Traceability of the value chain in the garment and footwear sector

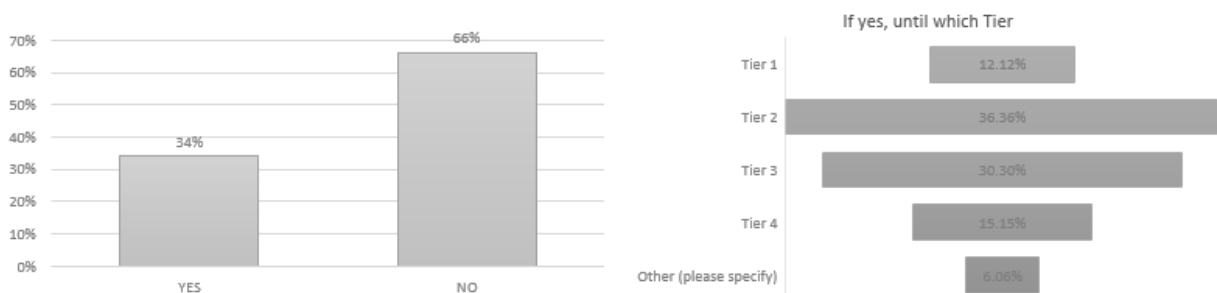


Source: UNECE 2018

## 6. Challenges and opportunities to achieving value chain traceability and transparency

Tracking and tracing the value chain is a multifaceted effort and a challenging task because of the organizational and technological complexities for the industry (Kumar et al 2017). The Survey has enquired among respondents on the actual share of companies tracking and tracing their value chain. The results point out that only 34% of companies has a traceability approach in place, of which half has visibility up to Tier 2 (material manufacturing or finished materials production) only (See Figure 6).

Figure 6  
Traceability of the value chain in the garment and footwear sector



Source: UNECE 2018 [In the left graph, other refers to Chemical Suppliers]

In the Survey, respondents view key challenges as mainly in relation to:

1. The *fragmentation and complexity of the business network* (for 69% of respondents), which makes it often difficult for companies to track products history and features. Multiple actors with different systems and requirements contribute to production across international borders, and some areas in a supply chain are especially opaque. However, technological advances (e.g. blockchain, bar codes, chips) and demands for greater transparency from both business and government sectors may make this increasingly more manageable;
2. *Privacy of data and data security* (for 55% of respondents), which are of concern particularly for brands, traders, and companies in the high value segment of the market, as they are often ready to share information about specialized providers, which may represent an important competitiveness factor; and
3. The *costs associated with the necessary resources and technologies* for the implementation of such schemes, also due to increasing amounts of data and information to manage and inventory volumes (for 49% of respondents). Traceability requires substantial investment in technology and processes aimed at performing various levels of verification on products, parts and components at all stages of the value chain. This means that supply chain actors need to collect and validate data and commit to chain of custody standards.
4. *Technological barriers*. Indeed, technological advances such as blockchain and distributed ledger technologies, bar codes and chips, offer an opportunity, but mastering these technologies is a challenge, also due to geographical and language barriers. In addition, coordination between different supply chain actors requires time and willingness on all sides. These costs are a concern for many actors pursuing traceability, which is the case especially for non-vertically integrated companies or brands and SMEs (29% of respondents). Alignment around tools helps reduce costs to individual actors. When leadership is there and collaboration is widespread, there is greater incentive for actors to work together, which lowers cost overall. In addition, there are also challenges around ensuring that data systems are secure for all users.

The reliability and authenticity of data shared, stringency of controls around the certification of materials, products and production processes, and proof of compliance with sustainability requirements, is also seen as an important issue. In the context of traceability, models with less stringent controls around the handling of certified and non-certified materials are certainly less complex and thus, less expensive.



When it comes to transparency and the disclosure of information about suppliers, location of production sites, and compliance with sustainability standards in companies own operations and suppliers, only 28% of companies in the textile and leather sectors make their suppliers list publicly available (on average, they do so until Tier 2). The same share of companies produce a sustainability report that covers the environmental/social and ethical risks and impacts described in Table 1. Such reports are mainly addressed to the general public, the clients/suppliers base, and investors, and are disclosed through companies websites, and other distribution channels like social media, and events.

This is in line with the findings of other research and studies. In 2017, about one third of the 100 largest global fashion brands are reported to have traced and made publicly available their list of tier-one suppliers, while only 10-15% of them have detailed information about their raw materials suppliers, and the remaining 85-90% have partial or no information at all (BCG and GFA 2018, Nimbalkar et al. 2015).

But having or disclosing information about Tier-1/Tier-2 suppliers is not enough. Traceability is required through the whole value chain. According to the Pulse of the Fashion Industry 2018 report, 2/3 of negative sustainability impact occurs at the raw materials stage (tier-four). Cotton farming, for example, consumes 4% of worldwide nitrogen fertilizers and phosphorous, 16% of all insecticides, and 7% of all herbicides (GFA and BCG, 2018). In such opaque supply chains, it is extremely challenging to make reliable sustainability claims. Information disclosure is gaining further relevance through the harnessing of consumer demands and public awareness campaigns, such as #whomademyclothes by Fashion Revolution and the Transparency Pledge by Clean Clothes Campaign (Follow the thread, 2017).

## 7. Key elements of a robust traceability system

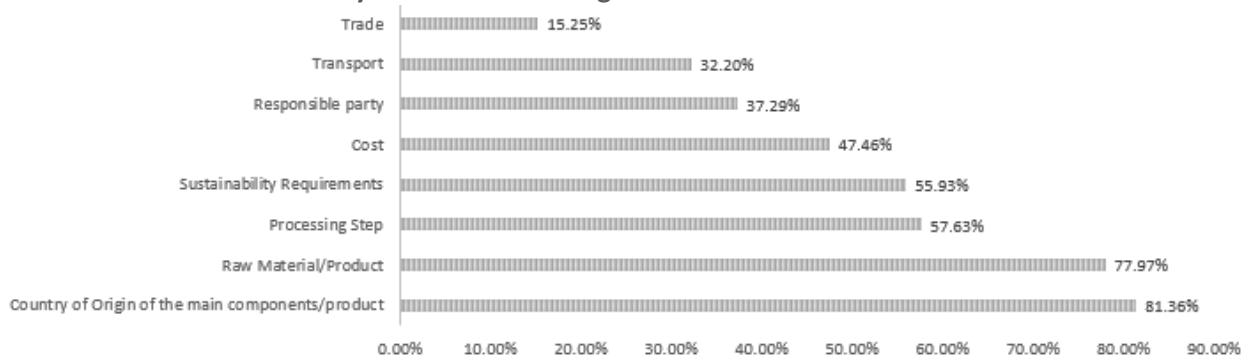
While retailers, suppliers (product, component, packaging), brand owners, processors, manufacturers, distributors, logistics providers and solution providers, regulators, and consumers, are all increasingly demanding fast, accurate and complete information that can be seamlessly accessed across traceability systems, it is a challenge to meet such demand for trusted information about the products and their parts and components, without a framework to ensure that traceability systems are interoperable and scalable (GS1 2018).

So, the second research question enquired by this study, is as follows: *“What are the key requirements for the business sector to put in place a robust transparency and traceability scheme?”*

According to Survey’s respondents, key data/information to be exchanged through a robust traceability system for sustainable value chain in the sector should include information on the country of origin of the main

products, parts and components of garment and footwear (81% of respondents), features and properties of raw material and products (78 % of respondents), information on the processing step (58% of respondents) and compliance with sustainability requirements in terms of social, environmental and health risks and impacts (56% of respondents). Other type of data should relate to costs, responsible parties, transport modalities and trade transactions (See Figure 7).

Figure 7  
**Elements of a traceability scheme for the garment and footwear sector**



Source: UNECE 2018, GS1 2018, UN/CEFACT 2016

|                                    |  |
|------------------------------------|--|
| <b>Responsible party</b>           | Name and role of identified company/organization   |
| <b>Country of origin</b>           | Location of company (address, country); Location of production facility (address, country)   |
| <b>Raw material/product</b>        | Raw material type: textile (e.g. synthetic fiber, cotton, man made cellulosic fibre, wool, linen, etc.), leather; Material attributes description; Harvest/Production Date; Product type (apparel, footwear, home textile, accessories); Purpose; Quantity; Quality; Identification  |
| <b>Production</b>                  | Processing step; Production attributes; Packaging attributes   |
| <b>Transport</b>                   | Period; Consignment; Shipment; Transport means; Locations; Products involved; Indicator (e.g. animal tag) number(s); Responsible parties   |
| <b>Trade</b>                       | Customs clearance data   |
| <b>Sustainability requirements</b> | Social/Ethical for Internal Operation/Suppliers/Sub-contractors<br>Employees: Health & Safety on the workplace; Child Labour: Forced and Compulsory Labour; Working Hours; Right of association & collective bargaining; Discrimination; Disciplinary Practices; Remuneration<br>Clients: Consumer protection (including Health&Safety); Quality of the product/Durability<br>Animal welfare<br>Bribery and corruption<br>Environmental for Internal Operation/Suppliers/Sub-contractors:<br>Raw Material: Biodiversity, Pesticides, Habitat loss/Deforestation, Land Use, Resource/Fossil Fuel depletion, Renewable; Not renewable<br>Production process: Chemicals consumption, Water consumption, Energy consumptions, CO2 emissions, Other Air emissions, Waste water treatment, Production wastes treatment/recycling, Soil and ecosystem<br>Circular approach: Circular Design, Reuse/Recycling, Green R&D |

When it comes to technical standards to exchange such information and data, the GS1 Global Standards provides general guidelines to identify, capture and share supply chain data. They define business process and system requirements for full supply chain traceability, although the standards developed so far do not focus specifically on textile and leather value chains. The EU Ecolabel, the Global Organic Textiles Standard (GOTS) and the Fairtrade Textiles Standards all contain elements of traceability implementation for textiles. Some traceability systems such as String 2.0 and 3.0 offer full traceability throughout the value chain and can both

integrate with other systems and support connections to other data systems for information sharing. However, it should be mentioned that so far, available data managing softwares for traceability, are always private.

All together, these standards and guidelines do not cover all the materials and types of production used in textile and leather value chains, thus do not encompass every single stage of the value chain. This makes it hard for companies and consumers to navigate and chose which model to use, what standards to adopt and how and what to report and communicate.

Based on such indications, a cornerstone of a Traceability Framework would be a standardized representation of business processes, business transactions and information entities (*Business Requirement Specifications BRS*), to map and describe the exchange of data for the traceability of raw materials, products parts and components, during extraction, processing, assembling, transport, within a country or across borders, as well as location and responsible parties. Such scheme should also map and describe the exchange of data related to the origin of raw materials, textile products, parts and components and how they have been made, including with respect to social, environmental and health requirements, based for instance, on a complete set of sustainability criteria, like those included in the OECD Due Diligence Guidelines for Multinational Enterprises. This will allow the exchange of certificates for compliance sustainability requirements (e.g. organic or fair-trade textile standards, chemicals use standards, eco-management and audit schemes, etc.).

The Framework should also provide for the standardization of the basic structure of supporting Business Documents (*Core Component Business Document Assembly CCBDA*) and describe the information exchanged in a Business Interaction in textile and leather value chains, in a syntax and technology neutral way. In addition, a *XML and/or EDIFACT message schema* should provide for the harmonized electronic exchange of data and certificates B2G and B2B that supports the business processes for sustainable value chains in the textile and leather sector. Finally, implementation guidelines should be made available for usage of the message and exchange mechanisms, including the specification of identifiers for product, parties and locations and other devices, and use of code lists (UN/CEFACT 2015).

## 8. Policy and legislation in support of transparency and traceability of value chains in the garment and footwear sector

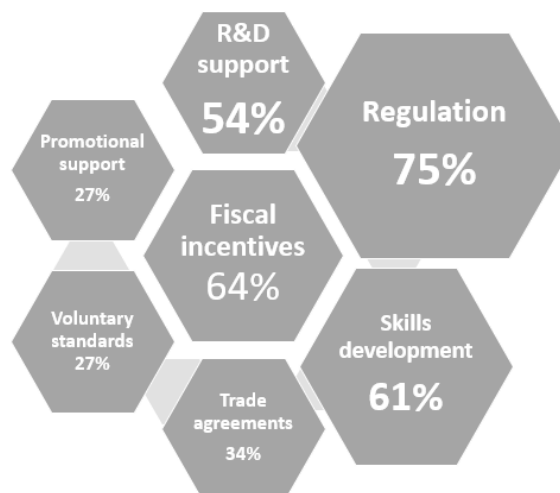
*“What are possible measures that public authorities (national/regional/international) could devise to support traceability and transparency of sustainable garment and footwear value chains?”* is the third main research question addressed by this Study.

Both the results of the Survey and the interviews conducted in this Study, highlight the relevance of policy and legislation as a key driver for advancing transparency and traceability of value chains in the industry. Compliance with national, regional or international regulatory requirements or guidance directives and common criteria to measure and benchmark sustainability performance, coupled with an effective auditing system for compliance and alert on violations, is a priority for companies (75% of respondents), which have also stressed the need for fiscal incentives (64%) and support to R&D (54%) and training for skills development (61%).

However, unless other sectors, like minerals and timber, where targeted regulation address issues related to minerals extracted in conflict zones or threats of illegal logging that require various degrees of due diligence on the part of actors throughout the supply chain to achieve compliance, in the clothing sector available instruments to improve sustainability performance are either non-mandatory, or only cover specific risks and impacts along the value chain, and minor parts of the production. Currently there are more than 100 standards and certification schemes are available for the industry (Changing markets 2018), which are leading to confusion.

Figure 8

**Possible policy approaches to advance traceability and transparency of the value chain**



Source: UNECE 2018

For the garment and footwear sector, at the regional level, Regulation (EC 907/2006) of the European Parliament and of the Council REACH mandates the traceability for all chemical substances, including those used in garment and footwear manufactured or imported in Europe. Also, in 2011, the EU adopted a Regulation (EU 1007/2011) on textile names and the related labelling of textile products. And in April 2014, the European Parliament voted that manufacturers should be required to label all non-food goods with their country of origin. The new legislation does not only make the labelling mandatory, but it also changes well-established rules already in place in several Member States of the EU. Finally, a EU Regulation (1007/2011) concerns the marking and labelling of the composition of products fibers and other information for the consumer on products quality.

**Table 3**  
**Examples of traceability related regulations**

| <b>Timber</b>                     |  |
|-----------------------------------|--|
| Timber Regulation (EU) 995/2010   | “Prohibits the placing of illegal timber and timber products on the EU internal market and requires “due diligence” and risk management of EU traders of timber, including obligations to keep records that facilitate traceability”.  |
| The US Lacey Act                  | “Tackles trade of illegal timber and timber products in the US along the entire supply chain and requires that importers exercise “due care” in identifying the source of their goods”.  |
| <b>Fishery</b>                    |  |
| Food Law Regulation (EC) 178/2002 | “To be able to gain knowledge, traceability, transparency and dialogue deep down the supply chain are a prerequisite for enabling change and improvements on environmental, social and ethical aspects in production patterns”   |
| Regulation (EC) 2065/2001         | “Regulation 01224/2009 provides fisheries control measures with further implementation measures under Regulation 04/2011. These require product information to be available throughout the supply chain.”  |
| <b>Agriculture</b>                |  |
| Regulation (EC) 178/2002          | “Traceability and transparency further facilitate increased accountability of companies towards their consumers, owners, supply chain partners and other stakeholders”   |
| ISO 22005:2007                    | “Explains the principles and requirements for the design and implementation of a feed and food traceability system.”   |
| Safe Quality Food (SQF) Program   | “The Program provides independent certification that a supplier's food safety and quality management system complies with international and domestic food safety regulations. This enables suppliers to assure their customers that food has been produced, processed, prepared and handled according to the highest possible standards, at all levels of the supply chain |

Source: GC (2014), UNECE 2018

At the international level, the OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector encourages enterprises to take a due diligence approach and implement traceability and transparency systems in their value chains. In particular, the Guidelines stress the need to collect and record information regarding companies’ ownership structure, location, size and nature of production stage, suppliers and intermediaries operating at Tier 1 (suppliers and intermediaries/trading agents). They also emphasize the importance of working towards mapping all suppliers of Tier 2, and account for progress over time, with the supply chain mapping including information on subcontractors, to the extent possible. Companies should also work towards identifying the country of origin for all materials or components sourced from high risk areas for adverse impacts of greatest severity, no matter where the risk of impact falls in the supply chain. The Guidance recommends that, in order to facilitate supply chain transparency and ease of conducting due diligence, the sector should work towards a unified and harmonized approach to identifying and mapping suppliers.

The UN Global Compact also provides guidance to help companies and stakeholders understand and advance supply chain traceability, and provides practical steps for implementing traceability programs within companies pertaining to the identification of key commodities, gaining an understanding of the key sustainability risks for those commodities, developing the business case for traceability, taking traceability actions, developing solid internal procedures, engaging with suppliers and partners along the value chain, and investing in long term efforts. And the UN Guiding Principles on Business and Human Rights impose obligations for corporations to practice due diligence covering ‘adverse human rights impact that the business enterprise may cause or contribute to through its own activities, or which may be directly linked to its operations, products or services by its business relationships’. These guidelines and principles provide good standards of corporate social responsibility for companies in the garment and footwear industry, however they are not binding and thus not enforceable.

Based on the discussed challenges and opportunities, and in addition to a technical traceability standard, a targeted policy document should be therefore developed providing vision and objectives for a global transparency and traceability system, along with implementation phases, a distribution model of costs and benefits among stakeholders, rules for collaboration, a framework for data exchange, including sustainability risks, rules on confidentiality, and measurement of performance, among other elements. All this based on the business process analysis of the industry value chain as and the vision for sustainability and transparency of the value chain.

Such a policy recommendation should provide Governments and decision makers with a framework for developing a high level plan for a traceability scheme; to establish an enabling environment for all actors of the textile and leather industry to develop, share, learn, and improve practices related to transparency and traceability in value chains; to improve the access to information on best practices; to enable government to advance the necessary policy and regulatory approaches and to support parties along the value chain (e.g. brands, retailers, agents, manufacturers, raw materials producers) in their efforts to implement improvement plans, self-assess themselves against recognized international initiatives, standards, codes of conduct and audit protocols.

It should also explore the potential application of new technologies, such as blockchain and other distributed ledger technologies, Internet of Things, artificial intelligence, use of electronic identifiers and labels. The policy recommendation could be developed by the United Nations Centre for Trade facilitation and e-Business UN/CEFACT in light of its mandate and expertise on traceability schemes for sustainable value chains, through a multi-stakeholder consultation approach.

## 9. Conclusions and recommendations

This study argues that in the garment and footwear sector, the lack of complete and transparent information about where and by whom materials are sourced, transformed and assembled, about the effects on the environment and human health of practices and processes, and on working conditions across the supply chain are key gaps. This is due to the high complexity of the value chain, with multiple parties, nodes and processing stages in the various phases/tiers, upstream and downstream, often dispersed in different geographical locations.

Key actors in the industry have identified traceability and transparency as crucial enablers of more responsible production and consumption patterns, and a core priority for immediate action. In fact, traceability helps companies to build trust with consumers, along with stronger relationships and more solid networks with

clients and suppliers. It also helps identifies opportunities for efficient and sustainable management of resources, as well as risks for health, the environment and labour rights. Presenting the information in a standardized form, supports common understanding, accessibility, clarity and comparison, and fosters credible communication towards consumers and the general public.

However, the numerous existing standards and guidelines do not cover all the materials and types of production used in the sector, and do not encompass every single stage of the value chain. This makes it hard for companies and consumers to navigate and chose which model to use, what sustainability standards to adopt and how and what to report and communicate.

*A sectoral Framework for Traceability and Transparency of the Value Chain*, that is interoperable and scalable can be the response. It would allow an effective connection between producers and firms, firms and brands and retailers, and provide a rigorous way of collecting and exchanging information related to operations and products along the entire value chain.

In the attempt to answer the proposed research questions, the findings of this study substantiate the following Recommendations about the main elements of such sectoral Framework:

**Recommendation 1:** To develop a comprehensive *Technical Global Standard for the Traceability of Sustainable Value Chains in the Garment and Footwear Sector*, covering the entire life-cycle of products, consisting of:

**Component 1:** a standardized representation of business processes, business transactions and information entities (*Business Requirement Specifications BRS*), to map and describe the entire value chain in the garment and footwear sectors, including sustainability risks at key nodes of the production and consumption process.

**Component 2:** a standardized basic structure of supporting Business Documents (*Core Component Business Document Assembly CCBDA*) and a description of the information exchanged in a Business Interaction in textile and leather value chains, in a syntax and technology neutral way.

**Component 3:** a *XML and/or EDIFACT message schema* to provide for the harmonized electronic exchange of data and certificates B2G and B2B that supports the business processes for sustainable value chains in the textile and leather sector.

**Component 4:** Finally, *implementation guidelines* should be made available for usage of the message and exchange mechanisms, including the specification of identifiers for product, parties and locations and other devices, and use of code lists (UN/CEFACT 2015).

In addition to a *Technical Standard*, such sectoral *Transparency and Traceability Framework* should include a targeted *Policy Document*, providing vision and objectives for a global transparency and traceability system, along with implementation phases, a distribution model of costs and benefits among stakeholders, rules for collaboration, a framework for data exchange, including sustainability risks, rules on confidentiality, and measurement of performance, among other elements. All this based on the business process analysis of the industry value chain as and the vision for sustainability and transparency of the value chain. It should also explore the potential application of new technologies, such as blockchain and other distributed ledger technologies, Internet of Things, artificial intelligence, use of electronic identifiers and labels.

**Recommendation 2:** to develop a *Policy Recommendation*, to enable government to advance the necessary policy and regulatory approaches and to support parties along the value chain in their efforts to implement improvement plans, self-assess themselves against recognized international initiatives, standards, codes of conduct and audit protocols.

**Principle 1:** it should be based on an holistic, multi-stakeholders approach, aiming to ensure traceability for the whole life-cycle and value chain of a product, with its parts and components, and requiring companies to cover the entire set of sustainability criteria (e.g. the requirements of the OECD Due Diligence Guidelines).

**Principle 2:** it should include a standardized set of criteria for reporting on the sustainability performance of different parties of the value chain and encourage transparency.

**Principle 3:** it should provide a roadmap for continuous improvement and set the bar high enough to only acknowledge companies that go above and beyond average performance and are committed to continuous improvement.

**Principle 4:** it should also be science-based and reflect regulatory improvements.

Both elements of the Framework, i.e. the Technical Standard and the Policy Recommendation, could be developed by the United Nations Centre for Trade Facilitation and e-Business UN/CEFACT in light of its mandate and expertise on traceability schemes for sustainable value chains, through a multi-stakeholder consultation approach, and in connection with its support to UN Member States to achieving the Sustainable Development Goals (SDGs) of the 2030 United Nations Agenda for Sustainable Development, and particularly SDG12 on responsible consumption and production.



## Annex 1

### Survey Questionnaire:

### Transparency and Traceability for Sustainable Value Chains in the Garment and Footwear Sector

#### 1. Background

In the textile and leather sector, global and complex value chains, with production facilities scattered all over the world, makes it very hard to gain accurate information about where and how products, parts and components are made and where along the value chain, environmental, social and health risks occur. In order increase the industry's ability to manage its value chain more sustainably, both consumers and businesses must first be aware of the nature and magnitude of these risks. Improving transparency and traceability of value chains has therefore become a priority.

The United Nations Economic Commission for Europe (UNECE), together with experts from governments, private sector, academia, international governmental and non-governmental organizations (NGOs), has looked into such risks and impacts and has launched a project for an international framework initiative on transparency and traceability for sustainability patterns in the sector.

The project aims at developing principles and policy recommendations, standards and implementation guidelines for traceability of sustainable value chains in the textile and leather industries.

In the context of this project and this survey, the concepts of traceability, transparency and sustainability will be understood according to the following widely agreed-upon definitions:

- **Traceability** is understood as “the ability to trace the history, application or location of an object” in a supply chain (ISO, 2015), and “the process by which enterprises track materials and products and the conditions in which they were produced through the supply chain” (OECD, 2017).
- **Transparency**, relates directly to relevant information been made available to all elements of the value chain in a standardised way, which allows common understanding, accessibility, clarity and comparison (EC 2017)
- **Sustainability**, in this context, is understood as the manufacturing, marketing and use of garment, footwear and accessories, and its parts and components, taking into account the environmental, health, human rights and socio-economic impacts, and their continuous improvement through all stages of the product's life cycle (from design, raw material production, manufacturing, transport, storage, marketing and final sale, to use, reuse, repair, remake and recycling of the product and its parts and components) (UNECE 2018).
- **Tier**: for the purpose of this survey, Tier refers to a main phase of the value chain. Tier 1: Final product manufacturing and assembly (or finished goods production). Tier 2: Material manufacturing (or finished materials production). Tier 3: Raw material processing. Tier 4: Agriculture, farming and extraction. Other tiers: E.g. Agent, Wholesale/Third Party Brands, Chemical supplier (SAC 2018).

## 2. Questions

### 1. Information on respondent

1.1 Title:  Mr.  Mrs.

1.2 Name and Surname:

1.3 Job Title

1.4 Contacts (e-mail/telephone)

### 2. Information on Organization

2.1 Name of Organization:

2.2 Address:

2.3 Website:

2.4 Number of (direct) employees:

2.5 Of which women:

2.6 Financial turnover:

2.7 Industry Sector:  Textile  Leather  Both

2.8 Stage in the value chain:

2.8.1

If **Textile** value chain

(Check all that apply - Multi-Select):

Retailer  Brand  Agent/Trading Company  Tier 1 ( Cutting  Assembling  Finishing)  Tier 2 ( Dyeing,  Printing  Finishing  Lamination  Weaving,  Knitting)  Tier 3 ( Fiber Processing,  Spinning)  Tier 4 (Farming/Agriculture/Extraction)  Other. Please describe:

2.8.2

If **Leather** Value Chain

(Check all that apply - Multi-Select):

Retailer  Brand  Agent/Trading Company  Tier 1 ( Cutting  Assembling  Finishing)  Tier 2 ( Beam House  Tanning  Retanning/Dyeing/Fatliquoring  Finishing)  Tier 3 (Slaughterning)  Tier 4 (Farming /Breeding)  Other. Please describe:

### 3. Information on Sustainability

3.1. Is there a dedicated team in charge of sustainability in the organization?

Yes  No

3.1.1. If so, how many staff members does it include?

3.2 Has your company a formal sustainability approach or strategy in place?

Yes  No

3.2.1 If so, which sustainability risks, impacts, opportunities does it address? (Check all that apply - Multi-Select):

Social  Environmental  Other: Please specify:

3.3. Please check the box/es if you have approaches and strategies to improve the following sustainability aspects (Check all that apply - Multi-Select):

Internal Production  Suppliers  Subcontractors

**Social/Ethical (at what level it is applied):**

3.3.1 Employees

Health & Safety on the workplace  Child Labour  Forced and Compulsory Labour  Working Hours  Right of association & collective bargaining  Discrimination  Disciplinary Practices  Remuneration  Management System  Other. Please describe:

3.3.2 Clients

Consumer protection (including Health&Safety)  Quality of the product/Durability  Other. Please describe:

3.3.3. Community

Contribution to social/cultural services  Support to disadvantaged groups  Donations for non-profit organizations  Other. Please describe:

3.3.4. All Stakeholders

Engagement  Transparency  Ethics & Corruption  Other. Please describe:

3.3.5 Animal Welfare

Animal wealfare

Environmental (at what level it is applied)

Internal Production  Suppliers  Subcontractors

- 3.3.6 Production process  Chemicals consumption  Water consumption  Energy consumptions  CO2 emissions  Other Air emissions  Waste water treatment  Production wastes treatment/recycling  Soil and ecosystem  Other. Please describe:
- 3.3.7 Raw Material  Biodiversity  Pesticides  Habitat loss/Deforestation  Land Use  Resource/Fossil Fuel depletion  Renewable  Not renewable  Other. Please describe:
- 3.3.8 Circular approach  Circular Design  Reuse/Recycling  Green R&D  Other. Please describe:
- 3.4 Please mention any reference guidelines and methodology eventually used to produce your sustainability approach or strategy (e.g. GRI / OECD Due Diligence Guidelines/ UN Global Compact/Higg Index/Own/ Other):
- 3.5 Does your sustainability approach or strategy link to United Nations Agenda 2030 and the Sustainable Development Goals (SDGs)?  Yes  No
- 3.5.1 If so, please indicate for which SDG? (e.g. SDG 12 on Responsible Production and Consumption, SDG 13 on Climate Change):
- 3.6 Do you have voluntary certification/s on sustainability performance?  Yes  No
- 3.6.1 If so, which ones?  For Raw material. Please specify:  For Product. Please specify:  For Internal Production. Please specify:
- 3.7 Do you ask for sustainability requirements in your sourcing practices (in case not already foreseen by your certification and beyond minimum legal requirements)?
- 3.7.1 If so, for which Tier?  Tier 1  Tier 2  Tier 3  Tier 4  Other, please describe:
- 3.8 Do your clients request you to address sustainability risks/impacts?  Yes  No
- 3.8.1 Is so which ones (see 3.3)?  Social  Environmental  Other: Please specify:

#### 4. Information on Traceability and Transparency

##### Traceability

- 4.1 Which kind of data would you collect for a robust traceability system of sustainable value chains in this sector? (Check all that apply - Multi-Select):  Cost  Responsible party  Country of origin of the main components/product  Raw material type  Product type  Processing Step  Transport  Trade  Sustainability requirements  Other. Please describe:
- 4.2 In your view, what are the main benefits associated with traceability for sustainable value chains? (Check all that apply - Multi-Select):  Reputational risk management  Efficient resource management (e.g. energy, water, chemicals)  Enhanced communication with business partners  More accurate information for consumers  Other. Please specify:
- 4.3 What are the challenges of putting in place such a system for the sector? (Check all that apply - Multi-Select):  Privacy of data  Complex business network  Product segregation  Technological barriers  Cost  Other. Please specify:
- 4.4 What do you believe is the best way to capture sustainability performance for products, production processes and facilities in a traceability system?
- 4.5 What are possible measures that public authorities (national/regional/international) could put in place to support traceability and transparency in textile and leather value chains? (Check all that apply - Multi-Select):  Regulation  Voluntary standards  Trade agreements  Fiscal incentives  R&D support  Promotional support  Training and skills development  Other. Please describe:
- 4.6 What are in your view the key technical requirements of a traceability system for the

sector (e.g. supporting tools for blockchain applications, for smart contracts, etc.)

4.7. Other ideas and suggestions for advancing traceability and transparency in the sector value chain?

4.8. Do you track and trace your value chain?  Yes  No

4.9 Do you know the physical address for where manufacturing takes place for the factories that produce materials or products for you? Please check the tiers that this applies to.  
 Tier 1  Tier 2  Tier 3  Tier 4  
 Other, please describe:

*Transparency*

4.10 Do you publicly disclose your suppliers lists?  Yes  No

4.10.1 If so, for which Tier (see 2.9)?  Tier 1  Tier 2  Tier 3  Tier 4  
 Other, please describe

4.10.2 Is your information available in an open, machine readable format?  Yes  No

4.10.3 How often does it get updated? (Please state your answer in number of months)

4.10.4 What is the data license you use for public disclosure?  Open data  Attribution requirement  Non-commerciality  Other (please specify)  Copy-left proprietary  Don't know

4.11 Do you produce a sustainability report (covering the sustainability aspects in 3.3.)?  Yes  No

4.11.1 If so, how is it disseminated? (Check all that apply - Multi-Select):  Website  Events  Press  Social Media  Networks  Trainings  
 Other. Please describe:

4.11.2 Is it addressed towards? (Check all that apply - Multi-Select):  General Public  Investors/Shareholders  Employees  Suppliers  
 Local Communities  Governments  Other. Please describe:

4.11.3 Does it include your sustainability impacts, policies and programs associated with the following supplier tiers:  
 Tier 1  Tier 2  Tier 3  Tier 4  
 Other, please describe

4.11.4 What is, in your view, information that should be disclosed and communicated to the final consumer to enhance the understanding of product sustainability performance? (Check all that apply - Multi-Select):  Country of origin of the main product transformation phase  Country of origin of the main constituent materials  Authenticity of the material  Product environmental footprint  Product durability  Recyclable and renewable content  
 Other. Please describe:

## Annex 2

### 1. List of Survey respondents

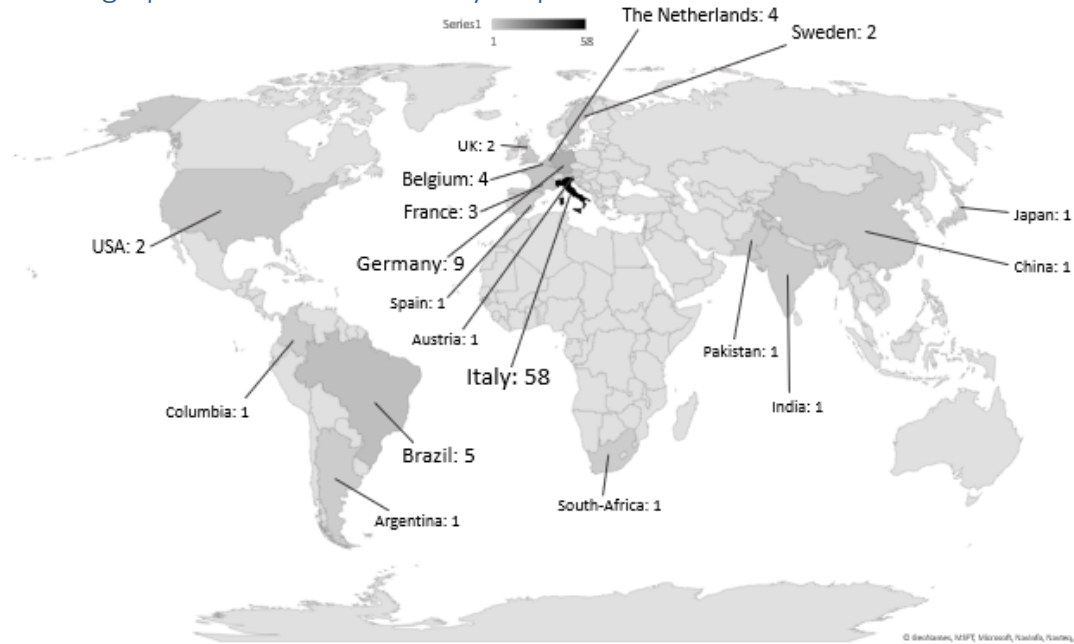
Respondents were asked to address all questions included in the questionnaire in Annex 1 (1.1 to 4.11)

| Country         | Name                                      | Address   | Sector  | Employees | Turnover in €          |
|-----------------|---|---|---------|-----------|------------------------|
| Italy           | Achille Pinto S.p.A.                      | Via Roma 9, 22070 Casnate con Bernate (CO)                                    | Textile | 240       | 66,000,000             |
| Germany         | Adidas AG                                 | Adi-Dassler Str. 1, 91074 Herzogenaurach                                      | Both    | 56,888    | 21,200,000             |
| The Netherlands | Alcon Advies                              | De Aa 31, 7642HA Wierden, NL  | Textile | 2         |                        |
| Italy           | Alfredo Grassi S.p.A.                     | Via Vittorio Veneto 82 Lonate Pozzolo (VA)                                    | Textile | 100       | 55,000,000             |
| Italy           | Allavelli Michele S.r.L.                  | Via Dell Industria 7 / 9 - 21015 Lonate Pozzolo                               | Textile | 29        | 4,600,000              |
| Argentina       | Animaná                                   | San Ignacio 3628 1231 Buenos Aires CABA                                       | Textile | 10        | N/A                    |
| Sweden          | ASKET                                     | Regeringsgatan 109  | Both    | 6         | 3,000,000              |
| United Kingdom  | Authenticae Ltd                           | Unit 11, Grove Farm, Grove Farm Lane, Moulton, Northamptonshire, NN3 7TG, UK  | Leather | 7         | 60,000                 |
| Germany         | BADER GmbH & Co. KG                       | Metzgerstr. 32  | Leather | 11300     |                        |
| Brazil          | BCM – Industria e Comercio de Couros Ltda | Rua Julio de Castilhos, 2780 – Porto Velho, Portao RS                         | Leather | 83        | 8,730,384              |
| Belgium         | Bel&Bo                                    | Theo Nuyttenslaan 5, 8540 Deerlijk, Belgium                                   | Textile | 500       | 80,000,000             |
| Japan           | Bemberg of Asahi Kasei Corporation        | 3-23, Nakanoshima 3-Chome, Kita-ku, Osaka, Japan 530-8205                     | Textile | 16945     | 16,063,906,410         |
| Italy           | Biella Manifatture Tessili S.r.L.         | Via XXIV Maggio n°4   | Textile | 365       | 103,900,000            |
| Italy           | Biseta                                    | Via Leopardi 35 - 22075 Lurate Caccivio                                       | Textile | 50        | 7,000,000              |
| China           | C&A Foundation                            | 392 Kwun Tong Road  | Textile | 55        | 55,000,000 (in grants) |
| Italy           | Candiani S.p.A.                           | Via Arese 85, 200220 Robecchetto con Induno (MI), Italy                       | Textile | 569       | 93,564,000             |
| Italy           | Cesare Cerana Industriale S.r.L.          | Via Palestro 19, Busto Arsizio  | Textile | 51        | 4,400,000              |
| Italy           | Cittadini S.p.A.                          | Via Trento 35/45 - 25050 Paderno Franciacorta (Bs)                            | Textile | 80        | 14,664,619             |
| Italy           | Clerici Tessuto & C. S.p.A                | Via Belvedere 1/a 22070 Grandate Como   | Textile | 275       | 55,000,000             |
| Italy           | Conceria Blutonic S.p.A.                  | Via Dei Conciatori 7A/B 56928 San Minato (Italy)                              | Leather | 15        | 27.000.000             |
| Belgium         | Cotance                                   | 40, Rue Washington, B-1050 Brussels   | Leather |           |                        |
| Italy           | Cotanella S.p.A.                          |   | Textile | 120       | 30,000,000             |
| Brazil          | Couros Nobre Beneficiamento Ltda          | Estrada da Integração Leopoldo Petry, 500, Rondônia - Novo Hamburgo/RS/Brazil | Leather | 97        | N/A                    |
| Spain           | Curtidos Badia SAU                        | C/ Sol 52 Igualada 08700 BCN Spain  | Leather | 80        | N/A                    |
| USA             | Disney                                    |   | Textile | 200000    | N/A                    |
| Italy           | Di.vè S.p.A.                              | Via Papa Giovanni XXIII 94/96   | Textile | 94        | 18,000,000             |
| Italy           | Drago S.p.A.                              | Via IV Novembre 134 – Lessona (BI)  | Textile | 157       |                        |
| Italy           | E. Boselli & C. S.r.L.                    | Via Repubblica 80, 22077 Olgiate Comasco                                      | Textile | 93        | 9,200,000              |
| Italy           | Eurojersey S.p.A.                         | Via San Giovanni Bosco 260  | Textile | 198       | 68,200,000             |
| Italy           | Ezio Ghiringhelli S.p.A.                  | Via Ronchetti 25  | Textile | 56        | 14,500,000             |
| Italy           | Facenti S.r.l.                            | Via b. Buoizzi 23 - 25021 Bagnolo Mella (BS)                                  | Textile | 13        | 4,500,000              |

|                 |                                    |   |         |       |             |
|-----------------|------------------------------------|---|---------|-------|-------------|
| Italy           | Filatura Pettinata Mello S.r.L.    | Via G. Berra, 1   | Textile | 8     | 3,500,000   |
| Italy           | Filidea S.r.L.                     | Via Maestri del Lavoro 4/a  | Textile | 15    | 22,550,000  |
| Italy           | Fuga Couros S.A.                   | Rua Jose Fuga, 1155   | Leather | 306   | N/A         |
| Italy           | G. Tosi S.p.A Tintoria             | Via dell'Industrie 61   | Textile | 43    | 5,000,000   |
| Germany         | German Leather Federation VDL      | Germany, 60489 Frankfurt/Main, Fuchstanzstrasse 61  | Leather |       | N/A         |
| Italy           | Giovanni Clerici & Figli S.p.A.    | Viale Milano, 22, 21013 Gallarate VA  | Textile | 54    | 5,900,000   |
| Germany         | Gmelich + Söhne GmbH               | Kreuzstraße 65, D 71723 Großbottwar   | Leather | 140   | 26,000,000  |
| Germany         | Gmx                                |   |         |       | N/A         |
| Italy           | Gruppo Tessile Industriale S.p.A.  | Str. Trossi 57, 13871 Verrone BI  | Textile | 50    | 11,165,000  |
| Germany         | GS1                                |   |         |       | N/A         |
| Colombia        | GS1 Colombia                       | Avenida el dorado 92 32 módulo g5 piso 5  | Both    | 98    | 1,000,000   |
| United Kingdom  | Hayley Hanson group                | Maescoed Farm, Llandefalle, Brecon, Powys LD3 OND   | Leather | 1     | 100,000     |
| Germany         | HUGO BOSS                          | HQ - Dieselstrasse 12, 72555 Metzingen, DE  | Both    | 14000 | N/A         |
| Sweden          | H&M                                | H & M Hennes & Mauritz AB Mäster Samuelsgatan 46A SE -106 38 Stockholm, Sweeden               | Both    | N/A   | N/A         |
| India           | Impactiva                          | Chennai, Tamil Nadu 600101  | Both    | N/A   | N/A         |
| Belgium         | JBC nv                             | Centrum Zuid 3401   | Textile | 226   | 188,780,736 |
| Brazil          | JBS                                | São Paulo Brazil  | Leather | 8000  | 873,038,392 |
| France          | Kering                             | Rue de Sèvres 75007 Paris France  | Both    | N/A   | N/A         |
| The Netherlands | Kings Of Indigo                    | Krijn Taconiskade 440   | Textile | 15    | N/A         |
| Italy           | Lanecardate S.p.A.                 | Via Garibaldi 57 Cossato  | Textile | 34    | 11,415,719  |
| Italy           | Lanficio Egidio Ferla S.p.A.       | Via Polto 13 - 13835 Trivero (Biella)   | Textile | 38    | 8,569,653   |
| Italy           | Lanificio Angelico S.r.L.          | Via Roma 96 Ronco Biellese  | Textile | 176   | 35,000,000  |
| Italy           | Lanificio Reggiani S.p.A.          | Via Altenberg 4 - 13019 Varallo   | Textile | 79    | 17,000,000  |
| Italy           | Lardini S.r.L.                     | Via Achille Grandi 15/a, 60024 Filottrano (AN)  | Textile | 430   | 68,500,000  |
| Pakistan        | Leather Research Center            | D/102, South Avenue, SITE, Karachi-75700 Pakistan   | Leather | 80    | 32,792      |
| Italy           | Leggiuno S.p.A.                    | Via D.Alaighieri 1  | Textile | 154   | 18,000,000  |
| Italy           | Maglificio Fragi S.p.A.            | Corso Sempione 196  | Textile | 50    | 5,000,000   |
| Italy           | Maglificio Maggia S.r.L.           | Via graglia 89 - occhieppo sup.re (BI)  | Textile | 45    | 8,185,358   |
| France          | Maison Dupuy de Lôme               | 29/31, boulevard de la Muette - 95140 Garges-les-Gonesse                                      | Textile | 2     | 10,000      |
| Italy           | Manifattura Golf S.r.L.            | Strada Trossi 63, Verrone   | Textile | 14    | N/A         |
| Italy           | Manifattura Renata S.r.L.          | Via Siracusa 14 - 21050 Bolladello di Cairate   | Textile | 11    | N/A         |
| Italy           | Marchi & Fildi S.p.A.              | Via Maestri del Lavoro, 4/a   | Textile | 63    | 18,000,000  |
| Italy           | Marzotto Lab S.r.L.                | Largo Santa Margherita 1- 36078 Valdagno VI   | Textile | 178   | 59,017,000  |
| Italy           | Marzotto Wool Manufacturing S.r.L. | Largo Santa Margherita n.1-Valdagno (VI)  | Textile | 477   | 132,900,000 |
| Brazil          | Mats Beneficiamento de Couro Ltda  | Rua Carlos Strassburguer 6870, Bairro Industrial Norte, Campo Bom, Rio Grande do Sul, Brasil. | Leather | 163   | N/A         |
| Italy           | Mc2 S.r.L.                         | Via Piave 5 - 21020 Brebbia (VA)  | Textile | 5     | 400/500,000 |
| South-Africa    | Mosstrich                          | 10 Mkuzi street; Mossel Bay; South Africa   | Leather | 74    | 18,167,284  |
| Italy           | R di S S.r.L.                      | 2.2 Indirizzo Via Quintino Sella 4, Lessona BI  | Textile | 50    | 3,575,000   |

|                 |  |  |         |      |             |
|-----------------|--|--|---------|------|-------------|
| Italy           | Ratti S.p.A.                               | Via Madonna 30 - Guanzate (CO) - Italy                           | Textile | 755  | 99,400,000  |
| Italy           | Ricamificio A. Rola S.r.L/Linea IMAGO-ROLA | Via Garibaldi 14, 21050 Cairate                                  | Textile | 5    | 2,000,000   |
| Italy           | Rubelli S.p.A.                             | San Marco, 3395, 30124 Venezia (VE), Italy                       | Textile | 160  | 40,000,000  |
| The Netherlands | Stahl                                      | Sluisweg 10<br>5145 PE Waalwijk , Netherlands<br>+31 416 689 111 | Both    | 2200 | 900,000,000 |
| Italy           | Stamperia Olonia S.r.L.                    | Via A. Colombo 65 - Gorla Minore (VA) 21055                      | Textile | 103  | 20,000,000  |
| Italy           | Successori Giuseppe Cattaneo S.p.A.        | Via Galilei 13   | Textile | 38   | 9,000,000   |
| Italy           | Successori Reda S.p.A.                     | Via Robiolio 25  | Textile | 415  | 116,000,000 |
| Germany         | Südleider GmbH & Co. KG                    | Gerberstrasse 44, 95111 Rehau, Germany                           | Leather | 334  | N/A         |
| France          | Tannerie de Périers                        | ZA la Mare aux raines 50190 Périers                              | Leather | 87   | N/A         |
| Italy           | Tessibusto S.r.L.                          | Via M. Candia 8 - 21052 Busto Arsizio                            | Textile | 4    | 700,000     |
| Italy           | Tessitura Armand Saccal S.r.L.             | S.S. Del Sempione 240/TER  | Textile | 15   | 4,000,000   |
| Italy           | Tessitura Enrico Sironi Sas                | Via Cappuccini 50 - Gallarate                                    | Textile | 14   | 1,100,000   |
| Italy           | Tessitura Serica A.M. Taborelli S.r.L.     | Via XXV Aprile 20 - 22020 Faloppio CO                            | Textile | 258  | 44,700,000  |
| USA             | Textile Exchange                           | 511 South 1st Street, Lamesa, TX, USA                            | Both    | 29   | 2,158,864   |
| Italy           | Tifitex S.r.L.                             | Via Adige 12, 21013 Gallarate (VA)                               | Textile | 11   | 1,000,000   |
| Italy           | Tintoria E Stamperia Di Lambrugo S.p.A.    | Via Cava Ghiaia, 7, 22045 Lambrugo CO                            | Textile | 53   | 9,200       |
| Italy           | Tintoria Moretti S.r.L.                    | Via Barrarello 12, 20836 Briosco                                 | Textile | 27   | 3,200,000   |
| Italy           | Tintoria Viola S.r.L.                      | Via Alberto da Giussano 23 - 21053 - Castellanza (VA), Italia    | Textile | 16   | 2,000,000   |
| Italy           | Tnr Cederna Fodere S.p.A.                  | Via Acquedotto 107 - Samarate - VA                               | Textile | 73   | 9,500,000   |
| Italy           | Tollegno 1900 S.p.A.                       | Via Gramsci 11, 13818 Tollegno (BI)                              | Textile | 345  | 123,568,692 |
| Italy           | UNPAC                                      | Via Dalmazia, 43/C - 36078 Valdagno (VI) Italy                   | Leather | 3    | N/A         |
| The Netherlands | UPSET Textiles                             | Pannekoekstraat 100 Rotterdam                                    | Textile | N/A  | N/A         |
| Italy           | Vago S.p.A.                                | Via San Miniato 4 - busto arsizio (VA)                           | Textile | 41   | 7,184,000   |
| Italy           | Vitale Barberis Canonico S.p.A.            | Via Diagonale 296, Pratrivero 13835 (BI)                         | Textile | 405  | 160,000,000 |
| Germany         | Weinheimer Leder GmbH                      | Höhnerweg 2-4, 69469 Weinheim                                    | Leather | 21   | 28,000,000  |
| Austria         | Wollsdorf Leder International GmbH         | Wollsdorf 80, Austria  | Leather | 1000 | 170,000,000 |
| Italy           | WRAD S.r.L.                                | Via Saviabona 56, 36010 Monticello Conte Otto (VI)               | Textile | 5    | N/A         |
| Italy           | Zegna Baruffa Lane Borgosesia S.p.A.       | Via B. Sella 140 Valle Mosso (Bi)                                | Textile | 784  | 101,000,000 |

## 2. Geographical location of Survey respondents



Source: UNECE 2018

## 3. List of Interviews and field visits with industry stakeholders

During interviews and field visits, respondents were asked to address a selected number of questions in the questionnaire in Annex I, and particularly questions 1, 2.1, 2.7, 2.8, 3.3, 4.1 to 4.7 and 4.11, which are directly related to the research questions for the study.

| Country   | Company/Organization                   | Address   | Type of business                         | Respondent  |
|-----------|--|---|--|---|
| Australia | Woolmark                               | Via Dell'Orso, 16<br>Milano, Italy                                      | Textile Wool Association                 | Francesco Magri, Country Manager and Director   |
| Belgium   | GS1                                    | Rue Royale 76, b1,<br>Brussels, Belgium                                 | Standard setting body                    | Markus Mueller, Director Industry Engagement Apparel & General Merchandise                      |
| China     | Innovation Design Institute            | 800 Dong Chuan Road,<br>Shanghai 200240                                 | School of Design                         | Peng Yunfeng, Vice Dean   |
| China     | C&A Foundation                         | Level 10, Millennium City 6<br>392 Kwun Tong Road<br>Kowloon, Hong Kong | Corporate Foundation                     | Sarah Ong, Programme Manager<br>Jill Tucker, Head of Supply Chain Innovation and Transformation |
| Ethiopia  | GIZ, Sustainable Textile               | P.O.Box 100009<br>Addis Ababa, Ethiopia                                 | International Cooperation Agency         | Ulrich Plein, Program Manager   |
| Italy     | Sistema Moda Italia                    | Via A. Riva Villasanta 3<br>Milano, Italy                               | Textile and Leather Business Association | Mauro Chezzi, Deputy Director   |
| Italy     | Candiani S.P.A.                        | Via Arese 85, 200220<br>Robecchetto con Induno (MI), Italy              | Textile                                  | Simon Giuliani, Head Sustainability   |
| Italy     | Tessitura Serica A.M. Taborelli s.r.l. | 22020 Faloppio Como, Italia   | Textile                                  | Andrea Taborelli, President Conindustria Como and Vice-President SMI                            |
| Italy     | Tesitura Taiana Virgilio S.p.a.        | Via Carducci, 20<br>22077 Olgiate Comasco, Como, Italy                  | Textile                                  | Marco Tajana, Head of Marketing   |
| Italy     | Sinterama                              | Via Gramsci, 5<br>Biella 138876 Sandigliano,                            | Textile                                  | Matteo Soppera, Product Marketing Manager   |
| Italy     | Greenpeace Italy                       | Via della Cordonata 7,<br>00187 Roma                                    | NGO                                      | Chiara Campione, Senior Strategist  |



|                 |                                    |  |                                    |   |
|-----------------|------------------------------------|--|------------------------------------|---|
| Italy           | Vitale Barberis Canonico S.p.A.    | Via Diagonale 296, Pratrivero 13835 (BI)                                       | Textile                            | Andrea Barberis, CEO  |
| Italy           | Ministero dello Sviluppo Economico | Via Veneto 4, 00100 Roma   | Ministry                           | Benedetta Francesconi, Head of SMEs and Startups Division                         |
| Italy           | WRAD S.r.L.                        | Via Saviabona 56, 36010 Monticello Conte Otto (VI)                             | Textile                            | Matteo Wrad, CEO  |
| Italy           | Reda Group                         | Via Robiolio 25, Biella  | Textile                            | Ercole Botto, CEO   |
| Italy           | ICEC                               | Via Brisa 3<br>20123 Milano, Italy   | Certification Body<br>Leather      | Sabrina Frontini, Director  |
| Italy           | Eurojersey                         | Via S. Giovanni Bosco, 260,<br>21042 Caronno Pertusella VA                     | Textile                            | Andrea Crespi, CEO  |
| Italy           | Camera della Moda                  | Piazza Duomo 31,<br>Milano, Italia   | Textile and<br>Leather             | Paola Arosio, Events Manager<br>Chiara Luisi, CSR Specialist                      |
| Italy           | Milano Fashion Institute           | Via Roberto Sarfatti 25,<br>Milano, Italia                                     | Academia                           | Francesca Romana Rinaldi, Professor   |
| Italy           | Cittadellarte Fashion B.E.S.T.     | Via Giovanni Battista Serralunga 27, Biella, Italy                             | NGO                                | Paolo Naldini, Director<br>Olga Pirazzi, Manager                                  |
| Italy           | Kering Group                       | Via Pisana 336, Scandicci, Italia  | Leather                            | Chiara Morelli, Group operations sustainability Manager                           |
| Italy           | Confindustria Toscana Nord         | Via Giuseppe Valentini, 14,<br>59100 Prato PO, Italia                          | Textile                            | Marcello Gozzi, Director  |
| Italy           | Be.Mi.Va                           | Via Mugellese, 115, 50013 Campi Bisenzio FI, Italia                            | Textile                            | Marco Benesperi, Executive Director   |
| Italy           | Faliero Sarti                      | Via Vittorio Alfieri, 88<br>50013 Campi Bisenzio, Firenze                      | Textile                            | Executive Director  |
| Italy           | Nuove Fibre                        | 59013 Montemurlo, Prato, Italy   | Textile                            | Dalila Mazzi, President   |
| The Netherlands | Sustainable Apparel Coalition      | Sustainable Apparel Coalition<br>82 Second Street,<br>San Francisco, CA 94105  | Textile<br>Business<br>Association | Baptiste Carriere-Pradal, Vice-President<br>Pascal Moreau, Public Affairs Manager |
| The Netherlands | Patagonia                          | Patagonia Europe Coöperatief U.A. - Jollemanhof 11<br>1019 GW Amsterdam        | Textile                            | Ryan Gellert, General Manager   |
| EU              | EURATEX                            | Rue Montoyer 24, Box 10<br>1000 Brussels, Belgium                              | Textile<br>Business<br>Association | Mauro Scalia,<br>Director Sustainable Business                                    |
| EU              | COTANCE                            | Avenue Washington 40,<br>B-1050 Brussels, Belgium                              | Leather<br>Business<br>Association | Gustavo Gonzales, Secretary General   |
| EU              | Fur Europe                         | Avenue des Arts 3-4-5<br>1210 Brussels, Belgium                                | Fur<br>Association                 | Daniela Liebetegger<br>Retail and CSR Manager                                     |
| UK              | Fashion revolution                 | 19 Dig Street, Ashbourne,<br>Derbyshire, UK                                    | NGO                                | Sarah Ditty, Head of Policy   |
| Sweden          | H&M                                | H&M Hennes & Mauritz AB<br>Mäster Samuelsgatan 46A<br>106 38 Stockholm, Sweden | Textile and<br>Leather             | Nina Shariati, Transparency & Innovation<br>Business expert                       |
| USA             | Textile Exchange                   | Lamesa, TX, USA  | Standard<br>setting body           | Ashley Gill, Senior Manager of Industry<br>Integrit                               |

## Annex 3

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## **Accelerating action for a sustainable and circular garment and footwear industry: which role for transparency and traceability of value chains?**

The garment and footwear industry is one of the main sectors in the global economy, but is also one of the industries with the highest environmental footprint and risks for human health and the society. At the same time, the complexity and opacity of the value chain makes it difficult to identify where such impacts occur and devise necessary targeted actions to address them. In the next decades, fast fashion trends, coupled to growing demand in emerging economies, are going to intensify the effects on the environment and human health of practices and processes, and on working conditions across the value chain.

Addressing the growing civil society's and consumers' demand for attaining sustainability in the sector and for trusted information about the products that consumers purchase, wear or use, is going to be a challenge for companies.

Key actors in the industry have identified traceability and transparency as crucial enablers of more responsible production and consumption patterns, and a core priority for immediate action. A sectoral framework for traceability and transparency of the value chain, that is interoperable and scalable can be the response. It would allow an effective connection between producers and firms, firms and brands and retailers, and provide a rigorous way of collecting and exchanging information related to operations and products along the entire value chain.

This study shows that transparency and traceability are a key driver of sustainability and must be a collaborative effort. It looks into the key requirements for and components of robust transparency and traceability framework, and provides a series of recommendations on possible measures that public authorities could devise to create a conducive environment and sustain the implementation of such a framework at the industry level.

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