Toward product transparency: communicating traceability information to consumers

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In the textile industry, corporate transparency does not provide information about products that would allow customers to make informed purchases. Based on a literature review, the concept of product transparency is defined as the disclosure of information concerning a specific product about traceability and sustainability conditions for the supplier, as well as the entire lifecycle and the buying firm's purchasing practices. A field study in the current fashion landscape evaluated the situation of actual practices concerning transparency and compared information available online and in-store regarding both product transparency and corporate transparency. The information available at the time of purchase is limited and even more so on the internet. An experiment with a brand to create a customer information model for a specific product focuses on the importance of traceability for gathering the information necessary. The authors discuss the necessity of centralising information in a Digital Product Passport for greater transparency.

Keywords: traceability; transparency; fashion industry; supply chain; product transparency

Introduction

The textile industry is facing both ecological and economic crises. Since the rise of fast fashion, the textile industry has been one of the major and ever-increasing contributors to pollution and waste. Fashion brands are now producing twice the amount of clothing today compared with before the year 2000 (Morlet et al., 2017). Consumers have become more aware of both social and ecological risks in the textile industry and do not want to encourage such practices. According to a study with French consumers in 2018 (Delattre & Minvielle, 2018) by IFM (Institut Français de la Mode), 44% of consumers bought less clothing and for 40% of them, the reason was chosen de-consumption. This phenomenon unveiled a growing consumer awareness and a growing distrust of the industry's companies. A survey conducted in April 2020 involving 2035 British and German consumers revealed that 64% of them

would spend less on fashion during the crisis and half of them expected that trend to continue after the crisis had passed (Granskog et al., 2020). Consumers were open to purchasing more durable fashion items, as well as repairing and keeping them longer. This survey revealed a shift in purchasing behaviour, with customers wanting to make informed purchases (Granskog et al., 2020; James & Montgomery, 2017). The globalised and fragmented textile supply chain (Ospital et al., 2021) requires different laws and regulations (Fletcher & Grose, 2012) to improve its transparency.

The concept of transparency is strongly related to traceability information in the context of the textile and clothing industry. Based on the scientific literature, several definitions of transparency have been extracted. According to these definitions, we evaluated the current transparency of the industry with a study of the information communicated by brands in-store and online. Combining the result of this study about legal requirements and recommendations regarding traceability information for products and environmental displays, the definition of "Product Transparency" is created.

The concept of product transparency is supported by the importance of traceability for gathering the information necessary for full transparency. Information and communication technologies are involved in gathering, collecting, sorting and selecting information to communicate it to the consumer.

1. Literature review about transparency and traceability

In this section, several definitions of transparency, and traceability as well as related terms and their relationships are reported.

The literature showed that the definitions of transparency and traceability are linked as the general definition (Doorey, 2011; Mol, 2015) stated that transparency can be defined as the disclosure of traceability information.

The concept of transparency is often specified by a second term that helps delineate its perimeter. (Bushman et al., 2004) proposed a definition that refers to corporate transparency as the availability of firm-specific information to those outside the firm. This information includes factors of financial and governance transparency.

In the textile and clothing industry, which is organised with complex externalised production including multi-tier companies, transparency can be defined as internal transparency "what do the firm and managers know "and "external transparency: what is shown to the public" (Bozic, 2017). These two points of view are described as asymmetrical between those who have access to information and those who do not, as well as the Supply Chain Transparency intended to rebalance it (Gardner et al., 2019).

For (Sodhi & Tang, 2019) there is a distinction between transparency and visibility. Transparency is about sharing information between supply chain partners and visibility implies traceability regarding suppliers and sub-suppliers. The latter definition highlights the various stakeholders both upstream and downstream that are related to transparency. Stakeholders have various profiles and interests: suppliers and brands: including all their staff, investors, customers, retailers, policymakers and non-governmental organisations. In (Parris et al., 2016) a general definition is described. It can address multiple profiles with stakeholders described as all the players affected by or affecting an organisation's activities."The extent to which a stakeholder perceives an organisation provides learning opportunities about itself."

Fung, (2013) addressed stakeholders as individuals. They were described as "consumers, clients, and equal citizens of democratic societies". He defined democratic transparency as envisioned to enable "individuals to protect their interests and, collectively, to control the organizations that affect their lives." Democratic transparency is defined by four principles of public information: availability: individuals should have access to information,

proportionality: information should be provided to the same extent to which their actions

cause risks, accessibility: information should be understandable and actionability: information

should allow citizens and organizations to take action.

The definition of supply chain transparency (Egels-Zandén et al., 2015) was cited by

many academics (Bozic, 2017; Brun et al., 2020; Gardner et al., 2019) and was specific to the

textile and clothing industry. It links transparency and traceability.

It comprises corporate disclosure of i) the names of suppliers involved in producing the firm's

products (i.e., traceability), ii) information about the sustainability conditions at these

suppliers' companies, and iii) the buying firms' purchasing practices.

Gardner et al., (2019) completed Egels-Zandén's definition with a holistic definition of supply

chain transparency to improve sustainability made up of six dimensions of information:

traceability, transaction, impact, policy and commitment, activity and effectiveness. This

framework was designed as a cyclical process of assessment and intervention.

Bozic, (2017) used Egels-Zandén's supply chain transparency definition with (Bastian & Zentes,

2013) research about the five factors that drive supply chain transparency as antecedents of

Supply Chain Transparency to build a framework and methodology to evaluate social

transparency: supply chain disintermediation, the legal complexity of countries involved in the

supply chain, product formalisation and standards, third-party integration, and communication

between players in the supply chain.

For Sodhi & Tang, (2019) transparency is seen as company information disclosed to

"consumers, investors and other stakeholders about compliance with consumer-expected

norms in its supply chain operations and products." This definition highlights the consumer's

need for company openness. Today consumers want to buy according to their sets of values

(ethical, environmental, etc) and look for information related to a product to help them do so.

This "need-to-know mentality" is explained by Bhaduri & Ha-Brookshire, (2011): consumers

wanted to make an educated decision with adequate information but did not seem to "research it all".

BoF-McKinsey State of Fashion Survey 2019 revealed that some consumers are both curious and organised before making a clothing purchase. Millennials were at the vanguard, with 52 percent agreeing that they always research for background information before buying, compared with 45 percent of Gen Z consumers and 41 percent of baby boomers. Reviews of products on merchant websites and brand websites are common sources of information (The Business of Fashion and McKinsey & Company, 2019). This survey explained that common sources of information were reviews, articles and social media. A survey of over 111 people revealed that sources of information that they relied on were (in order): campaigns/initiatives, the media, social media word of mouth (James & Montgomery, 2017).

As well as other initiatives, such as the Transparency Index (Ditty, 2020), mobile applications such as Good on You and Clear Fashion or Transparency Pledge provide general information: brands' strategy transparency policies and institutional brand communication. This general corporate information provides an insight for the consumer about general Corporate Social Responsibility (CSR) strategy but it does not help with regard to a specific product (e.g. there could be a wide variety of products, some of them with a poor impact). Distrusting consumers expect 'radical transparency' with the disclosure of information about product origins, geographic history, environmental impact of manufacturing, labour and safety conditions of workers, transport, and the cost of materials, duties and mark-up (The Business of Fashion and McKinsey & Company, 2019).

To implement this radical transparency, the perimeter of traceability for transparency must be extended to the finished product, not only supply chain. The International Organization for Standardization (ISO) defines traceability as the ability to trace the history, application and location of the product which is under consideration, and this can include the

origin of materials and parts, the processing history, and the distribution and location of the product after delivery (ISO 9000:2015).

This distrusting consumer behaviour is reflected in the United Nations Sustainable Development Goal 12: To ensure sustainable consumption and production patterns. In particular, SDG 12.8 states that 'by 2030 ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature'. The UN argues that companies must be transparent and give information to their clients regarding their sustainable purchasing practices by implementing and enforcing traceability in their supply chains.

Data from four consecutive Fashion Transparency Indexes (2017–2020) highlighted that brands have become more transparent (Jestratijevic et al., 2021). This study benchmarked sustainability reporting across five areas: policies (social and environmental standards), governance (business executives and their roles), traceability (supplier networks), audits (audits and remediation plans/procedures) and issues (business risks and negative impacts). Overall, disclosures were more frequent between 2017 and 2020, but disproportionally distributed between 30% transparency leaders and 70% transparency laggards.

The United Nations Global Compact Office 'A Guide to Traceability, A Practical Approach to Advance Sustainability in Global Supply Chains' improved this definition by including sustainability criteria:'[traceability is] 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 and Business for Social Responsibility, 2014). Most transparency definitions refer to organisations on a large scale: companies, brands, supply chains and industry. On a smaller scale, focusing on product information for the consumer, product transparency is missing. Based on (Egels-Zandén et al.,

2015) three dimensions of supply chain transparency definition, product transparency were defined as the disclosure of information concerning a specific product at the moment of purchase with regard to traceability, sustainability conditions at their suppliers' and also the entire lifecycle, as well as buying firms' purchasing practices.

2. Field study: what is the situation of current practices concerning transparency?

While the fashion transparency index is based on a general brand transparency declaration, one of the objectives is to find how transparency is currently implemented concretely in shops and by online textile brands. By conducting a field study, the goal was to get an adequate view of current brand practices regarding the disclosure of product traceability information. This field study was focused on companies which have signed the Fashion Pact.

The Fashion Pact is a global coalition of companies in the fashion and textile industry that is committed to three areas: stopping global warming, restoring biodiversity and protecting the oceans. French President Emmanuel Macron initiated this project and appointed François-Henri Pinault, CEO of Kering, to carry out this mission. The Fashion Pact was presented to the Heads of State at the G7 Summit in Biarritz. In August 2019 there were originally 32 signatories. By April 2021 there were 77 signatories. These companies included suppliers and distributors, from 14 countries, and together these groups represented over 200 brands, i.e. one third of the global fashion industry.

This selection was representative of the fashion landscape with brands of the time that addressed a diverse range of customers (luxury, middle market, fast fashion, sport) and were collectively committed to sustainable development.

2.1. Methodology

A study on what the brands from the Fashion Pact communicate in-store (Source 1) compared

to what they communicate on their commercial website (Source 2) was conducted. The primary data were collected using two sources: in-store and on commercial website. This study was carried out from the point of view of the consumer, accessing only information that was attainable by the general public.

Among the 77 companies involved in the Fashion Pact, this study covered 54 brands that were distributed and accessible in France online and in-store. For groups, one brand was chosen based on its accessibility. Companies involved in the Fashion Pact that are only distributors, manufacturers, or merchandising suppliers were excluded from the selection, as well as geographically inaccessible shops (2 cases). The list of companies and the reasons for their exclusion from the study is given in Table 1: Fashion Pact Signatories on 07.04.2021 and the selection. The survey was conducted between January and July 2021, which corresponds to the Spring-Summer 2021 collection. All the collected data are available in Table 2: Collected Data. The methodology to collect the two sources of information is described below.

The first author and another observer with the same instructions visited one of the brand's stores and looked at what information was available about the products in the store. They noted whether the following elements were mentioned for All/Some/No products:

- The origin of raw materials

- The country of manufacture

- Visibility of the label (yes/no)

- The name of the supplier or factory

- Material certification

- Presence of an environmental impact rating (carbon footprint, water consumption or environmental display, which is a national French environmental labelling project).

- If technological support was available in the store (mobile application, blockchain, connected screen, QR code), the same set of information was collected through the technological support.

When they were available, they asked the sales staff for more information about two of the elements for all the products on the sales floor: the origin of raw materials and the country of manufacture.

Finally, the first author and another observer took a picture of one of the products in the shop with its labels to compare the traceability information available for the same product on the brand's website.

Based on the online source of information, two levels of transparency information were collected: corporate transparency and product transparency.
For each brand, the first author looked at the presence of corporate information that would demonstrate a concern for traceability and transparency with regard to consumers:

- Group's CSR report (extra-financial performance declaration)

- Publication of the list of suppliers

- Environmental and social commitments

- For all the products presented on the brand's online store, the same set of information as in the shop was observed. For All/Some/None of the products were mentioned:

- The origin of the raw material

- The country of manufacture

- The name of the supplier or factory

- Material certification

- Presence of an environmental impact rating (carbon footprint, water consumption or environmental display, which is a national French environmental labelling project)

- The existence of a specific range (sustainable, eco-designed, traced) and possible observations about traceability information available

For each of the selected products in store, the first author collected on the brand website the available information for the same reference. If the product could not be found, a similar product, in the same range, in a different colour was selected. He compared if "made in" information was available and took a screenshot of product details on the website.

This photo/website comparison was carried out for 54 brands.

2.2. Findings

With regard to corporate transparency, the study revealed that 83% (45) of these brands committed to the Fashion Pact produced a CSR report (Extra-Financial Performance Statement) and 98% (53) communicated their social and environmental commitments. For 30% (16), the list of their first-tier suppliers was published, however without linking this information to the products.

Regarding product transparency, the study showed that among these 54 brands little traceability information was present for each product either in the shop and on the internet. The only traceability information commonly available was the "Made in" label which was systematically displayed on the articles in the store for 91% (49) of the brands. However, this information was rarely mentioned online as only 15% (8) brands published the "Made in"

information on their website. The origin of raw materials was rarely found as only 3 brands published this information for a very limited selection of articles both in-store and online.

Most of these 54 brands only displayed information on product labels or their websites. Four shops had technological support to display traceability information: two publishing information about the manufacturing process and two guaranteeing the authenticity of products.

5 brands displayed information about the environmental impact of their products, such as an environmental label for 2 of them. The environmental label on clothing in France is a national pilot project that aims to put an environmental rating on textile labels, from A to E in order to inform consumers. In all instances, this information is related only to a limited part of their product ranges.

One of the findings of this study was that most of the time (91%), the most accurate traceability information attached to a product is the country of manufacture. However, some brands have interesting initiatives to provide more information to the consumer. The survey was an opportunity to highlight 2 types of practices, with the use of information and communication technologies, and the display of environmental labelling initiatives.

In this study, 4 brands were noticeable for their use of innovative information and communication technologies for different purposes: some of them to authenticate products and others to disclose manufacturing information.

Armani Exchange products have a Certilogo certification service. Every garment comes with a QR code called Certilogo: the certification service can be accessed by anyone from a PC, tablet or smartphone to verify the authenticity of a product before buying. For the same authentication purpose, Moncler products have an RFID Chip with a QR code for verification on code.moncler.com. After logging in, the customer is asked to enter the name of

the point of sale and to upload photographs of the entire garment as well as some specific parts, such as labels, zip pullers or buttons.

Other brands display information about manufacturers: Etam and H&M have technological support (mobile application or QR code linked to a website) to disclose information about tier 1 manufacturers for a specific product.

For instance, in Etam stores, the customer can scan a product label using a QR code (available for a selection of products) giving them immediate access to a video or information regarding the factory in which the product was made. This information is also available on the website for a selection of products tagged *Wecare*. For tier 1 manufacturers the information available is the name and address of the factory, length of the partnership, number of employees, the specialty of the factory, if an audit has been performed, such as BSCI, SMETA, ICS or SA8000, and a video about the manufacturer.

In the case of H&M's website, a 'product background' tab is available for all products: name, address of the factory and the number of employees for tier 1 manufacturers is disclosed. In addition, the brand's mobile application allows clients to scan labels in-store to get the same information as online.

During the survey, initiatives were also identified concerning the environmental impact and its presentation to consumers to help them buy products in line with their values.

Okaidi and Decathlon as a part of the environmental display pilot experiment in France displayed a score (A to E) for some products. At Decathlon it represented 61.1% of all ranges in 2019, at Okaidi it represented 120 products in 2019.

At H&M, for a selection of products from the Conscious range, the Higg Index Sustainability Profile is displayed (Baseline, levels 1 to 3). It is a scorecard sharing data on a product's environmental impact across four areas: water use, global warming, fossil fuel, and water pollution.

Also, some Jeans at Celio and Bonobo have Environmental Impact Measuring software (EIM) product scores: low, medium, and high. Spanish-based company Jeanologia created EIM scoring with 3 criteria: water consumption, energy use and chemical use.

3. Traceability tool to inform customers

The survey presented in the previous section shows that brands with a greater intention to display the most information about a specific product are using new information and communication technologies to increase the information available on printed labels.

In this way, consumers can access data about the manufacturing of products they wish to purchase. By moving from a printed label displaying only the composition of the product and its place of manufacture to a technological application, the consumer can understand the origin of the product in a more detailed way: 'made in' becomes 'made by' and this implies IT literacy. Distrusting consumers expect more transparency from fashion brands to have a better understanding and regain trust. Defining the information to be collected and returned is crucial to improving trust and understanding of the brand's product development strategy while not overloading the customer with meaningless information. With regard to brands, data collection should be done in the most straightforward way possible.

Improving the traceability of the textile sector is one of the challenges to increase the knowledge of brands concerning their processes and practices in terms of supply chain and also fostering the level of transparency.

There are numerous questions concerning transparency for brands: what information do brands have and can they access existing information through different tools (Supply Chain Management -SCM, Product Lifecycle Management -PLM or Enterprise Resource Planning -ERP), or in files collected by the procurement team? How can they authenticate data? How much effort do brands have to put into accessing it, is there a way to automate and

avoid double entry? What is meaningful for their clients: depending on client preferences and brand characteristics?

To address these questions, as transparency is based on traceability information, we developed a model validated with different brands and customer profiles information to identify the levers and obstacles to product transparency.

3.1. Methodology

An experiment with a brand was conducted to create a customer information model for a specific product.

A list of collectible data was established for several uses including information for clients, companies and industry, legal department, and sustainability. This spreadsheet was divided into 3 tabs: product history, detailed bill of material and consumer information.

This file was completed during and after an interview with the brand. Afterwards, the brand had to research in-depth data and component traceability. During the interview, the first author asked about their procurement strategy and their commitments.

So far, this research was completed with one brand for one of their products. This luxury brand wanted to keep its suppliers' addresses secret. However, the company has carried out a very thorough investigation into the sourcing of its materials. Information provided to consumer is structured around five themes: Composition, Manufacturing, Impact, Commitments, and Craftsmanship.

3.2. Information collected

Recommendations from (OECD, 2018) are followed to elaborate a list of information for a prototype:

- Products: Origin, composition, technical characteristics, product identification, quality, management data: costs and sales, sustainability*.

- Processes: Inputs and outputs, events, process identification, sustainability*.

- Facilities: Details of economic operators, activity, location, identification of facility and economic operator, sustainability*.

- Transport: Details of economic operators, location, transport, sustainability*

*Sustainability refers to information on the environment, human rights and labour, health and safety, and ethics.

At each stage in a supply chain, proof of transaction are collected to constitute a chain of custody (OECD, 2018). This term originates from a legal expression that refers to chronological documentation for the processing of evidence throughout a criminal investigation. Each actor in the supply chain must be able to transmit verifiable information (e.g. invoices, transaction certificates, test results or inspection reports for certification) as simple statements are not enough to give credibility for total traceability.

4. Conclusions and future directions for theory building and practice

Product transparency evaluation from both the textile industry and academics is at its beginning. The 2021 inventory of product transparency is a first step that should be extended and systematised and repeated from year to year to see and measure the evolution of fashion companies in terms of product transparency. There are 200 brands committed to the Fashion Pact and the Fashion Transparency index is improving year on year, but when looking at the level of product transparency, there is very little information available. Even if there are promising key innovations they are limited as brand initiatives. It remains difficult to obtain

transparency at the supply chain level of each product, and questions are open as to what the obstacles to this are: technological, competitive and economic.

Future regulations for consumer information will lead to changes in practices. In France, the AGEC law (anti-waste for a circular economy) requires brands to disclose information such as the country of manufacture of the product and its fabric on a standardised format: "product information sheet on environmental qualities and characteristics". The application of this regulation will be effective in January 2023 will lead to changes in consumer information. At a European level, the European Commission is demanding more transparency from fashion companies with more information disclosure (European Commission, 2022). Digital Product Passport as explained in The European Green Deal (European Commission, 2019) "electronic product passport could provide information on a product's origin, composition, repair and dismantling possibilities, and end of life handling". The set-up of a Digital Product Passport for textile products is an opportunity to inform consumers but also to improve communication between all actors along with the value chains including after purchase, to support more circularity (Adisorn et al., 2021).

Digitalisation of the full supply chain from raw materials to consumers could create a dynamic relationship between brands, manufacturers, consumers and NGOs. Each product with individual identification would have a digital passport to enhance information on labels and create a link between all actors. Future work will include experiments with customer information models and digital product passports with brands in our research ecosystem. These developments could create a new level of information for customers as well as for all actors in the textile industry. In the end, they could facilitate new, more circular and sustainable behaviour.

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Table 1: Fashion Pact Signatories on 07.04.2021 and our selection.

Group	Selected brand	If not, why?

Adidas	Adidas	
Aigle	Aigle	
Aldo group	No	No shop in France
Armani group	Armani exchange	
Asics	Asics	
Auchan retail	In extenso	No access to shop
Bally	Bally	
Besson chaussures	Besson	
Bestseller	Jack & Jones	
Bonaveri	No	Visual merchandising
Burberry	Burberry	
Calzedonia group	Calzedonia	
Capri holdings limited	Michael Kors	
Carrefour	Tex	
Celio	Celio	
Chanel	Eres	

Chloe	Chloe	
Damartex group	Damart	
Dcm jennyfer	Jennyfer	
Decathlon	Forclaz	
Desigual	Desigual	
Diesel	Diesel	
El Corte ingles	No	Only online in France
Eralda	No	Sourcing
Ermenegildo Zegna	Ermenegildo Zegna	
Everybody & everyone	No	Only in US
Farfetch	No	Reseller
Fashioncube	Jules	
Fung group	No	Only in Asia
Gant	Gant	
Gap inc.	Gap	
Geox	Geox	

Groupe Beaumanoir	Bonobo	
Groupe Eram	Gemo	
Groupe Etam	Etam	
Groupe galeries Lafayette	Galeries Lafayette	
Groupe Idkids	Okaïdi	
Groupe Rossignol	Rossignol	
GTS group	No	Manufacturer
H&M group	H&M	
Hans Boodt mannequins	No	Visual merchandising
Hermes	Hermes	
Herno	Herno	
House of Baukjen	Baukjen	No shop in France
Inditex	Zara	
Karl Lagerfeld	Karl lagerfeld	
Kering	Saint laurent	
Kiabi	Kiabi	

Lacoste	Lacoste	
Lady Lawyer fashion archive	No	Association
Mango	Mango	
Matchesfashion.com	No	Reseller
Moncler	Moncler	
Monoprix	Monoprix	
Nana judy	No	Only in Australia and New Zealand
Nike	Nike	
Noabrands	No	Visual merchandising
Nordstrom	No	Only in US and Canada
North sails	North sails	No access to shop
Paul & joe	Paul & joe	
Prada s.p.a.	Prada	
Promod	Promod	
Puma	Puma	
PVH corp.	Calvin Klein	

Ralph Lauren	Ralph Lauren	
Ruyi	Maje	
Salvatore Ferragamo	Salvatore Ferragamo	
Selfridges group	No	Reseller
Stella McCartney	Stella McCartney	
Tapestry	Coach	
Tendam	Springfield	
Umdasch	No	Visual merchandising
Vestiaire collective	No	Reseller
Zimmermann	Zimmermann	

Table 2: collected data.