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TESI DI LAUREA

""BUY LESS, CHOOSE WELL, MAKE IT LAST": EXPLORING THE RELATIONSHIP BETWEEN FASHION AND SUSTAINABILITY"

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Firma (signature) …………………………*Vanessa Pellegrin*…….

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INTRODUCTION

Fashion is undoubtedly one of the biggest industries in the world for economic impact; however, especially in the case of Italy - where it is considered one the three "Fs" of Made in Italy - what really characterises the sector is its social and cultural value: indeed, since the 1950s, Italian fashion has become synonymous with high-quality, craftsmanship, innovation and beauty, loved and recognised all over the world. Nevertheless, the industry has also proven to be extremely unsustainable, with its prevailing linear model promoting the overproduction and overconsumption of cheap clothing at low prices, created with little consideration for the social and environmental implications of such exploitation. So, it is obvious how urgent and immediate actions, particularly in Italy, where the fashion industry has been found to be lagging behind other sectors, are needed to advance a more sustainable development that not only takes into account the profits generated, but also the effects on people and the planet, in line with a TBL approach (Figure 1).
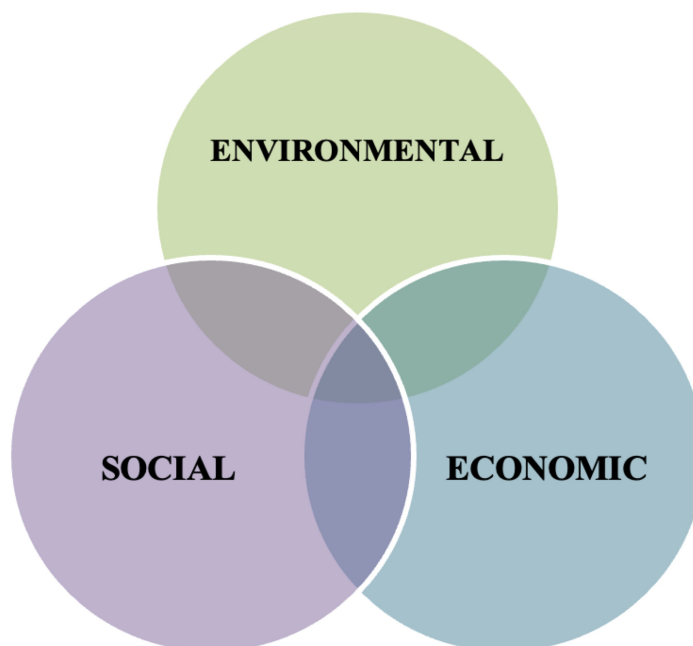
Figure 1: The Three Pillars of Sustainability. Own Elaboration

Therefore, the main purpose of this dissertation, which is structured in four chapters, will be exploring the relationship between fashion and sustainability, from both a theoretical and empirical point of view, by firstly illustrating an analysis of current literature for then

contextualizing this relationship by presenting the impact the industry has on both people and the planet and the main actions that are being implemented to mitigate it (with a particular focus on the Italian situation).

The first chapter presents a bibliometric analysis based on a database of 574 documents extracted from Scopus, highlighting the most relevant characteristics of the research constituents, their intellectual interactions and structural connections. Moreover, since it has been deemed to be the most effective way to identify the most relevant topics discussed by past literature, a considerable part of the chapter deals with the co-citation analysis, drawing attention to central themes – consumers' attitude-behaviour gap when it comes to sustainable clothing consumption, slow fashion, the role of luxury brands in fostering sustainability, the opportunities and challenges of sustainable fashion supply chain management and the emergence of new business models. The second chapter investigates the current state of the fashion industry placing a focus on Italy and its peculiarities, represented by the reality of industrial districts and *Made in Italy*. The third chapter provides up-to-date information on the environmental and social impact of the fashion industry, and it illustrates possible measures for reducing it, in line with the need for a structural and systematic change. Of particular interest is the exploration of the significant positive impact on "Goal 12: Responsible Consumption and Production" (one of 17 Sustainable Development Goals defined by United Nations in 2015) of accelerating the much-needed transition towards circular economy. The latter refers to a restorative and regenerative economic system that could bring many environmental and social benefits, other than representing a significant opportunity for economic growth. In the fourth chapter, an empirical analysis of the sustainability performance of Italian fashion businesses is illustrated. A novel content analysis methodology based on the term frequency – inverse document frequency (TF-IDF) weighting scheme has been adopted, since this method allows summarising in an index the presence and degree of discussion about sustainability on companies' websites. This approach is particularly useful for executing descriptive analysis (highlighting the link between sustainability and spatial distribution of firms) and for making considerations about the businesses' real commitment to a greener, fairer future.

CHAPTER 1. A Bibliometric Analysis of the Relationship between Fashion and Sustainability

This dissertation will adopt a bibliometric analysis, one of the most popular and rigorous methods for analysing large quantities of scientific data, with the aim of gaining a full understanding of the bibliometric and intellectual structures and of the emerging trends of the topic of interest (Donthu et al., 2021).

Many reasons, which will be explained in detail in section 1.1.1, support the choice of this approach, but, ultimately, the main motivation is related to the fact that science mapping, using bibliometric methods, can provide the most objective, integrated and reliable analysis (Aria and Cuccurullo, 2017), even if it entails complexity deriving from the several discrete steps and the use of mapping software tools (Guler et al., 2016). About the last point, one of the most relevant and used – and also applied in this thesis - is surely bibliometrix[1], which not only is characterised by uniqueness and comprehensiveness, but it is also a tool with a workflow able to support and assist scholars through the stages of the recommended science mapping workflow, namely data collection (loading and conversion to R data frame), data analysis (descriptive analysis of bibliographic data frame, network creation for bibliographic coupling, citation, co-citation, collaboration and co-occurrence analysis) and data visualization (conceptual structure mapping and network mapping) (Aria and Cuccurullo, 2017).

1.1 "Reviewing" Different Types of Literature Review

Literature reviews play an essential role in academic research, since they allow scholars to gather existing knowledge, examine the state of art of a scientific field, advance a line of research and identify gaps before conducting new research.

There are different types of review methods, either of qualitative or quantitative nature, and the choice of one over the other is dependent upon the aims and goals of the review and the magnitude and characteristics of the dataset considered for the analysis. For example, bibliometric analysis is best suited for dealing with a large amount of data and when the scope of the review is broad, whereas meta-analysis is ideal when the aim of the process is limited

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[1] Source: Bibliometrix. Available at: https://www.bibliometrix.org/home/

to summarise the findings and in the case of availability of large quantities of homogeneous studies (Donthu et al., 2021).

Before deep diving into the main characteristics of bibliometric analysis, the three other major review methods are traditional narrative reviews, systematic reviews, and meta-analysis.

The first one, traditional narrative reviews, attempts to identify what has been written on a topic adopting a broader perspective. Systematic reviews summarise and critique existing literature and scientific evidence in relation to a specific, smaller research question (Donthu et al., 2021; Siddaway, Wood and Hedges, 2019; Tranfield, Denyer and Smart, 2003); however, despite this method allowing the diversity of the publications to be captured, it still remains a time-consuming process subject to bias (Zupic and Čater, 2015). Finally, meta-analysis utilises statistical procedures to summarise empirical evidence of a relationship between variables while also proposing new connections not already discovered in previous works (Donthu et al., 2021; Tranfield, Denyer and Smart, 2003). This is a powerful but limited method, since it requires researchers to choose studies based on what connections they want to focus on (Zupic and Čater, 2015).

1.1.1 A Focus on Bibliometric Analysis

Bibliographic studies represent a new style of reviewing theoretical literature (Brika et al., 2021), and literature reviews conducted through this method are becoming increasingly popular (Blasi and Sedita, 2022; Donthu et al., 2021).

Regarding the methodology, this type of analysis entails the application of quantitative methods and techniques on bibliometric data, and the two main techniques can be categorised into: (1) performance analysis, a descriptive presentation of the contributions of research constituents, and (2) science mapping, that focuses on the intellectual interactions and structural connections between authors, countries, institutions and journals, often enriched with network analysis techniques (such as network metrics, clustering and visualization) (Donthu et al., 2021; Wallin, 2005).

Based on the work of Zupic and Čater (2015), a description of the five main bibliometric techniques of science mapping, with their most relevant pros and cons, is proposed in Table 1: even if quantitative by nature, the results coming from the application of these methods are extremely useful when formulating qualitative judgements and interpretations (Wallin, 2005).

Method	Description	Pros	Cons
Citation	Estimates the influence of research constituents through citation rates.	Finding the important works in the field.	Citation count is biased towards older publications.
Co-Citation	Connects documents, authors or journals on the basis of joint appearances in the reference list.	Reliable and most used method to filter the most relevant, highly cited work. Useful to reveal the intellectual structure.	Not optimal for mapping current research fronts. It is also impossible to map articles that are not highly cited.
Bibliographic Coupling	Connects documents, authors or journals based on shared references, also highlighting thematic clusters.	Allows recent or niche publications to gain visibility. Does not require citations to accumulate.	Difficult to know whether mapped publications are important or not.
Co-author	Connects authors when they co-author a paper.	Can provide evidence of collaboration and produce the social structure.	Collaboration not always acknowledged with co-authorship.
Co-word	Connects keywords when they appear in the same title, abstract or keyword list.	Uses the actual content of the documents for the analysis.	Words can appear in different forms and can have different meanings.

Table 1: Bibliometric Methods: main pros and cons. Own Elaboration based on Zupic and Čater (2015)

In general, the great potential of bibliometric analysis – in particular science mapping - is related to its usefulness regarding three aspects (Donthu et al., 2021; Zupic and Čater, 2015):

a) It can be used to help researchers, in particular the ones new to a field, to quickly grasp its structure and most important characteristics, while also identifying knowledge gaps and novel ideas to be further explored;

b) It allows to manage larger set of data;

c) When used correctly, it can introduce the objectivity and rigour that other types of literature reviews, which are more subject to bias by the researchers, often do not have.

In conclusion, even though bibliometric methods are no substitute for extensive reading and synthesis, it is undoubtedly true that they will be increasingly used to review scientific literature (Zupic and Čater, 2015) and become one of the most valid and complementary alternative to other methods, providing different perspectives and unique advantages compared to those offered by traditional qualitative literature reviews, systematic literature reviews and the quantitative approach of meta-analysis (Wallin, 2005). Even if obvious care and attention are required when going through the process and when interpreting the results of the analysis, it is clear how the weaknesses of bibliometric analysis are not that significant to jeopardize its overall effectiveness.

1.2 Data Source and Method

The essential process of data collection can be divided into three sub-stages (that will be also followed when performing the proposed analysis):

1. Data retrieval: Scopus, Web of Science and Google Scholar are three among the most used online sources of bibliographic information, in which metadata on scientific documents are stored. The availability and accessibility of these databases, along with the development of software for conducting the process, can be considered the main reasons behind the increasing popularity of bibliometric analysis (Donthu et al., 2021; Zupic and Čater, 2015);

2. Data loading and converting: data must be converted into a suitable format for the chosen bibliometric tool;

3. Data cleaning: an essential step since databases are not exclusively designed for bibliometric analysis. So, in order to obtain quality results, it is essential to have quality data that does not present redundancy and misspelled elements.

The database chosen to conduct this review is Scopus[2], Elsevier's source-neutral abstract and citation database, curated by subject-matter experts and launched in 2004. With over 25,000 active titles from more than 5000 international publishers, the database can deliver the broadest and most comprehensive overview of the world's research output in the field of science, technology, social, medicine, social science and arts and humanities. The most prominent publishers indexed in Scopus are Elsevier (10%), Springer (8%), Taylor & Francis (5%), Wiley-Blackwell (5%) and Sage (2%).

Other than Scopus, as already anticipated, the two other major existing databases are Web of Science (WoS) and Google Scholar.

The first (Wos), is a paid-access platform owned by Clarivate, that provides access to multiple databases and their reference and citation data from academic journals, conference proceedings and other documents in various academic disciplines. Compared to WoS, Scopus not only has been found to be more user-friendly (providing an API – application programming interface - and allowing users to export up to 2000 records at a time), but various studies have also stressed how the Elsevier's database has a broader coverage than WoS (Zupic and Čater, 2015) – indeed, WoS was defined as "a perfect subset of Scopus" (Waltman, 2016, p. 368). Moreover, Scopus tends to have higher citation counts than WoS and, by containing data for all authors in the cited references, author-based citation and co-citation analysis were found to be more accurate (Zupic and Čater, 2015).

The second one (Google Scholar) is a freely accessible web search engine that indexes the full text or metadata of scholarly literature across an array of publishing formats and disciplines (making it a very different tool from Scopus and WoS). Not only its inclusion of non-peer-reviewed, non-scientific content and of low quality publications, but also the lack of metadata useful for citation analysis, advance search and keyword analysis tools make Google Scholar a not suitable database to perform a bibliometric analysis (Harzing and Alakangas, 2016; Martín-Martín et al., 2018).

1.2.1 Describing Every Step of the Process

The process that will be described took place in June 2022 (Figure 2) and is articulated in three steps.

The first step concerns the decision about the appropriate search strategy to identify documents related to the topic in the Scopus database. After trying multiple keywords and

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2   Source: Scopus. Available at: https://www.elsevier.com/solutions/scopus

different combinations, the search query TITLE-ABS-KEY "Fashion" AND "Sustainab*" has been deemed the most comprehensive for capturing the full breadth and depth of the scientific production on the sustainability of fashion (Table 2).

A total of 3609 articles (as of June 3, 2022) were obtained.

Keyword/Boolean Operator	Description
Fashion	The fashion industry is the business of making and selling clothes and accessories, considering all value chain players
Sustainab*	In Boolean search, the asterisk serves as a wildcard character (to substitute one or more characters in a string) to include alternative forms of the words. In this case, it has been used to account for variations of the term "sustainability", namely "sustainable"
AND	The Boolean operator AND has been adopted to find, in the chosen database, the results containing all the search terms considered

Table 2: Search Keywords. Own Elaboration

The second step was to limit the search results to only comprehend documents meeting the following two criteria, obtaining, in the end, a list of 877 documents:

- Selection of documents belonging to the subject area: Business, Management and Accounting;
- Selection of documents classified as "article", "book chapter", "book" and "conference paper".

Regarding the timespan and the language of the documents, no restriction was applied.

The third step was downloading the list of documents as a CSV file (exporting, in this way, the metadata related to citation, bibliography, abstract and keywords, funding details and many other key information), and cleaning the database eliminating all the documents not aligned with the search query. In order to do so, title, abstract, keywords and even the full text of each publication were read and checked for inclusion suitability. Each document has been categorised into one of the following three categories: "Relevant", "Not Relevant" and "About sustainability or fashion, not both" (Table 3).

Category Name	Description	N° of Documents
"Relevant"	Documents about both Fashion and Sustainability. Only these documents were included in the final collection	574
"Not relevant"	"False positives", irrelevant documents about other topics in other fields and mistakenly included in the set	181
"About sustainability or fashion, not both"	Articles either about sustainability or fashion, not considered in this case since the aim is to study the relationship between the two themes	87

Table 3: Categorisation of the articles. Own Elaboration

It must be mentioned that 35 documents presented no author name or ID available: the decision was to exclude them, even if 19 of these papers could have qualified as part of the "Relevant" category (the numbers, presented in Table 3, do not count for these documents). Only 6 out of the 574 publications are written in languages other than English, and, as specified above, they have been included in the dataset.

The final collection includes 574 publications: since it comprehends hundreds of papers, the research field can be considered large enough to allow the bibliometric analysis to be performed.
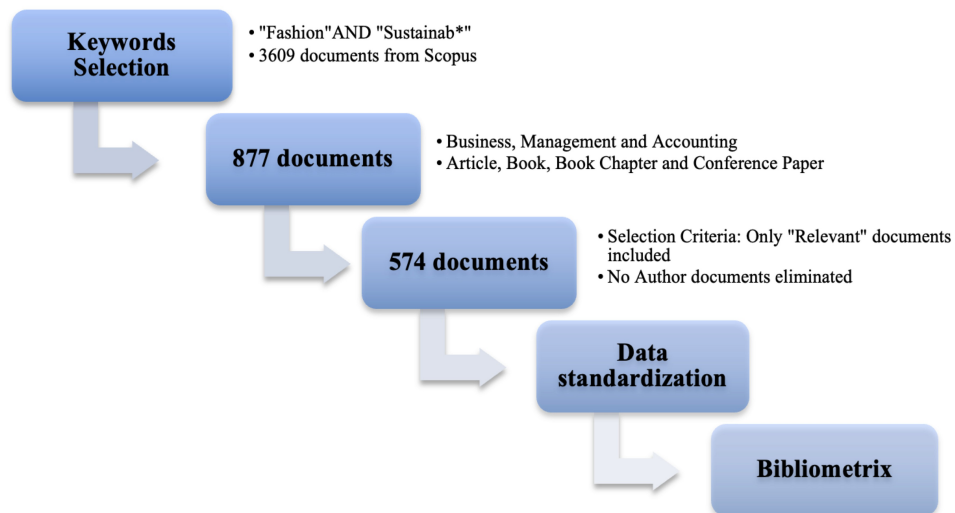
Figure 2: Flow Diagram for Bibliometrics Search. Own Elaboration

1.2.2 Bibliometrix and Biblioshiny

Bibliometric tools are particularly useful, since they are able to perform bibliometric calculations and present similarity matrices between different items (documents, authors, words, sources) starting from simple and raw bibliographic data exported either from Scopus or other databases (Zupic and Čater, 2015). BibExcel, HistCite and SciMAT are among the most famous software but, in this review, the one that has been chosen is bibliometrix that, with its Shiny web-app Biblioshiny, offers users with no advanced coding skills an easy-to-use interface that allows them to still use the tool in an effective manner.

As already mentioned, Bibliometrix is one of the most popular R-tools, used in a growing number of publications for the execution of comprehensive science mapping analysis (unlike many other software tools, that are only concerned with certain steps of the process) of scientific literature. Developed by Massimo Aria and Corrado Cuccurullo (also authors of the main document about the program, "bibliometrix: An R-tool for comprehensive science mapping analysis"), it is an open-source tool published on CRAN - The Comprehensive R Archive Network - used for quantitative research in scientometrics and bibliometrics, developed in the statistical computing and graphic R language. Providing routines for importing bibliographic data from online bibliographic databases, the tool also includes a comprehensive set of functions that can be grouped into two main areas: analytics for three level metrics of sources, authors and documents (Table 4) and three structures of knowledge (conceptual, intellectual, social) (Table 5).

Level of analysis metrics	Metrics
Sources	Bradford's Law H Index Source dynamics Most relevant sources
Authors	Most relevant authors Annual production per author Lotka's Law H Index Most relevant affiliations Countries
Documents	Most cited documents Cited References Words

Table 4: Level of analysis metrics. Own Elaboration based on Biblioshiny

In particular, conceptual structure deals with the main themes and trends of a field, intellectual structure concerns the way in which the work of authors can influence the scientific community and, lastly, social structure explains the interactions and relationships between countries, institutions and authors.

Structure	Bibliometric Technique	Unit of Analysis	Statistical Technique
Conceptual	Co-word	Keywords Plus Author's Keywords Title Abstract Full document	Network analysis Factorial analysis Thematic mapping Thematic evolution Topic modelling
Intellectual	Co-citation Citation	References Authors Journals	Network analysis Historiograph
Social	Collaboration	Authors (and co-authorship) Institutions Journals	Collaboration Network

Table 5: Structures of knowledge. Own Elaboration based on Biblioshiny

Bibliometrix is also useful for data visualization: knowledge extracted from the data analysis process can be depicted on maps or graphs such as bi-dimensional maps, dendrograms and social networks, which will be extensively reported in this chapter to show the detailed results of the bibliographic review.

1.3 Bibliometric Analysis: The Results

1.3.1 Main Findings

As already mentioned, the final list is composed of 574 documents - 463 articles, 12 books, 66 book chapters and 33 conference papers - from 204 different sources and published during a fifteen-year period, starting in 2007 and ending in May 2022. The principal information regarding the collection, such as the number and types of documents, the number of keywords, citation and sources, are indicated in Table 6.

Also, about the authors, the following measures have been included:

- Documents per Author index: the ratio between the total number of documents and the total number of authors;

- Author per Document index: the ratio between the total number of authors and the total number of documents;

- Co-Authors per Documents index: calculated as the number of author appearances (unlike the Authors per Document index, that counts the author only once, even if they have published more than one work) divided by the total number of documents;

- Collaboration Index: defined as the total number of authors of multi-authored documents divided by the total number of multi-authored documents.

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2007:2022
Sources	204
Documents	574
Average years from publications	4.25
Average citations for documents	17.25
Average citations per year per doc	2.891
References	28276
DOCUMENT TYPES	
Article	463
Book	12
Book Chapter	66
Conference Paper	33
DOCUMENT CONTENTS	
Keywords Plus (ID)	965
Author's Keywords (DE)	1556
AUTHORS	
Authors	1140
Author Appearances	1474
Authors of single-authored documents	95
Authors of multi-authored documents	1045
AUTHORS COLLABORATION	
Single-authored documents	114
Documents per Author	0.504
Authors per Document	1.99
Co-Authors per Documents	2.57
Collaboration Index	2.27

Table 6: Main Information regarding the collection. Own Elaboration from Biblioshiny

1.3.2 Scientific Production

The first documents about the topic of fashion and sustainability appear in 2007, but the first big spike in the annual production, with almost 50 documents produced in a year, has been registered in 2015, and an all-time high was reached in 2021, with almost 100 documents (Figure 3). Not considering the outlier drop happened in 2016, an upward trend in the annual scientific production is evident: a CAGR (Compound Annual Growth Rate) for the period 2007-2022 equal to 24.42% shows how the research topic has been grabbing the attention of scholars and academics. This growing interest (especially after 2020) could be linked to the laws and regulations adopted by many nations and international organisations (namely the European Union) to tackle the threat of climate change and pollution.
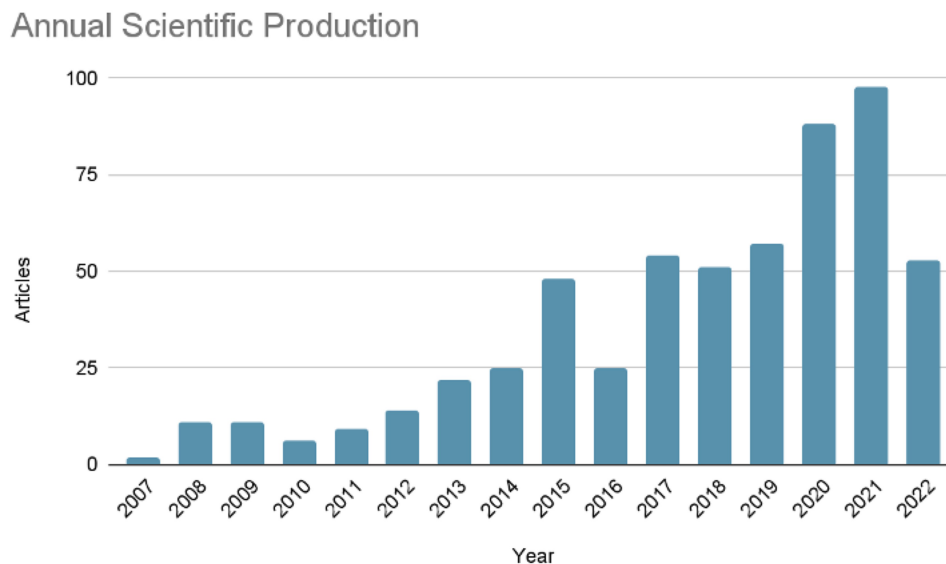
Figure 3: Annual Scientific Production 2007-2022. Own Elaboration from Biblioshiny

1.3.3 Sources

Sources are articles, books or conference papers which have published one or more documents included in the bibliographic collection: the total number of sources considered in this bibliographic review is equal to 204, and the following Table 7 shows the ten most relevant sources for number of documents.

Focusing on the two most important, the Journal of Fashion Marketing and Management, which is published by Emerald and provides extensive research on themes related to clothing marketing and management (with also a very recent focus on sustainability of supply chains), occupies the first position, having published 8.7% out of the total 574 documents considered.

The Journal of Cleaner Production - by Elsevier, it concerns topics such as cleaner production through reduction of waste and increase in source efficiency, sustainable development and consumption - is a close second, with 8% of the papers coming from this source.

Sources	Articles
Journal of Fashion Marketing and Management	50
Journal of Cleaner Production	46
Journal of Global Fashion Marketing	25
International Journal of Consumer Studies	20
Research Journal of Textile and Apparel	20
Clothing and Textiles Research Journal	13
Journal of Business Research	13
Handbook of Sustainable Luxury Textiles and Fashion	11
International Journal of Production Economics	11
Fashion and Textiles	10

Table 7: Most Relevant Sources. Own Elaboration from Biblioshiny

Through Bradford's Law, it is also possible to perform a source clustering analysis. The law, formulated in 1948 by Samuel C. Bradford, states that, for a given subject area, "there are few very productive periodicals, a large number of more moderate producers, and still a large number of constantly diminishing productivity" (Nash-Stewart, Kruesi and del Mar, 2012, p, 135). One formulation of the law is the one that, after having sorted journals in three different zones (Zone 1, Zone 2 and Zone 3) by number of articles, to have about one third of all articles per zone, makes it possible to predict that the number of sources in the second and third zone will be, respectively, n and n^2 times larger than the core.

In line with previous findings, the core (also called the "first zone") is composed of 8 journals (the first eight already listed in Table 7) out of 204, which have published 198 documents out of the whole set (35.5%) (Figure 4). A Second Zone consisting of 38 sources and a Third one with the remaining 158 journals come after the core.
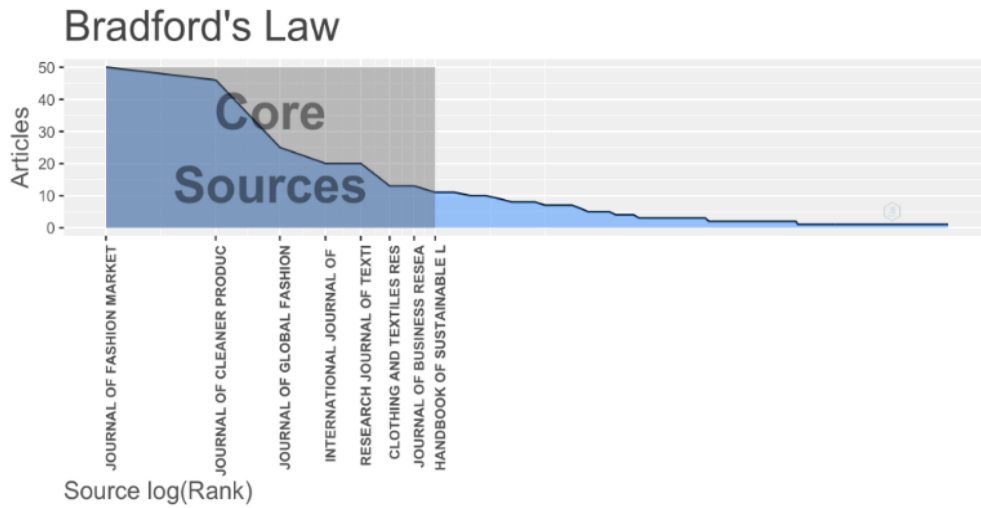
Figure 4: Bradford's Law. Own Elaboration from Biblioshiny

1.3.4 Authors

The most prolific authors on the topics of fashion and sustainability are presented in Table 8. The ranking is based on the number of documents in which they have been listed as authors/co-authors.

Other than their names, number of articles written and affiliation, the fractionalized number of authored documents is also presented (Figure 5): this is a measure that quantifies the individual author's contribution to a published set of papers (following the hypothesis of uniform contribution of all co-authors at each document).

$$Frac\ Freq(AU_j) = \sum_{h \in AU_j} \frac{1}{n.\ of\ CoAuthors(h)}$$

Figure 5: Fractionalized number of authored documents. Own Elaboration

where AU_j is the set of documents co-authored by the author j and h is a document included in AU_j.

Henninger, C.E. (currently reader in Fashion Marketing and Management at The University of Manchester), Choi, T.-M. (who has worked for 17 years at The Hong Kong Polytechnic University and, since September 2022, occupies the role of professor of Operations and Supply Chain Management in Liverpool) and Ko, E. (from the Department of Clothing and Textiles at Yonsei University, South Korea) are the three most relevant authors of the collection, having worked on, respectively, 12, 11 and 10 articles.

Authors	Articles	Articles Fractionalized	Author's Affiliation
Henninger CE	12	3.70	University of Manchester
Choi T-M	11	4.53	The Hong Kong Polytechnic University
Ko E	10	3.12	Yonsei University
Vinelli A	7	1.30	University of Padua
Caniato F	6	1.05	Politecnico di Milano
Danese P	6	1.05	University of Padua
Goworek H	6	2.28	Nottingham Trent University
Kim KH	6	1.67	Changwon National University
Macchion L	6	1.05	University of Padua
Pedersen ERG	6	2.50	Copenhagen Business School

Table 8: Most Relevant Authors (and their Affiliation). Own Elaboration from Biblioshiny

Table 9, other than presenting for each author their total citations (TC), the number of publications (NP) and the publication year start (PY), proposes three other useful measures: the h-index, the g-index and the m-index.

The Hirsch Index (h-index) is an author's number of published articles (*h*) each of which have been cited in other publications at least h times. The g-index, introduced by Egghe in 2006, measures the global citations performance of a set of documents: ranking in decreasing order of the number of received citations, the g-index is the unique, largest number such that the top *g* articles have received together at least g^2 citations. Finally, the m-index is the ratio between the h-index and the number of years since the first published paper of the author.

Ko, E. ranked first in h-index and m-index but only third regarding article production. Henninger, C.E., author of the highest number of publications during the period and first regarding the g-index, ranked second in m-index and third on h-index and total citations.

Choi, T.-M. is the first for number of total citations and g-index, and second for both article production and h-index.

Authors	h-index	g-index	m-index	TC	NP	PY Start
Ko E	10	10	1.25	278	10	2015
Choi T-M	9	11	0.82	520	11	2012
Henninger CE	8	11	1	253	12	2015
Vinelli A	7	7	1	201	7	2016
Caniato F	6	6	0.55	457	6	2012
Danese P	6	6	0.86	186	6	2016
Macchion L	6	6	0.86	186	6	2016

Table 9: Author Impact by H-index and its generalization. Own Elaboration from Biblioshiny

Regarding the development of these top-authors' production over time, Figure 6 graphically shows the timeline of the ten most relevant researchers, the number of written articles (proportional to the bubble size) and the total citations (TC) per year (represented by the different colour intensity). From 2015 to 2021, all the considered top 10 authors have had a period of significant activity: in particular, Henninger, C.E. has published the highest number of articles in a year (five papers in 2017), while Choi, T.-M. had the most total citations per year (equal to 39.5 in 2019) and Caniato, F. and Caridi, M., with 295 total citations each for the article "Environmental Sustainability In Fashion Supply Chains: An Exploratory Case Based Research" (2012), are the ones who got the highest TC.
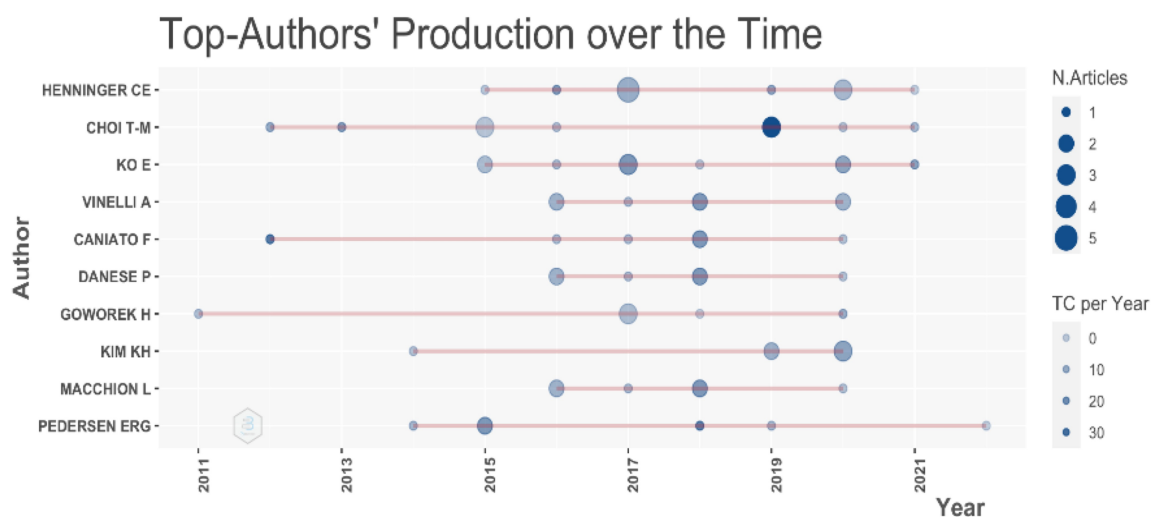
Figure 6: Top-Authors' Production over the Time. Own Elaboration based on Biblioshiny

Lotka's Law, that describes the frequency of publication by authors in a given field, states how productivity (meaning authors producing more than one publication) tends to decrease as the number of articles published increases (Lotka, 1926). Based on their productivity, academics can be classified as either "core authors" or "occasional authors": arbitrarily setting the threshold level at five documents, less than 2% of authors included in the whole set can be defined as "core". Also, more than 83% of authors have written just one document each (Figure 7).
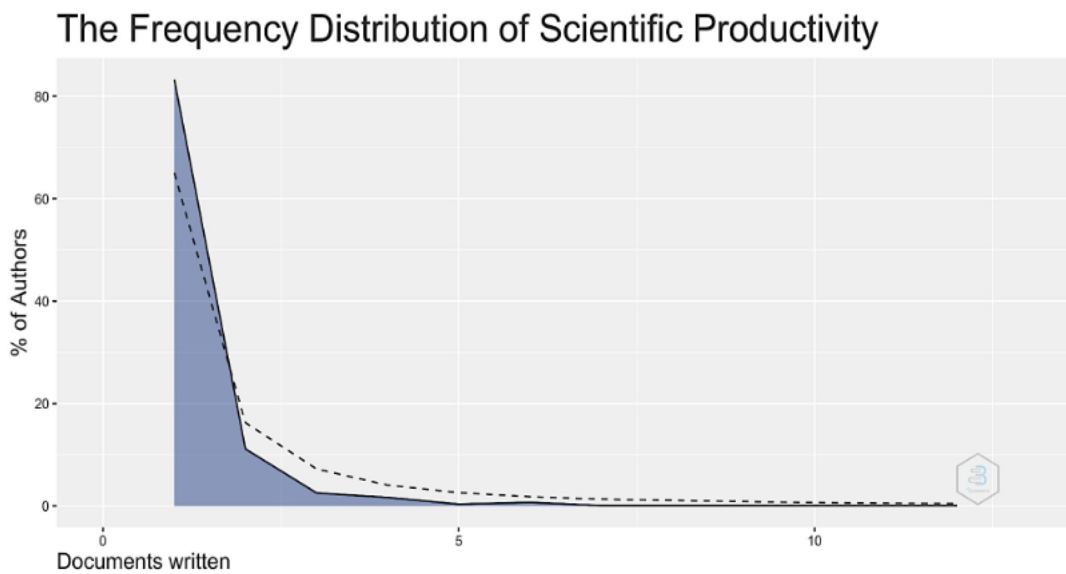
Figure 7: The Frequency Distribution of Scientific Productivity. Own Elaboration based on Biblioshiny

With single-authored documents only being 114 out of 574 and a collaboration index of 2.27, co-authorship is clearly a very relevant phenomenon in the considered collection. Presuming co-authoring to be a measure of collaboration (Zupic and Čater, 2015), examining social structures, like the authors' collaboration network, is very useful to assess how and which scholars have interacted with each other in a research field.

Figure 8 depicts the author's collaboration network: from a total of 1140 nodes, 35 were the identified clusters, the five most relevant (for betweenness, closeness and PageRank) being the red, blue, green, purple and grey groups.

The four writers composing the red cluster are Henninger, C.E. (University of Manchester), Alevizou, P.J. (University of Sheffield), Ryding, D. (University of Manchester) and Oates, C.J. (Newcastle University). To give an example of their collaborations, Henninger, Alevizou and Oates are co-authors of the article "Sustainable supply chain management in the slow-fashion industry", while Henninger, Alevizou and Ryding have written together

"Consumption strategies and motivations of Chinese consumers: The case of UK sustainable luxury fashion".

In the blue cluster, Choi, T.-M. (The Hong Kong Polytechnic University) is the most relevant author of the group. Also, he is the one who has repeatedly collaborated with the other authors included in the cluster, all working at The Hong Kong Polytechnic University (but in different departments): Chan, H.-L., Chow P.-S., Cai, Y.-J., Fung, Y.-N. and Liu, R.

To the green cluster belong Ko, E. (Yonsei University), Choi, H. (Yonsei University), Mattila, P. (Aalto University), Han, J. (Yonsei University), Kong, H. M. (Yonsei University) and Seo, Y. (The University of Auckland).

Regarding the purple cluster, characterised for being the one with the largest set of connected authors, it is composed by Vinelli, A. (University of Padua), Caniato, F. (Politecnico di Milano), Danese, P. (University of Padua), Macchion, L. (University of Padua), Caridi, M. (Politecnico di Milano), Moretto, A. (Politecnico di Milano), Da Giau, A. (University of Padua) and Lion, A. (University of Padua).

The grey cluster is made by Rinaldi, R. (University of Florence), Bandinelli, R. (University of Florence), Ciarapica, F.E. (Università Politecnica delle Marche), Dotti, S. (University of Bergamo), Resta, B. (University of Bergamo), Fani, V. (University of Florence) and Pinto, R. (University of Bergamo).

The most significant fact about these last two clusters, the purple and the grey ones, is the connection they share with each other by multiple edges: Rinaldi, R. (from the grey group), in particular, has collaborated with many researchers from the purple cluster to write the articles "Strategic approaches to sustainability in fashion supply chain management" and "Sustainability practices and web-based communication: An analysis of the Italian fashion industry".

It can be noticed a homogeneity regarding the affiliations in each cluster, proving the existence of a clear correlation between co-authorship collaborations (past, present and future) and geographic proximity (defined as working on the same site/campus) (Long et al., 2014).

On a final, more technical note, the clustering algorithm Louvain, that uses the notion of network modularity, has been chosen to perform this (and all the following) analysis not only because it is the default setting of bibliometrix, but also because it has been found to be very fast for larger networks and to provide excellent accuracy (Blondel et al., 2008).

Figure 8: Collaboration Network: Authors. Number of Nodes: 1140, Clustering Algorithm: Louvain, Normalization: Association. Own Elaboration based on Biblioshiny

1.3.5 Three-Fields Plot

After having analysed them separately, the three-fields plot presented in Figure 9 (also called Sankey diagram) can be useful to investigate and visually assess the relationship between top sources, topics – in the form of keywords, the focus of the graph - and main authors: thanks to the different thicknesses of the edges (coloured in grey), it is possible to understand the strength of the connections between the three categories. Also, the larger the size of the rectangles, the higher the frequency of the items in the collaboration network.

Not surprisingly, almost all the proposed sources and authors have extensively covered and developed the topics of "fashion" and "sustainability". But, very interestingly, also "supply chain management" and "corporate social responsibility" have been growing in presence, being covered by five and six of the considered authors, respectively.

29
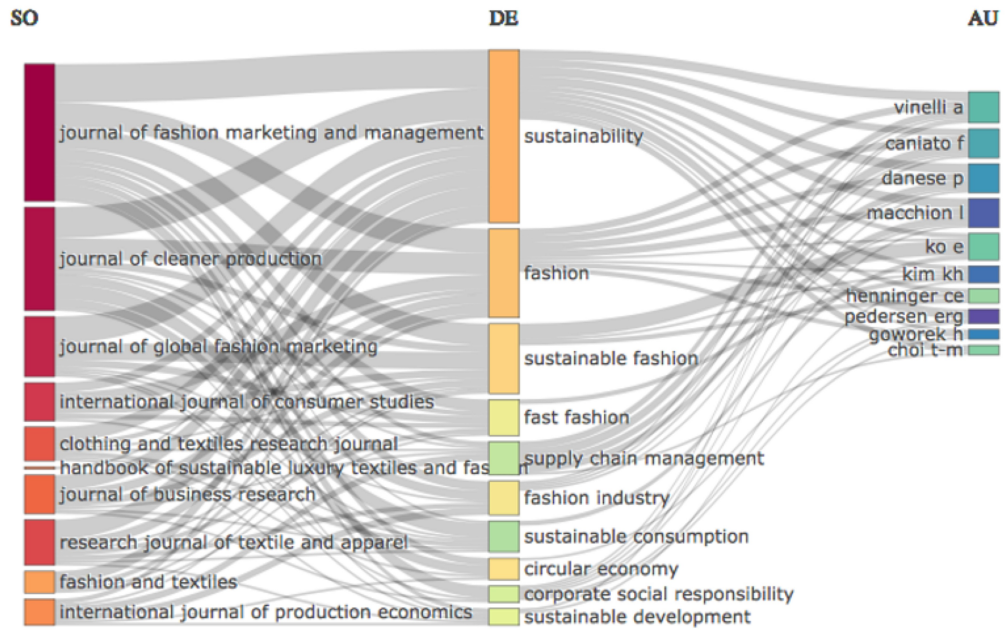
Figure 9: Three-Fields Plot (Sources-Keywords-Authors). Own Elaboration based on Biblioshiny

1.3.6 Countries and Affiliations

As highlighted by the different colour intensity, USA (223), Italy (186) and UK (171) are the most prolific countries in terms of scientific publications, followed by South Korea, India, China and Hong Kong (Figure 10).

It is worth mentioning that USA, Italy, UK, Korea and Denmark are also the five most cited countries in the collection.

Figure 10: Country Scientific Production. Own Elaboration based on Biblioshiny

In Table 10, the authors' affiliation is reported: Hong Kong, South Korea, Italy and United Kingdom are the countries where the most relevant affiliations are located. Interestingly, no American universities and colleges are present in the top 5, even if most of the scientific production comes from the U.S.: this is probably due to the presence of countless different institutions scattered all over the country, which leads to higher fragmentation and dispersion. Conversely, Hong Kong, that presents a significantly lower number of universities and institutions of higher education (only 22) than the United States, holds the top spot for number of affiliations, despite the country ranking 7th regarding the total scientific production.

Most Relevant Affiliations (with disambiguated affiliation items)	N° of Affiliations
The Hong Kong Polytechnic University	37
Yonsei University	26
Politecnico di Milano	24
University of Padua	22
Nottingham Trent University	20

Table 10: Most Relevant Affiliations. Own Elaboration from Biblioshiny

Another interesting aspect to consider is the international collaboration intensity of countries: measured by the MCP (Multiple Country Publications), it indicates the number of documents in which there is at least one co-author from a different country. Another measure is the Single Country Publications (SCP), which differs from the MCP since it is a measure of the inter-country collaboration intensity. Both measures are then useful for calculating the MCP Ratio, it being the Multiple Country Publications divided by the number of articles per country. Table 11 and Figure 11 report this information for the most significant nations.

Almost all countries (excluding Korea, with a MCP slightly higher than its SCP) present a low international collaboration, meaning that these relationships tend to happen between professionals living in the same country, often working in the same institution (which is in line with previous findings reported in section 1.3.4).
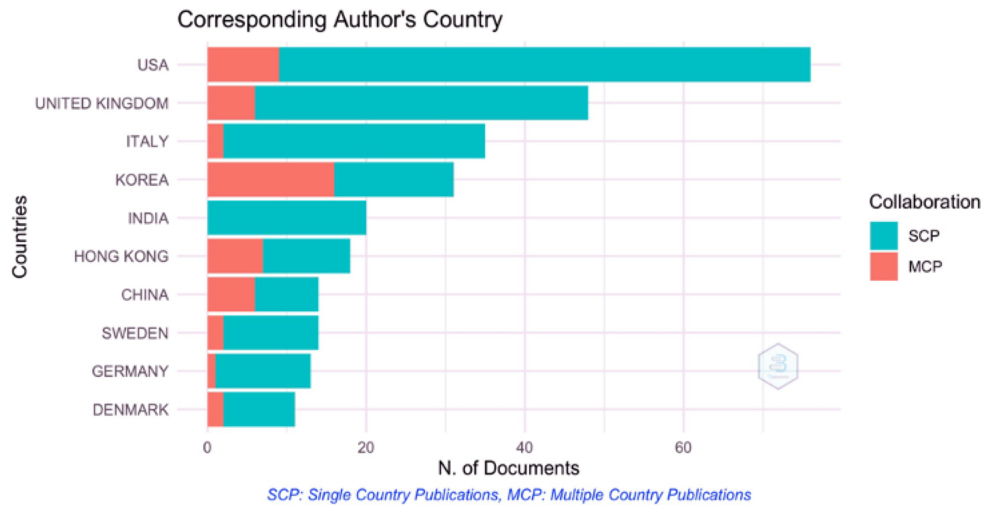
Figure 11: Corresponding Author's Country. Own Elaboration based on Biblioshiny

Country	Articles	Frequency	SCP	MCP	MCP Ratio
USA	76	0.18719	67	9	0.1184
United Kingdom	48	0.11823	42	6	0.1250
Italy	35	0.08621	33	2	0.0571
Korea	31	0.07635	15	16	0.5161
India	20	0.04926	20	0	0.0000

Table 11: SCP, MCP and MCP Ratio of the Most Relevant Countries. Own Elaboration from Biblioshiny

Even if international collaborations appear to be low for most nations, it is still worth to assess between which countries these relationships have taken place.

In the countries' collaboration network, graphically depicted in Figure 12, it is possible to identify four different clusters (in red, blue, green and purple).

Confirming previous data, USA and United Kingdom emerge as the most prolific regarding the scientific production (which is proportional to the size of the bubble), also sharing a weak link with each other. UK, with six direct nodes, is the most prominent nation regarding the collaboration aspect, being connected to Sri Lanka, Sweden, France, Denmark, USA and Italy (with whom it has the strongest connection). Very importantly, UK is also able to connect three out of the four identified clusters. From the red cluster, Korea comes second in terms of highest number of edges, with five direct links to China, USA (with whom there is a particularly intense relationship), Hong Kong, Finland and New Zealand.
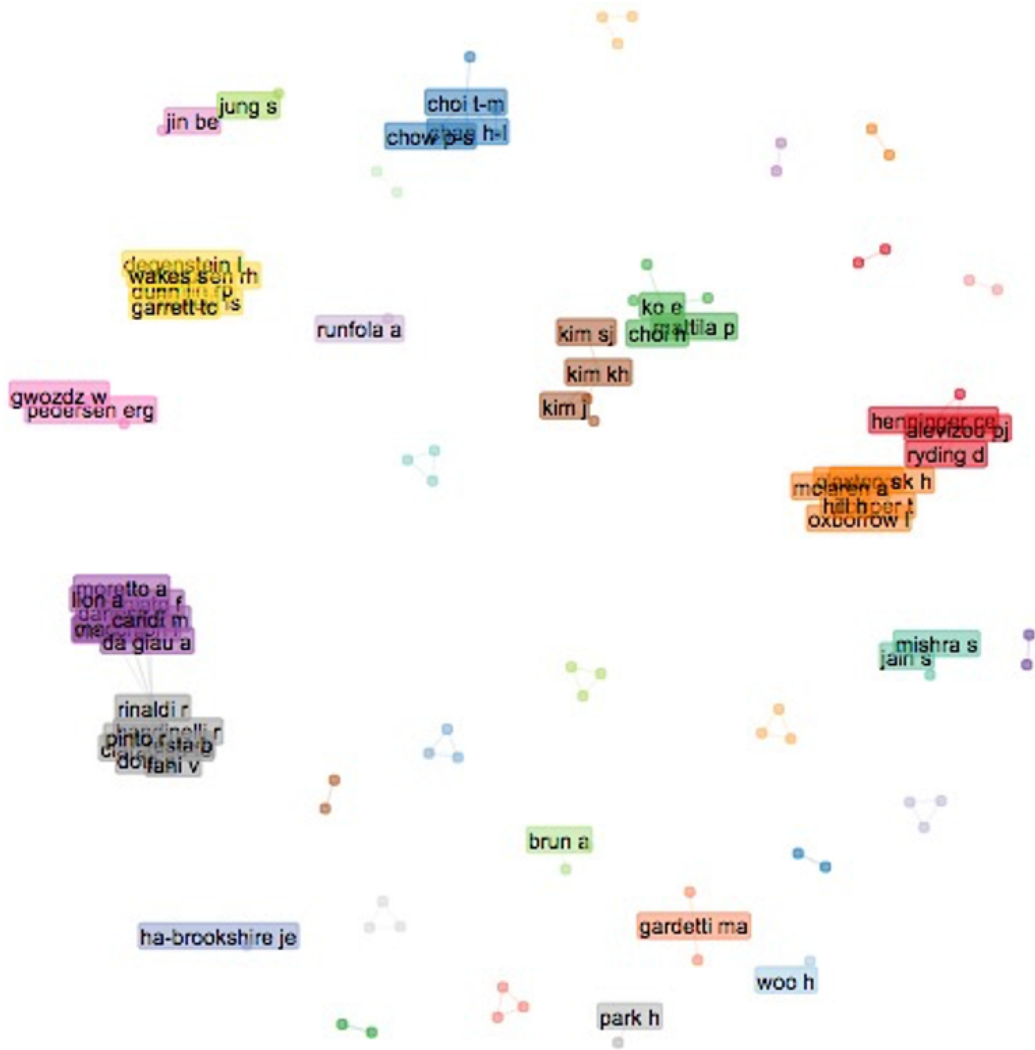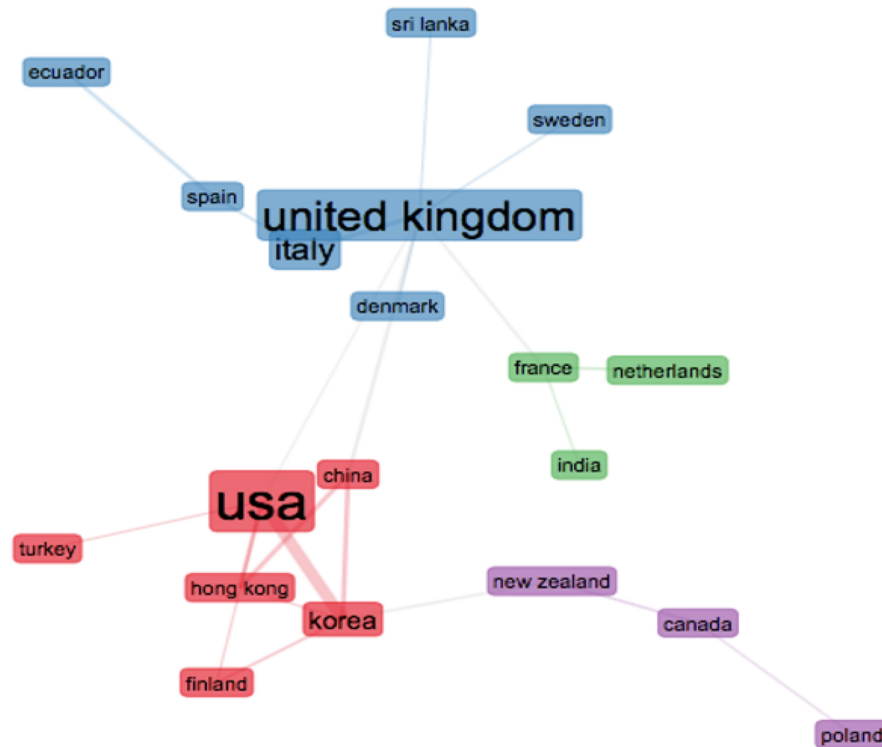
Figure 12: Collaboration Network: Countries. Clustering Algorithm: Louvain, Normalization: Association. Own Elaboration based on Biblioshiny

1.3.7 Keyword Analysis

To conduct the keyword analysis, the chosen field has been Author's Keywords, which consists in a list of terms that, for the authors of the publications, best represent the content of their work. Another possible option could have been Keywords Plus, which proposes words and phrases that appear frequently in the titles of an article's references (and not necessarily in the title of the publication itself, as in Author's Keywords). After having analysed both possibilities, the results obtained from Author's Keywords (Table 12) were considered more in line with the aim of the dissertation; also, even if Keywords Plus and Author's Keywords have been found to be equally effective in terms of bibliometric analysis investigating the knowledge structure of the scientific field, Keywords Plus is considered less comprehensive and specific in representing the content of a document (Zhang et al., 2016).

It must be mentioned that the first two results, "sustainability" and "fashion", could be considered trivial, since they are also the two terms used to create the search query.

Words	Occurrences
Sustainability	168
Fashion	73
Sustainable fashion	57
Circular economy	36
Fashion industry	34
Fast fashion	29
Sustainable development	24
Corporate social responsibility	19
Supply chain management	19
Sustainable consumption	19

Table 12: Most Frequent Keywords. Own Elaboration from Biblioshiny

A focus has to be placed on the concept of circular economy – that ranked 4th in the most frequent keywords – which has been gaining significant traction since 2019 (Figure 13). The growing presence of this topic in scientific research could be attributed to the introduction of CE policies in many areas of the world, mainly in the European Union and in China (Merli, Preziosi and Acampora, 2018; Schöggl, Stumpf and Baumgartner, 2020). Indeed, the EU has become a leading proponent of international action on sustainable development and resource efficiency: not only the European Commission adopted a new Circular Economy Action Plan in March 2020, but it has also promoted the launch of a Global Alliance on Circular Economy and Resource Efficiency (GACERE) with the aim of fostering the transition to this new industry paradigm on an international scale. Also, the presence of "corporate social responsibility" and "supply chain management" are key indicators of an increasing awareness about the need of reorganising the way the fashion industry operates, to take into account how the sustainability performance of fashion companies is affected by different stakeholders (them being other firms along the value chain, the people or the environment).
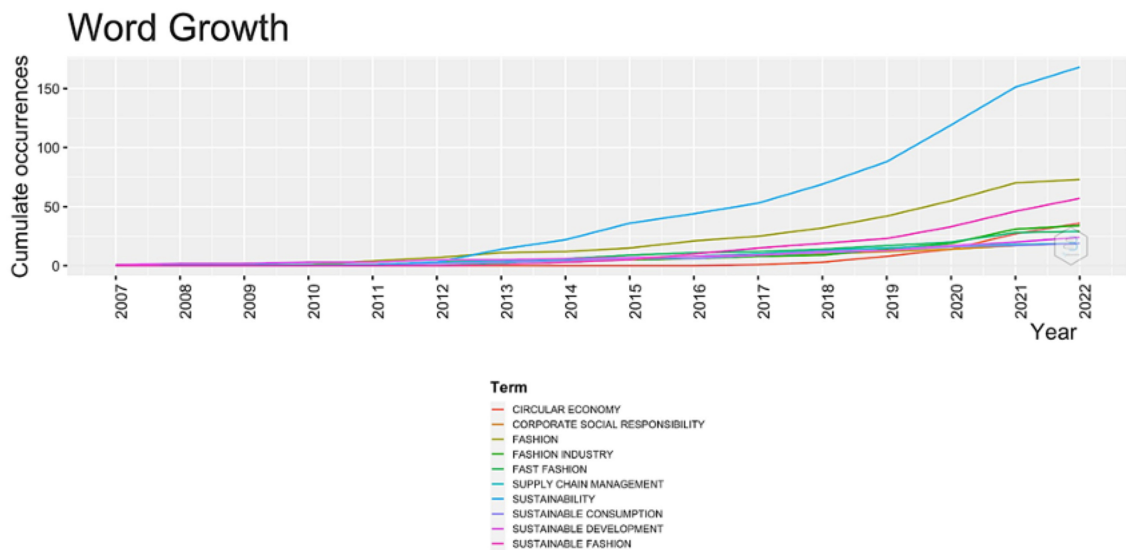
Figure 13: Word Growth by cumulate occurrences. Own Elaboration based on Biblioshiny

Similarly to what has been done for the authors, also keywords can be taken as unit of analysis to investigate the existing relations among them in a set of publications, using conceptual structures to do so. One of the main techniques is the one of the network approach, where words that appear together in a document, assuming them having a thematic relationship with one another (Donthu et al., 2021), will be related to each other in a co-word network.

In this case, Keywords Plus has been deemed as the most appropriate choice.

Utilising Louvain as algorithm, it was possible to identify six different clusters (Figure 14), here presented with their main topics and keywords:

- Red cluster: "sustainable development" clearly comes out as the most important and central keyword out of the almost 1000 keywords considered, also linking this cluster to the other five. Since the edge size is proportional to item co-occurrences, significant are the connections of the mentioned topic to supply chains related themes, namely "supply chain management" and "sustainable supply chains";

- Blue cluster: it contains "fashion industry", "supply chains", "manufacture", "sales", cotton" and "environmental protection" as most important terms, with the relationship of the industry with cotton production and usage being particularly relevant;

- Purple cluster: the main keywords, "textiles", "textile industry", "product design", "circular economy" and "clothing" confirm the attention paid to the life cycle of textiles, from the growing or manufacturing of the fibres to the clothing production and their reinvention with circular economy;

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- Brown cluster: focused on the topic of environmentally friendly materials, with "commerce", "yarn", "natural fibres", "wool" and "knit fabrics" among the most relevant topics;
- Green cluster: a more peripheral group about "fashion", "environmental impact", "life cycle", "garment" and "environmental management". Life Cycle Assessment (LCA) is one of the most used and accepted methods for assessing the current environmental impact of all the phases related to clothing production and disposal and the potential gains that could derive from extended garments' lifespan;
- Orange cluster: "sustainability", "clothing industry", "retailing", "consumption behaviour", "environmental economics", "innovation" and "corporate social responsibility" are the main topics of the cluster, attesting the focus of literature on consumers behaviour, also in the light of CSR policies fashion companies have been developing, which act upon their methods of partnering with downstream and upstream firms.

Interestingly, Donthu et al. (2021) mentioned how using words as unit of analysis could lead to potential downsides related, for example, to the different meanings the relationships between words can assume in multiple contexts. So, the best option is for scholars to consider the co-word analysis as a supplement and enrichment of their interpretation of the thematic clusters coming from the co-citation analysis (that focuses on the foundation of the research field) and bibliographic coupling (which uncovers the present of the field), also in the light of predicting future research directions.
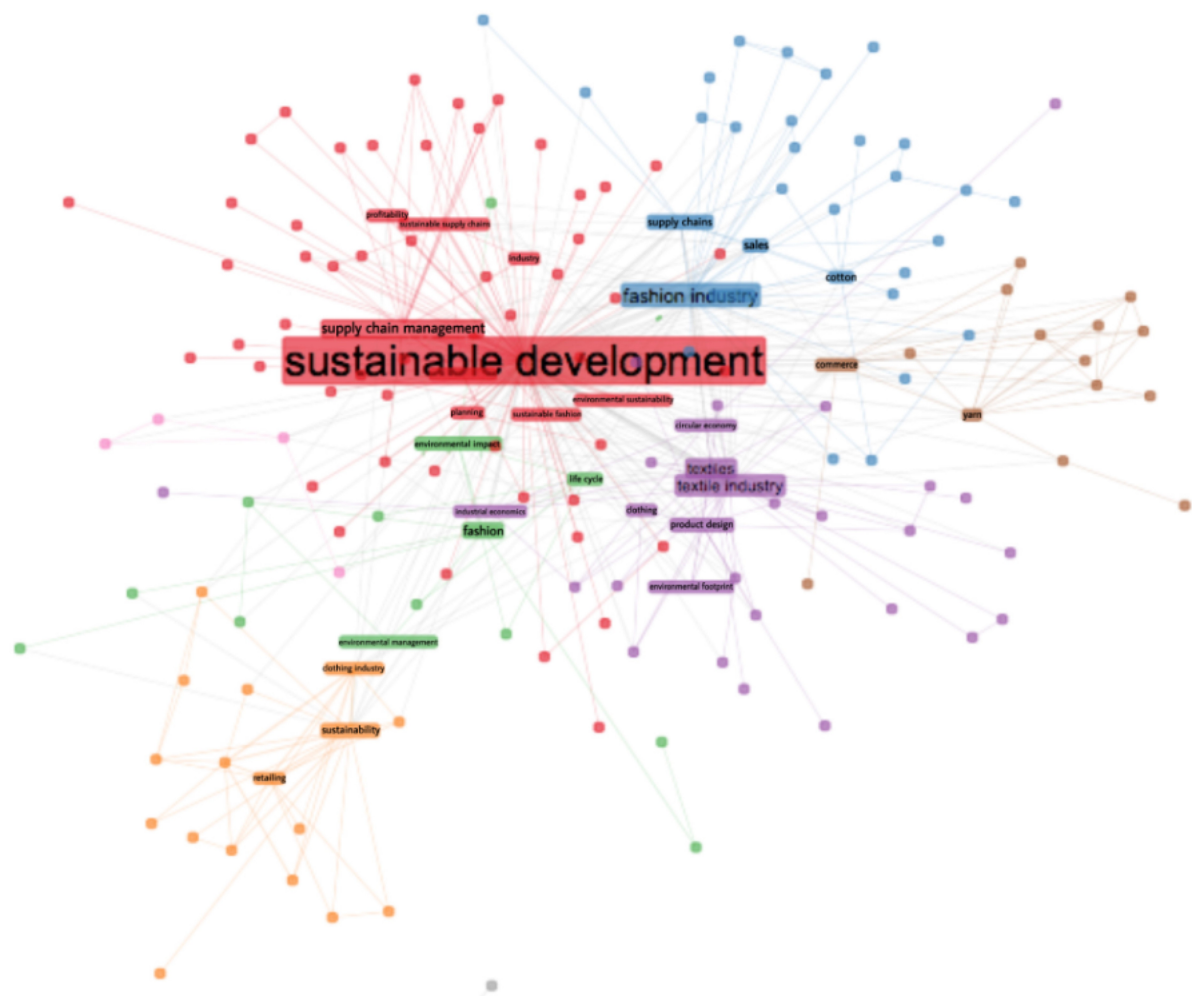
Figure 14: Co-occurrence Network: Keywords Plus. Number of Nodes: 965, Clustering Algorithm: Louvain, Normalization: Association. Own Elaboration based on Biblioshiny

1.3.8 Most (local) Cited Documents and References

Generally, most bibliometric studies provide a citation analysis, which can be divided into bibliographic coupling and co-citation analysis (both illustrated later), of the search field, usually in the form of top-N list cited studies, authors or journals.

Cited documents are scientific papers that are included in a bibliographic collection and, at the same time, cited in at least one other document of the set, whereas cited references (or just references that are, in this case, 28276) refer to scientific documents included in at least one of the documents in the bibliography.

In both cases, a distinction between local and global citations can be made: global citations measure the number of citations a publication has received from documents contained in the entire Scopus database, whereas local citations indicate the number of citations received from

documents contained in the analysed collection. Between the two, the most interesting considerations are believed to come from the latter, since local citations express, with a measure, the impact a document has on the considered set. This is the reason way, in Table 13 and Table 14, the five most locally cited documents and references are listed, and a partial correspondence between the two categories can be noticed (with three documents out of five being present in both tables).

The first document, with 52 local citations (and 226 global citations), is the one by Morgan and Birtwistle (2009), which underlines the general lack of awareness by consumers about the negative environmental implications derived from the production and the disposal of clothing items. De Brito, Carbone and Blanquart (2008) and Caniato et al. (2012), instead, published articles addressing the challenge of sustainable supply chain management for clothing companies, with the former focusing on stakeholder and organisational changes and the latter highlighting the different approaches taken by companies of different sizes (larger, international brands versus smaller, alternative firms).

Still focusing on the point of view of consumers, these have shown to have different drivers, attitudes, and subsequent behaviours, towards sustainable and ethical fashion purchasing, and this segmentation could be exploited by brands when targeting new potential customers (Mcneill and Moore, 2015).

Henninger, C., Oates, C.J. and Alevizou (2016), finally, explored the principles underpinning sustainable fashion from a social constructionist viewpoint, finding that this type of fashion is subjective in nature and suggesting a matrix, for micro-organisation, to identify and then communicate to customers their key sustainable fashion criteria.

On a final note, it is worth mentioning that Birtwistle, G., Caniato, F., and Caridi, M. are the three most locally cited authors with 81, 75 and 70 local citations, respectively.

Document	Local Citations	Global Citations
Morgan, L.R., Birtwistle, G., An Investigation Of Young Fashion Consumers' Disposal Habits (2009) International Journal Of Consumer Studies, 33 (2), Pp. 190-198	52	226
De Brito, M.P., Carbone, V., Blanquart, C.M., Towards A Sustainable Fashion Retail Supply Chain In Europe: Organisation And Performance (2008) International Journal Of Production Economics, 114 (2), Pp. 534-553	50	350
Caniato, F., Caridi, M., Crippa, L., Moretto, A., Environmental Sustainability In Fashion Supply Chains: An Exploratory Case Based Research (2012) International Journal Of Production Economics, 135 (2), Pp. 659-670	50	295
McNeill, L., Moore, R., Sustainable Fashion Consumption And The Fast Fashion Conundrum: Fashionable Consumers And Attitudes To Sustainability In Clothing Choice (2015) International Journal Of Consumer Studies, 39 (3), Pp. 212-222	42	143
Henninger, C.E., Alevizou, P.J., Oates, C.J., What Is Sustainable Fashion? (2016) Journal Of Fashion Marketing And Management, 20 (4), Pp. 400-416	36	114

Table 13: Most (local) Cited Documents. Own Elaboration from Biblioshiny

The most locally cited reference is the work of Caniato et al. (2012), which is also the third most cited document. The other references, aside from de Brito, Carbone and Blanquart (2008), are all concerned with sustainable fashion consumption by customers.

Joergens (2006) contributed to the topic highlighting that there is still little evidence on the effect ethical issues can have on consumers' fashion purchase behaviour (that is, in general, mainly driven by personal needs, that take precedence over other, more sustainable, considerations).

Niinimäki (2010), instead, discussed fashion actors' lack of awareness about customer's expectations from eco-fashion (still characterised by a limited and niche appeal), proposing, as a possible solution to make greener clothing more attractive, to engage consumers in the design process of products in order to create items which not only are sustainable, but also

able to fulfil the needs and desires of people.

Document	N° of Local Citations
Caniato, F., Caridi, M., Crippa, L., Moretto, A., Environmental Sustainability In Fashion Supply Chains: An Exploratory Case Based Research (2012) International Journal Of Production Economics, 135 (2), Pp. 659-670	28
McNeill, L., Moore, R., Sustainable Fashion Consumption And The Fast Fashion Conundrum: Fashionable Consumers And Attitudes To Sustainability In Clothing Choice (2015) International Journal Of Consumer Studies, 39 (3), Pp. 212-222	26
Joergens, C., Ethical Fashion: Myth Or Future Trend? (2006) Journal Of Fashion Marketing And Management, 10 (3), Pp. 360-371	25
De Brito, M.P., Carbone, V., Blanquart, C.M., Towards A Sustainable Fashion Retail Supply Chain In Europe: Organisation And Performance (2008) International Journal Of Production Economics, 114 (2), Pp. 534-553	19
Niinimäki, K., Eco-Clothing, Consumer Identity And Ideology (2010) Sustainable Development, 18 (3), Pp. 150-162	18

Table 14: Most (local) Cited References. Own Elaboration from Biblioshiny

1.3.8.1 Co-Citation Analysis

The intellectual structure - one of three structures of knowledge - shows the relationships between nodes which represent references, and citation analysis, in the form of co-citation between documents (or authors or journals), is the most common and dominating analysis in the current bibliometric landscape to identify the knowledge base of a field and the most relevant topics discussed by past literature. Based on the assumption that items often cited together are likely to have related content to construct this measure of similarity, what co-citation represents is the frequency with which two items of earlier literature are cited together by later literature (Small, 1973); so, the main difference between bibliographic coupling (presented in paragraph 1.3.8.2) and co-citation analysis is that the former is concerned with the citing documents, whereas the latter studies the cited documents.

Both methods have several limitations, the most relevant already illustrated in Table 1 but, in general, bibliographic coupling is affirmed to be the better option when mapping current research fronts, whereas co-citation analysis should be chosen to map older publications (Donthu et al., 2021; Small, 1999).

Since co-citation analysis is such a key step, the process was conducted not only using bibliometrix, but also with the help of VOSviewer - a software tool developed by Leiden University's Centre for Science and Technology Studies, extensively used for constructing and visualizing bibliometric networks - in order to double-check the results.

The extremely high number of references included in the collection makes the choosing of an appropriate cut-off point, to limit the documents considered in the co-citation analysis, a necessary and not trivial step. As also affirmed by Zupic and Čater (2015), limiting the scope of documents for the analysis is a judgment call that tries to balance two conflicting goals:

a)   Providing as broad representation of the intellectual structure as possible, and

b)   Giving a more focused, clean representation.

Choosing a lower cut-off point leads to bigger groups of documents that are very hard to manage and analyse, whilst a more stringent limitation (so a higher citation benchmark) entails running the risk of missing groups of publications that, even if less cited, are still important for the purpose of the analysis.

After several trials with different cut-off points, it was decided to consider four as the minimum number of citations: 255 cited references, out of the total, are the ones meeting the chosen threshold (with 233 being the largest set of connected references).

Performing then the co-citation analysis with bibliometrix, five are the resulting clusters (Figure 15), highlighted in red, green, blue, purple and orange, each one corresponding to a common research area or subfield.

The leading publications of each group - chosen based on betweenness, closeness and PageRank values - were read, and the following considerations are the results of the process.

Regarding the main research methodologies identified, theoretical papers, case studies - suitable approach for theory building, especially for new research areas (Eisenhardt, 1989) – primary research and literature reviews are the most present in the set. Moreover, from a more detailed content analysis, the main themes characterising each cluster emerged, and are presented below.

Cluster 1 (Red): Consumers' perspective on Fast Fashion and Eco-Fashion

With 62 nodes, the red cluster is the second largest one, its focus being the dichotomy

between fast fashion and eco-fashion from the point of view of consumers, more and more viewed as responsible actors in fashion. The most significant publications include Fletcher (2008), Joergens (2006), Niinimäki (2010), Bhardwaj and Fairhurst (2010), Joy et al. (2012), Claudio (2007) and Morgan and Birtwistle (2009).

Existing literature has focused on both consumption and disposal habits, coming to the conclusion that greater responsibility for a new vision of fashion in the era of sustainability needs to be promoted: the industry does not need to be demonised, it is possible to acknowledge its pivotal importance to human culture while, simultaneously, recognising the need for increased awareness and, ultimately, for a structural change (Fletcher, 2008).

The biggest impact for widespread sustainability in the clothing industry was believed to be a customer's prerogative (Joergens, 2006): for this reason, increasing their knowledge about the fate of clothing through the life cycle and about greener alternatives and practices (Claudio, 2007) - such as reselling, exporting items to developing countries (however, recent studies have been arguing that this practice is actually undermining the development of the local industries of these areas[3]) or recycling (chemically or mechanically) into raw materials – are both key steps for widespread sustainable fashion adoption, which is still very much a niche segment.

Fletcher (2008) can be certainly defined as one of the most influential books about sustainability issues in the fashion and textile industry, and for that frequently present as reference in the works of academics who have approached the topic. The ground-breaking merit of the author is having presented a broad and holistic view on the subject, with the aim of stimulating innovations in processes, products and consumers. Changing consumption patterns, although difficult and time-consuming, could lead to the biggest benefits, since these changes would be based on cultural modifications (e.g. re-defying the concept of cleanliness to influence laundering practices or by designing new types of products never to be washed) and shifts in consumer consciousness. However, as the author has also affirmed, fashion trends are guilty of confusing sustainability issues and promoting misconceptions, for example on the environmental impact of natural and manufactured textile fibres - especially in the case of cotton and polyester, the most in-demand ones in the industry.

On the topic, natural fibres are made from plants (cotton, linen, hemp, jute, and natural bamboo) or from animal resources (wool, silk, cashmere and mohair), whereas manufactured fibres come from raw materials obtained from a variety of sources, them being natural (in the

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3   Source: Kaldor, G. (2022) The Invasion of Second-Hand Clothing in Africa, Renewable Matter (39).
     Available at: https://www.renewablematter.eu/articles/article/the-invasion-of-second-hand-clothes-in-africa

case of viscose, modal, lyocell, to name the most relevant ones) or synthetic polymers (polyester, nylon, acrylic, polypropylene and PVC). Even if it could appear counter-intuitive, natural materials are not necessarily the better, greener option and, paradoxically, polyester is sometimes marketed as more sustainable that cotton and wool, since it requires much smaller quantities of water - the global average water footprint for 1kg of cotton is 10,000 litres (Freitas, Zhang and Mathews, 2017), whereas producing 1kg of polyester is said to use little to no water (Fletcher, 2008) - and no use of pesticides to be produced. Nevertheless, manufactured fibres are the result of an extremely energy-intensive and polluting process, and the laundering of these types of materials was found to be particularly detrimental to the environment, since they shed microplastic fibres that end up in seawater (European Commission, 2022c). For these considerations, many fashion brands have started to introduce "greener" alternatives, such as organic cotton (not only beneficial to the environment, but also characterised by a strong social element, linked to Fair Trade and ethical production), and sustainable synthetics (like Econyl®, obtained through the recycling and purification process of ocean and landfill waste by Italian company Aquafil for brands like Prada, Stella McCartney and H&M[4]), that will require significant technological innovations in order to scale their commercial viability.

If consumer confusion on sustainability can be considered legitimate, the issue of having to make a choice regarding what to buy does not even occur since, as Joy et al. (2012) also affirm, sustainability is not even a term younger consumers usually associate with fashion. Moreover, customers usually tend to "cherry-pick" when it comes to ethical issues: they prioritise the ones that can influence them directly (e.g. related to their health), dismissing others, such as unfair working conditions and environmental issues (Joergens, 2006).

In any case, awareness rarely translates into purchases, because, in the end, for the majority of customers the clothes have to be attractive for their eco-aspect to even represent an added value (Joergens, 2006; Niinimäki, 2010). To compete with fast fashion brands, sustainable fashion would need to balance two opposite objectives: creating quality and durable items that not only respond to physical needs, but also endowed with the ability of fulfilling customers' requests at functional, emotional, symbolical and identity construction levels (Fletcher, 2008; Niinimäki, 2010).

A change could come from by either engaging consumers in the design and production process of eco-clothing to create more desirable products (Lundblad and Davies, 2016;

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4   Source: Kaldor, G. (2022) The Invasion of Second-Hand Clothing in Africa, Renewable Matter (39).
     Available at: https://www.renewablematter.eu/articles/article/the-invasion-of-second-hand-clothes-in-africa

Niinimäki, 2010), or by actively involving them through marketing strategies, in order to enhance their favourable attitudes and ideas about eco-fashion (Joergens, 2006; Turker and Altuntas, 2014).

Regarding the first point, eco friendly behaviour and environmental concern are the main predictors of purchase intention regarding environmentally friendly clothing (EFC) but, even if ethical consumers have shown positive attitudes towards this new type of fashion, EFC still only appeals to that small, niche market with a very well-defined aesthetic, explaining the attitude-behaviour gap - defined as the paradoxical behaviour of indulging in clothing consumption in contrast with ecological concerns - highlighted by various authors (Bly, Gwozdz and Reisch, 2015; Mcneill and Moore, 2015; Niinimäki, 2010).

Literature has extensively covered the topics regarding barriers to eco-fashion consumption: lack of awareness, negative perceptions, distrust in brands, limited availability of desirable options and information about the products (Gam, 2011; Joergens, 2006; Lundblad and Davies, 2016), the influence of other factors – such as beauty, fashion, trends, emotions, desires and social acceptance – and, very importantly, the style of eco-clothes, often described as frumpy and unfashionable. Also, even if slow fashion is said to have derived from the Slow Food Movement (Fletcher, 2008), in the case of organic food the influence of consumption on the customer's own health and wellbeing is much more obvious and accepted than for clothing, further preventing purchases (Gam, 2011; Joergens, 2006; Joy et al., 2012).

Moreover, the effect of having to pay a premium for more sustainable garments has been very debated: if some authors define it as just an apparent barrier (Joy et al., 2012), for others it is a relevant hindering factor (Joergens, 2006), with customers affirming to strongly prefer paying less to even just consider eco-items when purchasing. Cheaper and much more fashionable choices are what younger people and the middle-lower class turn to, especially when their motivations are not strong (Joergens, 2006; Joy et al., 2012; Niinimäki, 2010).

About the second point – involving customers through communication efforts – marketing and media (TV, social media, celebrities and fashion leaders) are viewed to be both the cause, for the current lack of coverage, but also the potential vehicle for altering younger consumers' judgment about sustainable fashion (Henninger, C., Oates, C.J. and Alevizou, 2016; Joergens, 2006) and their clothing disposal habits (Morgan and Birtwistle, 2009). It is essential for companies to be transparent and to educate customers about garment care (in order to have the items' lifecycle extended) and sustainable disposal behaviours, such as donating to charity, giving or re-selling to another person or second-hand shops, placing items in textile recycling bins, and many more. This point is especially important since, as Morgan and Birtwistle

(2009) have affirmed, little or no correlation was found between awareness and disposal behaviour and the attitude to textile reusing and recycling, since consumers often seem to lack an understanding or care of how not only compulsive purchases, but also clothing disposal (especially the waste going to landfill), are negatively affecting the environment.

As mentioned before, both fast fashion and sustainable fashion are key topics of the red cluster, discussed putting an emphasis on consumers' perceptions, attitudes and behaviours.

Since most of the publications have been written more than 10 years ago, they all place an important focus on the rise of fast fashion retailers such as H&M and Zara, which were quickly becoming the new standard after over 20 years of changing industry dynamics, and that nowadays are guilty of feeding a culture of overconsumption and increased textile waste sent to landfills (Morgan and Birtwistle, 2009). The characteristics that allowed fast fashion to thrive are many but, ultimately, these brands are the only ones able to provide customers with the right product at the right time at the lowest price. They are flexible, responsive to demands, rapid and coordinated with the other actors of the supply chain (Bhardwaj and Fairhurst, 2010). But it can also be argued that having all these elements is a sufficient but not enough condition for achieving the strategic agility that has allowed Zara to become the successful brand it is today: its ability to maintain shared situation awareness, meaning the capability of anticipating future opportunities for then seizing them, is what made Zara one of the leaders of the industry (Sull and Turconi, 2008). Finally, what is worth mentioning is that many publications (Bhardwaj and Fairhurst, 2010; Sull and Turconi, 2008), more than a decade ago, were posing the issue of customers' environmental and social concerns, showing that sustainability was already in the mind of academics, brands and people.

Cluster 2 (Blue): Sustainable Fashion Supply Chain Management

The blue cluster is composed of 48 nodes, the main ones being Caniato et al. (2012), de Brito, Carbone and Blanquart (2008), Seuring and Müller (2008), Turker and Altuntas (2014), Barnes and Lea-Greenwood (2006), Shen (2014) and Li et al. (2014).

The cluster focuses on how fashion supply chains are implementing sustainability - from both the environmental and the social point of view.

Several are the publications dealing with the topic of sustainable supply chain management (or SSCM) and the fashion industry (Li et al., 2014; Seuring and Müller, 2008; Turker and Altuntas, 2014), and, for this reason, different are the terms and notions used in the literature: one of the most common is certainly Green Supply Chain Management (GSCM), even if definitions for this have been found to be too narrow and with a major emphasis on

environmental issues, meaning that SSCM can be considered as an extension of GSCM, since it incorporates a TBL perspective (Ahi and Searcy, 2013).

In this dissertation, SSCM will be defined as the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account, which are derived from customer and stakeholder requirements (Seuring and Müller, 2008).

There appears to be a consensus on the factors which trigger the adaptation of sustainability by focal companies (then passed on to their suppliers and other members of the chain): legal demands and regulations, top management commitment, customer demands, compliance and response to stakeholders (government and NGOs, for instance) and creation of a competitive advantage are among the main pressures and incentives (Caniato et al., 2012; Li et al., 2014; Seuring and Müller, 2008) to which de Brito, Carbone and Blanquart (2008) also add cost driven motivations.

Obvious changes at the organisational level, both inside companies and along the supply chains, come with the adoption of a greener approach (de Brito, Carbone and Blanquart, 2008). Seuring and Müller (2008) also highlight three distinctive features of sustainable supply chain management: indeed, these firms deal with a wider range of issues (causing them to have to take into account a longer part of the supply chain), with an higher number of performance objectives (especially the ones related to environmental and social sustainability) and with an increased need for cooperation with other partners of the chain - also found by Li et al. (2014), Todeschini et al. (2017), Turker and Altuntas (2014) and to which de Brito, Carbone and Blanquart (2008) added that the broadening of the number of stakeholders also requires the adoption of coordination methods for dealing with different needs and claims.

Sustainable innovation has traditionally been driven by the supply side, so specific attention has been placed on that part of the chain. Both the sourcing of raw, semi-finished and finished materials and the relocation of production sites from Europe to developing countries with lower labour and input cost have posed particular challenges, financial and reputational threats, since social and environmental conditions in these nations are not as tight as in developed countries (Caniato et al., 2012; Niinimäki and Hassi, 2011; Seuring and Müller, 2008; Todeschini et al., 2017; Turker and Altuntas, 2014).

For these reasons, activities of monitoring, auditing and compliance by suppliers, the guidelines set by environmental and social standards or codes of conduct are the main components adopted by SSCM to avoid risks, establish long-term relationships and, in the

end, improve the performance of the whole chain (Li et al., 2014; Todeschini et al., 2017; Turker and Altuntas, 2014).

Caniato et al. (2012) affirms that the attention given to the supply side is also due to the fact that GIBs (Green International Brands, such as Patagonia, Napapijri and The North Face) prefer to adopt incremental changes to the inbound supply chain in order to improve final products' environmental footprint; whereas Small Alternative Firms (SAFs) are the ones which have constructed or redesigned their whole chain - by excluding distributors and retailers in favour of a direct contact with the final consumers, by adopting greener processes or by contracting local sourcing or in the fair-trade context - to include sustainability and make it their key competitive advantage, even achieving that with a low economic input.

It must be mentioned that the increasing consumer awareness on environmental and social issues has also caused fast fashion companies to consider adapting their supply chains to the challenges posed by sustainable development. As already mentioned, the success of these kind of brands is based on their responsiveness to changing trends and demands, a speed achieved by adopting one between just-in-time, agile supply chains and quick response systems (Barnes and Lea-Greenwood, 2006). Nevertheless, the increased pressure put on suppliers and distributors has inevitably caused environmental and ethical issues to rise.

On the topic of fast fashion, one of the most relevant cases is the one of multinational clothing company H&M: both Shen (2014) and Li et al. (2014) have highlighted how the brand has been continuously improving its sustainability level along the supply chain while offering cheap and fashionable clothes, identifying in the power of central influence of the focal company and in virtuous stakeholder collaboration two of the main reasons behind H&M's success in tackling sustainability challenges. The brand has been known for not only reducing its GHG emissions and promoting energy efficiency, but also for using organic cotton and recycled materials, for trying to select responsible and ethical partners, for promoting systematic change by working with governments (to obtain more sustainable manufacturing for its suppliers) and NGOs (such as WWF, for water savings programs) and for adopting green retailing initiatives to increase transparency and educate on reusing and recycling (e.g. old garment collection in stores).

Generally speaking, common measures, such as reducing packaging and waste, designing more environmentally friendly products - thanks to high-skilled labour and technological development, as highlighted by de Brito, Carbone and Blanquart (2008) - reducing energy consumption or carbon emissions during product production and distribution, accurate selection and collaboration with suppliers, and reverse logistics systems, are all suggested by

scholars to obtain a greener supply chain (Caniato et al., 2012).

Even if concerns about the compatibility between sustainability and SC principles have been raised and different degree of internalisation of sustainable responsibilities have been found in stakeholders (de Brito, Carbone and Blanquart, 2008), there is still a general consensus on the positive effects of social and environmental considerations integrated in the day-to-day management and long-term growth strategy of fashion companies and their supply chains.

Cluster 3 (Green): Slow Fashion and Sustainable Fashion

The largest cluster, with 71 nodes, discusses different aspects of sustainable fashion, starting from its definition (Fletcher, 2010; Henninger, C., Oates, C.J. and Alevizou, 2016) and the reasons why consumers are buying it (Bly, Gwozdz and Reisch, 2015; Lundblad and Davies, 2016; Mcneill and Moore, 2015).

Sustainable fashion, as part of the Slow Fashion movement, is either misleadingly described as just being the opposite of fast fashion, when these are simply two different approaches with distinct underlying economic logics and business models, values and processes (Fletcher, 2010; Henninger, C., Oates, C.J. and Alevizou, 2016; Jung and Jin, 2014), or as being an overlapping notion to environmental sustainability, whereas it is a much broader concept that also includes social concerns (Jung and Jin, 2014; Lundblad and Davies, 2016).

But this confusion is not surprising, since there is no unique definition or industry standard for "sustainable fashion": it is a context and person dependent concept, and it can be interpreted from different realities and can incorporate several aspects (Bly, Gwozdz and Reisch, 2015; Henninger, C., Oates, C.J. and Alevizou, 2016; Lundblad and Davies, 2016).

However, in order to provide some clarity, the definition of slow fashion given by Fletcher (2010, p. 262) is the one that is going to be considered: for the author, it is a vision of sustainability in the sector that represents "a break from the values and goals of fast growth-based fashion, that requires a changed infrastructure and a reduced throughput of goods". It is an invitation to start rethinking the ways in which the fashion industry have been operating in the last decade, promoting an emphasis on quality (of the product, of the environment, of society, of the workers) and a heightened awareness and collaboration between stakeholders along the value chain, meaning also the rise of a new, "different relationship between designer and maker, maker and garment, garment and user" (Fletcher, 2008, p. 173).

In general, sustainable fashion is perceived as a positive value alternative, more expensive than other options but with a sufficiently higher quality, value and durability to justify both the price premium and the reduction of fashion purchases in the long run (Fletcher, 2010;

Lundblad and Davies, 2016; Niinimäki, 2010).

A useful distinction between clothing and fashion is proposed by Fletcher (2008): fashion pieces have a higher symbolic, communicational and emotional meaning that non-fashion clothes, usually purchased for their material and functional value, do not have. The direct implication is that fashion clothes tend to be discarded more rapidly once they lose their status, whereas non-fashion items are usually consumed at a slower pace. Partially expanding on the concept (and as many other researchers have done), Henninger, C., Oates, C.J. and Alevizou (2016) identified three categories of customers, named "self", "social" and "sacrifice", based on their different attitudes towards fast fashion and sustainable fashion.

"Self" consumers consider fashion as vital to their identity expression and, since they prioritise change in their garments' consumption, they tend to hold an unfavourable or neutral attitude towards sustainable fashion and practices that promote higher care and durability.

The second group, "social" consumers, displays an emergent sustainable fashion consumption behaviour, holding the highest potential as a market for eco-fashion; however, several barriers – such as unawareness, lack of social acceptance, perceived high prices – cause their positive attitude to not always translate into purchasing. Because of their particularly high social awareness, mass and social media are thought to be valid means to reach this category.

Already established consumers of sustainable clothing and adopters of green practices compose the last group, "sacrifice" consumers. However, their prioritising of fashion consumption reduction - since, as also discussed by Henninger, C., Oates, C.J. and Alevizou (2016), buying sustainable fashion is still indulging in a consumption act - and sceptical attitude towards green fashion manufacturers and, in general, towards what the mainstream fashion industry defines as sustainable (referring to the mixed consumers' attitudes in relation to eco-labels) could lead to a reduction of their total spending on clothes, posing the question of how much companies would want to support a change of the industry paradigm towards sustainability, if that meant lower profits and a smaller market share.

This categorisation is a useful starting point for understanding motivations and behaviours; nevertheless, in reality, the difference between customers buying clothes for their functional purpose and the ones purchasing to satisfy their personal desires is more blurred, as it has been discussed by Bly, Gwozdz and Reisch (2015), Jung and Jin (2014), Lundblad and Davies (2016), and Mcneill and Moore (2015). Self-fulfilment, self-improvement, and self-expression can play a significant role in determining sustainable fashion purchase decisions, since consumers also take into account the after-purchase feeling of well-being and the unique, personal and non-dictated style they can create by excluding fast fashion items from

their wardrobe. This and other key selling features of sustainable fashion (namely durability, natural materials and perceived health benefits) have the potential to be exploited by marketing campaigns that place more weight on the egoistical benefits rather than on the traditional ethical or biospheric values (Lundblad and Davies, 2016).

On the topic of marketing and communication, Henninger, C., Oates, C.J. and Alevizou (2016) elaborated on how companies, especially micro-organisations, should differentiate themselves by exploiting their unique way in which they create sustainability, securing a strong competitive advantage and avoiding risk and challenges, such as the one of greenwashing. But this aspect could be challenging since the literature highlighted mixed opinions about the features of sustainability manufacturers and consumers seem to care about. If eco friendly materials are generally highly considered by customers (Achabou and Dekhili, 2013; Lundblad and Davies, 2016), localism in production and sourcing is found to be an opportunity for major change mainly from the point of view of organisations (Fletcher, 2008), whilst consumers hold different views on the matter, with some only paying a relative attention to this feature (Henninger, C., Oates, C.J. and Alevizou, 2016) and others regarding it as a key indicator of sustainability (Bly, Gwozdz and Reisch, 2015; Jung and Jin, 2014).

Cluster 4 (Purple): Sustainable Business Models

Niinimäki and Hassi (2011), Pedersen and Netter (2015), Todeschini et al. (2017), Armstrong et al. (2015), Dissanayake and Sinha (2015), Pal and Gander (2018), Stål and Corvellec (2018) and Bocken et al. (2014) are the most significant nodes out of the 42 composing the fourth cluster, that centres around the topic of emerging sustainable business models (SBMs).

Starting from the concept of business model, even if extensively used, several are the definitions present in the literature. The authors of the cluster mostly agree on describing it as a conceptual tool that helps expressing the business logic behind the company and understanding the value creation, delivery and capture linked to the value proposition (Osterwalder, Pigneur and Tucci, 2005). Adding to this, Zott and Amit (2010)'s emphasis on the essential role played by external stakeholders (suppliers, partners, customers) is an interesting perspective to consider, especially when discussing the topic of SBMs, a subcategory that deviates from the more traditional linear value creation paradigm.

If, as aforementioned, the current, prevailing system in the textile and clothing industry is the one symbolised by fast fashion, with continuous and rapid cycles of trends that produce new consumer needs and garments, the growing awareness about products' low quality and short life span could represent the starting point for a conversation around sustainable business

models (Niinimäki and Hassi, 2011). These are defined as models that not only incorporate a triple bottom line approach, but that also represent means to implement corporate innovation for sustainability and embed it into business purpose and processes, serving as a key driver of competitive advantage. Business model innovations for sustainability are introduced at the core of the business model, and they should create significant positive and/or significantly reduce negative impacts for the environment and/or society, through changes in the way organisations and their value networks create, deliver and capture value (Bocken et al., 2014). Regarding this topic, existing literature presents itself as a vast but fragmented body of work: to address these gaps, Bocken et al. (2014) proposed a categorisation of sustainable business model archetypes, also affirming that most firms could benefit from the adoption of combinations of these single archetypes.

A first grouping, focused on technical innovation, includes archetypes related to maximising material and energy efficiency, creating value from waste (e.g. closed-loop business models and Cradle-to-Cradle) and by substituting with renewables and more natural processes.

The second social grouping deals with providing customers with functionality rather than ownership of garments (Product Service Systems, or PSS, and servitisation), engaging with stakeholders to ensure their long-term health and well-being, and encouraging solutions that seek to influence costumers to reduce their consumption, hence reducing production (e.g. slowing product replacement by designing durable, modular and long-lasting items, and further developing the second-hand market). The last grouping, about organisational innovation, proposes a more widespread presence and scale up of sustainable business models, other than prioritising the social and environmental value creation, rather than the economic side of the business.

The highest consumer interest has been found for clothing take-back, swaps and consultancy options, with younger customers best suited for social, experiential and innovative approaches (renting, swapping), and older consumers preferring services that put emphasis on product satisfaction (redesign, repair, customisation) (Armstrong et al., 2015): for these reasons, with their marketing efforts, companies could obtain the highest return by taking this segmentation into account.

Pedersen and Netter (2015, p. 259) have examined, from a business model perspective, the concept of fashion libraries, defined as "a subscription-based service that allows people to share wardrobes". In line with previous findings (Armstrong et al., 2015), younger users are the ones for which this concept was found to be more appealing, since they tend to enjoy the creative and social aspect related to shopping in fashion libraries, other than its low cost. On

the other hand, this service could be also adopted by people driven by the desire of reducing their clothing purchases. Nevertheless, fashion libraries are still a niche phenomena that, in order to scale-up operations, would benefit from developing partnerships with suppliers (such as fashion brands and young designers) or with the downstream supply chain (meaning libraries, cultural institutions or student organisations, for example). In this way, they could potentially overcome the challenges deriving from having limited resources (financial, technical and human) and, in general, from the pervasive traditional ownership culture.

It must be highlighted that the shift towards service economy (like in the case of fashion libraries) is not necessarily a shift towards sustainability: it could certainly mean meeting the needs of customers with fewer resources and less energies, but the service would have to be designed to make the phases of using and laundering less damaging and to have customers understanding the changes they would have to adopt in their cleaning behaviour. For these reasons, sharing could be the best solution for some – not all - textile products, such as carpets, or formal wear, usually meant to be worn as a one-off (Fletcher, 2008).

In general, the benefits of these new business models are related to the dematerialisation of the production-consumption system, the optimisation of natural resources and the enhanced product satisfaction, all factors allowing to decrease clothing replacement by extending their life cycle either through added services, customised features or waste management strategies - such as recycling, reusing and remanufacturing (Armstrong et al., 2015; Barquet et al., 2016 Niinimäki and Hassi, 2011).

However, Stål and Corvellec (2018) argue that organisations adopt but do not fully implement sustainable business models (in particular the circular ones), since what they seek to achieve is mainly the alignment with institutional processes: profiling a new form of greenwashing, decoupling allows firms to mitigate the already vague demand, buffer linear value creation (by not interfering with core operations) and refrain from closing the loop.

In any case, even in the case of interest in these new options, the three sustainable logics of narrowing, slowing and closing resource loops show to have low current and potential environmental value (Pal and Gander, 2018) mainly because of the weak scalability potential (Pal and Gander, 2018; Todeschini et al., 2017), that is causing them to remain a marginal phenomena, other than not completely implemented.

Indeed, low scalability is caused by numerous issues, of both internal and external nature.

The first point mainly refers to the procurement of environmentally friendly materials – calling, as mentioned by Dissanayake and Sinha (2015), for partnerships with textile waste collectors and fashion retailers – to production process inefficiencies and to the current lack of

scalable technological innovations. A key example is the one of remanufactured fashion, defined as fashion clothing constructed by using reclaimed fabrics (Dissanayake and Sinha, 2015): progress in sorting, grading and disassembly of garments would have to be achieved in order to make the process of recycling textile (especially in the case of blended fibres) less labour-intensive and time-consuming.

Regarding the external issues, the requirement of fostering collaborations, commitment and sharing of information along the supply chain, a general consumer low awareness and low acceptance of these models - related, as highlighted by Armstrong et al. (2015), to lack of trust in providers, making them ideal solutions for well-established companies with strong brand image and reputation – are the most significant challenges to be tackled.

Also, in line with Caniato et al. (2012), it must be mentioned that large incumbents and star-ups have shown to adopt radically different approaches: if the latter are typically born sustainable and flexible enough to design innovative SBMs, the former are characterised by resource rigidity and by small-scale green initiatives, that usually only address the supplier side. So, it is very unlikely that new sustainable business models (SBMs) will challenge the current, dominant and unsustainable industry paradigm of production and consumption, given the numerous barriers to widespread adoption (Armstrong et al., 2015; Pal and Gander, 2018). Mainstream presence of SBMs would certainly help to achieve the desired change in the fashion industry, and the inclusion of social and environmental considerations by businesses seems to be encouraged in order to drive sustainability at scale (Bocken et al., 2014; Todeschini et al., 2017). However, what it is not certain is the effect that a widespread presence could have on current and future sustainable fashion consumers (Bly, Gwozdz and Reisch, 2015). For them, trusting smaller or local producers (that, as mentioned earlier, adopt more radical innovations and a holistic approach to sustainability) is easier than supporting major fashion retailers, often seen as untrustworthy, unauthentic and simply viewed as doing "not enough" in pursuing the sustainability cause. If it is true that many fast fashion brands are implementing organic or recycled materials, since taking into account sustainability considerations is more and more considered as a prerequisite for just being in the industry, these brands are simultaneously stimulating consumptions and approaches that contribute to not "closing the loop" (e.g. using other single-use plastics, such as plastic bottles, rather than other textiles). If a shift in the way corporations respond to sustainability - moving from a strategy of compliance and risk mitigation to one of brand differentiation (Fletcher, 2008) - happened, it would be interesting to observe whether "green" consumers would start supporting these bigger brands and their versions of sustainable fashion.

Cluster 5 (Orange): Sustainable Luxury

The orange cluster (10 nodes) focuses on the relationship between luxury fashion and sustainability, on which scholars and practitioners show to have different, mixed opinions. Achabou and Dekhili (2013), Bendell and Kleanthous (2007), Bhattacharya and Sen (2004) and Guercini and Ranfagni (2014) are the authors of the most significant publications.

Luxury fashion, as well as slow fashion, is perceived differently from the predominant fast fashion paradigm: for its characteristics of quality over quantity, durability, craft and rarity, it is believed not to be a danger to the planet as fast fashion - with its promotion of impulsive consumption of cheap clothing - is depicted (Achabou and Dekhili, 2013; Guercini and Ranfagni, 2014; Joy et al., 2012). However, it can also be argued that, even though fast fashion brands are the ones which should be carrying the bigger share of responsibility, high-end brands should be blamed for originating demand for new trends and clothing styles (Bhardwaj and Fairhurst, 2010), then re-interpreted and mass-produced by fast fashion companies in very short lead times, at a lower quality and for – apparently – a fraction of the cost (Joy et al., 2012). Moreover, luxury brands have been found guilty of unfair and dangerous working conditions, of threatening natural areas (in relation to the impact of mining operations, for example), and to be frequent users of animal products such as furs (Bendell and Kleanthous, 2007).

In the end, it is debated whether sustainability considerations and luxury fashion are compatible (Achabou and Dekhili, 2013; Amatulli et al., 2018; Kapferer and Michaut-Denizeau, 2014), even in the light of growing consumer awareness of the negative environmental and social impact of the fashion industry.

It is true that a growing share of "luxury" consumers wants their favourite companies to reflect their personal concerns and aspirations for the society and environment: the question is how to redefine what luxury means in relation to sustainability issues and opportunities, in order to also capture the strategic commercial benefits coming from responding appropriately to this industry call (Bendell and Kleanthous, 2007).

Traditionally, product quality, along with brand reputation, have been ranking first among the leading purchasing factors for consumers of luxury items, with environmental commitment not representing a decisive factor. Moreover, recycled materials and components in luxury products have been found to reduce the value and the preference for a product, with a positive effect only observed for sustainable, recycled packages (Achabou and Dekhili, 2013).

Guercini and Ranfagni (2014), however, argue that the features of durability, rarity, quality, collective sharing and rigour could bridge the concepts of luxury (and of fashion in general)

and sustainability together. The relationship, of both respect and exploitation, between the two, can vary in nature: on the one hand, sustainable luxury can strengthen the exclusivity of the brand and, on the other hand, sustainability may be not so much the instrument but the real source of luxury, the added value derived from superior environmental and social performance. And this opens the door to virtuous examples such as the one of local supply chains, where the luxury status derives from the unique materials utilised and the authenticity of the territory they can evoke (like in the case of *Made in Italy*).

As it has been mentioned before, sustainability needs a backbone structure to be successful, and this statement holds true even in the case of luxury brands: for this reason, the creation of a project within a community of stakeholders (them being customers, other firms of the chain or third parties) that collaborate closely with each other, share a collective culture and a common identity - also serving as a barrier against internal and external opportunistic behaviours - is an essential step towards luxury sustainability implementation (Guercini and Ranfagni, 2014).

Luxury fashion, for its power to influence customer behaviour and consumption process (also thanks to celebrity endorsements), could play a major role in the transition towards sustainable fashion, which would substitute fast fashion in giving customers the dreamlike quality they search combined with a timelessness and excellence that throw away fashion is not able to bring to the table. So, the major sustainable consumption challenge for luxury brands is embodying craftsmanship and focusing on giving their customers the authenticity, quality and social and environmental care and attention they have been demanding from their beloved brands (Bendell and Kleanthous, 2007; Joy et al., 2012).
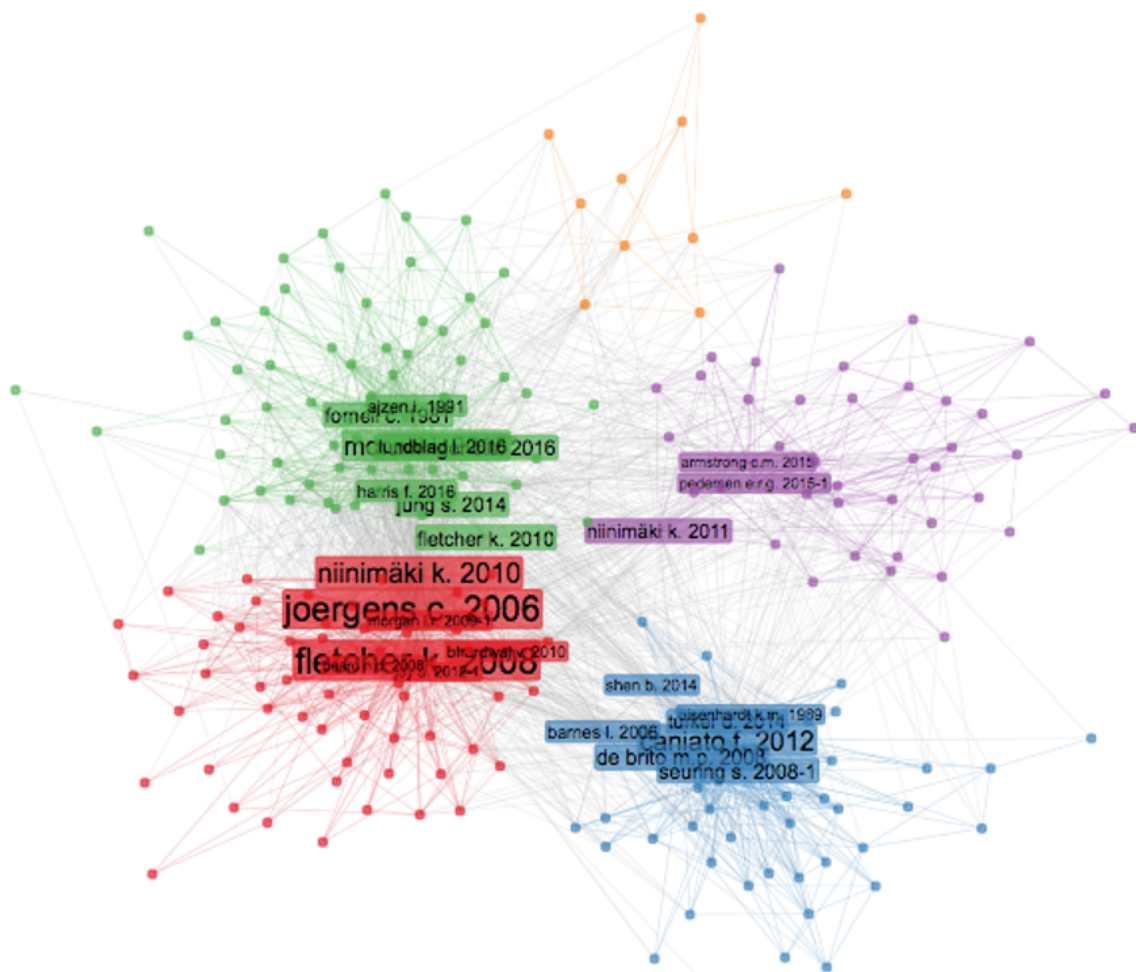
Figure 15: Co-Citation Network. Field: Papers, Number of Nodes: 233, Clustering algorithm: Louvain. Own Elaboration based on Biblioshiny

1.3.8.2 Bibliographic Coupling

On a final note, bibliographic coupling can be used to investigate and underline the relationship between publications (Wallin, 2005), since two articles are said to be bibliographically coupled if at least one cited source appears in the bibliographic or reference list of both articles. Taking as unit of analysis the documents and using the classical approach to measure the coupling strength (meaning the coupling by references), a clustering analysis can be performed and then plotted in a graph, as shown in Figure 16. The horizontal axis presents the Callon's centrality, that measures the degree of interaction among clusters, while the vertical axis is the impact, referred to the most critical publications, calculated using the Normalized Local Citation Score (or NLCS) - resulting from dividing the actual count of local citing items by the expected citation rate for documents with the same year of publication.

Four are the clusters that have emerged from the analysis, all of them reflective of the different themes on which authors have been focusing on; however, the presence of the keyword "sustainable development" in each cluster is indicative of its general relevance, and it also confirms the findings from the co-word analysis.

The first, red cluster – "sustainable development – product design – textile industry" – presents both medium centrality (0.207) and impact (2.446). Proposing a general view on various topics concerning the textile and fashion industry, Morgan and Birtwistle (2009), Gupta, Gwozdz and Gentry (2019), Pookulangara and Shephard (2013), Turker and Altuntas (2014), Pedersen and Netter (2015) are the publications with the higher NLCS.

From the second, blue cluster – "sustainable development – fashion industry – supply chain management" – de Brito, Carbone and Blanquart (2008), Caniato et al. (2012), Karaosman et al. (2020), Brydges (2021) and Urbinati, Chiaroni and Chiesa (2017) are the most relevant articles. The cluster, mainly on the topic of sustainability in fashion supply chains, not only presents the lowest frequency (93), but also lowers values for both centrality (0.158) and impact (2.093), suggesting the need for further development.

Mcneill and Moore (2015), Todeschini et al. (2017), Henninger, C., Oates, C.J. and Alevizou (2016), Vehmas et al. (2018), Armstrong et al. (2015) belong to the third, green cluster – "sustainable development - sustainable consumption - consumption behavior" – focused on the customers' attitude and behaviour in relation to sustainable fashion consumption, presenting a medium centrality (0.181) but the highest impact (2.537).

The fourth, purple cluster – "sustainable development - textile –textile industry" – the one with the highest frequency (151) and centrality (0.242) but lowest impact (1.339), is concerned with the circular economy perspective on the industry. Pal and Gander (2018), Athwal et al. (2019), Puspita, H., and Chae (2021), and Pedersen, E.R.G., Earley, R. and Andersen (2019) and Stringer, T., Mortimer, G. and Payne (2020) are the articles presenting the highest NLCS.
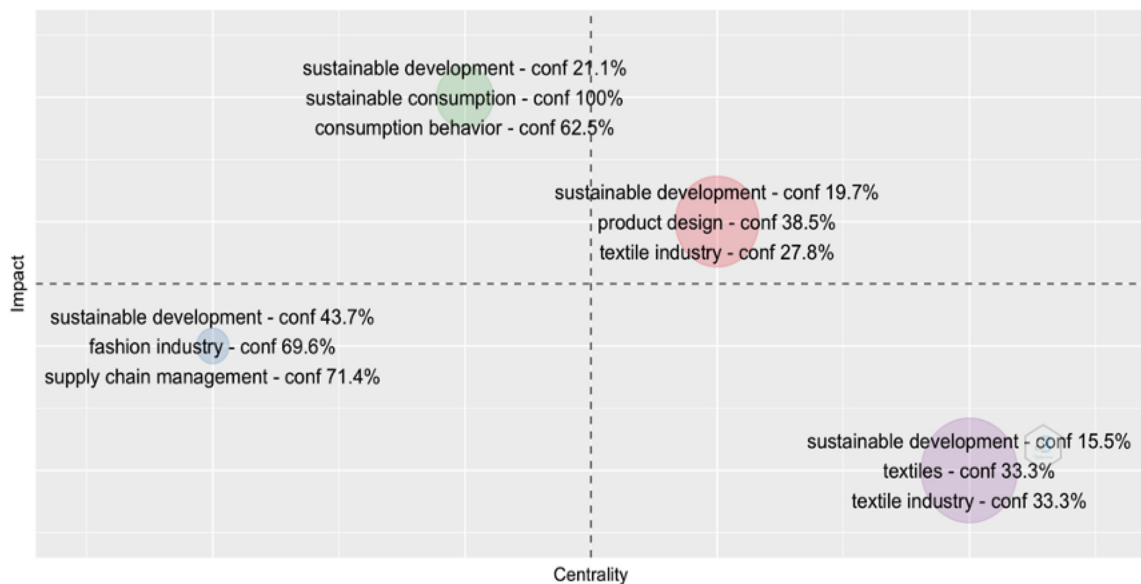
Figure 16: Clustering Map. Unit of Analysis: Documents, Coupling measured by: References, Impact Measure: Local Citation Score, Cluster labelling by: Keywords Plus, Number of Units: 574, Min. Cluster Frequency: 15. Own Elaboration based on Biblioshiny

1.3.9 An Overview of the Thematic Evolution

Applying a cluster algorithm on the Author's Keywords allows to highlight different themes (or clusters) of a given domain: then, each cluster can be presented on a thematic map (Cobo et al., 2011) that plots the two dimensions of centrality (horizontal axis) and density (vertical axis). The centrality (or relevance degree) measures the importance of a topic in the entire search field by focusing on the strength of the cluster's connection to the other ones, whereas the density (or development degree) measures the theme's development, referring to the strength of the linkages connecting the cluster's words. A strategic diagram is a useful representation also because different topics can be classified into one of the four possible quadrants. Niche themes (high density and low centrality) are highly developed but isolated themes, with marginal importance due to the weak external ties; motor themes (high density and centrality) are well developed and important for the structuring of the research field; emerging or declining themes (low density and centrality) are topics that, because of their newness or their oldness, are not particularly important and weakly developed; basic and transversal themes (low density and high centrality) are very relevant, important and general themes transversal to different areas.

Even with some limitations - keywords associated with only one theme, impossibility of using themes for document categorisation or jointly analysing meta-information - dividing the time

horizon into different periods, three in this case, is still extremely useful to plot the topics' (represented by Author's Keywords) evolution in terms of time trajectory and their tendency of merging together or splitting into several themes. The two cutting years, 2014 and 2019, were chosen for two main reasons: they represent the last years before a big change (meaning a significant increase in the scientific production) happened and to obtain homogeneity in the time slices.

In details, during the time period 2007-2014, the Author's Keywords are identified in 10 topics, the largest being "sustainability" (occurrences = 32, with the circle size proportional to the frequency), "consumer behaviour" (occur. = 29) and "clothing" (occur. =19) (Figure 17).

In particular, seven themes ("consumer behaviour", "environmental sustainability", "fashion", "fashion industry", "fast fashion", "recycling", "sustainability") out of the ten topics presented are classified as basic themes. "Clothing" and "consumer" belong to the motor themes quadrant, and only "fashion supply chain management" is classified as a niche theme.
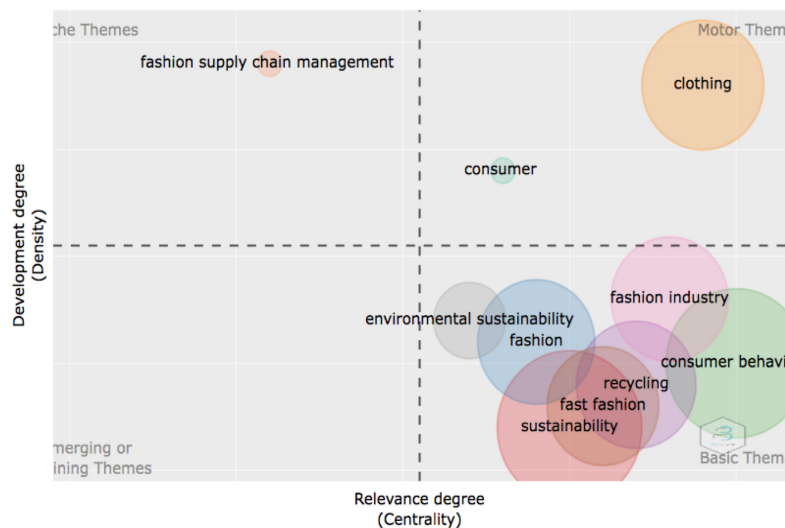
Figure 17: 2007-2014 Thematic Evolution. Own Elaboration based on Biblioshiny

During the second sub-period from 2015 to 2019, the number of topics increases to 12, with "sustainability" (occur. = 164) still being the most prominent out of all the themes. The second and the third places, instead, belong to "sustainable fashion" (occur. = 62) and "corporate social responsibility" (occur. = 29).

New topics, "design", "textile" and "corporate social responsibility", emerge as motor themes; "Luxury and consumption" appears as an emerging theme and, regarding the basic themes, "sustainable fashion" and "sustainable supply chain management" are also present as new, transversal topics (Figure 18).

59
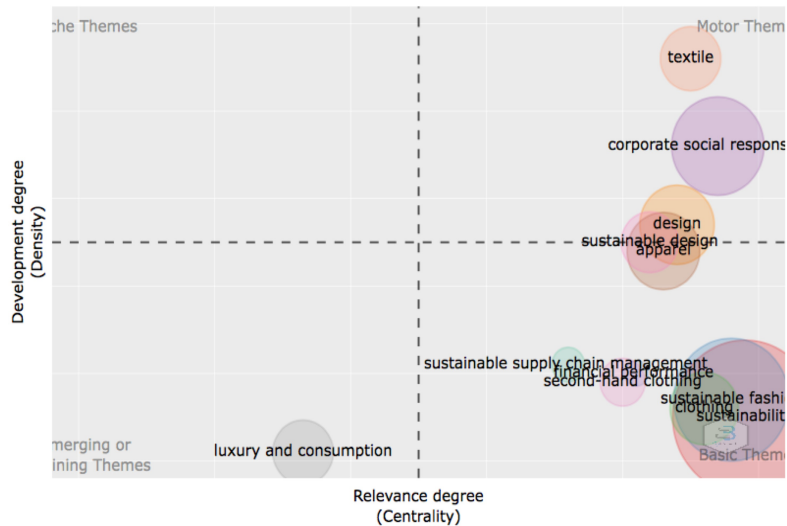
Figure 18: 2015-2019 Thematic Evolution. Own Elaboration based on Biblioshiny

The period 2020-2022 also presents 12 topics, the two most relevant still being "sustainability" (occur. = 225) and "sustainable fashion" (occur. = 63); furthermore, it is interesting to point out the presence of the topics "luxury fashion" (occur. = 31), "fast fashion" (occur. = 20) and "slow fashion" (occur. = 20).

"Supply chain management", classified as motor theme, represents the first time a topic related to SCM can be defined developed and relevant. "Fast fashion" appears as motor theme when, in 2007-2014, it was a basic theme (meaning a growing development of the topic). Other relevant basic themes ("sustainable consumption", "purchase intention" and "sustainable practices") focus on the customer's point of view. "Slow fashion" and "luxury fashion" became new basic themes (Figure 19).
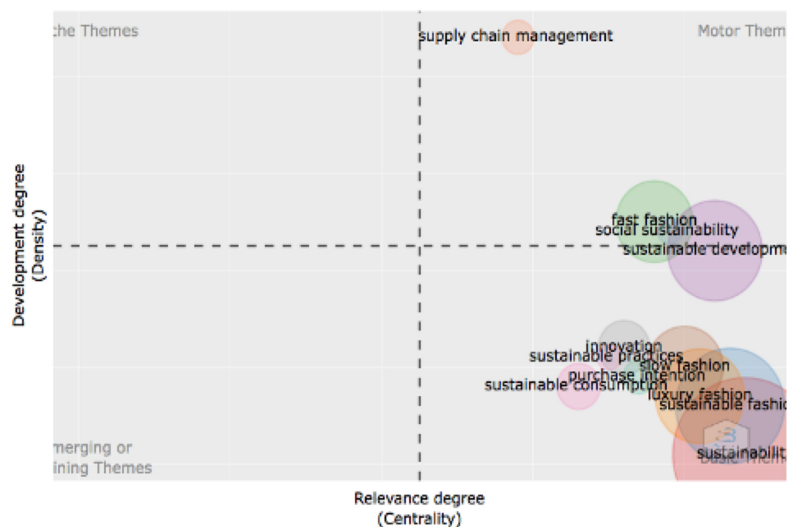
Figure 19: 2020-2022 Thematic Evolution. Own Elaboration based on Biblioshiny

As just stressed and also shown in Figure 20, in each period new keywords have emerged; moreover, as predicted, many topics have started as unique themes for then diverging and vice-versa, with a lot of different topics merging into bigger ones.

For example, from 2007-2014 to 2015-2019 five topics have entirely ("fashion industry") or partially ("clothing", "sustainability", "environmental sustainability" and "fashion") merged into "sustainability", and other four ("environmental sustainability", "fast fashion" "recycling" and "consumer behaviour") partially became part of "sustainable fashion".

Focusing on 2015-2019 onwards, the most notable change is the literature focus on the new topics of "sustainable supply chain management" and "corporate social responsibility" (it is also indicative its coming from the union of the two themes of "fast fashion and "consumer behaviour", which largely contributed to the starting of a conversation around sustainability in the industry).

In the period 2020-2022, it is worth mentioning the growing interest for not only "fast fashion", as previous years, but also for "luxury fashion" and "slow fashion" as development of the topics of "sustainable supply chain management" for the former and of "sustainability" and "sustainable fashion" for the latter.
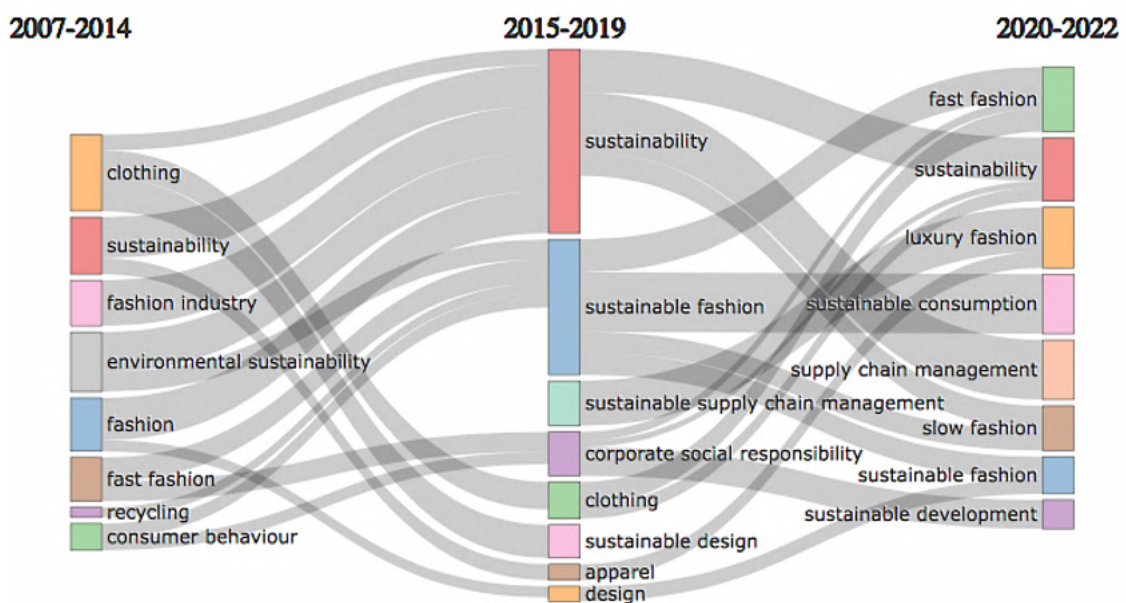
Figure 20: Thematic Map. Field: Author's Keywords, Number of Words: 1556, Min. Cluster Frequency (per thousand docs): 15. Own Elaboration based on Biblioshiny

On a final note, one of the most useful representations in bibliometrix is the historiographic map. First proposed by Garfield in 2004, it is a graph for depicting the chronological network map of the most relevant direct citations resulting from a bibliographic collection. In the graph (Figure 21), each node represents a document cited by other publications and each edge stands for a direct citation of a document.
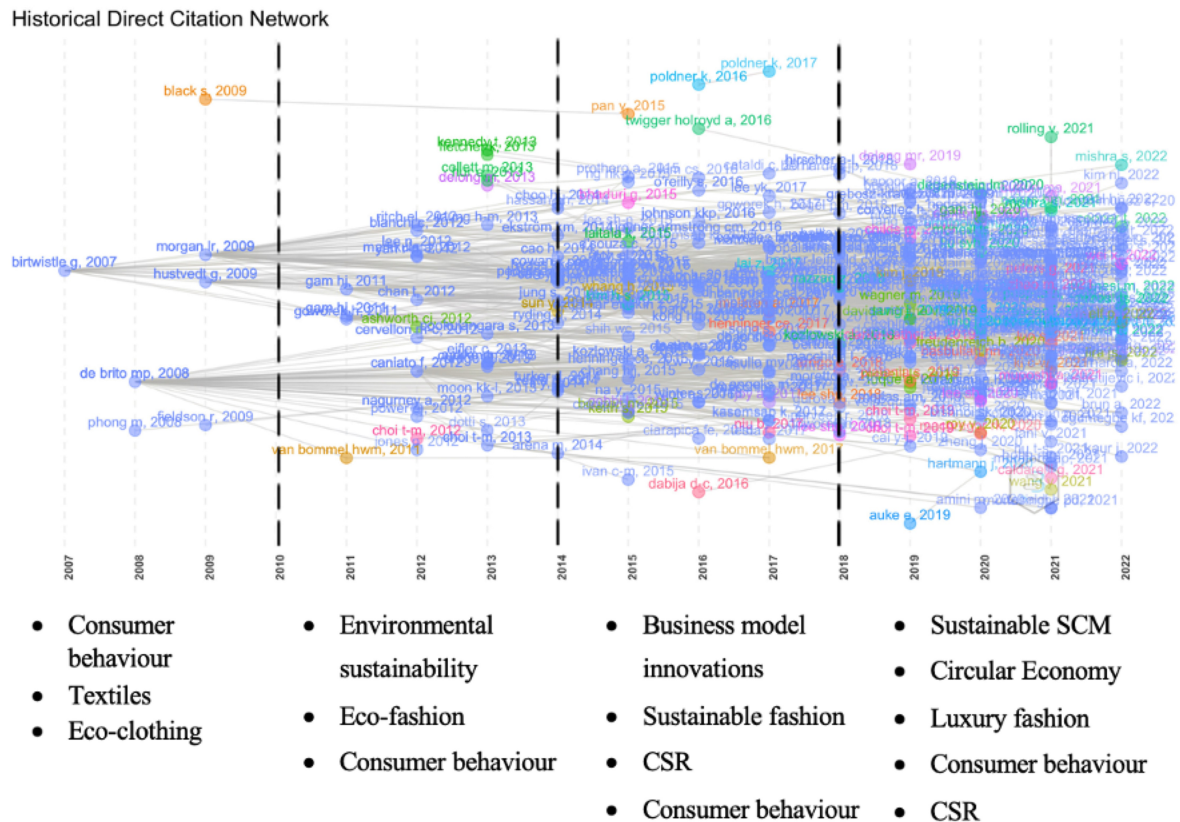
Figure 21: Historical Direct Citation Network. Number of Nodes: 574, labelled by Short ID. Own Elaboration based on Biblioshiny

The most interesting application of the map is the one that wants to highlight the origins of the historical paths of a topic, focusing on core authors and documents.

For practical reasons, and drawing from similar works, the 2007-2022 period was divided into four sub-periods of four years each (2007-2010, 2011-2014, 2015-2018, 2019-2022), for then identifying the main themes characterising each segment.

As it can be seen, the research field was mainly originated by four publications with the highest number of edges – Birtwistle and Moore (2007), de Brito, Carbone and Blanquart (2008), Hustvedt and Dickson (2009) and Morgan and Birtwistle (2009).

During the period 2007-2010, scholars started to show their interest for the challenge, faced

by the actors of the fashion value chain, of tackling the emerging trend of sustainability.

It is very meaningful that Birtwistle and Moore (2007) and de Brito, Carbone and Blanquart (2008) are the publications that started the conversation around fashion and sustainability, since they are the articles that originated two of the most relevant and recurring research paths also present today: consumer behaviour - with articles like the one of Morgan and Birtwistle (2009) and Niinimäki (2010) - and sustainable fashion supply chain management (Seuring and Müller, 2008).

In 2011-2014, literature focused on social and environmental sustainability challenges in the fashion industry, a relevant topic that, up to that point, had not received a structured analysis, especially in relation to sustainable supply chain management, which slowly was becoming one of the most significant research areas (Caniato et al., 2012; Turker and Altuntas, 2014).

Also, the theme of customer's consumption attitudes and habits regarding eco-fashion and sustainable consumption has been a transversal one, explored in 2011-2014 (Gam, 2011; Chan and Wong, 2012; Bly, Gwozdz and Reisch, 2015; Mcneill and Moore, 2015) and 2019-2022 (Park and Lin, 2020).

From 2015 to 2018, the topic of business model innovations (Bocken et al., 2014) gained significant traction, affirming that business success and promotion of a more sustainable consumption could come from companies incorporating a triple bottom line approach and adopting sustainable business models – related to circular and sharing economy (Brydges, 2021; Geissinger et al., 2019; McNeill and Venter, 2019). Also, the theme of corporate social responsibility, which has become prominent since 2015, is in line with the rising global sustainability pressures, that have led fashion companies to start considering the environment and society as key stakeholders to engage and collaborate with.

On a final note, the period 2019-2022 has been characterised by the impressive growth of publications related to supply chain management and sustainability, with a focus also on luxury supply chains. Confirming the findings presented in Figure 18, where it was an emerging theme in the period 2015-2019, authors have been showing a growing attention towards the relationship between sustainability and luxury (Athwal et al., 2019), especially for its potential to promote sustainable consumption and to be a solution to the on-going problem represented by the gap between purchase intentions and purchase experience.

1.4 Concluding Remarks

If fifteen years ago the conversation around the relationship between fashion and sustainability was just in its beginning phases, the growing interest on the topic, registered during the most recent years, makes for an impressive volume of scientific research, which has exponentially grown in both breadth and depth (as it can be clearly seen in Figure 21).

So, the use of bibliometric methods is now an essential step in order to effectively handle significant numbers of data, filter the most relevant works and discover the underlying structures of a field (Zupic and Čater, 2015).

The in-depth review - performed during the co-citation analysis - of some of the most important documents of the literature allows to draw some significant conclusions: originally consumers were the ones on which the "burden" of making a change in their habits was placed on but, over the years, scholars and academics have understood that sustainability has to be approached at a supply chain level to be truly effective. For this reason, and also considering the widespread adoption of CSR strategies, joint effort and collaboration with other stakeholders (consumers, employees, communities, government, NGOs, etc.) is affirmed to be an essential requirement in order to capture the benefits sustainability, shifting away from traditional business models to focus on innovative ways in which brands can still extract value but where growth and volume are decoupled.

The biggest criticism about the fashion industry is that its values, logics, processes and goals might seem to conflict with sustainability goals: even if most brands are implementing more social and environmentally conscious practices (such as recycled materials), in the end, what they are really doing is pushing their customers to buy more and more frequently. To mitigate the negative effects of overconsumption, the industry must guide and educate consumers on what sustainability truly means, addressing the attitude-behaviour gap - especially in the cases in which extra effort by customers is required (D'Arpizio et al., 2022) – and showing them more transparent, sustainable but also appealing alternatives.

Both fast fashion and luxury brands, along with their value chains, have to find a way of incorporating business model innovation for sustainability: especially in the case of the latter, where products are usually seen as investments, quality could become a gateway to more sustainable shopping, even among more careless customers (D'Arpizio et al., 2022).

The following chapters will continue investigating the relationship between fashion and sustainability by adopting a more practical point of view, starting from the analysis of the fashion industry and continuing with its sustainability efforts and commitments.

CHAPTER 2. The Fashion Industry: A focus on the Italian excellence

The second chapter will present an in-depth analysis of the fashion sector: in particular, a comprehensive overview of Italy and its peculiarities will be illustrated, focusing on the reality of industrial districts and the excellence of Made in Italy (from its origin to the connection to the industrial district phenomenon).

2.1 The Global Fashion Industry in figures

"In difficult times, fashion is always outrageous."
- Elsa Schiaparelli, Fashion Designer[5] -

With more than 100 (according to McKinsey & Company and Ellen MacArthur Foundation) to 150 (for the World Economic Forum) billion items of clothing produced each year[6], the global fashion industry has registered a period of unprecedented growth: as a matter of fact, according to various sources (such as the EU, McKinsey & Company and the World Economic Forum, clothing production (which represents the largest application of textiles) has at least doubled since the beginning of the millennium, while utilisation has drastically plummeted (- 36% comparing to the early 2000s), meaning the vast majority of garments are discarded when they are still massively underutilised (Ellen MacArthur Foundation, 2017).

This incredible growth has been slowed down by two years of COVID-19 pandemic, with its related lockdowns and restrictions: indeed, the implementation of social distancing measures and people having to stay at home limiting in-person interactions caused purchasing habits to be altered. But not only fashion consumption dropped: supply chain shutdowns severely threatened all companies, ranging from small local firms to global luxury brands.

The industry was able to partially bounce back, entering 2022 in a position of relative strength; nevertheless, it is now facing numerous challenges: geopolitical instability (mainly referring to the war in Ukraine), energy crisis, inflation and supply chain disruptions are

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5   Source: Achara, E. A. (2017) Elsa Schiaparelli's Closet Is Up for Grabs This Paris Fashion Week, Vogue. Available at: https://www.vogue.com/article/designer-elsa-schiaparelli-vintage-clothing-for-sale

6   Source: Fashion United (2022) Global Fashion Industry Statistics. Available at: https://fashionunited.com/global-fashion-industry-statistics

among the main factors contributing to an already fragile situation, causing fashion executives to be more pessimistic and cautious in 2022 - than in 2021 - about the years ahead (McKinsey & Company and Business of Fashion, 2022).

In any case, the global apparel market, which has been valued a total of US$ 1.53 trillion revenues in 2022[7], is expected to grow annually by 4.92% (CAGR 2022-2027); more in detail, in 2023, global fashion sales are expected to increase (between 5 and 10%) for luxury, a segment that has shown extraordinary resilience and that has been able to outperform the rest of the industry (for which only a negative 2 percent to positive 3 percent has been forecasted) (McKinsey & Company and Business of Fashion, 2022).

2.2 Italy: the power of Fashion

According to the Camera Nazionale della Moda Italiana (2022), the Italian fashion Industry - considered in its broader sense, meaning apparel, textiles, leather goods, footwear, jewellery, cosmetics, eyewear – is expected not only only recover, but also to exceed pre-COVID performances, achieving record sales for more than €90 billion in 2022 (Table 15).

(million €)	2019	2020	2021	2022E
Revenues	90 237	68 761	83 338	92 088
Export	71 552	56 168	67 963	75 439
Import	39 285	34 677	34 732	40 973

Table 15: The Italian Fashion Industry 2019-2022E in figures. Own Elaboration based on Camera Nazionale della Moda Italiana (2022)

Not only the enormous economic value, but the culture, beauty, passion, craftsmanship and innovation associated to Italian Fashion make for an extremely impactful industry, far beyond what one could ever imagine.

An example? Well, without Versace we would not have Google Images. Even Eric Schmidt - former CEO and executive chairman of the company – said so (Kilcooley-O'Halloran, 2015). To give some context to this statement, we need to go back to February 23, 2000 when, at the 42nd Grammy Awards, Jennifer Lopez wore a Versace green silk chiffon gown (Figure 22, on the left), sending the world into a frenzy: images of her wearing that dress with a plunging neckline were downloaded more than 600,000 times from the Grammy website, this in just 24 hours after the ceremony (Rezk, 2019). Besides, it was the most popular search query Google

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7   Source: Statista (2022) Apparel-Worldwide. Available at:
    https://www.statista.com/outlook/cmo/apparel/worldwide

had seen to date, prompting the search engine's developers to create the image search tool, launched in 2001.

Much, considering people often think clothes are just superfluous, irrelevant pieces of fabric: that dress did not only help building the Internet 20 years ago, but it also "broke it" when, in 2019, Jennifer Lopez closed the Versace Show wearing a reimagined, ever more revealing version of THAT jungle dress (Figure 22, on the right[8]) generating – according to Launchmetrics - $31.8 million in media impact value in the first week after her appearance (Lockwood, 2019).

This short story, even if it is clearly somewhat of a provocation, really captures the power fashion can exert on society: it is one of the greatest expressions of the changing world, and of how people are changing with it.

Figure 22: Jennifer Lopez wearing the Versace Green Dress at the 2000 Grammy Awards and at the 2019 Versace's SS20 Show. Source: British Vogue

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8   Source: Maitland, H. (2019) Jennifer Lopez Closes Versace's SS20 Show In Her Iconic Noughties Jungle Dress, British Vogue. Available at:
    https://www.vogue.co.uk/news/article/jennifer-lopez-green-versace-dress-milan-fashion-week-ss20

2.3 The reality of Italian Industrial Districts

In 2020, as reported by the Italian National Institute for Statistics (Istat), the active companies in Italy were 4,427,307 in total: 99.4% of these were categorised as micro (0-9 employees) and small (from 10 to 49 employees) companies, 23,831 enterprises were medium sized (from 50 to 249 employees) and only 4,187 firms were defined as large companies (with more than 250 employees)[9]. Clearly dominating the business landscape by being the backbone of Italian economy, the SMEs are proving to be essential sources of growth, innovation - although larger companies are, on average, more proactive about it - and resilience, contributing to job creation and to the overall economic and sustainable development of the country.

The fashion industry, in line with the rest of the national economic system, is also largely fragmented, showing meaningful differences when it comes to profit margins: if for brands these are usually higher but volatile, in the case of supply chains they are lower but much more stable (The European House - Ambrosetti, 2022a).

Also, what is interesting about this myriad of micro, small and medium firms is that they tend to cluster in specific locations, allowing the fragmentation to be recomposed within the industrial districts, a peculiar - but not exclusive – reality, which has proven to be crucial for the development and the international leadership of typical Made in Italy industries (like fashion is).

Before continuing, it is worth taking a step back to define what is meant by "industrial districts". First of all, Alfred Marshall – one of the most influential economist of the 19th century, founder of the Cambridge School of Economics - is universally believed to be the "father" of this concept. As highlighted by Belussi and Caldari (2008), in the original conceptualization by Marshall, the main features of Industrial Districts are highlighted to be the long-term settlement with a special and peculiar "atmosphere" (beneficial to the firms located in that particular area), an enhanced division of labour among firms, a high degree of technological complementarities and a "peculiar combination of competition and cooperation" (Belussi and Caldari, 2008, p. 338). In Italy, the further development and popularisation of Marshall's thinking is ascribed to Giacomo Becattini, who enriched the notion of industrial district by describing it as "a socio territorial entity which is characterised by the active presence of both a community of people and a population of firms in one naturally and historically bounded area" (Becattini, 1989, p. 112), where the synergistic interplay between the living and working population and local firms of a specific industrial branch cannot exist

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9   Source: Dati Istat (2020) Imprese e addetti.
    Available at: http://dati.istat.it/Index.aspx?DataSetCode=DICA_ASIAUE1P

without a specialised network for selling the products and without the "image" of the district (Becattini, 1989). And this is, according to Sforzi (2008), the original contribution of the Florentine economist: incorporating the social and cultural aspects (meaning the local communities and labour systems) into the more traditional technological and economic features, and making them the defining elements of the industry, going as far as defining this conceptualization as an original theoretical construct, suitable for illustrating the characteristics of Italian industrial production.

Summing up, industrial districts are SMEs-based, with firms specialised in one (or few) specific phase of the same production process common to the district (making each company inter-dependent and functional to the others, rather than stand-alone, isolated entities), with a privileged access to a local labour market endowed with specific skills and able to exploit the presence of significant external economies (e.g. learning, creativity, specialisation).

The division of labour, by combining external economies with specialisation, leads to large but dis-integrated organisations able to achieve economies of scale (cost advantages due to higher efficiency and capacity) without having to give up the quality and customisation typical of craftsmanship. Regarding the more social aspect, the values of the local communities and their sense of belonging to the places where production is located is one of the most distinctive elements of Italian industrial districts: the intertwine of work and family life leads to an integrated system of shared values and collective identities that facilitates trust, communication, and collaborative relationships.

Both Istat and Intesa Sanpaolo Research Department (one of most relevant financial and economic think tanks in Italy) have conducted studies on the topic of industrial districts, their main difference being the mapping methodology utilised.

Starting from Istat, its latest report, dated 2015, adopted a technique based on Labour Market Areas (LMAs, or "SLL – Sistemi Locali del Lavoro" in Italian[10]) and the analysis of the dominant economic specialisation, relying on data on economic units surveyed in the 9th Industry and Services Census (from 2011). From more than 600 LMAs, the Institute was able to identify 141 industrial districts (-22% compared to 2001), which accounted for one-fourth of the Italian economic system, and with the North-East area being the one with the highest concentration of districts. Out of the 141 districts identified, 52 can be related to the fashion industry: 32 from the "textiles and clothing" segment, 17 are "leather, hide, footwear" and 3 belong to "jewellery et cetera" (Istat, 2015).

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10 Labour Market Areas are aggregations of neighbouring municipalities identified analysing the mobility and flow of the local labour force.

On the contrary, the 2022 report by Intesa Sanpaolo was drafted based on non-consolidated financial statements of enterprises present in the company's own databased (ISID, Intesa Sanpaolo Integrated Database). The companies included in the sample – which have been selected considering businesses with a turnover higher than € 400,000 in 2018 and not lower than €150,000 in 2019 and 2020, and assets higher than 0 during the 2018-2020 period – were then classified into two categories, "non -district areas" and "district areas", depending on their sector and the location of production (Intesa Sanpaolo, 2022).

In this dissertation, it was chosen to illustrate the topic building on the work of Intesa Sanpaolo, since not only it contains more recent and up-to-date data, but it also proposes a more granular representation of the so-called "Fashion System" (in Italian: "Sistema Moda"), comprehending not only textiles and clothing, but leather goods, footwear, jewellery and eyewear sectors, the same ones considered during the creation of the database of Italian fashion companies (illustrated in Chapter 4). Furthermore, the 2022 report ("Annual Report – n.14"), which mostly considers the period from 2019 to 2021, was supplemented with the one drawn up during 2021 ("Annual Report – n.13), the mainly focuses on the years 2017-2020: this to give a clearer and more comprehensive picture of the industry before and after the a n o m a l i e s   c a u s e d   b y   t h e   p a n d e m i c .

For the period 2018-2020, ISP estimated the existence of 159 industrial districts, divided into five different sectors (Figure 23). The "Fashion System"- with the names of the districts presented in Table 16 – includes 5929 companies distributed among 41 districts, with 64% of them belonging to textiles, clothing and footwear sectors. Regarding their geographical distribution, Tuscany, Veneto, Marche and Lombardy clearly emerge as the regions with the highest concentration of fashion-related industrial districts. Worth mentioning, because of their size (proportional to the 2020 turnover and the number of companies composing the district) are the following ten groupings (which, in fact, are all located in one of the four areas mentioned above):

- Goldsmith of Arezzo: "the city of gold"[11], it is one of the world's most famous jewellery capitals;
- Textile and Clothing District of Prato: one of the largest in Europe, with each firm within the district specialised in one of the stages of textile manufacturing (spinning, warping, weaving, dyeing, trimming, and finishing)[12];

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11 Source: Discover Arezzo (no date) Arezzo the city of gold.
   Available at: https://www.discoverarezzo.com/en/arezzo-the-city-of-gold/
12 Source: Unioncamere (no date) Il Tessile di Prato.
   Available at: https://artsandculture.google.com/story/OAVhQPqMpxUA8A?hl=it

- Footwear District of Fermo: in the provinces of Fermo, Ascoli Piceno and Macerata is located the largest concentration of footwear companies in Italy, specialised in the production of shoes components. It is characterised by the presence of few leading companies – like Tod's and B.A.G (NeroGiardini) - and a high number of smaller companies (Intesa Sanpaolo, 2021c);

- Leather goods and Footwear District of Florence: this district is famous for its high-quality leather goods, that range from footwear to bags, wallets, belts and suitcases. Both global luxury brands (such as Gucci, Ferragamo, LVMH, Yves Saint Laurent, and Balenciaga) and small and medium-sized local businesses can be found in the area (Intesa Sanpaolo, 2021a);

- Eyewear District of Belluno: since the opening of the first factory in Calalzo di Cadore in the late 19th century, the district – which produces every type of eyewear components - has been one of the highest expressions of quality, design and innovation. In this area not only a myriad of micro-enterprises is located, but also some of the world's leading companies, like Luxottica and Safilo[13];

- Tanning and footwear of Santa Croce sull'Arno: one of the largest tanning districts in Europe[14], also characterised by its close collaboration with the nearby Leather goods and Footwear District of Florence;

- Tanning District of Arzignano: between Vicenza and Verona, it comprehends a complete and integrated supply chain – from tanning to recycling – that serves the automotive, furniture and fashion industries[15];

- Textile District of Biella: high-end yarns and textiles, such as wool and noble fibres, obtained from sheep breeding are what the district - located at the foot of the Alps and near many waterways - is famous for[16];

- Footwear and Sportsystem District of Montebelluna: specialised in sports equipment and footwear (Sammarra and Belussi, 2006), it has a long history of innovation – also being, among the leather districts, the one with the highest number of patents. Geox S.p.a., Stonefly S.p.a. and Garmont S.r.l. are some of the most important companies in the area (Intesa Sanpaolo, 2021a);

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13 Source: Innoveneto (no date) Occhialeria Bellunese.
   Available at: https://www.innoveneto.org/reti-e-clusters/distretti-industriali/occhialeria-bellunese/
14 Source: Distretto Santa Croce (no date) Distretto Santa Croce-Dove la Concia diventa Arte.
   Available at: (https://www.distrettosantacroce.it)
15 Source: Distretto Veneto della Pelle (no date) Il Distretto.
   Available at: https://distrettovenetodellapelle.it/il-distretto-produttivo-veneto/
16 Source: Unioncamere (no date) Il Tessile Biellese.
   Available at: https://artsandculture.google.com/story/xAVhwHGvQwUA8A?hl=it

- Silk-Textile District of Como Lake: all processes of the silk textile chain - twisting, weaving, dyeing, printing, finishing – are present in the province, making it a region known worldwide and loved by many luxury brands[17].
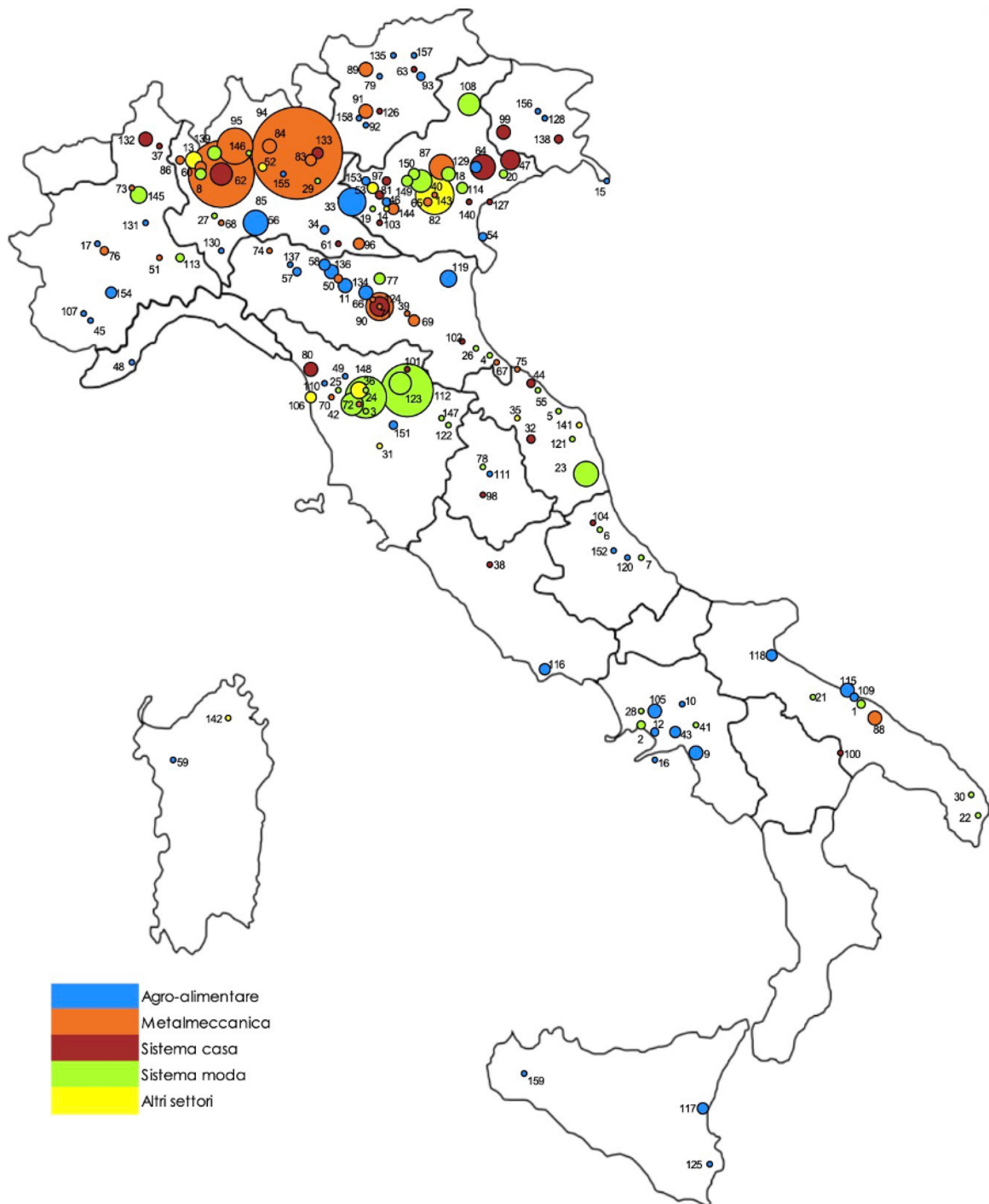
Figure 23: Italian Industrial Districts. Source: Intesa Sanpaolo (2022)

17 Source: Meliado, E. (2019) La seta di Como, il distretto che ha incantato le griffe del lusso, FashionNetwork.com. Available at: https://it.fashionnetwork.com/news/La-seta-di-como-il-distretto-che-ha-incantato-le-griffe-del-lusso,1114408.html

N°	Industrial Districts	(Italian translation)
1	Clothing District of Bari	Abbigliamento del barese
2	Clothing District of Naples	Abbigliamento del napoletano
3	Clothing District of Empoli	Abbigliamento di Empoli
4	Clothing District of Rimini	Abbigliamento di Rimini
5	Clothing District of Marche	Abbigliamento marchigiano
6	Clothing District of Northern Abruzzo	Abbigliamento nord abruzzese
7	Clothing District of Southern Abruzzo	Abbigliamento sud abruzzese
8	Clothing-Textile District of Gallarate	Abbigliamento-tessile gallaratese
18	Footwear and Sportsystem District of Montebelluna	Calzatura sportiva e sportsystem di Montebelluna
19	Footwear District of Verona	Calzatura veronese
20	Footwear District of Brenta	Calzature del Brenta
21	Footwear District of North-Bari	Calzature del nord barese
22	Footwear District of Casarano	Calzature di Casarano
23	Footwear District of Fermo	Calzature di Fermo
24	Footwear District of Lamporecchio	Calzature di Lamporecchio
25	Footwear District of Lucca	Calzature di Lucca
26	Footwear District of San Mauro Pascoli	Calzature di San Mauro Pascoli
27	Footwear District of Vigevano	Calzature di Vigevano
28	Footwear District of Naples	Calzature napoletane
29	Hosiery District of Castel Goffredo	Calzetteria di Castel Goffredo
30	Hosiery-Clothing District of Salento	Calzetteria-abbigliamento del Salento
40	Tanning District of Arzignano	Concia di Arzignano
41	Tanning District of Solofra	Concia di Solofra
42	Tanning and footwear of Santa Croce sull'Arno	Concia e calzature di Santa Croce sull'Arno
55	Jeans Valley of Montefeltro	Jeans Valley del Montefeltro
77	Knitwear and Clothing District of Carpi	Maglieria e abbigliamento di Carpi
78	knitwear and Clothing District of Perugia	Maglieria e abbigliamento di Perugia
108	Eyewear District of Belluno	Occhialeria di Belluno
112	Goldsmith of Arezzo	Oreficeria di Arezzo
113	Goldsmith of Valenza	Oreficeria di Valenza
114	Goldsmith of Vicenza	Oreficeria di Vicenza
121	Leather goods of Tolentino	Pelletteria di Tolentino
122	Leather goods and Footwear District of Arezzo	Pelletteria e calzature di Arezzo
123	Leather goods and Footwear District of Florence	Pelletteria e calzature di Firenze
139	Silk-Textile District of Como Lake	Seta-tessile di Como
145	Textile District of Biella	Tessile di Biella
146	Textile and Clothing District of Val Seriana	Tessile e abbigliamento della Val Seriana
147	Textile and Clothing District of Arezzo	Tessile e abbigliamento di Arezzo
148	Textile and Clothing District of Prato	Tessile e abbigliamento di Prato

N°	Industrial Districts	(Italian translation)
149	Textile and Clothing District of *Schio-Thiene-Valdagno*	Tessile e abbigliamento di Schio-Thiene-Valdagno
150	Textile and Clothing of Treviso	Tessile e abbigliamento di Treviso

Table 16: Italian Industrial Districts (English and Italian translation). Source: Intesa Sanpaolo (2022)

In the period 2008-2019 industrial districts, in particular the ones belonging to the fashion sectors, did perform significantly better than non-district areas in terms of turnover (Intesa Sanpaolo, 2021b). However, already in 2019, many sectors related to the fashion system, in particular textiles, clothing, footwear (-3.7%), tanning (-5.6%), knitwear and eyewear, were recording a negative performance; only goldsmith (+5.5%), leather goods (+1.7%) and sporting goods (+1.5%) were able to register some growth, though not sufficient to make up for the setbacks suffered by the other segments (Intesa Sanpaolo, 2021b). Indeed, the only fashion district that could actually compete with the other categories in terms of growth, profitability and capitalization was Goldsmith of Valenza (Intesa Sanpaolo, 2021b).

The Coronavirus outbreak in 2019-2020 only worsened this downward trajectory, with the "Fashion System" reporting a drastic drop in turnover equal to -26%. Also, more than 27% of these companies recorded a negative EBITDA margin, +17.6% with respect to 2019 (Intesa Sanpaolo, 2022).

Figure 24: Districts – Fashion System: ROI (avg. values) by business size (2018-2020). Own Elaboration based on Intesa Sanpaolo (2022)

Regarding ROI (= Return on Investment), as it can be seen in Figure 24, significant drops for companies of any size were recorded in the 2018-2020 period. Moreover, no relevant differences between district and non-district areas were underlined (Intesa Sanpaolo, 2021b), only a general, common negative trend for the period 2008-2019, even more substantial when 2020 is included: indeed, the 2008-2020 gap for non-district areas has been found to be equal to 3.2 percentage points, whereas it is only 2.8 percentage points for district areas. Even if the drop has been more pronounced for the former, non-district areas have recorder better ROI and EBIT margins (considering them in absolute terms) than districts during the three-year period from 2018 to 2020; moreover, when comparing the 2008 and 2020 Return on Investment, it must be mentioned that the "Fashion System", with a - 4.3 percentage point difference, recorder a considerable negative performance (Intesa Sanpaolo, 2022).

Also, because of the COVID-19 outbreak and directly linked to businesses shutting down, Italian fashion companies – both from district and non-district areas - tended to significantly reduce their supplier base. Ongoing transactions (meaning two years of buyer-supplier relationship during the 2016-19 period) are the types of relationships which have been affected the most, but it is interesting to mention how many companies, especially from non-district areas, also decided to put an end to some of their strategic alliances (of at least three years). On the other hand, a considerable number of companies established new collaborations with regional - and sometimes national, especially in the case of Made in Italy enterprises – suppliers, mostly operating within the fashion sector (Intesa Sanpaolo, 2022), with the goal of improving resilience, flexibility and sustainability.

On a final note, "Fashion System" districts present a higher degree of internationalization (measured by the number of foreign enterprises in the area) than all the other industries: for example, the Textile and Clothing District of Prato holds the top spot in the overall standing, with 124 foreign companies accounting for 14.6% of the total businesses located in the area (Intesa Sanpaolo, 2022).

2.4 Made in Italy: from its origin to industrial districts

As specified by Istat (2015), 130 out of 141 detected industrial districts can be defined Made in Italy, with 22.7% of them from the textiles and clothing ("tessile e abbigliamento") sector and 12.1% belonging to the leather and footwear ("pelli, cuoio e calzature") segment.

But what does Made in Italy really mean? And when was Italia Fashion born?

To answer this question, we need to step back in time to February 12, 1951, when Giovanni

Battista Giorgini – a successful and visionary entrepreneur from Tuscany - organised the first ever Italian fashion show in Florence, at his residence Villa Torrigiani: with 18 models from 10 different houses[18] (Figure 25[19]), it was the first time Italy was presenting its art to the world in such a major way. In a period when Paris was the fashion world's epicentre, Giorgini was capable of grasping the tremendous economic and cultural potential of Made in Italy fashion which, at the time, was very different from the current industry: despite the presence of many talented designers and skilled tailors, what Italian fashion was lacking was a strong, recognisable cultural identity, other than a widespread international presence and legitimization (Belfanti, 2015).

The creative freshness and the references to the artistic traditions of the Renaissance, combined with the support of the Italian and international press, buyers and industry experts, decreed the success of the event, then reproposed two times each year starting from 1952 until 1982, in the new location of Sala Bianca in the Medici residence of Palazzo Pitti (Belfanti, 2015), marking the birth of Italian fashion as we know it today.

Figure 25: The first ever Made in Italy fashion show in 1951. Source: L'OFFICIEL ITALIA

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18 Atelier Carosa, Alberto Fabiani, Duchess Simonetta Colonna di Cesaro Visconti of Simonetta, Emilio Schuberth, Sorelle Fontana, Jole Veneziani, Vanna (trade name of Anna Carmeli and Manette Valente), Vita Noberasko, Germana Marucelli, Emilio Pucci, Giorgio Avolio, Baroness Clarette Gallotti of La Tessitrice Dell'Isola, and Marquise Olga di Grésy of Mirsa (Belfanti, 2015).
19 Source: Vertua, S. (2021) 70 anni fa nasceva il Made in Italy con la prima sfilata di moda, L'OFFICIEL ITALIA. Available at: https://www.lofficielitalia.com/moda/qual-e-la-prima-sfilata-di-moda-nella-storia-firenze-giovanni-battista-giorgini-chi-era-moda-italiana-made-in-italy

If the world has been acknowledging Made in Italy as a synonymous for excellence, quality, passion and creativity since the 1950s (Belfanti, 2015), national regulations regarding this indication of origin is surprisingly very recent, dating back only to 2003.

In that year, the Law n. 350 of 24 December 2003[20] was enacted for two main reasons: to promote the indication of the origin or the establishment of a specific trademark protecting the goods entirely produced in Italy, and to sanction (pursuant to article 517 of the Italian Penal Code) all these false Made in Italy indications that, until then, had induced customers to mistakenly infer the Italian origin of a good (which, now, must be determined in accordance with the EU legislation).

Indeed, national legislation must always cope with the relevant European Union legislation (Pozzo, 2021): in particular, it is necessary to refer to the Union Customs Code on the non-preferential origin of the product when a good has only been partially Made in Italy. According to Art. 60[21] ("Acquisition of origin") of the Union Customs Code - Regulation (EU) No 952/2013 - "goods the production of which involves more than one country or territory shall be deemed to originate in the country or territory where they underwent their last, substantial, economically-justified processing or working, in an undertaking equipped for that purpose, resulting in the manufacture of a new product or representing an important stage of manufacture". Summing up, the non-preferential Italian origin - Made in Italy - can be granted only to those products which have undergone substantial transformations on the Italian territory, regardless of the amount of domestic or foreign inputs utilised during the production process (Pozzo, 2021).

Furthermore, in 2009, a new "100% Made in Italy" trademark was introduced with the Law 166/2009 - from a previous Law Decree 135/2009, Art. 16 ("Made in Italy e prodotti interamente italiani") – which states that an item claiming to be "Made in Italy", "100% Made in Italy", "100% Italia", or "All Italian" (in every language) must have been designed, manufactured and packaged exclusively in Italy[22] .

On a finale note, to increase protection and transparency in the textile, leather goods and footwear sectors, the Law n. 55 of 8 April 2010[23] (also known as Reguzzoni-Versace-Calearo Law) provided that goods for which the processing phases - or at least two of them - had

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20 Source: LEGGE 24 Dicembre 2003, n. 350 – Available at:
    https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:2003-12-24;350~art4-com177
21 Source: Regulation (EU) No 952/2013 laying down the Union Customs Code - Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R0952&qid=1671226958214
22 Source: Decreto-legge 25 settembre 2009, n. 135 - Available at:
    https://www.parlamento.it/parlam/leggi/decreti/09135d.htm
23 Source: LEGGE 8 aprile 2010, n. 55 – Available at:
    https://www.gazzettaufficiale.it/eli/id/2010/04/21/010G0077/sg

taken place in Italy – could boast the Made in Italy label. However, this law was found to be in contrast with the Union Customs Code which, as expressed in the aforementioned Article 60, follows a different criterion when establishing the origin of a product: for this reason, both the Italian Customs Agency and the Presidency of the Council of Ministers have declared its non-applicability (Pozzo, 2021).

As affirmed by Campagna Abiti Puliti (2022), "the Made in Italy is a system articulated in supply chains embedded in global production networks with close relationships with territories". Indeed, many fashion industrial districts have become essential production sites – upstream activates related to textile manufacturing, tanning, creation of parts and components - for many Italian and French luxury fashion houses (Intesa Sanpaolo, 2021b), the main reasons being rooted in the presence of a broad manufacturing base with network structures (distinctive feature of industrial districts), which makes for a system capable of creating and maintaining its unique skills, heritage, reliability, know-how and quality, whilst allowing for customisation and diversified production.

Even with these characteristics of excellence, Made in Italy still has to face competition from cheap labour cost countries – China and Vietnam, to give an example - that, over the time, have been able to develop skills potentially threatening the supremacy of Italian industrial districts. However, these have managed to prosper and evolve, adopting different strategies all focused on giving their customers unique services (quality craftsmanship and co-design) and differentiated products that are original combination of local traditions and international demands (Intesa Sanpaolo, 2021b), that could not be created in any other area of the world.

In Chapter 4, the topic of *Made in Italy* fashion industrial districts will be enriched with considerations regarding the sustainability performance of national fashion businesses, in the end explaining why sustainability, for these areas, could represent a new source of competitive advantage. However, before this step, in the following Chapter, some key points about the overall sustainability of the fashion industry will be presented in detail.

CHAPTER 3. The Challenge of Sustainability: "only as strong as the weakest link" [24]

The third chapter investigates the environmental and social impact of the industry: after some up-to-date statistics and information about what has been found to be the fourth most polluting sector in Europe, some solutions that could improve its performance in relation to the environmental footprint and respect of human rights will be illustrated.

Furthermore, a section will be dedicated to circular economy, particularly relevant for the aims of this dissertation, since the transition to this new paradigm is believed it will bring significant benefit to several Sustainable Development Goals, most prominently to "Goal 12: Responsible Consumption and Production"[25], which calls for immediate collective actions for changing current unsustainable ways in which goods and services are being produced and consumed (European Commission, 2015).

Lastly, the chapter ends with a focus on both the European and Italian situation and achievements regarding sustainability linking, in this way, this third chapter to the following one, which will empirically assess Italian fashion businesses' sustainability efforts.

3.1 17 goals to transform the world

Figure 26: The 17 Sustainable Development Goals. Source: United Nations

"This Agenda is a plan of action for people, planet and prosperity" (United Nations, 2015): 17 Sustainable Development Goals (SDGs) (Figure 26) – categorised into 5Ps: People, Planet, Prosperity, Peace, Partnership - and 169 associated targets that integrate and balance the three

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24 Villena and Gioia (2020) A More Sustainable Supply Chain

25 Source: United Nations - Department of Economic and Social Affairs (no date) Goal 12 | Ensure sustainable consumption and production patterns. Available at: https://sdgs.un.org/goals/goal12

dimensions of sustainable development: economic, social, and environmental.

Signed in September 2015 by all United Nations Member States, the 2030 Agenda for Sustainable Development wants to tackle the challenges related to sustainability by involving every country and member of society in a real global partnership, with the ultimate goal of ending poverty, improving health and education, creating peaceful societies where inequalities are overcome and human rights are respected, while simultaneously fighting against climate change and achieving economic growth (United Nations). The commitment to this fifteen-year long collective journey has been encouraging: more and more companies (over 70%) have started to incorporate the UN Sustainable Development Goals in their reporting, and around 25% of businesses include SDGs in their published corporate strategy (Strategy&, 2021)[26].

On a national level, Figure 27 proposes a graph summarising the current situation of Italian regions in reference to the 17 goals, where the longer the distance from the best performance axis (which represents the performance of an ideal region that achieves the bp in every measure), the worse has been the result obtained for that particular goal. On average, Northern regions are the ones that have accomplished the most, although there have been some exceptions, such as Marche for Goal 12 (Istat, 2022).
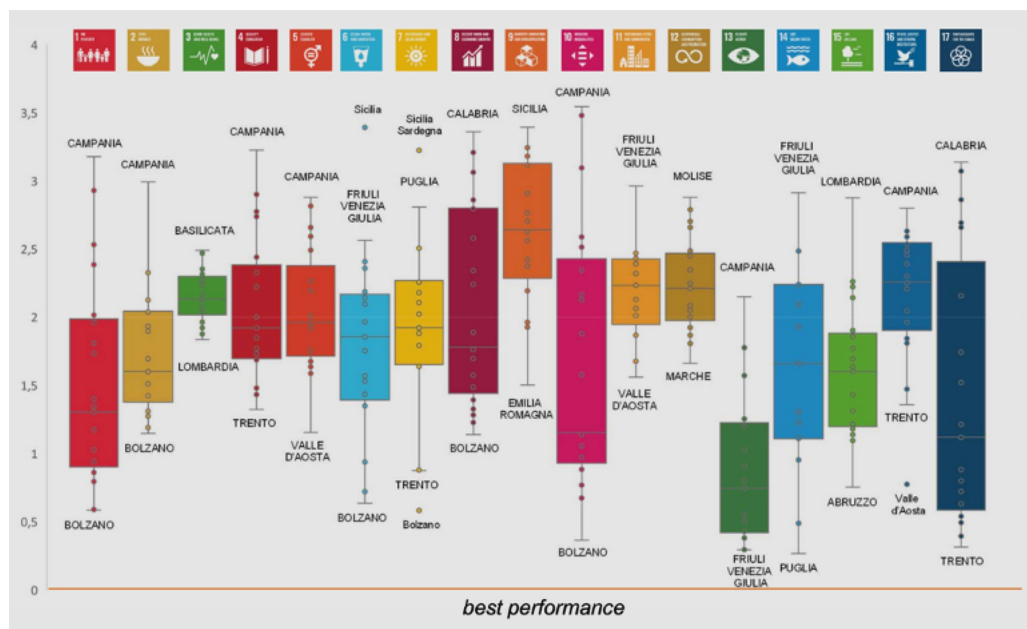
Figure 27: Overall distance of Italian regions from best performance, by Goal. Source: Istat (2022)

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26 Strategy& is a global strategy consulting team at PwC.

3.2 The game-changer role of supply chains in the fight against Climate Change

Fashion, undoubtedly one most valuable industries in the world, is also one the most wasteful, destructive and unsustainable sectors: the need for bold and urgent actions to prevent further damage has also been recognised by fashion stakeholders who, in 2018, created the UNCCC Fashion Industry Charter for Climate Action, then renewed in 2021. Drawing from the 2015 Paris Agreement – international treaty on climate change, signed by almost 200 members of United Nations Framework Convention on Climate Change, that promotes greenhouse gas emissions reduction to limit global temperature increase to below 2°C above pre-industrial levels, preferably limiting it to 1.5 °C, and the achievement of net-zero by 2050 (UNFCCC) - companies of all sectors and sizes have the opportunity to create a decarbonisation pathway (setting emission reduction targets for their own operations and their value chain) or to commit to at least 50% absolute aggregate GHG emissions reduction by 2030. In both cases, net-zero emissions must be reached no later than 2050 (UN Climate Change, 2021).

Greenhouse gases (GHG) emissions reduction clearly emerges as a key objective: it has been estimated that, in 2018, the fashion industry was responsible for 2.1 billion tonnes of emissions, accounting for around 4% of the global total (Global Fashion Agenda and McKinsey & Company, 2020), although other studies report that this figure could even be near 8-10% (United Nations, 2019) - meaning not only that consistent and universally accepted data are still missing, but that carbon emission estimates can show deviations up to 310% between the different sources (The European House - Ambrosetti, 2022c) . According to the World Economic Forum and Boston Consulting Group (2021), the industry is also one of the eight supply chains responsible for more than 50% of overall global air pollution.

In particular, the vast majority (around 70%) of this negative impact has been attributed to upstream activities, such as energy-intensive raw material production (38%, the most polluting phase overall), followed by preparation and processing of inputs. Regarding the remaining 30%, product use, with more than 420 million tonnes CO2Eq, held the top spot among the downstream and end-of-use stages (Global Fashion Agenda and McKinsey & Company, 2020).

This scenario, already apocalyptic, is expected to worsen during the next decade: emission could reach the 2.7 billion tonnes by 2030 - registering an annual growth rate of 2.7% - if no immediate, additional abatement measures to correct this trend will be implemented. It has

been calculated that, in order to stay in the 1.5-degree pathway, the industry should cut its GHG footprint in half from current levels, arriving to 1.1 billion tonnes – making for a total 1.7 billions tonnes of accelerated abatement potential (Figure 28).

EMISSIONS ABATEMENT
ASSUMING ACCELERATED INDUSTRY DECARBONISATION
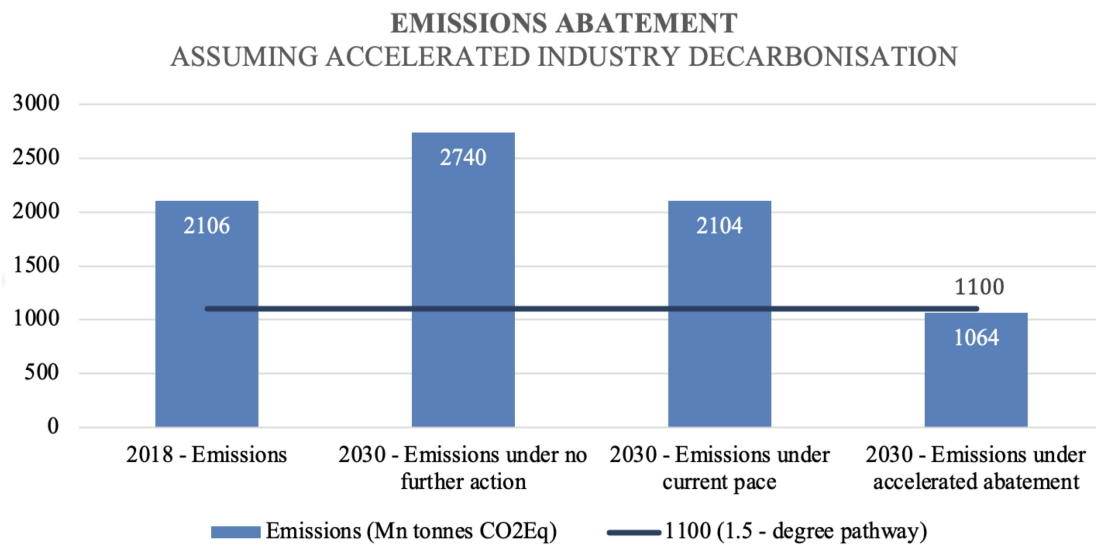
Figure 28: Emission abatement assuming accelerated industry decarbonization. Own Elaboration based on Global Fashion Agenda and McKinsey & Company (2020)

3.2.1 Putting sustainability first

Sustainability topics are gaining traction among fashion executives, them going as far as indicating sustainability as one of the biggest trends which will dominate the fashion agenda in 2023 (McKinsey & Company and Business of Fashion, 2022). If cost savings - in the form of waste, energy and/or input consumption reduction - and regulatory compliance have traditionally been the main reasons and priorities, opportunities for revenue growth, improved work conditions for employees and increased customer loyalty are other non-financial aspects that could benefit from supply chain sustainability initiatives (Alves and Steinberg, 2022).

However, the main point being stressed by academics and by numerous actors, within and outside the industry, is that relevant results – from the environmental, social and economic point of view – will be achieved only when brands will stop shifting problems from one region of the world to another (Kearney, 2022), finally taking an end-to-end perspective: indeed, supply chains can be often considered "core activators" of sustainability goals and commitments (Alves and Steinberg, 2022). In this regard, brands and retailers have the chance of supporting their value chains, since they represent the greatest pressure for value chain businesses (The European House - Ambrosetti, 2022a).

Collaborations could foster sustainability, making it more feasible: larger brands should include – and financially support - both their first-tier and lower-tier suppliers in their sustainability programs. If the former are usually disclosed by almost the majority of larger brands, little to no information is shared about the rest of the supply chain. In this sense, the case of lower-tier suppliers is especially problematic: as mentioned beforehand, fashion supply chains are characterised by the presence of countless small or medium-sized businesses, encompassing many intermediate processing steps (Cao et al., 2008), with them often unknown by both the companies' stakeholders – this is why there is urgent need for them to disclose beyond tier 1 (Fashion Revolution, 2022) - and the media. In most cases, these smaller businesses not only are not prepared to handle social and environmental issues, but usually they do not even feel the need to address them (Villena and Gioia, 2020); moreover, if supply chain players often tend to be reactive to brand demands, usually they are not proactive to anticipate them (The European House - Ambrosetti, 2022a). Even if some measures are currently in place, expanding the scale and scope of these actions is crucial while, at the same time, increasing end-to-end visibility, transparency and traceability: as a matter of fact, lack of high-quality data sharing with suppliers and no accurate information on supply chain emissions are among the greatest barriers preventing decarbonisation efforts to even be taken into consideration (Global Fashion Agenda and McKinsey & Company, 2020; World Economic Forum and Boston Consulting Group, 2021).

Indeed, establishing sustainable supply chains requires both internal and external players to collaborate and mutually support each other, even when these relationships entail dealing with the inherent complexity of having a globalized and fragmented business environment (Ha-Brookshire, 2017; Ki, Chong and Ha-Brookshire, 2020). However, bold commitments require bold actions: so, tracking, analysing and benchmarking to enhance transparency will be the areas in which various actors will need to work on and coordinate closely, aligning sustainability values, practices and targets of the main brand with the ones of these other players of the chain (Global Fashion Agenda and McKinsey & Company, 2020; Ki, Chong and Ha-Brookshire, 2020). In this sense, technology and sustainability, "green and digital" (European Commission, 2022c), go hand in hand: for EY, more than 60% of companies are implementing technologies – such as Internet of Things devices and sensors, cloud or blockchain-based platforms, machine learning and A.I. – to help them during the tracking and measuring phases (Alves and Steinberg, 2022).

If around 20% emissions savings (for a total of 186 million tonnes) could surely derive from

more sustainable consumer behaviours - as mentioned in Chapter 1, new washing and drying habits, along with better care instructions offered by companies – and an additional 143 million tonnes[27] cut could come from a widespread adoption of circular business models - in which ideally, by 2030, 1 out of 5 clothing items should trade - it is in the incredibly polluting upstream operations where the highest potential (61%) for emissions savings could lie. In particular, decarbonising the material processing phase, thanks to efficiency improvements (such as shifting from wet to dry processing, or by implementing motor and air modifications in machinery) and renewable energy (assuming a 100% transition), could lead to a reduction up to 703 million tonnes (42% of the total) in GHG emissions. On the topic, it must be mentioned how more than 60% of the total required abatement could come from energy-related levers (Global Fashion Agenda and McKinsey & Company, 2020). However, since cutting value chain emissions poses several challenges for companies, more and more firms are adopting Science-Based Targets (SBTs), recognising them as one of the most clearly defined roadmaps to achieve net-zero by 2050. These targets are measurable, actionable, and time-bound objectives that helps companies quantify the extent of the commitment to them required to contrast climate change. Adopting them means activating one of the available levers companies are equipped with, such as material efficiency (reducing waste), material substitution (with new sustainable materials), shifting to lower carbon sourcing (deploying renewable energy) and supply chain investments in discrete emission reduction opportunities (Figure 29). All of these measures along with a specific timeline, appropriate monitoring tools and governance structures set by brands to support the operationalisation of these strategies (Global Fashion Agenda and McKinsey & Company, 2020).

Figure 29: A Framework for GHG Reduction. Source: Science Based Targets initiative and World Resources Institute (2019)

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27 The Ellen MacArthur Foundation (2021) has been even more optimistic proposing, under certain assumptions, a potential CBM emission abatement higher than 300 million tonnes CO2Eq (Figure 33).

As of December 2022, more than 4,000 businesses and financial institutions all over the world are working with the Science Based Targets initiative (SBTi): of these, 280 belong to the fashion industry – identified by the two categories "Textile Manufacturing, Spinning, Weaving & Apparel" and "Textiles, Apparel, Footwear and Luxury Goods" - and only 101 (all from the second grouping) have had their targets approved and validated by the initiative. Just 2 companies – Mahmood Group and Gul Ahmed Textile Mills Limited, both from Pakistan - are part of the "Textile Manufacturing, Spinning, Weaving & Apparel" sector: these are "committed" to both near term and net zero targets, meaning that they have stated their intent of developing SBTs and submit these for validation within 24 months (starting from 2021).

The remaining 278 businesses are from the "Textiles, Apparel, Footwear and Luxury Goods" sector, and only 15 of these are Italian companies (Table 17). In particular:

- The first 8 companies are the ones with approved targets;

- Relaxshoe Srl, Prada Group and Ermenegildo Zegna NV have set both near term (focused on the next 5 to 10 years) and net zero targets (which encompass both near and long-term targets);

- Salvatore Ferragamo Group, Prada Group, Gruppo Armani, OTB and Ermenegildo Zegna NV – indicated in bold - are also members of the Business Ambition for 1.5°C campaign, a call to action from a coalition of UN agencies, business and industry leaders, in partnership with the Race to Zero;

- Lastly, Prada Group SpA, Moncler Group and Gruppo Armani are the only three companies which have set scope 3 targets – that refers to value chain emissions, indicated in italics in the table – in addition to scope 1 and scope 2 (that, respectively, represent direct emissions for owned or controlled sources and indirect emissions from purchased energy).

It clearly emerges how luxury brands have been the most proactive, in line with similar considerations presented in Chapter 1 about the role of the segment in fostering sustainability, but it is also encouraging to see some small-medium enterprises, like Save The Duck S.p.A. and Pattern S.P.A. (which also works in the field of luxury, being the first Italian Hub of Luxury Fashion Engineering) taking action on the matter. In general, more companies joining the project and the setting of value chain targets will help the sector pursuing the ambitious common goal represented by GHG emission reduction.

Company	Near Term	Long Term	Net-Zero	Organisation type
Save The Duck S.p.A.	1.5°C by 2030	-	-	Small or Medium Enterprise
Salvatore Ferragamo Group	1.5°C by 2029	-	-	Company
Prada Group	1.5°C by 2026, *2029*	-	-	Company
Pattern S.P.A.	1.5°C by 2030	-	-	Small or Medium Enterprise
Moncler Group	1.5°C by 2030, *2023*	-	-	Company
MFP INDUSTRY di Ludmila Lung & C.	1.5°C by 2030	-	-	Small or Medium Enterprise
Gruppo Armani	1.5°C by 2030, *2029*	-	-	Company
C.T. POINT SpA	1.5°C by 2030	-	-	Small or Medium Enterprise
The Schneider Group	Committed	-	-	Company
Relaxshoe Srl	Committed	-	Committed	Company
OTB	Committed	-	-	Company
Golden Goose S.p.A.	Committed	-	-	Company
Ermenegildo Zegna NV	Committed	-	Committed	Company
Brunello Cucinelli SpA	Committed	-	-	Company
Benetton Group Srl	Committed	-	-	Company

Table 17: Italian Fashion companies committed to SBTs Own Elaboration based on Science Based Targets (2022)[28]

28 Source: Science Based Targets (no date) Companies taking action.
    Available at: https://sciencebasedtargets.org/companies-taking-action#table

Again, a major collaborative effort between actors across the supply chain and other stakeholders is highly recommended to achieve the prospected cut in greenhouse gas emissions (Science Based Targets initiative and World Resources Institute, 2019). One of the many current, ongoing collaborations is the Sustainable Apparel Coalition (SAC)[29], a global multi-stakeholder non-profit alliance promoting sustainable production: indeed, starting from 2023, its more than 280 members from the textile, apparel and footwear sectors will be required to commit and set Science Based Targets (Sustainable Apparel Coalition, 2022). Another initiative, promoted by the President of France Emmanuel Macron and Kering's Chairman and CEO François-Henri Pinault, is the Fashion Pact, an international coalition that involves more than 60 signatories and 200 brands for a total of 1/3 of the global fashion and textile industry (by volume), all committed to the three key environmental pillars of stopping global warming, protecting the oceans and restoring biodiversity. Also in this case, science-based targets are seen as a useful framework for significant GHG reduction (The Fashion Pact, 2020).

3.3 Leaving no one behind: the social impact of the fashion industry

"Doing business around the world, global trade […] can never be done at the expense of people's dignity and freedom […] Human rights are not for sale – at any price"

-Ursula von der Leyen, President of the European Commission[30]-

The fashion industry is an incredibly labour-intensive sector with, according to the Ellen MacArthur Foundation[31], more than 300 million people employed along the entire value chain, - 520,633 of these in Italy and only considering the textile, clothing, leather goods and eyewear sectors[32] (Osservatorio Economico - Ministero degli Affari Esteri e della Cooperazione Internazionale, 2022).

Significant geographical differences in relation to the respect of working conditions have been underlined by the International Trade Union Confederation (ITUC) – a confederation that represents 200 million people in more than 160 countries (International Trade Union

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29 Source: Sustainable Apparel Coalition. Available at: https://apparelcoalition.org
30 Source: European Commission (2021) 2021 State of the Union Address by President von der Leyen.
Available at: https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_21_4701
31 Source: Ellen MacArthur Foundation | Archive (no date) Fashion and the circular economy.
Available at: https://archive.ellenmacarthurfoundation.org/explore/fashion-and-the-circular-economy
32 Considering the following ATECO codes: 13, 14, 15, 321, 32505.

Confederation, 2022). In 2022, Europe outperformed all the other considered regions (Americas, Africa, Middle East and North Africa and Asia Pacific), with Italy, Norway, Sweden, Germany, Ireland, Iceland, Denmark, Austria and Finland being the best nine performing countries with only sporadic violations of rights - meaning collective labour rights have generally been guaranteed, workers have had the opportunity to freely associate and the right of defending or even improving their working conditions through collective bargaining (International Trade Union Confederation, 2022). However, when looking at the bigger picture, only 13% of the biggest global brands actually disclose how many of their supplier facilities have trade union, which could be related to these operating in countries where bargaining for greater, better rights is risky, dangerous, or even impossible (Fashion Revolution, 2022).

The worsening of labour rights abuses and human rights violations - including slavery, forced labour and child labour – have been threatening the basic rights of equality and freedom belonging to every person. Middle East and North Africa, in 2022, have once again been found to be the worst regions for working people (International Trade Union Confederation, 2022): Bangladesh, Afghanistan, India, Pakistan, Indonesia are among the most unfavourable countries, and they are also some of the nations in which urgent actions by Clean Clothes Campaign have been taken in order to support garment workers. Even though the good position of Europe regarding the subject of social sustainability, assuring decent working conditions has been highlighted as a key step in EU's promotion of fairer value chains, since it is obvious that sustainability efforts cannot be limited to the environmental sphere, considering that almost 1 in 10 of all children (for a number of 160 million, with almost half of them performing risky works) worldwide are still in child labour (UNICEF and International Labour Organization, 2021), and about 28 million people are forced to work against their own will – over 40% of them being female (International Labour Organization, Walk Free, and International Organization for Migration, 2022).

This is why the EU is committed to become a responsible leader by promoting corporate responsibility and transparency, safer and better working conditions, and protection of human rights. And this not only inside Europe's borders, but also internationally: among the various initiatives the Union has supported there is Better Work[33], a collaboration between United Nation's International Labour Organization and World Bank Group's International Finance Corporation, created with the aim of providing decent working conditions for millions of

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33 Source: Better Work – Improving garment industry conditions. Available at: https://betterwork.org

people employed in the clothing industry and supporting, at the same time, inclusive economic growth (European Commission, 2022a).

Ending with a focus on the Italian situation, one of the best ways to present the topic of social sustainability is by illustrating the first five SDGs - Goal 1 (No Poverty), Goal 2 (Zero Hunger), Goal 3 (Good Health and Well-Being), Goal 4 (Quality Education) and Goal 5 (Gender Equality) – which have been combined into the People category, since their ultimate goals are to end poverty and hunger, to ensure to all human beings the opportunity to fulfil their potential in dignity and equality, and to achieve gender equality (United Nations, 2015).
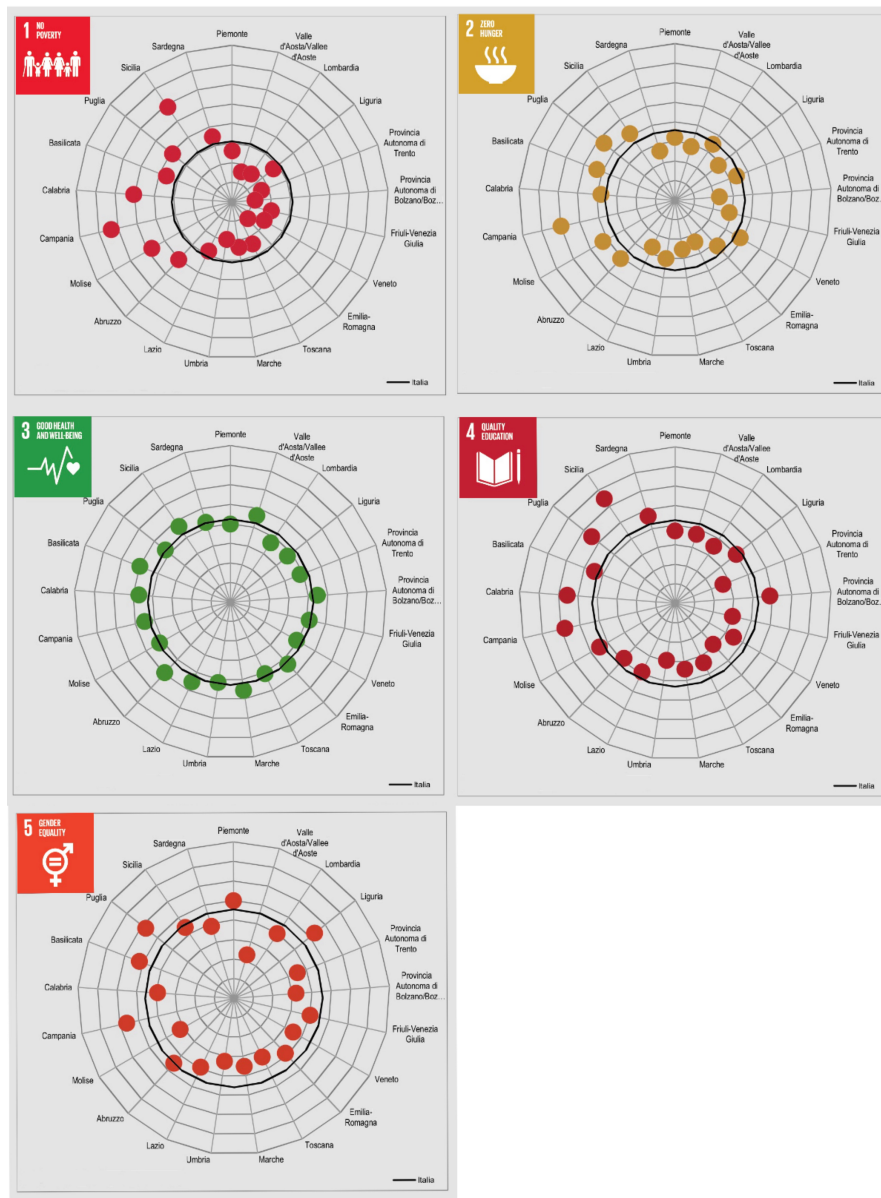
Figure 30: Overall distance of Italian regions from best performance, People Goals. Source: Istat (2022)

Figure 30 presents these goals into five radar charts, where the best performance is represented by the central point of the graph and the Italian average being the bold black circle. The highest variability has been recorded for Goal 1 - with eight Southern regions recording a performance worse than the Italian average, whereas Goal 3 presents the greatest homogeneity, in line with the national average (Istat, 2022).

The Campagna Abiti Puliti, one of the 14 members of the Clean Clothes Campaign[34], coordinated in Italy by the social cooperative Fair, has been at the forefront in promoting better working conditions in the global fashion industry. Also, one of the Campaign's main initiatives concerns the recognition of the human right of earning decent living wages, defined as the compensation needed for workers of the supply chain to live in a dignified manner and to satisfy all his/her basic needs. Brands have been very secretive about how much their workforce is being paid; nevertheless, it is a well-known fact that wages represent only a tiny fraction of the price paid by consumers. Indeed, according to some estimates by the Clean Clothes Campaign (2014), for some companies this percentage could even be less than 1%.

The link between sustainability and quality of work - and life - is obvious, since only when social rights will be respected, especially in reference to the most vulnerable links of the supply chains (where irregular, less qualified work, and abuse usually concentrate), the whole system will move forward. Moreover, less opacity on the topic will be key, since around 96% of major global brands do not disclose the number of workers in their supply chain who are being paid a living wage (Fashion Revolution, 2022).

Based on the Campaign's own calculations and methodologies, and under the premise that this figure does differ from the one of legal minimum wage, a floor living wage of €1,905 net monthly has been obtained, assuming €11 net per each of the weekly forty working hours.

So, fair labour practices, wage policies, free association and collective bargaining, job security, safe working conditions, commitment to responsible recruitment (especially when the risk of forced labour is high), workplace violence and acting for gender equality - since women, that represent more than 70% of the fashion-related industries workforce, not only are usually underpaid, but often lack access to education, finance or formal training, and having in mind that in Italy gender inequalities are still considerable (Istat, 2022) - are all areas on which fashion supply chains should keep improving (Accenture et al., 2022), going beyond just talking about social injustices and actually disclosing the efforts made to eliminate inequalities in their operations and value chains (Fashion Revolution, 2022).

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34 Clean Clothes Campaign (CCC) is an international network of human rights, labour, and trade union organisations. Available at: https://cleanclothes.org

On a final note, and connecting to previous topics, it deserves to be briefly mentioned the new German Supply Chain Act, also known as Lieferkettengesetz, which will apply as of 2023 to German companies (or to business having a branch in the country) employing at least 3,000 workers (and, from 2024, this threshold will drop to 1,000). The bill, that aims to ensure compliance with human rights among their entire value chain by requiring businesses to concretely identify and address corporate social responsibility risks (also covering environmental considerations), represent a step in the right direction since it implies companies should bear – and report in a due diligence - responsibility for the detriment caused to both their workers and to the society as a whole (Bundesregierung, 2021).

3.4 There is no sustainability without transparency

The transition towards a greener, more sustainable fashion industry will be realised only when solutions to the sector's most relevant challenges will be found and when strict measures and regulations regarding greenwashing, the "act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or a service"[35] (UL Solutions), will be enacted.

First coined in 1986 by Jay Westerveld in his work about hotel industry practices on towel reusing (presented as an environmentally sustainable initiative, whereas it was just a mere cost-saving measure) (Becker-Olsen and Potucek, 2013), the term "greenwashing" has been present in both literature and media, gaining considerable attention especially during the last few years with the rise of green marketing practices.

Considered as the combination of poor environmental performance with positive communication on the subject (Delmas and Burbano, 2011), greenwashing can come in various forms: from utilising false or deceptive labels and phrases and declaring environmental commitment without solid proof to back it up to products claiming to be "sustainable" when, in reality, only one or few of its components could be defined as such (Fashion Revolution, 2022).

Engaging in these types of unethical behaviours not only deeply affects customers and companies' stakeholders, but it also has profound detrimental effects on society and on the planet as a whole (Delmas and Burbano, 2011; Yang et al., 2020),

Also, as sustainability does not only mean CO_2 emission, the so-called "bluewashing", companies lying about their social commitment (in relation to human rights and fair labour

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35 As defined by TerraChoice Environmental Marketing Inc., a company which has been acquired by UL Solutions, global leader in applied safety science.

practices, for example), has been a growing concern; however, since this topic has received little attention, especially from literature, the main focus is going to be placed on the environmental aspect, as companies falsely presenting themselves as "green" has been an on-going issue for a while. Despite this, the 2021 controversy between Miko s.r.l.[36] - the defendant, manufacturer of a luxury textile named Dinamika® obtained through a water-based process, utilising recycled polyester and without the use of organic solvents - and Alcantara[37] - the plaintiff, an Italian company globally known for producing the homonym material Alcantara®, that counts several prestigious collaborations with brands operating in the field of design, art and fashion - can be considered the first real legal dispute concerning greenwashing practices in Italy (and Europe). In February 2022, the Court of Gorizia recognised the generic and misleading nature of Miko's advertising messages on the environmental benefits of Dinamika® (e.g. about its composition and the claims of reduced energy consumption), enforcing the company to remove all the contested advertising messages and to inform their clients about the decisions of the Court (Marcatajo, 2022).

The key point is that brands making "green claims" about their products and services have to be sure that what it is being communicated to customers is reliable, accurate, comparable and supported by evidence of excellent performances across the whole value chain, obtaining, in the end, increased transparency on their environmental performance paired with consistent and authentic marketing communication.

However, many drivers of greenwashing still need to be addressed, one of the most critical (for the influence it can have on the other factors) being the regulatory context (Delmas and Burbano, 2011), requiring urgent legislative actions from major institutions such as the European Union. In fact the topic, which has already been discussed in the European Green Deal and the Circular Economy Action Plan, will be further addressed in future legislative proposals, all with the aim of suggesting businesses - with larger companies possibly leading the way (The European House - Ambrosetti, 2022a) - to substantiate their environmental claims by adopting common standard methods, also setting minimum requirements for sustainability labels.

Expanding on the topic, both literature and various institutions have highlighted the criticalities deriving from trying to measure sustainability efforts (Alves and Steinberg, 2022). The current myriad of standards, certifications and ratings, obtained based on different paraments and procedures, cannot ensure neither transparency, standardisation, or industry

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36 Source: Dinamicamiko. Available at: https://dinamicamiko.com/en/
37 Source: Alcantara. Available at: https://www.alcantara.com/it/

comparison, leaving both companies and consumers confused on the actions to undertake and undermining the pivotal role of ESG certifications. Moreover, according to an elaboration of The European House – Ambrosetti based on the analysis of more than 100 certifications among the most relevant for the fashion industry, half of these tools considers both the social and environmental aspects, whereas only 6% of these certifications assess exclusively the social sustainability point of view (The European House - Ambrosetti, 2022b).

However, there are indeed some exceptions to this general trend, one of them being the B-Corp Certification, a global recognition for businesses meeting the highest standards of verified performance, accountability, and transparency on their environmental and social responsibility commitment (based on a variety of different factors, ranging from employee benefits to supply chain practices), which has been gaining more and more traction in the recent years (B Lab), also thanks to its completeness and comprehensiveness. Over 4000 companies[38] worldwide today can be defined Certified B corps. As of December 2022, 18 companies[39] from the "Apparel", "Jewellery & related products" and "Leather & related products" operate in Italy, but only 4 of them are headquartered in the country:

- Rifo S.r.l.: *Made in Italy* brand from Prato that creates clothes and accessories from recycled textile fibres;
- Save The Duck S.p.A.: a 100% animal free outwear brand from Lombardy;
- SEAY S.r.l., a company from Vicenza that produces sustainable clothing (including beachwear) made with highly innovative or organic materials;
- Successori Reda S.p.A.: a Biella manufacturer of sustainable pure Merino wool fabrics, symbol of *Made in Italy* luxury.

It has to be hoped that more Italian companies will transform themselves in order to achieve the certification since, as also stated by Eric Ezechieli (Cofounder and Regeneration Officer of Nativa[40]) the Italian productive system, with its link to local communities, could be particularly suitable for bringing together the concepts of regeneration, sustainability and quality (Beghelli, 2022) that the B Corp Certification reward.

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38 In particular, Chloé (part of the Richemont Group) has been the first luxury fashion house to achieve the B Lab status, whereas Vestiaire Collective (French company, leader global resale platform for pre-loved luxury products) is the first second-hand fashion app to have been certified B Corporation.

39 Source: B Lab (no date) Find a B Corp. Available at: https://www.bcorporation.net/en-us/find-a-b-corp?refinement%5Bcountries%5D%5B0%5D=Italy&refinement%5Bindustry%5D%5B0%5D=Apparel&refinement%5Bindustry%5D%5B1%5D=Jewelry%20%26%20related%20articles&refinement%5Bindustry%5D%5B2%5D=Leather%20%26%20related%20products

40 Nativa is the first Benefit Corporation and B Corp in Italy and in Europe. It is also the country partner of B Lab, collaborating with other leading companies in their journey towards sustainability.

If measuring progresses - after having identified appropriate KPIs and set challenging but realistic targets – is important, also reporting them is a key step in which fashion companies will need to improve. According to studies conducted by the United Nations Conference on Trade and Development (2019), enterprise sustainability reporting was an increasingly present practice already in 2019, with international organisations and companies engaged in developing harmonised set of standards. Indeed, during the last months of 2022, the European Union has been working on a new Corporate Sustainability Reporting Directive (CSRD), which will introduce – from 2024 to 2029 - more stringent and detailed reporting requirements regarding businesses' environmental and social performance. These new rules will apply to all large companies and companies listed on regular markets, including SMEs (European Commission, 2022b): according to The European House – Ambrosetti, around 1,000 European companies from the fashion and luxury sectors will have to adopt these new standards, Italy being the most affected country with almost 300 companies (The European House - Ambrosetti, 2022c). The goal of adopting these guidelines, drafted by the European Financial Reporting Advisory Group (EFRAG), is clear: reporting in a standardised, transparent and balanced way will allow for comparability between businesses, stakeholder expectations will be met - while also mitigating ESG risk (Strategy&, 2021) - and with costs substantially lower due to this standardisation (European Commission, 2022b).

3.5 Circular Economy: "Buy less, choose well, make it last" [41]

There is no consensus around the origin of the concept of "Circular Economy": its birth is generally believed to have happened over half a century ago (Winans, Kendall and Deng, 2017), even though, for some authors, the theoretical foundation of CE (circular economy) could even date back to the 1920s (Ki, Chong and Ha-Brookshire, 2020). However, only in recent years CE – which endorses a restorative economic system (take, make, use, and reuse) – has been touted as one of the most ideal solutions for achieving a more sustainable future for people and the planet (Geissdoerfer et al., 2017; Ki, Chong and Ha-Brookshire, 2020). Indeed, even if circular economy has been described as an evolving concept (Merli, Preziosi and Acampora, 2018) and literature on the topic is still not complete (Geissdoerfer et al., 2018), academics have paid increasing attention to this research area, either focusing on the conceptualization of its key aspects (such as its definition, scopes and main principles), or by investigating the drivers and barriers to the adoption and implementation of this new social-

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41 Furniss J.-A. (2013) Vivienne Westwood Red Label Spring 2014 Ready-to-Wear. Vogue. Available at: https://www.vogue.com/fashion-shows/spring-2014-ready-to-wear/vivienne-westwood

economic paradigm (Ki, Chong and Ha-Brookshire, 2020).

In any case, as highlighted by Geissdoerfer et al. (2017), it is not possible to discuss this theme without mentioning Dame Ellen MacArthur, an extraordinary woman who, in 2005, became the fastest sailor to circumnavigate the world, completing a 26,000 miles journey in only 72 days (Murphy, 2006). Following her retirement from competitive racing, and inspired by her incredible adventure, she decided to set up a Foundation in her name: the famous Ellen MacArthur Foundation, a charity which has been created to raise awareness and accelerate the transition to a circular economy that works in synergy with businesses, institutions and policymakers to find sustainable global solutions.

In this dissertation, the focus is obviously narrowed to only consider the fashion industry, also in line with considerations presented by Ki, Chong and Ha-Brookshire (2020), which highlighted gaps in current literature in relation to how specific industries should approach circular economy implementation.

Hence, according to the Ellen MacArthur Foundation (2021), a circular economy for fashion creates better products and services for customers, representing a significant growth opportunity that not only contributes to shape a resilient and thriving industry, but that also regenerate the environment – reducing waste and pollution, also by using biodegradable resources and renewable energy - and improves society as a whole (Figure 31). In simple words, it is all about reusing the resources the industry already has: wearing clothes more and for longer, allowing more people to wear the same item by facilitating product movement from user-to-user, or offering products and/or services that integrate, enhance, and replace garments that are in line with customers' needs (Ellen MacArthur Foundation, 2021).

CBMs are based on "closing, narrowing, slowing, intensifying, and dematerialising loops" (Geissdoerfer et al., 2018, p. 712): as argued by Geissdoerfer et al. (2018), these can be considered a class of Sustainable Business Models (SBMs), since their sustainability performance benefits from reduced resources inputs and lower waste and emissions. The previous statement implies that CSCM (Circular Supply Chain Management) aiming at fostering sustainable development should not only include the aforementioned typical features of CE, but also incorporate the distinguishing characteristics of SBM - them being the adoption of a long-term perspective, pro-active multi-stakeholder management and the creation of additional value due to environmental and social sustainability considerations.

Therefore, circular economy entails moving away from the unsustainable, traditional linear fashion model ("take-make-waste"), whose unfeasibility and riskiness - since it poses, among many other problems, considerable operational challenges (related to the sourcing of virgin

raw materials, for example) and strategic concerns (for example, almost 90% of Europeans think clothes should be made to last longer, indicating changes in consumer preferences (European Commission, 2022d)) - is becoming every day more evident. Indeed, already in 2018, it was advised to companies to "self-disrupt their own identity and the sources of their old success" by adopting new business models in line with sustainability concerns (McKinsey & Company and Business of Fashion, 2018).

However, it is clear that rethinking the design of fashion supply chains represents a necessary step for unlocking the potential of these new models, since also, as highlighted by the Ellen MacArthur Foundation (2021), and especially in the case of larger companies, circular business models are often implemented only as "add-ons" to linear models, whereas they should entail the shift to an entirely new system (Ellen MacArthur Foundation, 2017). In this sense, close collaboration with upstream suppliers and retailers could be crucial in creating new solutions that increase the longevity of clothing life cycle and in retaining both the control and the additional value products hold after sale (Global Fashion Agenda and McKinsey & Company, 2020).

Summarising, the three main pillars the industry should pursue are:

- Encouraging the adoption of new business models that increase clothing reusing: keeping products and materials in use is defined as the most direct lever to capture value while reducing waste and pollution (Ellen MacArthur Foundation, 2017). Nonetheless, this step presupposes, among the many other factors, the design of higher quality garments, the overcoming of both internal and external barriers, and consumer embracing second-hand clothing and actively collaborating with brands by returning their used, unwanted garments to make them re-entering the supply chain (Ki, Chong and Ha-Brookshire, 2020);

- Using safe and renewable inputs: eliminating materials with negative environmental impact and, when possible, replacing virgin raw materials with renewable inputs would certainly enable large-scale recycling. However, significant innovation would be required to introduce fewer toxic materials – with Italy being at the forefront of this transition (Fondazione Symbola and Unioncamere, 2022a) – and to adopt new,, more sustainable (e.g. that generate less waste, need fewer inputs of resources, reduced water and energy use) production processes (Ellen MacArthur Foundation, 2017);

- Developing additional solutions that give new life to used garments, starting from radical improvements in recycling by transforming clothing design, collection and reprocessing of items (Ellen MacArthur Foundation, 2017).
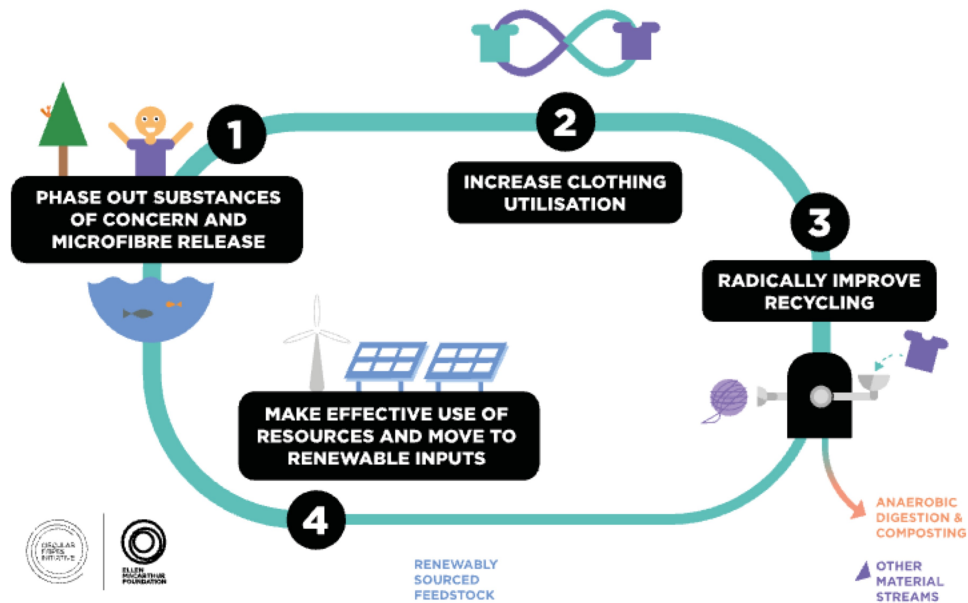
Figure 31: Circular Economy for Fashion. Source: Ellen MacArthur Foundation (2017)

3.5.1 Renting, reselling, repairing and remaking

In principle, reusing – the preferred option, since it requires little to no intervention - repairing, remaking and recycling – the last resort, since it involves reducing items to their basic and environmentally safe material level, for then being remanufactured (Ellen MacArthur Foundation, 2020) - are the steps of the technological cycle loop all materials should go through to have textiles kept in use at their highest value.

Going beyond what we know as the "3 Rs" of reducing, reusing and recycling, new business models - in line with the principles of circular economy - have been emerging, the four main ones being rental, resale, repair and remaking.

As of 2019, these four models represented a USD$ 73 billion market - accounting for 3.5% of the total fashion market, even estimating a cumulative 5% in 2020 e 2021– and, by 2030, they are expected to reach a market share of 23%, making for an impressive USD$ 700 billion opportunity the fashion industry should embrace, especially in North America and Europe (Ellen MacArthur Foundation, 2021).

More in details, these models are foreseen to grow at different rates (Figure 32):

Resale

Including peer-to-peer sale of second-hand items, third-party marketplaces and own-brand re-commerce and take-back (both online and offline), resale represents the most relevant category in terms of profitability. Already accounting for 63% of the total revenues referring to circular business models, by 2030 this percentage could increase up to 69% (with a CAGR

2019-2030 of 24%) (Ellen MacArthur Foundation, 2021).

Rental

The second largest segment, operated by private owners or in the form of large-scale rental and subscription models by either platforms or brands. It has been estimated that this practice could extend life cycles by 1.8x, based on the average number of rentals during the item's lifetime (Global Fashion Agenda and McKinsey & Company, 2020).

As resale, also rental is expected to grow during the next decade (with the same CAGR 2019-2030 of 24%), arriving to a 24% market share by 2030 (Ellen MacArthur Foundation, 2021).

Repairing

Repairing broken or damaged garments to bring them back to a useable state is forecasted to achieve USD$ 32 billion revenues; however, the segment is also forecasted to have its market share reduced from 13% (in 2019) to 5% (in 2030) (Ellen MacArthur Foundation, 2021).

Remaking

Creating a new item from existing products and/or components, it can present itself in many different forms - such as disassembling, re-dying or re-styling. In the end, the novel products are characterised by enhanced emotional and physical durability. Similarly to repairing, remaking will experience a revenue growth (from USD$ 3 billion to USD$ 16 billion) but the segment, by 2030, will also account for a smaller portion of the total fashion market (from 4% to 2%) (Ellen MacArthur Foundation, 2021).
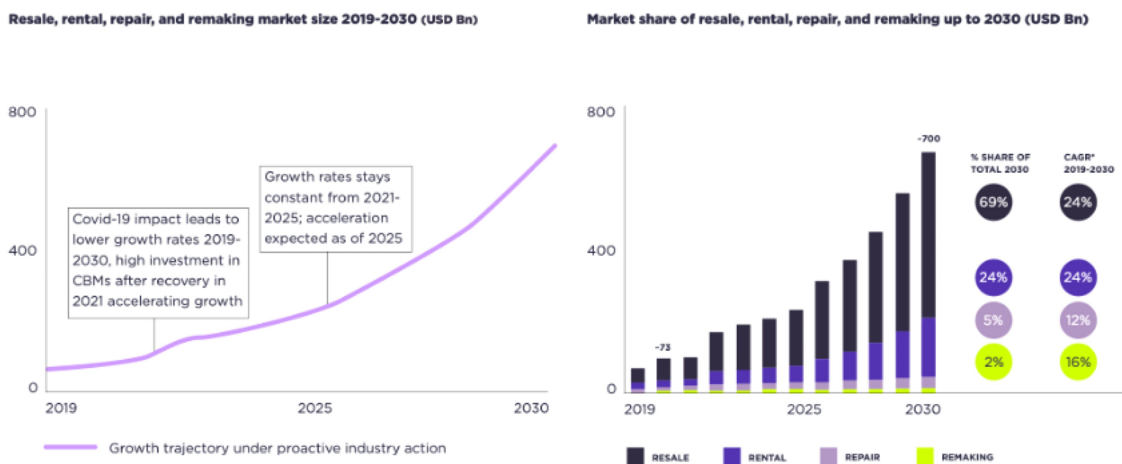
Figure 32: Resale, Rental, Repair and Remaking 2019-2030 in figures. Source: Ellen MacArthur Foundation (2021)

3.5.2 The benefits of Circular Business Models

As affirmed by Global Fashion Agenda and McKinsey & Company (2020), circular business models, by extending product life cycles, enabling recycling and reducing the need for virgin materials, could also act as decarbonisation levers. Indeed, it has been estimated that every percentage point increase in market share could save around 13 million tonnes of GHG emissions. Furthermore, in Figure 33, the potential contribution of CBMs adoption to the 1.5-degree pathway is presented, assuming a market share of 23% by 2030, a reduction in upstream and end-of-use phases emissions equal to 23% each, other than slightly higher emissions for the transportation-logistics-retail stages (due to increased reverse logistics) and for the use phase (because of additional processes, such as washing and drying, required before reusing).

CURRENT FASHION VALUE CHAIN	DIRECT EMISSIONS IMPACT INTENSITY	SHARE OF TOTAL CO_2E EMISSIONS	EXPECTED CHANGE IN CO_2E EMISSIONS
DESIGN			
RAW MATERIAL EXTRACTION AND FIBRE PRODUCTION		~70%	- 23%
YARN, FABRIC; AND GARMENT PRODUCTION			
TRANSPORT			
LOGISTICS		~5%	+ 2%
RETAIL			
USE (E.G. CARE)		~20%	+ 6%
END OF LIFE		~5%	- 23%
		100%	~16% REDUCTION
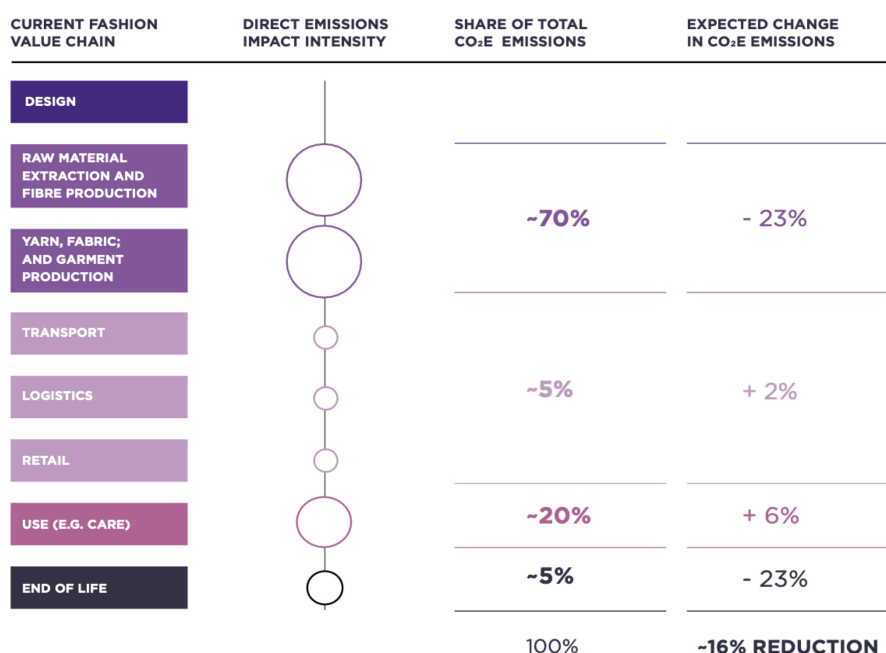
Figure 33: Environmental benefits of circular business models. Source: Ellen MacArthur Foundation (2021)

In line with previous findings and assuming decreased production due to lower revenues from linear models, the phases related to upstream activities (such as raw material and fabric production) and the reduction of wasted materials during the end-of-use stage could lead to the highest savings in terms of CO2Eq (Ellen MacArthur Foundation, 2021).

Additionally, these models not only have the potential of benefit the environment but, regarding the economic sphere, they could also represent sources of revenue and cost benefits (Table 18). Regarding the former, CBMs lead to better product margins and to opportunities

for multiple revenue streams (due to the customisation or renovation, for instance); whereas, concerning the cost benefits, these can be obtained from risk reduction, better resource productivity and by-products valorisation (Ellen MacArthur Foundation, 2021).

Cost Benefits	Revenue Benefits
Improved inventory management, and lower dependence on global supply chains	Brand loyalty from high-quality, durable products and guaranteed aftercare services
Improved employee retention, especially referring to the younger generations	More data on product use and customer preferences
Diversified revenue can lead to higher resilience	Expanded customer base, due to multiple users for item
Reputational gains, and brands less likely to be publicly criticised	"Newness without the new" that fulfil customer's desires without being fast fashion
Adoption of CBMs to be ahead of current and future regulation	Access to one-of-a-kind and rare clothes, with enhanced emotional durability
	Improved organisational performance and financial efficiency
	Proactive to investors' ESG requirements

Table 18: Potential revenue and cost benefits of Circular Business Models. Source: Ellen MacArthur Foundation (2021)

3.5.3 Main Barriers and Limitations to a Circular Economy

Even though the enormous potential of these circular business models, various authors have highlighted the many hindering factors that have prevented the adoption of CBMs by fashion brands. Based on a literature analysis on the topic, Ki, Chong and Ha-Brookshire (2020) have identified more than 100 barriers, grouped into six clusters and further classified according to their relation to internal and/or external stakeholders:

- Technology and resource barriers (such as lack of textile sorting technologies and low input availability), economic barriers (significant risks, costs and low profitability related to CE implementation) and knowledge barriers (mainly about consumers but also designers) are identified under the category "both internal and external barriers";
- Social barriers and governmental barriers are "external barriers": the former considers the attitude-behaviour gap identified in customers and their concerns regarding buying

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recycled or reused products, whereas the latter relates to regulations and policies, notably their frequent lack of feasibility;

- Management barriers are "internal barriers", meaning factors present inside the company or related to internal stakeholders: in particular, management prioritising different goals over sustainability and the inability to influence the different actors of the supply chains are elements that hinders the spreading of sustainability commitments.

Furthermore, another big challenge must be addressed: the scalability of these circular business models since, as mentioned before, supply chains have to be radically transformed for allowing effective and cost-efficient product circulation, both locally and globally. Once again, collaboration between the different actors – manufacturers, retailers, customers and collectors - is what the industry must achieve: only the widespread presence guaranteed by a highly-connected, diverse and distributed network will allow CBMs to thrive and reach their full potential (Ellen MacArthur Foundation, 2021). On the topic, all these aspects require increasing attention to be focused on the costs and environmental impact of transportation, reverse logistics and cleaning processes; also, particular care should be put in developing a winning marketing strategy (Ellen MacArthur Foundation, 2021), since no additional value is going to be captured if brands will not succeed in engaging both current and potential consumers, intercepting their desires and needs for high-quality – since both rental and resale models represent an affordable gateway to luxury and vintage - durable, and more sustainable products (Global Fashion Agenda and McKinsey & Company, 2020).

On a final note, and as it has been mentioned before, the vision of a future where fashion is circular can be achieved only if, across the entire supply chain, traceability and transparency (about the conditions and characteristics of products) will become the norm. Indeed, urgent action on the topic is required since, as underlined by Kearney[42] (2022) and by its own Circular Fashion Index - which assesses the performance of about 150 global fashion brands on the basis of seven indicators related to clothes' longevity - the fashion industry still scores v e r y   p o o r l y :   o n l y   a   2 . 9 7   o u t   o f   1 0 .

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42 Kearney is a global management consulting firm active in more than 40 countries.

However, it must always be remembered that the conversation around CE should not only include the environmental and economic aspects, which have been found to be the most prominent ones in CE literature; nevertheless, numerous academics noticed how the social sustainability implications of circular economy have been ignored or only marginally considered in scientific research – and, when this happens, usually it is only in relation to consumption phase. Many research gaps, in particular regarding how CE can lead to more equal societies (Murray, Skene and Haynes, 2017), still need to be fully addressed (Merli, Preziosi and Acampora, 2018; Schöggl, Stumpf and Baumgartner, 2020) but, to end on a positive note, the whole topic is indeed gaining some traction: for example, one of the themes scholars have been focusing on is the one of social sustainability assessment procedures by companies engaged in circular economy practices, which represent a relevant challenge and would benefit from being clearly defined (Walker et al., 2021).

3.5.4 Linking Sustainability and Circular Economy

Sustainability and circular economy are concepts which are often linked together; nevertheless, their similarities, differences and relationship have yet to be made clear and explicit by the literature (Geissdoerfer et al., 2017), making the whole topic still open for further discussion. In fact, with the aim of harmonising the two concepts, Geissdoerfer et al. (2018) have proposed an interesting framework (Figure 34) which highlights the connections between the different concepts of circular economy, sustainable development, circular supply chains and circular business models.

In on the right side, the authors have underlined the overlapping areas between circular economy and sustainable development, arguing about their three premises, but still recommending further research. However, the most interesting contribution of this framework is related to the left side: regarding the link between circular supply chains and circular business models, the main aspect being illustrated is the dependency of the single business (the specific CBM) on its whole value network (represented by the CSC), which greatly contributes to closing, slowing, intensifying, narrowing, and dematerialising the loops, once again underling the importance of collaborations between the different actors of the supply chain (Geissdoerfer et al., 2018) to reach the common goal of circularity implementation and scalability.
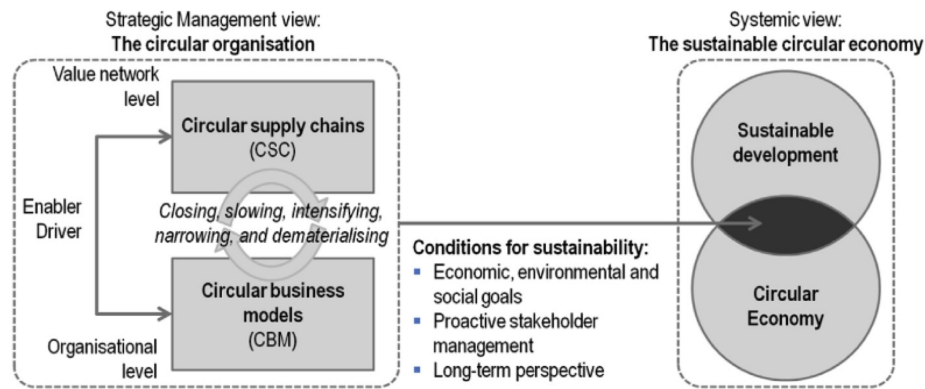
Figure 34: Framework combining Sustainable Development, Circular Economy, Circular Supply Chains and Circular Business Models. Source: Geissdoerfer et al. (2018)

3.6 For a cleaner, more competitive Europe

In a year, each European citizen throws away 11 kg of textile, for a total of almost 6 million tonnes discarded (European Commission, 2022d). Moreover, the textile industry is in the top five for GHG emissions and raw materials use, and it is one of the top three pressures on land and water use: in general, European consumption of textiles is estimated having the fourth highest impact, behind food, housing and mobility (European Commission, 2022d).

It is obvious how institutions and policymakers will have to play a pivotal role in incentivising sustainable practices and responsible consumption, engaging both consumers and industry actors in a long-needed changing process and transition towards circular economy (Global Fashion Agenda and McKinsey & Company, 2020).

In this sense, during the recent years, the European Union – with its members – has started to recognise the need for systems inspired by circular economy principles (Genovese et al., 2017): indeed, it has adopted several initiatives and regulations (Figure 35), one of them being the European Green Deal (2019), a set of policies and initiatives with the goals of transforming the EU in a cleaner, resource-efficient, competitive economy, to become the first climate-neutral continent (European Commission, 2022d).

In line with these ambitions, the European Commission went even further: the new Circular Economy Action Plan (adopted in March 2020)[43], but especially one of its measures, the EU Strategy for Sustainable and Circular Textiles (from March 2022), clearly signal the potential the fashion sector is believed to have in fostering the transition towards a more sustainable

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43 Source: European Commission (no date) Circular Economy Action Plan. Available at:
    https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en

and circular production, consumption, and business models.

The vision is that, by 2030, the textile sector should appear very different from what it is now, meaning some of the industry's biggest issues will have to be tackled: from mandatory eco-design requirements and waste production to green claims and producers' responsibilities. In ten years, all textile should be high-quality, durable, repairable, and recyclable, created with safer, less polluting and sustainable materials, leading to less waste going to landfill and to more products entering the cycle of circular business models, boosting their adoption and scalability. All these elements, in addition to more responsible actors all along the value chain – since producers should be held accountable for the entire life cycle of garments, even when these become waste - and increased transparency thanks to clearer, more structured, and accessible information – by introducing, for example, a Digital Product Passport, that will contain mandatory information regarding the sustainability aspects of a product and that will guide consumers during their buying process, and by revising the current Textile Labelling Regulation (European Commission, 2022c).

This strategy also addresses the social impact of the textile sector, and the importance of production taking place in full respect of human rights. With a considerable percentage of the global workforce being women, and with the unequal power relationships characterising the industry, fashion could play a game-changing role in advancing gender equality, other than promoting better working conditions and compliance with international labour standards. Even with all these ambitions and also considering the new proposals regarding the introduction of a Corporate Sustainability Due Diligence - that would oblige companies to report on the environmental and social fairness of their supply chains - and the overall support received, it must be mentioned that Campagna Abiti Puliti (2022) and The European House - Ambrosetti (2022b) have stressed the weakness of these measures, complaining about the little attention given to structural and systematic problems that are generating conditions of abuse and suffering for millions of people employed in the industry (having in mind that this due diligence would only apply to larger companies, ignoring SMEs).

2015
- First Circular Economy Action Plan

2019
- European Green Deal

2020
- New Circular Economy Action Plan
- Proposal for new regulation on sustainable batteries

2021
- Global Alliance on Circular Economy and Resource Efficiency
- Proposals for new rules on persistent organic pollutants and waste shipments

2022
- Adoption of measures proposed in the CE Action Plan, including Sustainable Products Initiative and Strategy for sustainable and circular textiles
- Adoption of proposals for revised EU measures on pollution from large industrial installations

2023
- Adoption of several initiatives under the Action plan, including proposals for substantiating green claims made by companies and measures to reduce the impact of microplastic pollution

Figure 35: Circular Economy Action Plan Timeline. Own Elaboration based on European Commission (2022)

Ultimately, the fashion industry cannot save the planet by itself: the various players of the value chains can surely collaborate to create an ecosystem that fosters sustainable initiatives, but it is the support of consumers and policymakers that will assure their success. The European Union, thanks to an increased attention to social and environmental issues, to this all-encompassing plan impacting every stage of the value chain, by providing incentives for the adoption of new business models and by increasing transparency, is taking small but fundamental steps in the right direction, strengthening supply chains and contributing to Sustainable Development Goals (European Commission, 2022c).

3.7 The vision for a more sustainable Italy

"*Made in Italy* is the brand that has been increasingly distinguishing excellence and quality at international level [...] sustainability is an important element and we must be at the forefront of the European and Western system[44]"
– Adolfo Urso, Minister of Enterprises and *Made in Italy* -

In 27 and 28 October 2022, the first international summit dedicated to the sustainable transition of the fashion sector took place in Venice, sponsored by Confindustria Venezia Metropolitan Area of Venice and Rovigo and The European House – Ambrosetti: the event, which has been named "Venice Sustainable Fashion Forum 2022", was attended by many companies, brands, institutions, NGOs, opinion leaders and sustainable transformation advocates, all united to contrast climate change and draw a shared path of change (The European House - Ambrosetti, 2022a). The fact that such meeting took place in Italy can be considered the result of years and years of initiatives aimed at promoting and disseminating models of sustainable production and consumption, not only sponsored by the Ministry of Ecological Transition, but also by the Camera Nazionale della Moda Italiana (2012). It is very interesting to notice that some of the points highlighted by the EU Strategy for Textiles were already included in the "Manifesto for the sustainability in Italian Fashion": in 2012, this document, defined as a "code of conduct" for the associated companies, was proposing guidelines and principles concerning sustainability for supply chains, from product design and material selection to marketing and stakeholder communication (Pozzo, 2021).

3.7.1 The sustainability performance of Italy

Addressing the sustainability of Italian companies, Italy – together with France – is the best in terms of overall circularity performance (Figure 36); furthermore, the country ranked first in circularity trends, meaning it has recorded the biggest performance improvement over the last five years (Circular Economy Network, 2022). This primacy is mainly due to particularly solid achievements in resource productivity (for each euro of resources employed, Italy generated 60% euros of GDP more than EU average) and waste management (with an overall recycling rate of almost 68%, the highest in Europe), and acceptable results in material

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44 Source: Meliado, E. (2022) A Venezia la Moda italiana detta il futuro green del settore, FashionNetwork.com. Available at: https://it.fashionnetwork.com/news/A-venezia-la-moda-italiana-detta-il-futuro-green-del-settore,1453964.html (Translation from Italian)

circular use rate and renewable energy consumption. On the topic, and as a prove of Italy's commitment, separate textile waste collection - which will be required to all member states by 1 January 2025 to stimulate the growth of circular economy models – has already been introduced since the beginning of 2022.

Still, Italy has to improve its performance on repair of goods, land use and relationship between waste and material consumption; also, it must be clear that, even if the nation was able to improve some circularity indexes and it is in a good position as far as Europe is concerned, it is still not enough to overcome the current global economic and environmental fragility (Circular Economy Network, 2022).
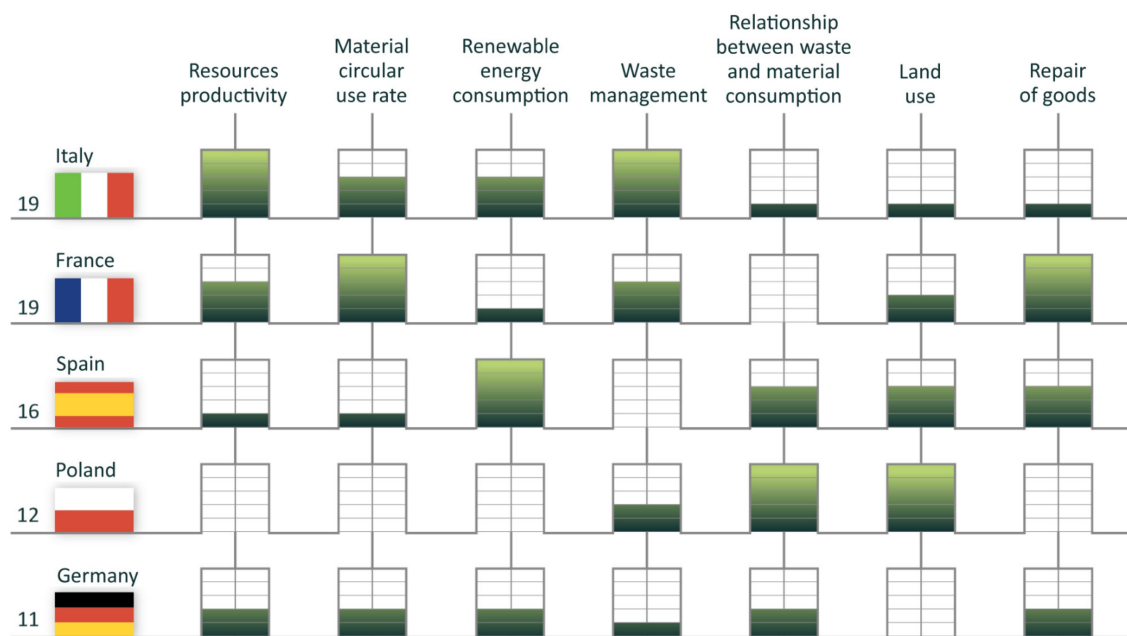
Figure 36: Overall ranking with 7 key circularity indicators in the major five economies in the EU in the latest available year. Source: Circular Economy Network (2022)

Still focusing on Italy, over the years, a growing percentage of companies have been investing in both greener technologies and products, since businesses are starting to consider them sources of competitive advantage (Fondazione Symbola and Unioncamere, 2022b)

On a positive note, no relevant differences emerged regarding the geographical distribution of eco-investments: between Northeast Italy, the most virtuous area (38.7%), and Central Italy, the worst performing region (36.1%), there is a less than three percentage point difference, which is an extraordinary result, considering the significant territorial imbalances found in previous years (when there were up to ten percentage points between the best and worst performing regions). Also, there seems to be a correlation between the size of the firms and the propensity to make eco-investments: 64.4% of the larger companies - between 250 and

107

499 employees – appear to be the most dynamic and proactive in this sense, beating out all the other categories.

However, the good results obtained by the Italian economy as a whole seem to not be reflected on the fashion industry: according to Fondazione Symbola and Unioncamere, eco-investments for the period 2017-2021 (with this last year being forecasted) were made by 37.2% of Italian manufacturing enterprises from the textile, clothing, leather and footwear sectors, significantly below the national average of 42.5%, and being the worst out of the eleven industries considered (Fondazione Symbola and Unioncamere, 2022b).

Also in the case of "green" patents[45], the fashion industry does not appear to be among the most virtuous, especially when comparing to other sectors (like the mechanical one); however, district areas did record a slightly better performance than non-district areas, which have been found to patent less when it comes to the environmental field (Intesa Sanpaolo, 2022). Regarding profitability, and focusing on district areas, certified green businesses of the "Fashion System" performed better than non-certified enterprises in terms of EBITDA margin during both 2019 and 2020, but environmental certifications did not seem to affect turnover in a positive, considerable way especially in 2020, when companies had to face the challenges related to the pandemic (Intesa Sanpaolo, 2022).

3.7.2 Moving towards a greener and fairer Italy

If the ultimate goal is to transform Italy in a low-carbon economy, in which the protection and enhancement of the territory, respect of local communities and the rational management, sustainable and circular use of natural resources are all present and guaranteed (Ministero dell'Ambiente e della Sicurezza Energetica, 2022), significant time and efforts will be required, other than more proactivity from companies. More Italian fashion businesses, for example, should join force with the SBTi and embed science-based targets in their sustainability management, which will give them a more defined path to cut emissions, also requiring them to report the progresses made each year. Particularly convenient for SMEs, which can enjoy substantially lower fees than companies with more than 500 employees[46],

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45 Based on the OECD methodology, they are defined "green" all the patents which fall under one of the three macro-categories of environmental management, climate change mitigation and water related technologies. The set, obtained from an initial database – which contains patent applications filed with the European Patent Office (EPO) during the1998-2019 period – was then associated with a sample of manufacturing companies located in industrial districts and present in the Intesa Sanpaolo Integrated Database (Intesa Sanpaolo, 2022)

46 Source: Science Based Targets (no date) How it works. Available at: https://sciencebasedtargets.org/how-it-works#how-long-does-the-sbti-process-take-how-much-does-it-cost

SBTs are also the perfect tool to demonstrate the real sustainability commitment of a company to its customers.

Moreover, even if costly, eco-investments, patents and certifications are another area in which the industry performance should be improved: in the light of future expected industry trends and consumer preferences, but also taking into consideration the inevitable threat represented by climate change, these will become real sources of competitive advantage, since they will allow companies to be more efficient, effective and resilient.

As mentioned before, energy consumption is one of the most relevant topics when discussing decarbonisation efforts in the fashion sector, and this statement holds true also when the focus is placed on "Fashion System" industrial districts. Indeed, energy-intensive businesses can be found also within the sector: in particular, Hosiery District of Castel Goffredo, Textile District of Biella, Silk-Textile District of Como Lake, and Textile and Clothing District of Val Seriana have been listed among the 30 most energy-intensive areas by Intesa Sanpaolo (2022). Mainly as a response to the massive impact energy costs are currently having on the sector, the Italian government has already started offering some economic support: for instance, around €20 million have been allocated to the two industrial districts of Prato and Biella for them to implement innovative environmental and social sustainability measures such as energy efficiency investments - also profiling opportunities of shared renewable energy production within the districts (Intesa Sanpaolo, 2022) - adoption of circular economy solutions and protection of health and safety standards in workplaces (Bittau, 2022).

On the topic of social commitment, Italy could encourage companies – by introducing a set of policies, incentives and measures - to respect human and labour standards, also taking action on the setting of legal minimum wages, in line with the need for people to live without fearing poverty or social exclusion (Campagna Abiti Puliti, 2022).

3.8 Concluding Remarks

"A future of fashion and a business model that takes into account human rights over profit, environment over production, and circularity over linearity"
-European Commission and Italian G20 Presidency (2021) -

With "sustainability" becoming a popular search term in relation to (online) shopping (Strategy&, 2021), playing an increasingly critical role in purchasing decisions, and young people - Millennials and Generation Z – affirming to be more in tune with social (human rights, diversity in workplaces and support of local communities), governance (transparency, regulation compliance, data and privacy protection) and environmental (carbon emissions reduction, use of recycled materials and waste reduction) concerns (PwC, 2022), it is clear how ESG will continue growing over the next few years, representing not only a disruptive force but also a valuable business opportunity. Nevertheless, this "green wave" has to be contextualized: even if younger generations appear to be particularly inclined towards adopting eco-friendly behaviours, brands will have to make sustainable choices more practical and accessible – from both the information and monetary point of view (PwC, 2021) – in order to close that famous attitude-behaviour gap, also highlighted in Chapter 1. Indeed, the World Economic Forum and Boston Consulting Group (2021) have estimated that the impact of sustainability on prices could be minimal, only a 1- 4% increase, even in the case of zero upstream emissions.

In conclusion, what has been highlighted by Fashion Revolution (2022), and that is of great concern, is how major brands have the tendency to disclose significantly more about their policies, efforts and processes than about the outcomes and impacts of these actions: this opacity can indicate a general lack of commitment concerning sustainability issues, that will have to be address and solved. Until then, the lack of visibility of supply chains will allow environmental damage and exploitative working conditions to thrive. However, taking a holistic view of all the points which have been raised in the chapter, the following six points – mainly based on a Strategy& (2021) study – can help companies grasping the full extent of the efforts required by the journey towards sustainability:

1. Integration of the new sustainability agenda with the core corporate strategy of the company;

2. Implementation of one or of a combination of more circular business models, also working towards the redesign of supply chains, to make their global scalability possible;

3. In a supply chain perspective, enhancing visibility and transparency, also in relation to the monitoring and reporting of the sustainability performance of the whole chain;

4. Traceability of materials, processes and practices, allowing, in this way, to verify sustainability claims;

5. Improving social equity and championing decent working and living conditions, also by setting standards and additional regulations;

6. Collaboration between the different players of the whole supply chain, policymakers and consumers: this, especially, will be the only way to significantly reduce the environmental and social impact of the fashion industry.

CHAPTER 4. The Sustainability of Italian Fashion Companies: an empirical analysis

This fourth, last chapter will investigate the sustainability performance of Italian Fashion businesses, analysing the discussion on this topic present in their official websites.

If years ago companies were still reluctant in utilising this channel for their environmental communication (Dutta and Bose, 2008; Lodhia, 2006), the web assuming a pivotal role in providing information about the goods and/or services sold and in allowing the interaction with actual and potential customers (Arora et al., 2016; Gök, Waterworth and Shapira, 2015) has prompted businesses to embrace and recognise the importance of web-based sustainability communication. So, coverage (as majority of companies do have their own webpage) and completeness, the currency and quantity of the content included, and the flexibility and adaptability to a range of different research purposes (Gök, Waterworth and Shapira, 2015) are among the many advantages of utilising websites as sources of information. Also, these are unobtrusive data sources (not requiring any form of direct knowledge and participation) (Gök, Waterworth and Shapira, 2015; Arora et al., 2016), publicly available (even if some websites do present access restrictions, like in the case of pharma related content and "professionals – only" information), and less expensive comparing to other forms of data collection techniques (Gök, Waterworth and Shapira, 2015).

However, if web pages can surely represent original sources of additional information, this way of gaining insights into the characteristics of companies suffers from some intrinsic limitations, since websites are known to be frequently changing (from being often updated), non-standardised (their content can vary according to how companies want to present themselves to customers), not always accurate (since businesses can also over-represent their efforts and results), unstructured, and self-reported, making them data sources that need to be homogenized and contextualised (Arora et al., 2013; Gök, Waterworth and Shapira, 2015).

By adopting a novel content analysis method based on the TF-IDF weighting scheme, the main aim of this analysis is addressing current gaps in the literature on the topic of web-based sustainability communication in fashion, where it is relatively new but growing practice (Da Giau et al., 2016) worth investigating as it could present peculiarities and characteristics specific to the industry (Lodhia, 2006). Also, this study allows to gain useful insights and findings about the sustainability of Italian companies in relation to their geographical distribution and concrete actions implemented and signalled by various certifications.

4.1 The Data and the Methodology

4.1.1 Data and Database

The starting point of this analysis has been the creation of a database[47] inclusive of what are known to be the three "big Fs" of *Made in Italy*: Fashion, Food and Furnishing.

In this dissertation, the focus is only going to be on the fashion industry, "one of the greatest carries of *Made in Italy* worldwide" (Campagna Abiti Puliti, 2022), that comprehends not only "moda (fashion)", but also "gioielli (jewellery)" and "occhiali (eyewear)".

Data for the "fashion" segment were collected from AIDA, whereas, in the case of the "jewellery" and "eyewear" sectors, ORBIS has been the chosen source. Both created and powered by Bureau van Dijk (a Moody's Analytics Company), AIDA is a database of comprehensive financial data of Italian companies, while ORBIS is one of the most powerful comparable data sources on millions of private companies and other entities worldwide.

In table 19, table 20 and table 21, the search criteria (three for "fashion" and four for "jewellery" and "eyewear") for each sub-sector are presented: active Italian companies identified by specific NACE (Nomenclature of Economic Activities)[48] categories and with operating revenues above a certain threshold.

FASHION AIDA (Export date: 03/11/2021, Cut-off date: 31/03/2021)	Step results	Search results
1. All active companies	1 494 514	1 494 514
2. NACE Rev. 2: Divisions C (Manufacturing) • 13 Manufacture of textiles • 14 Manufacture of wearing apparel • 15 Manufacturing of leather and related products	40 912	21 816
3. Operating Revenues (Turnover) (thousand EUR): last available year, min = 5,000	89 323	2 159
Boolean search (1 AND 2 AND 3)	TOTAL	2 159

Table 19: Criteria for the selection of fashion companies. Own Elaboration

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47 By Gianluca Toschi (Fondazione Nord Est) and Silvia Rita Sedita (Department of Economics and Management, University of Padua).

48 Complete list of all NACE Code - Available at: https://nacev2.com/en

JEWELLERY ORBIS (Export date: 22/02/2022)	Step results	Search results
1. All active companies and companies with unknown situation	321 316 013	321 316 013
2. World region / Country/ Region in country: Italy	7 421 016	6 553 007
3. NACE Rev. 2 (All codes): • 32.1 – Manufacture of jewellery, bijouterie and related articles	636 472	7 727
4. Operating Revenues (Turnover) (thousand EUR): last available year, min = 5,000, exclusion of companies with no recent financial data and Public authorities/States/Governments	1 868 893	132
Boolean search (1 AND 2 AND 3 AND 4)	TOTAL	132

Table 20: Criteria for the selection of jewellery companies. Own Elaboration

EYEWEAR ORBIS (Export date: 22/02/2022)	Step results	Search results
1. All active companies and companies with unknown situation	321 316 013	321 316 013
2. World region / Country/ Region in country: Italy	7 421 016	6 553 007
3. NACE Rev. 2: • 32.5 – Manufacture of medical and dental instruments and supplies	354 053	11 347
4. Operating Revenues (Turnover) (thousand EUR): last available year, min = 5,000, exclusion of companies with no recent financial data and Public authorities/States/Governments	1 868 893	169
Boolean search (1 AND 2 AND 3 AND 4)	TOTAL	169

Table 21: Criteria for the selection of eyewear companies. Own Elaboration

4.1.2 QIBA (Quantitas Intelligent Business Analyzer)

QIBA is a web crawling and scraping tool developed in Python by Quantitas srl: it is a data enrichment solution based on Machine Learning and AI capable of exploring the World Wide Web, allowing its users to obtain a great volume of significant, relevant information about specific companies (Toschi et al., 2019).

To do so, the software follows a three-step process: starting from uploaded companies' information (the minimum being the business names and VAT numbers, in this case obtained from AIDA and ORBIS), QIBA operates the Web scanning process, analysing each webpage to extract different types of information (ranging from keywords connected to products and services to certificates), then presented and structured by the program to make them more accessible and easier to interpret.

4.1.3 The Data Cleaning Process

To ensure that QIBA had correctly identified each company's website and to correct possible mistakes (one being, for example, the inclusion of online journals in place of the right website), an in-depth data cleaning process, broken down in several steps and repeated various times, has been performed. In particular, this phase of data pre-processing entails removing duplicate, incorrect and erroneous data from the original dataset, to obtain a correct, complete, usable and consistent database (Agarwal, 2013)

Starting from a list of more than 2400 companies, 178 redundant entries were identified and removed, giving priority, as selection criteria, to the ones with the most recent turnover data.

Then, a number of critical cases which required to be manually verified were identified based on the proprietary algorithm of the software, Index2, that assigns a score from 0 to 2 reflecting the goodness of search results (Toschi et al., 2019).

In particular, the 42 entries with an Index2 < 0,8 were double-checked: only for 18 of these companies QIBA had associated the right website and, regarding the rest, in four cases it was possible to identify and associate the correct company website.

Along with data cleaning, data integration is also a necessary step to perform (Agarwal, 2013): hence, all the 364 companies for which a website was not indicated were controlled, finding that 154 companies did have a website QIBA had not been able to detect.

Checking the 103 entries with an Index2 ranging from 0,8 to 1,5, 39 turned out to be incorrect, and for 15 of these companies the right website was found and integrated. Then, the

almost 300 companies with Index2 = 2 (the highest score) presenting either the "PIVA UNCERTAIN" or the "NO PIVA" Warnings (respectively, VAT numbers not certain or not included in the websites) were also controlled, the majority of them presenting the correct website. On the topic, it must be mentioned that despite current regulation – Article 35 of the Decree of the President of the Republic 633/1972[49] and subsequent updates, in particular the new 2001 formulation – requiring companies to indicate the VAT number in their own website (in particular, in the home page), a small but sizeable minority of companies still do not comply with this law.

As a last step, because of their relevance and to obtain the most complete and representative database of fashion companies, a total of 13 companies (presented with their VAT numbers and NACE codes in Appendix A) were also integrated in the final list: these are either famous Italian brands (Armani, Fendi, La Perla, Moschino, Prada, Trussardi, Valentino, Versace) not included in the original database because of their NACE codes being different from the ones considered during the initial search, or foreign companies which have created companies in Italy to operate in the country (Alexander McQueen, Balenciaga, Burberry, Kering and Louis Vuitton).

After the inclusion of these companies and all the corrections mentioned above, the list was analysed by QIBA and since, after the analysis, 43 erroneous results were still included in the final list, these were eliminated before re-running the web scraping process, obtaining in the end the most satisfactory result to date. However, and on a final note, it must be said that for a list of businesses for which a website had been manually found, QIBA could not obtain relevant information, the main reason (and most frequent case) usually related to the websites being built in JavaScript and publicly displaying little to no text in HTML tags.

In the end, the total number of companies considered is equal to 2204, divided into: 1912 (87%) from the "fashion" segment, 162 (7%) from the "eyewear" sector and the remaining 130 (6%) are "jewellery" companies (Figure 37).

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49 Source: Decreto del Presidente della Repubblica del 26/10/1972 n. 633, Art. 35. Available at: https://www.gazzettaufficiale.it/eli/id/1972/11/11/072U0633/sg

FASHION, EYEWEAR AND JEWELLERY COMPANIES: SAMPLE COMPOSITION

6%

7%

87%

- Fashion
- Eyewear
- Jewellery
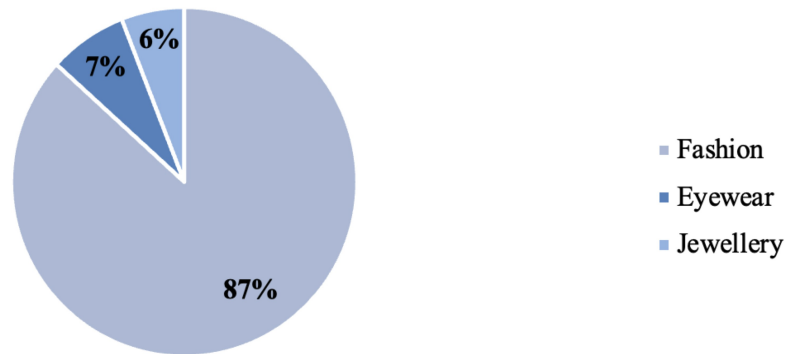
Figure 37: Fashion, eyewear and jewellery companies: sample composition. Own Elaboration

4.1.4 Baskets of Words

Information retrieval systems are designed to find documents relevant to a specific query in a document collection (Hiemstra, 2000), also allowing to rank them, from most to least pertinent, by comparing the words of the selected query with the terms included in each document.

Assuming their ability to describe and identify a certain topic, the first, fundamental step is choosing the most appropriate terms composing the basket of words (the query). In this case, a hybrid approach was adopted by applying a two-step procedure, starting from a qualitative lexicon-based approach based on current literature. This initial manual selection was then enriched and expanded using the word2vec package from R, a method for producing word embeddings, first introduced in 2013 and created at Google by a team of researchers lead by Tomas Mikolov (Mikolov et al., 2013). By taking a large corpus of text as input, this technique helps identifying syntactically and semantically similar terms after creating a vector space were words (first coded as n-dimensional vectors) sharing a common context in the corpus are located close to each other.

Because of the complex and broad nature of the concept, to properly represent the various facets of sustainability (mentioned in this dissertation) and to perform the most accurate and detailed analysis possible, it became necessary to draw up more than just one basket of words, one for each sustainability subtopic identified.

The final list of selected keywords is made of 249 terms (reported in full in Appendix B), which were then categorised into the four distinct groups:

- "Green sustainability", which covers themes related to environmental sustainability;

- "Social sustainability", that is about identifying and managing the impact of businesses on people (workers and society);

- "Certifications", standards and certifications adopted to demonstrate commitment to good environmental, social, ethical practices;

- "Sustainability", regarding sustainability in its broader sense (for example, all the SDGs have been included).

4.1.5 TF-IDF (Term Frequency – Inverse Document Frequency)

In this dissertation, the original methodology proposed in Blasi et al. (2022) has been followed: in their work the authors, to investigate the subject of sustainable hospitality and tourism in North-eastern Italy, applied data mining and machine learning techniques on data collected from websites of tourist accommodations using information retrieval techniques.

Similarly, in order to assess the strength and extent of Italian fashion companies' sustainability commitment, one of the most popular term-weighting schemes, the TF-IDF (Term Frequency – Inverse Document Frequency) has been adopted, since these schemes have been extensively studied by numerous academics (Salton and Buckley, 1988) and have been found to be essential to the study of information retrieval systems (Paik, 2013).

More specifically, this measure consists of two components: the Term Frequency (TF) and the Inverse Document Frequency (IDF).

The TF, that measures how frequently a word appears in a document, is characterised by it following three key hypotheses: the Advanced TF hypothesis (a modified TF hypothesis that proposes that the rate of change of a word's weight should decrease as TF increases), the Document Length Hypothesis (that regulates the TF value to take into account that, in longer documents, terms are likely to be used more frequently than for shorter documents) and the Term Discrimination Hypothesis (for which documents containing rarer terms should be preferred). In this case, the TF also includes the relative intra-document TF (RIFT), more effective for shorter queries, and the length regularized TF (RLTF), that performs better on longer queries (Paik, 2013).

The other component, Inverse Document Frequency, assigns higher scores to documents containing rare, uncommon terms in the collection, offsetting the weighting of the TF component on the assumption that some terms can naturally appear frequently in a text, making them less unique identifiers (Paik, 2013)

As just mentioned, considering many different versions of this measure exist and the need to choose the most suitable one, combining the TF-IDF with document length normalizations, as proposed by Paik (2013), has been found to be the most effective when dealing with documents of various lengths - since it includes the two different within-document TF normalizations, which are then combined to obtain the final weight – allowing to obtain the most accurate retrieval result (Hiemstra, 2000).

4.2 The Results

QIBA, after operating the web scraping process on the selected 2204 fashion companies' websites, returned TF-IDF values which allowed for the ranking of these businesses according to the four baskets of words presented in 4.1.4., knowing that that the higher the score, the higher the discussion about sustainability topics on the website.

In general, the analysis highlighted the presence of areas with concentration of sustainability commitment, mostly in the correspondence of the "Fashion System" industrial districts underlined in Paragraph 2.3.

From the 2204 companies considered in the final list, environmental sustainability (basket 1) themes were the dominant ones, being present in 1277 of the websites (58% of the total), followed by social sustainability (basket 2), with 916 of companies mentioning these topics, sustainability in general (basket 4) was discussed by 830 businesses (38%) and certifications were included by 764 companies (35%). Moreover, it was found that several businesses (251) only discussed environmental sustainability topics, 23 companies deepened social themes, 26 firms only talked about their certifications but none of the companies just considered sustainability in general in their websites.

This data suggests a moderate-to-high commitment, especially when focusing on the subtopic of "green sustainability": even though it is also the basket with more words, the considerable better results obtained are in line with the conversation on this aspect being the most developed out of the four themes considered.

The box-plot (Figure 38), also known as box-and-whisker plot, is a useful graphical method for showing the distributions of numeric data values also belonging to multiple clusters, allowing to quickly compare characteristics such as symmetry, variance, and outliers.

About green sustainability, the subtopic in which the higher percentage of companies has performed the best overall (the first 50 TF-IDF results are all from basket 1), it is also the one where the highest TF-IDF values were recorded. In fact, its average score is equal to 7.02

whereas, for the other baskets, this value is significantly lower: 2.29 for "Social Sustainability", 2.47 for "Certifications" and 1.27 for the fourth "Sustainability" basket.

Since for all four distributions the median is closer to the bottom and the whiskers are shorter on the lower end of the box, they can be classified as positively (or right) skewed, also resulting in the mean (represented by the "X") being higher than the median (the average value indicated by the line dividing the box in two parts).

"Green Sustainability" has shown the greatest degree of dispersion (visually indicated by the two ends of the whiskers), followed by the "Certifications", "Social Sustainability" and "Sustainability" categories.

Moreover, a significant number of outliers (observations numerically distant from the rest of the data) was found: these are businesses whose commitment to environmental sustainability is significantly greater than the average company.
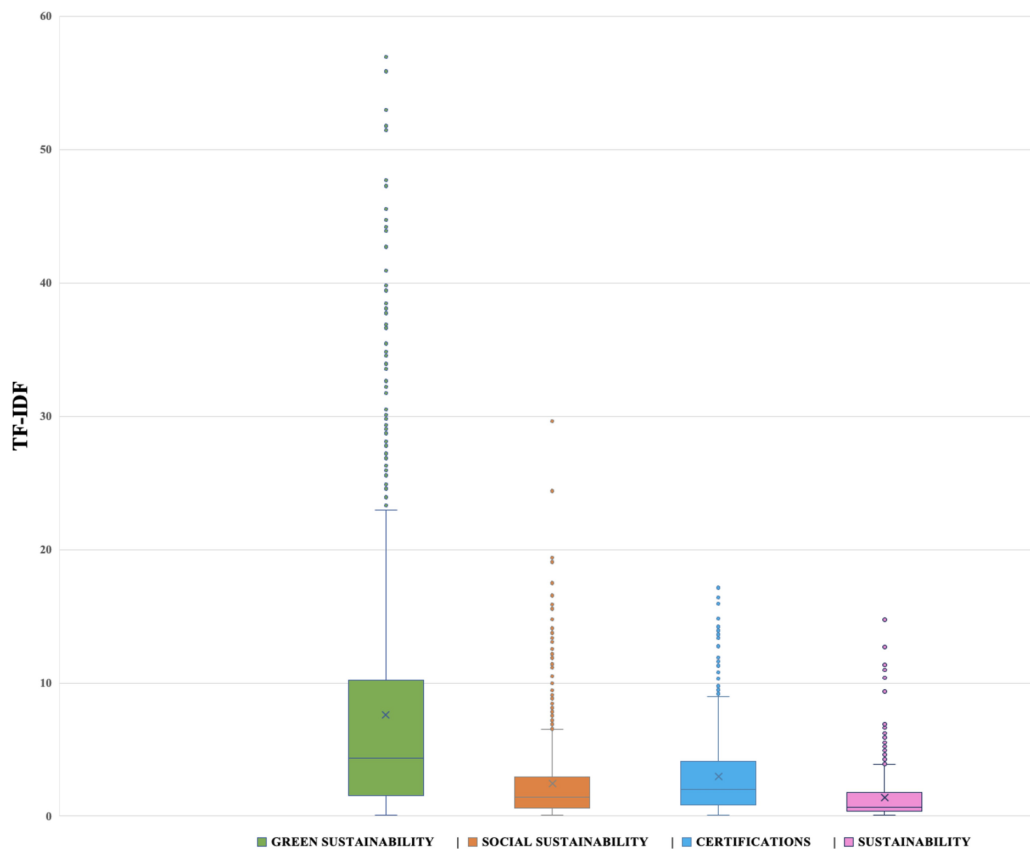
Figure 38: Box-plot for each Sustainability subtopic. Own Elaboration

Lastly, from the analysis it emerged that textiles businesses, manufacturers of high-quality yarn (cotton and other fabrics) and suppliers of input materials for other brands of the value chain are the type of company which recorded the best scores overall. For example, focusing on the top 20 of the "Green Sustainability" category, only tree enterprises - Sacchettificio

Toscano S.r.l., CadicaGroup S.r.l. and Kering Italia S.p.A – operate in sectors different than textile, with the first two dealing with packing and labelling and Kering Italia S.p.A. being the first luxury global brand appearing in the list. Also, still focusing on the first 100 results of basket 1, only one company – Karizia S.p.A., a jewellery business - is from one of the other two categories considered in the analysis. Nevertheless, when focusing the other three subtopics, the variety is certainly higher, with numerous companies being either from the eyewear or jewellery sectors. In particular, the "Sustainability" basket is the one showing the highest variety, with the best performing geographical area being the ones where eyewear and leather goods companies are located.

4.2.1 Regional Analysis

Trentino-South Tyrol ranks 1st in both "Green Sustainability" and "Certifications", whereas Friuli-Venezia Giulia and Basilicata are the most virtuous when it comes to social and sustainability topics respectively (Table 22).

Considering all the four sustainability topics, the best performing regions overall are Trentino-South Tyrol, Lombardy, Piedmont, Abruzzo and Basilicata.

Interestingly, the three regions of Trentino-South Tyrol, Friuli-Venezia Giulia and Basilicata do not have a long history when it comes to the fashion industry since, as stated in Paragraph 2.3, districts have been known to be present in different provinces and municipalities of Lombardy, Marche, Piedmont, Tuscany and Veneto.

However, the outstanding results obtained by several companies located in Lombardy (as presented in Paragraph 4.2.3, three out of the four best performing companies for each basket are based in this region) were diluted by the other numerous businesses with medium and low scores, while Basilicata and Friuli-Venezia Giulia, having only one or few businesses but with impressive scores, obtained higher average values in the end. For this reason, in Table 22, the number of companies for each region (and for each basket of words) that were considered when calculating the scores has been indicated in brackets.

As it can be seen, Lombardy is indeed the region with the highest number of firms considered in the analysis, followed by Tuscany, Piedmont, Veneto, Marche, Apulia, and Campania, confirming previous statements regarding the diffusion of many small-medium companies producing for the fashion industry in these territories.

	Basket 1 "Green Sustainability"	**Basket 2 "Social Sustainability"**	**Basket 3 "Certifications"**	**Basket 4 "Sustainability"**
Abruzzo	9.35 (18 companies)	3.54 (13 companies)	2.34 (12 companies)	1.29 (13 companies)
Aosta Valley	-	-	-	-
Apulia	4.31 (35 companies)	1.73 (22 companies)	2.00 (17 companies)	0.75 (24 companies)
Basilicata	7.58 (3 companies)	0.94 (2 companies)	3.28 (1 company)	2.23 (1 company)
Calabria	8.06 (1 company)	0.79 (1 company)	1.48 (1 company)	1.13 (1 company)
Campania	5.67 (31 companies)	1.97 (24 companies)	2.29 (20 companies)	0.79 (22 companies)
Emilia-Romagna	5.43 (80 companies)	2.34 (55 companies)	2.56 (35 companies)	0.79 (50 companies)
Friuli-Venezia Giulia	9.15 (11 companies)	4.50 (9 companies)	2.01 (10 companies)	1.26 (8 companies)
Lazio	4.75 (18 companies)	2.61 (11 companies)	1.06 (10 companies)	1.74 (10 companies)
Liguria	9.84 (1 company)	0.55 (2 companies)	2.79 (2 companies)	0.47 (2 companies)
Lombardy	9.80 (353 companies)	2.51 (257 companies)	3.73 (241 companies)	1.57 (241 companies)
Marche	4.30 (57 companies)	2.47 (29 companies)	2.09 (20 companies)	1.58 (23 companies)
Molise	0.41 (1 company)	-	-	-
Piedmont	8.15 (99 companies)	2.78 (70 companies)	3.01 (66 companies)	1.50 (62 companies)
Sardinia	-	-	-	-
Sicily	10.44 (1 company)	-	-	1.20 (1 company)
Trentino-South Tyrol	10.97 (16 companies)	3.54 (9 companies)	4.08 (10 companies)	1.36 (11 companies)
Tuscany	7.60 (269 companies)	2.18 (203 companies)	2.95 (159 companies)	1.41 (186 companies)
Umbria	3.91 (14 companies)	1.78 (9 companies)	1.39 (8 companies)	0.90 (10 companies)

	Basket 1 "Green Sustainability"	Basket 2 "Social Sustainability"	Basket 3 "Certifications"	Basket 4 "Sustainability"
Veneto	6.62 (270 companies)	2.47 (200 companies)	2.42 (152 companies)	1.29 (165 companies)

Table 22: Average TF-IDF values by Italian region. Own Elaboration

No fashion companies were detected in Sardinia and in Aosta Valley: subsequently, no TF-IDF values are present for these regions. For Molise only a score for the environmental commitment was found and, in the case of Sicily, social sustainability and certifications topics did not come up during the analysis.

4.2.2 A Focus on Provinces

In this section, a detailed analysis of the sustainability commitment of Italian provinces is presented using four map charts, one for every subtopic (green, social, certifications, and sustainability in general) and with the colour gradient signalling the progression from the highest to the lowest TF-IDF scores, enabling, in this way, data comparison.

Regarding the methodology, the addresses, municipalities, provinces, and regions of the companies' registered offices were extracted from the AIDA and ORBIS databases (or, when not indicated, manually found), for then averaging the TF-IDF scores for each province (these values are the ones presented in the maps).

It was decided to investigate sustainability at the provincial level, the second-level administrative divisions in Italy, since this unit represents the perfect balance between the level of detail required for this analysis to be meaningful and representative of geographical differences (which would not be possible focusing on regions) but still not that granular (like it would happen with municipalities) to not be able of providing a clear representation (also due to Excel constraints) and identifying correspondences between these territories and areas where industrial districts are located.

Moreover, since this dissertation has dealt with the topic of industrial districts and the role small and medium-sized companies populating these special areas played in the flourishing of *Made in Italy* fashion, it was chosen not to exclude firms (even if very small) when calculating the average values, to obtain a more realistic and accurate picture of each province, to operate in the most consistent way possible and to highlight if, precisely because

of the nature and characteristics of industrial districts (presented in Paragraph 2.3), being part of these agglomerations has been affecting the sustainability performance of businesses.

The remaining part of this section will consider the provinces with the highest 10% scores for each sustainability subtopic, highlighting areas and companies deemed of particular interest. Lastly, the most significant findings will be illustrated, focusing on the theoretical and practical implications but also the limitations of this study.

Green Sustainability (Basket 1)

Environmental sustainability is the subtopic showing the highest variability out of the four considered. Gorizia (Friuli-Venezia Giulia), Livorno (Tuscany), Matera (Basilicata), Como (Lombardy), Chieti (Abruzzo), Varese (Lombardy) and Trento (Trentino-South Tyrol) were the provinces which achieved the top 10% TF-IDF scores (Figure 39).

Focusing on the companies located in these territories, it emerged that most of them are from the textile sector, producing yarns, fibres and fabrics for either the fashion industry or others.

Conversation about environmental sustainability performed in their websites (and to which, usually, a specific section was dedicated) mainly dealt with topics of circular economy, emission reduction, recyclability of raw materials, waste management practices, and energy consumption: all themes that have already been highlighted in this dissertation for their strategic importance, since they could help reducing the carbon footprint of the industry.

The highest result was scored in Gorizia, province where Miko s.r.l[50], a non-woven fabric manufacturer, has based its head office. The company prides itself on the sustainability of what it produces, discussing and reporting in great detail how it measures, at every stage of the life cycle, the environmental impact of its products. What is interesting to highlight is that Miko s.r.l. is the same company which was subject of the first Italian greenwashing controversy (as mentioned in Paragraph 3.4): however, from this analysis, it emerged that Miko s.r.l. scores well also on the certifications point of view.

Producers of non-woven fabrics are located in Livorno and Matera; a much more significant number of companies is based in Como (Silk-Textile District of Como Lake), Varese and Trento and, also in this case, most businesses belong to the textile industry.

The area around Chieti (Clothing District of Northern Abruzzo) is specialised in different stages of clothing production, from yarn manufacturing to the production of finished products: C.T. Point S.p.A.[51] (the best performing company of this province, that was also

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50 Source: Dinamicamiko. Available at: https://dinamicamiko.com/en/
51 Source: C.T. POINT – 100% Filati Made in Italy. Available at: https://www.ctpoint.it/en/home/

mentioned in section 3.2.1, since it is one of the few Italian companies which committed to the SBTi) is a manufacturer of monofilament polyester and nylon yarns, Confezioni Mario De Cecco SpA[52] produces dynamic workwear, while Dyloan Manufacturing Technology[53] deals with both the manufacturing and R&D aspects associated to garment production.

Common sustainability-related practices detected during the analysis concern the collection of post-consumer garments, the recycling and reusing of textiles, the accurate selection of suppliers of innovative, high-quality and low impact raw materials and the constant monitoring and reporting of the effects of measures implemented.

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[52] Source: Mario De Cecco, abbigliamento da lavoro. Available at: https://www.dececco.net/en/
[53] Source: Dyloan Manufacturing Technology. Available at: https://www.dyloan.com/?lang=en

GREEN SUSTAINABILITY - BASKET 1

Figure 39: Average "Green Sustainability – Basket 1" TF-IDF scores for every Italian province. Own Elaboration

Social Sustainability (Basket 2)

As affirmed by the United Nations, social sustainability deals with how a company manages the impact it has on its stakeholders, them being employees and workers of the value chain or customers and local communities[54].

The analysis highlights social sustainability discussion to be much less developed than green/environmental themes, supporting previous findings presented in Chapter 3.

The best performing companies, with regard to social responsibility, are located in Viterbo (Lazio), Gorizia (Friuli-Venezia Giulia), Pordenone (Friuli-Venezia Giulia), Avellino (Campania), Trento (Trentino-South Tyrol), Fermo (Marche) and Udine (Friuli-Venezia Giulia) (Figure 40).

Leather goods and textile districts emerged as the ones where the conversation around social sustainability was found to be more developed: the continuous improvement, safety and respect of the human rights of workers and the development of local communities are among the most cited actions undertaken by companies (also in line with considerations about the strong people component of industrial district areas). Moreover, many firms also mention having their own Code of Ethics setting forth the values, principles, standards and best practices to follow when conducting business relationships.

An example is DiMar Group S.p.A.[55], located in Viterbo and specialised in the production of leather goods: the company, which has been documenting its effort in social reports, has set sustainability requirements for its supply chain, created code of conduct in compliance with the international human rights standards, promoted inclusion, diversity and the development of the workforce and established beneficial relationships with the local community and authorities. Miko also s.r.l. has adhered to the protection and development of their workers by adopting health and safety standards and code of ethics underlining the principles of fairness, loyalty, integrity and transparency.

Avellino, and in particular the leather tanning pole of Solofra (Tanning District of Solofra), is famous for the tanning of hides for the footwear, clothing and leather goods (Luongo and Viesti, 2015). Also Fermo, province known for being part of the so-called "Show Valley", is fuelled by the presence of tanneries and businesses dealing with different stages of the shoe-making process. Companies located in both these provinces show strong social commitment and solid ethical values that promote the enhancing of human resources and the establishing

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54 Source: UN Global Compact (no date) Social Sustainability.
    Available at: https://www.unglobalcompact.org/what-is-gc/our-work/social
55 Source: DiMar Group – Sviluppiamo la forza dell'artigianato Made in Italy.
    Available at: https://www.dimargroup.com

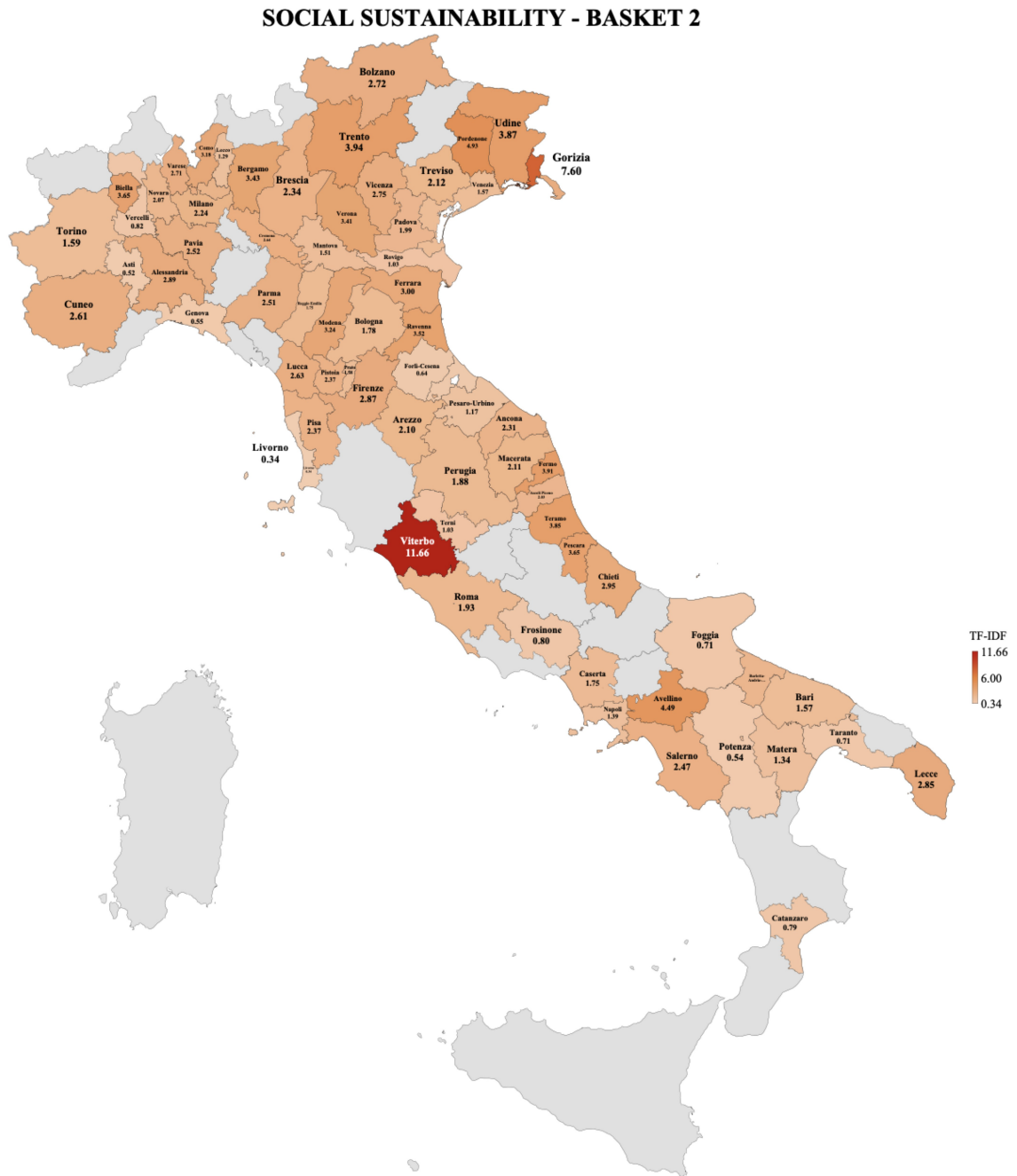of stakeholder relationships based on transparency and trust.

Figure 40: Average "Social Sustainability – Basket 2" TF-IDF scores for every Italian province. Own Elaboration

Certifications (Basket 3)

For this third subtopic, a wide range of certifications was considered: some of them focusing more on environmental aspects - such as green claims companies can make on their products (ISO 14021), the certified responsible origin of materials (FSC, or Forest Stewardship Council, and Oeko-Tex® Standards, for the textile and leather sectors), and the recycled content of final products (RCS, or Recycled Claim Standard) – and others – like SA8000 and ISO 26000 - being more concerned with social responsibility issues. In particular, many businesses, by complying with the quality standard ISO 9001, aim at guaranteeing their customers the absence of harmful or toxic substances in their products, in which Italy was found to be particularly advanced.

As it can be seen in Figure 41, Northern Italy is where the phenomenon of companies certifying their sustainability efforts has been found to be more present, however, some interesting exceptions were also detected in Southern Italy.

Gorizia (Friuli-Venezia Giulia), Caserta (Campania), Trento (Trentino-South Tyrol), Cuneo (Piedmont), Pavia (Lombardy), Varese (Lombardy) and Como (Lombardy) have the best 10% scores when it comes to certifications: indeed, most of the companies based on these areas have dedicated extensive sections of their websites to illustrate them.

The majority of companies in the areas are textile manufacturing businesses (located in territories where industrial districts are present, like in the case of Como and Pavia) meaning that not only this segment is the one which discusses the most about sustainability, but it is also the one more proactive in proving and demonstrating their real, actual commitment.

Sustainability (Basket 4)

The provinces of Viterbo (Lazio), Belluno (Veneto), Gorizia (Friuli-Venezia Giulia), Parma (Emilia-Romagna), Frosinone (Lazio), Fermo (Marche) and Bergamo (Lombardy) recorded the highest TF-IDF scores regarding sustainability (Figure 42).

More specifically, in the case of basket 4, sustainability is mainly concerned with the 2030 Agenda for Sustainable Development, with companies mentioning these topics to illustrate how the measures they have implemented or plan to adopt are connected to the 17 goals, highlighting their contribution to the achievement of these objectives.

DiMar Group (from Viterbo) established areas of intervention with specific actions and indicators, monitoring all along the progress of the sustainability journey.

Another important company, Luxottica[56], Italian leader in the design, manufacture and

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56 Source: Luxottica. Available at: https://www.luxottica.com/it

distribution of fashion, luxury and sports eyewear based in the industrial district of Belluno (Eyewear District of Belluno), has highlighted the tight connection between the four pillars of its vision of sustainability – them being commitment to excellence, visual well-being, social impact and the protection of the environment - and 10 Sustainable Development Goals, with the aim of showing how every company can help the global transition towards sustainability.

Figure 41: Average "Certifications – Basket 3" TF-IDF values for every Italian province. Own Elaboration
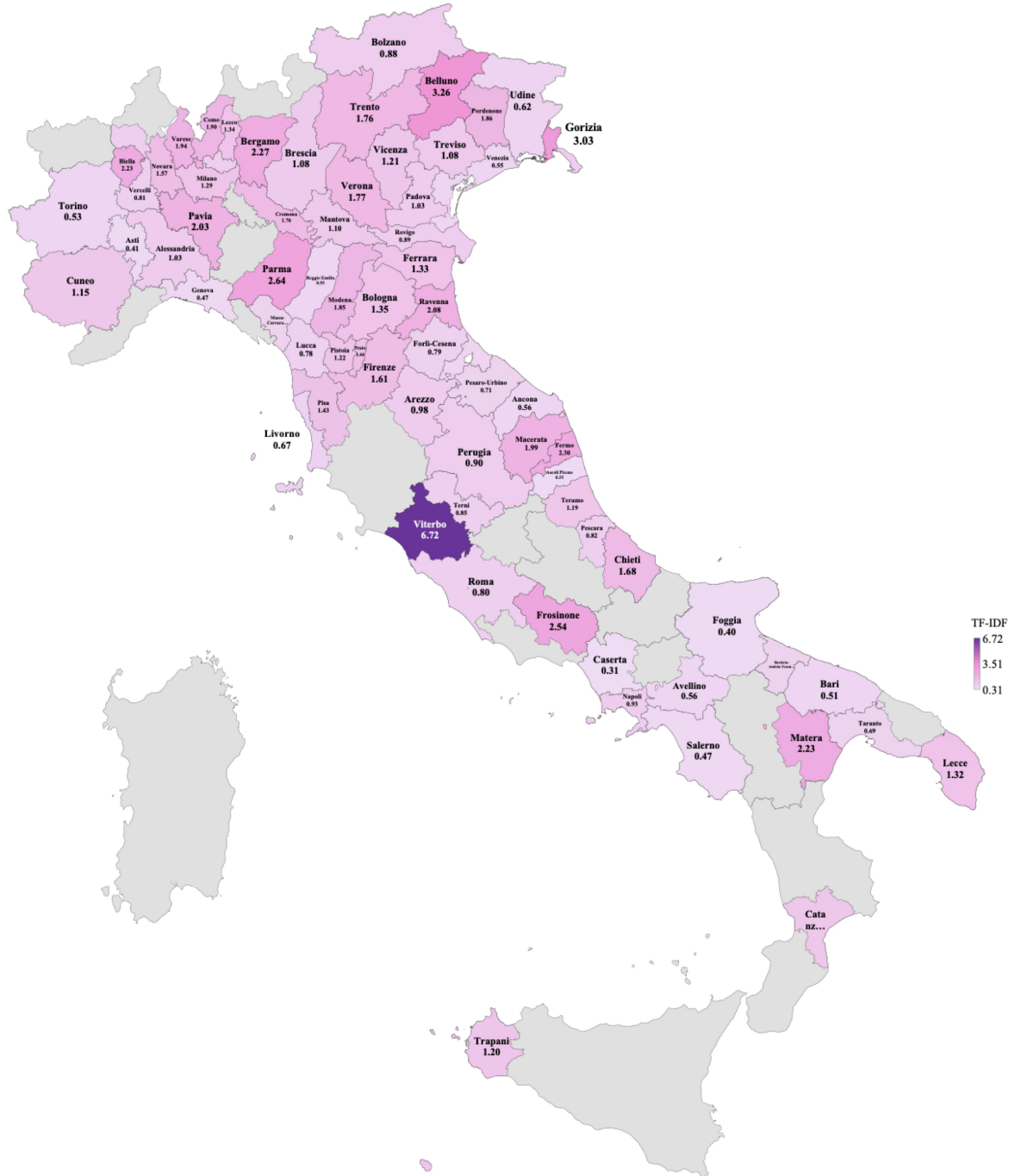
SUSTAINABILITY - BASKET 4

Figure 42: Average of "Sustainability – Basket 4" TF-IDF scores for every Italian province. Own Elaboration

4.2.3 The Most Sustainable Companies

This section will investigate the characteristics of the four companies which ranked first for each sustainability subtopic, underlining the main elements which allowed them to achieve these results. In detail:

1) Cotonificio Olcese Ferrari S.p.A.[57] (Brescia, Lombardy) not only holds the top spot in "Green Sustainability", but it is also the best performing company overall. Brescia, with its nearby alpine valley crossed by the river Serio, is where textile manufacturing businesses have historically been operating, giving life to the Textile and Clothing District of Val Seriana: indeed, the Cotonificio is a well-known manufacturer of high-quality yarn, founded in 2017 from the merger of two historical companies operating in the same sector. On its website, the Cotonificio Olcese Ferrari mentions many themes related to green sustainability; in particular, topics of circular economy, eco-design, waste recycling and environmentally friendly fibres are extensively illustrated. Moreover, the company has achieved good results for each subtopic, but it is also interesting to notice that the firm talks much more about its certifications (mentioning Better Cotton Initiative, Oeko-Tex Standard 100, FSC and GRS certifications among others) than about its social commitment.

2) Kering Italia S.p.A.[58] (Florence, Tuscany) ranks first regarding "Social Sustainability" and 54th overall. The luxury group has its registered office and manufactures in Scandicci (municipality in the province of Florence), part of the Leather goods and Footwear District of Florence. In its website, Kering has dedicated a specific section, "People in the supply chain", about the group's commitment to respect human rights, safeguard its heritage, and foster diversity and inclusion. Moreover, the group scores well also regarding the environmental point of view, with the company having created an innovative Environmental Profit & Loss for measuring and reporting the impact of the operations of the company and of the other players of the supply chain.

3) Tessiture Pietro Radici SpA[59] (Bergamo, Lombardy), occupying the 164th position in the overall ranking, is also at the top when it comes to the "Certifications" subtopic. Located in the Textile and Clothing District of Val Seriana, the company, part of the Radici Group, produces the non-woven fabric Dylar® while maintaining the highest standards of sustainability, certified by ISO 14001, ISO 45001, ISO 50001, ISO 9001

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57 Source: Cotonificio Olcese Ferrari | Produttori di Filati Italiani. Available at: https://www.olceseferrari.it/it
58 Source: Kering: gruppo francese di lusso. Available at: https://www.kering.com/it/
59 Source: Tessiture Pietro Radici – Radici Group.
 Available at: https://www.radicigroup.com/it/prodotti/fibres-and-nw/dylar/azienda

and Oeko-Tex standards.

4) Imprima Industrial Lonate S.r.l.[60] (Varese, Lombardy), the first company for "Sustainability" conversation, placed 213th in the overall ranking. Founded in 2016, the company, which combines different brands leader in printing and finishing of textile, aims at contributing to the achievement of Sustainability Development Goals thanks to a comprehensive strategy focused on water, energy, emission and certification management.

4.3 Discussion

Previous research on Italian industrial districts, viewed as dynamic entities with different possible evolutionary patterns, has largely been focused on the future development of these agglomerations; for instance, the opportunities and challenges faced during the globalization process have attracted the attention of many academics, leading to significant scientific production on the topic (Sammarra and Belussi, 2006).

However, with climate change and geopolitical issues becoming increasingly urgent, riskier, and impactful, the transition towards a more sustainable fashion industry has become more of a necessity than ever before. Hence, and regarding the main theoretical implications, this study contributes to filling gaps regarding the current sustainability performance of Italian fashion businesses by adopting a novel methodology (representing, to the best of the author's knowledge, one of the first times this technique has been applied to the fashion industry) that allowed to compare how different Italian regions and provinces communicate their sustainability efforts online and to highlight the pivotal role of traditional industrial districts in promoting the adoption of green and social practices.

Environmental sustainability conversation was found to be the most developed out of the four themes analysed, also proving previously made statements about social sustainability and certifications being more blurred and less defined than the green aspect.

Overall, sustainability conversation is more diffused in regions and provinces traditionally linked with fashion production: indeed, as it can be seen in Table 22, not only the number of companies located in Lombardy, Piedmont, Veneto, Tuscany and Marche (where famous industrial districts have been operating for decades) is much larger than that of other territories - such as Sicily or Calabria, where only on company for each region was detected -

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60 Source: IMPRIMA. Available at: https://www.imprima.group

but these regions were also still able to obtain very high and satisfactory scores in each subtopic.

The higher number of businesses, and the fact that, when considering the best 200 TF-IDF scores overall, 90% of the companies are either based in Lombardy (more specifically, in Bergamo, Brescia, Como, Milan, Pavia and Varese), Piedmont (in Biella), Veneto (in Belluno, Padua, Treviso and Vicenza), Tuscany (in Arezzo, Florence, Livorno and Prato) and Marche (in Fermo and Macerata), suggest that companies located in industrial districts can positively influence each other when it comes to sustainability. Indeed, as affirmed by Mazzoni (2020), the networking nature and geographical proximity characterising industrial clusters make them particularly suitable for the introduction of eco-innovations.

Regarding the type of companies, textile businesses, which manufacture inputs for the production processes of other businesses and often little known by the media and public, were the ones recording the highest results. As mentioned before, raw material production has been pointed out, by both literature and other international institutions, as the most polluting and unsustainable phase out of all of the stages of the fashion supply chain. However, what is also true is that this phase is the one with the highest potential and significant opportunities when it comes to the reduction of its negative impact, especially in relation to the environmental aspect. So, it could be suggested that firms adopting these measures would want to communicate them online, feeling they could obtain a competitive edge over other firms selling similar products. In fact, the adoption of sustainable measures not only is beneficial for the environment, but it can also bring important benefits on the company's performance, in terms of higher efficiency, cost savings, increased quality and safety for workers.

The fact that during the analysis it was found that even if bigger brands tend to be the ones maintaining official and complete websites, in some cases smaller companies are more proactive in disclosing relevant information than their larger counterparts (Arora et al., 2016) is in line with considerations regarding these businesses taking advantage of online communication to generate interest and enlarge their customer base.

About practical and managerial implications, this study could inform both managers and policymakers about the sustainability performance of both larger and smaller firms. Focusing on managers, knowing their company obtained a low TF-IDF score could lead them to change the way in which their business communicates sustainability efforts online, also prompting managers to aim for sustainability certifications to testify their commitment.

By identifying areas with medium or low sustainability orientation, policymakers, such as national and local authorities, could enact specific measures to support the widespread of best

practices and to increase awareness about the need, for companies, to incorporate sustainability in their future strategies, also with the aim of valorising local communities.

Lastly, even if rigorous approaches and methods were applied to minimise biases and subjectivity, limitations of this method need to be acknowledged. Already at the beginning of Chapter 4, the drawbacks of adopting companies' websites as sources of information were underlined to be their non-standardisation, them being self-reported and unstructured, other than frequently changing; for these reasons, the analysis performed in this chapter could be enriched with other data sources to further support and contextualize the findings.

Moreover, other limitations concern the criteria adopted to select the sample of companies (only Italian fashion businesses described by specific NACE codes) and the baskets of words, other than structural constraints of the software (QIBA, in particular) utilised. For these reasons, further analyses are suggested, with new research opportunities possibly arising from analysing the correlation between TF-IDF values and other variables (such as turnover), from investigating specific areas of interest highlighted during the discussion of the findings and from considering only the best scores of specific territories when computing average values.

On the other hand, further research could also investigate the topic of greenwashing: there were some provinces, like Viterbo, and regions, such as Sicily, which achieved good scores in one subtopic (with the social aspect being particularly discussed in the case of Viterbo, whereas it was environmental sustainability for Sicily) but also significantly lower scores (not even presenting one for Sicily) on certifications. Moreover, worth mentioning is also the case of those "sustainability champions" - such as Gorizia (Friuli-Venezia Giulia), the only province appearing in the highest spots for all the four subtopics - located in territories not traditionally linked to fashion production: investigating them could shed light on the characteristics and drivers of such commitment, understanding if those are really just virtuous, isolated cases that, with the right support, could represent the starting point of an evolutionary process involving their surrounding areas, or if these companies are just indulging in greenwashing behaviours.

Lastly, following the work of Blasi et al. (2022), from which this study took significant inspiration, the cognitive proximity of companies could be explored, possibly identifying the presence of networks of fashion companies particularly committed to sustainability.

CONCLUSIONS

The main search question of this dissertation was investigating the current state of the relationship between fashion and sustainability, firstly by focusing on the scientific production on the topic for then providing empirical evidence on the efforts put in place by the fashion industry, with a particular focus on the Italian case.

Already in 2014, when the iconic fashion designer Vivienne Westwood pronounced her famous motto "Buy Less, Choose Well, Make it Last", people were starting to understand the urgent need for a deeper connection between fashion and sustainability, in order to achieve a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 41). This sustainable development entails introducing significant innovations and changes to achieve relevant improvements to both the environment, reducing the significant negative impact the industry has on the planet, and the society, guaranteeing to every worker employed in the industry not only the respect of the basic human rights, but also the opportunity to live in a dignified and satisfactory manner.

Scientific production on the relationship between fashion and sustainability was found to be recent but still significant, and performing a bibliometric analysis was particularly meaningful not only to identify the characteristics of the main research constituents, but also to understand which themes have been increasingly grabbing the attention of scholars and academics. It was possible to connect the contributions different authors have made to the literature, highlighting similarities and differences to present a comprehensive view of the phenomenon. In particular, the topics of consumers' perspective on the dichotomy between fast and slow fashion, the management of sustainable supply chain management, the emerging of new businesses models and the role of luxury fashion in promoting the transition towards a new paradigm have been illustrated in great details.

Then, since both fashion companies and policymakers have increasingly been considering sustainability concerns into their strategies and future agendas (Geissdoerfer et al., 2017), with businesses introducing new business models in line with sustainability principles and national and supranational authorities (such as the European Union) enacting policies to support the transition towards circular economy, exploring the current situation of the industry with respect to social and environmental sustainability allowed to grasp both the benefits deriving from fashion actors altering the way in which they have been operating in the last decades but also the many challenges and obstacles still to overcome.

What emerged is that supply chains could really play the role of "core activators" of sustainability commitments: for both literature and media, collaboration between stakeholders within and outside the value chain, the setting of standards, well-defined targets and code of conducts for facilitating measuring and reporting, obtaining certifications and greater supply chain traceability and transparency could all be the keys to unlock a better future and improve the sustainability performance of the industry.

Hence, in order to assess this aspect in relation to the Italian fashion industry, the web-based sustainability communication of companies was investigated by adopting the novel content analysis methodology based on the term frequency – inverse document frequency weighting scheme, ranking firms' official websites according to their commitment to environmental, social, certifications, and sustainability themes.

The empirical findings of this study suggested a connection between sustainability performance and spatial distribution of companies, with awareness about sustainability topics being higher in areas traditionally associated with the industrial district model, proving the positive influence played by geographical proximity in promoting the sustainability orientation of companies located in these specific areas.

On the topic of Italian industrial districts, illustrating this reality was deemed necessary, as the development of *Made in Italy* fashion has been largely due to the success, leadership and reputation industrial districts were able to achieve nationally and globally. In particular, some of the best results were obtained by firms dealing with different phases of the textile production process located in historical district areas, suggesting the idea that sustainability communication, for them, represents a way to differentiate themselves from the myriad of surrounding companies, profiling a new competitive advantage based on the higher quality, efficiency and durability products made with more sustainable process and materials are able to guarantee. However, what also emerged is that the Italian fashion industry still needs to strengthen its environmental and social commitment, also supporting previous remarks about the sector lagging behind other industries and about social sustainability conversation and certifications being largely underdeveloped (despite recent indications about its increasing relevance among both companies and customers, especially the younger generations).

In conclusion, the fashion industry will truly embrace sustainability only when collaboration between different actors of the supply chain, institutions, governments, and consumers will be achieved. Customers can change their mindsets about sustainable fashion and close that famous attitude-behaviour gap, but companies, also supported by their value chains and the various international and national entities, will have to firstly embrace sustainability, it being

environmental or social, at a higher level than they have ever done before.

A true collective effort towards a greener, fairer but still fashionable future for the people and the planet.

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Appendix A: List of Companies

VAT Numbers, names and corresponding NACE Rev. 2 of the manually added brands. The companies which QIBA could find and analyse are here indicated in bold.

VAT Number	Company Name	NACE Rev. 2
06372600483	**ALEXANDER MCQUEEN ITALIA S.R.L.**	47.72 - Retail sale of footwear and leather goods in specialized stores
06466560486	**BALENCIAGA RETAIL ITALIA SRL**	47.7 - Retail sale of other goods in specialized stores
12474430159	**BURBERRY ITALIA S.R.L.**	47.71 - Retail sale of clothing in specialized stores
00900421009	FENDI - SOCIETA' A RESPONSABILITA' LIMITATA	46.49 - Wholesale of other household goods
04636090963	GIANNI VERSACE S.R.L.	74.10 - Specialized design activities
10985020964	GIORGIO ARMANI S.P.A.	74.10 - Specialized design activities
02339440485	**KERING ITALIA S.P.A.**	64.2 - Activities of holding companies
03422221204	**LA PERLA ITALIA S.R.L.**	47.71 - Retail sale of clothing in specialized stores
11885730967	LOUIS VUITTON ITALIA S.R.L.	47.71 - Retail sale of clothing in specialized stores
02705970404	**MOSCHINO S.P.A.**	74.10 - Specialized design activities
10115350158	PRADA S.P.A.	47.71 - Retail sale of clothing in specialized stores
08766830155	**TRUSSARDI S.P.A.**	46.41 - Wholesale of textiles
05412951005	**VALENTINO S.P.A.**	74.10 - Specialized design activities

Table 23: VAT Numbers, Names and NACE Codes of added brands. Own Elaboration

Appendix B: Baskets of Words

The complete list of all the words used in the Web scraping process /for the three sectors of the database – Fashion, Food and Furnishing) – is presented in these four tables: "Green Sustainability", "Social Sustainability", "Certifications" and "Sustainability".

Basket 1: Green Sustainability	English translation
accordo parigi	paris agreement
acquazero	acquazero
ambientale	environmental
ambiente	environment
antibatterico	antibacterial
assessment	assessment
bio	bio
biodegradabile	biodegradable
biodegradabili	biodegradable
biodiversity alliance	biodiversity alliance
biologica	organic
biologiche	organic
biologici	organic
biologico	biological
biomass	biomass
bioplastic	bioplastic
cambiamento climatico	climate change
carbon	carbon
carbon credit	carbon credit
carbon footprint	carbon footprint
carbon free	carbon free
carbon negative	carbon-negative
carbon neutrality	carbon neutrality
carbon positive	carbon positive
ciclo di vita del prodotto	life cycle of the product
circular economy	circular economy
closed loop	closed loop
co2	co2
codice condotta ambientale	environmental code of conduct
combustibili	combustible
compostabile	compostable
compostabili	compostable
compostable	compostable
cotone riciclato	recycled cotton
cradle	cradle

Basket 1: Green Sustainability	English translation
cradle to cradle	cradle to cradle
crediti di carbonio	carbon credits
eco	echo
eco®	eco®
ecologia	ecology
ecologici	ecological
ecologico	ecological
economia circolare	circular economy
ecosistema	ecosystem
ecosostenibili	environmentally sustainable
emissioni	emissions
energie	energies
energie rinnovabili	renewable energies
environment	environment
environmental	environmental
environmentally	environmentally
forest	forest
fossili	fossils
gas serra	greenhouse gases
green	greens
green deal	green deal
green guard	greenguard
green innovation	green innovation
impatto ambientale	environmental impact
impronta ambientale	environmental footprint
impronta di carbonio	carbon footprint
innovazione ambientale	environmental innovation
inquinamento	pollution
inquinanti	pollutants
km 0	km 0
lavabile	washable
lca	lca
life cycle analysis	life cycle analysis
life cycle assessment	life cycle assessment
naturale	natural

Basket 1: Green Sustainability	English translation
naturali	natural
net zero	netzero
net zero goal	net zero goals
neutralità carbonica	carbon neutrality
organic	organic
package free	package free
packaging sostenibile	sustainable packaging
plastic free	plastic-free
post-consumer	post-consumer
protocollo di kyoto	kyoto protocol
recupero	recovery
recycle	recycle
recycled	recycled
reduce	veteran
regenerated	regenerated
reusable	reusable
reuse	reuse
riciclabile	recyclable
riciclabili	recyclable
riciclaggio	recycling
riciclata	recycled
riciclate	recycled
riciclati	recycled
riciclato	recycled
riciclo	recycling
ricondizionato	refurbished
rifiuti	waste
rifiuti zero	zero waste
riforestare	reforest
rigenerata	regenerated
rigenerato	regenerated
rinnovabili	renewable
riscaldamento globale	global warming
riuso	reuse
riutilizzabile	reusable

Basket 1: Green Sustainability	English translation
riutilizzo	reuse
sostenibile	sustainable
sostenibilità	sustainability
surriscaldamento climatico	global warming
sustainability	sustainability
sustainability®	sustainability®
sustainable	sustainable
sustainable innovation	sustainable innovation
tracciabilità	traceability
traceability	traceability
water footprint	water footprint
zero emissioni	zero emissions
zero waste	zero waste

Table 24: Basket 1 – Green Sustainability. Own Elaboration

Basket 2: Social Sustainability	English Translation
anti-corruption	anti-corruption
anticorruzione	anti-corruption
b corp	b corp
b impact assessment	b impact assessment
b impact report	b impact report
b lab	b lab
benefit	benefits
benefit corporation	benefit corporation
code of conduct	code of conduct
code of ethics	code of ethics
codice condotta sociale	social conduct code
codice etico	ethical code
corporate social responsibility	corporate social responsibility
csr	csr
declaration of interdependence	declaration of interdependence
diritti umani	human rights
equità	equity
ethic	ethics
ethical	ethical
ethical code	ethical code
ethics	ethics
etica	ethics
etico	ethical
global impact investing rating system	global impact investing rating system
global reporting initiative	global reporting initiative
gri	gri
human rights	human rights
imprenditorialità sociale	social entrepreneurship
impresa ibrida	hybrid enterprise
impresa sociale	social enterprise
innovazione sociale	social innovation
lavoratori	workers
no-profit	no profit
onestà	honesty

Basket 2: Social Sustainability	English Translation
responsabilità sociale	social responsibility
social innovation	social innovation
social responsibility	social responsibility
sostenibilità	sustainability
sustainability reporting	sustainability reporting
sustainability®	sustainability®
sustainable	sustainable
the change we seek	the change we seek
trasparenza	transparency

Table 25: Basket 2 - Social Sustainability. Own Elaboration

Basket 3: Certifications	English Translation
bci	bci
better cotton initiative	better cotton initiative
brcgs etrs	brcgs etrs
c2c	c2c
certification	certification
certifications	certifications
certificazione	certification
certified	certified
certify	certify
certipur	certipur
confidence in textiles	confidence in textiles
cotone bci	bci cotton
council®	council®
cradle to cradle	cradle to cradle
cruelty free	cruelty free
csqa	csqa
dap	dap
ecolabel	eco-label
emas	emas
epd	epd
fiducia nel tessile	trust in textiles
fsc	fsc
fsc®	fsc®
gots	gots
greenlabel	greenlabel
grs	gr
iso 14001	iso 14001
iso 14021	iso 14021
iso 14024	iso 14024
iso 14025	iso 14025
iso 17025	iso 17025
iso 21401	iso 21401
iso 26000	iso 26000
iso 37001	iso 37001
iso 37101	iso 37101

Basket 3: Certifications	English Translation
iso 45001	iso 45001
iso 50001	iso 50001
iso 9001	iso 9001
iso 14064	iso 14064
iso 14067	iso 14067
lga	lga
ocs	ocs
oeko	oeko
oeko-tex	oeko-tex
pdr 42	pdr 42
pefc	pefc
rcs	rcs
rms	rms
rvs	rvs
sa8000	sa8000
smeta	smeta
sr 10	sr 10
tex®	tex®
vegan	vegan

Table 26: Basket 3 – Certifications. Own Elaboration

Basket 4: Sustainability	English Translation
agenda 2030	agenda 2030
bilancio di sostenibilità	sustainability report
ecosostenibile	eco friendly
eco-sostenibile	eco-friendly
esg	esg
global goals	global goals
sdg	sdg
sdg 1	sdg 1
sdg 10	sdg 10
sdg 11	sdg 11
sdg 12	sdg 12
sdg 13	sdg 13
sdg 14	sdg 14
sdg 15	sdg 15
sdg 16	sdg 16
sdg 17	sdg 17
sdg 2	sdg 2
sdg 3	sdg 3
sdg 4	sdg 4
sdg 5	sdg 5
sdg 6	sdg 6
sdg 7	sdg 7
sdg 8	sdg 8
sdg 9	sdg 9
sostenibile	sustainable
sostenibilità	sustainability
sustainability	sustainability
sustainability report	sustainability report
sustainable	sustainable
sustainable development goals	sustainable development goals
transparency	transparency
trasparenza	transparency
un goals	un goal
valore condiviso	shared value

Table 27: Basket 4 – Sustainability. Own Elaboration