

UNIVERSITÀ CARLO CATTANEO - LIUC

SCUOLA DI INGEGNERIA INDUSTRIALE

Corso di Laurea Magistrale in Ingegneria gestionale per la
produzione industriale – Classe LM-31

**“An investigation of waste management
within the fashion industry: the critical
barriers to transition to a sustainable
development”**

Relatore: Prof. Alessandro Creazza

Tesi di Laurea di:
Irene Stevenazzi

Matricola n° 25435

Anno Accademico 2020 – 2021

**AUTORIZZAZIONE ALLA CONSULTAZIONE DELLA TESI DI LAUREA
E TRATTAMENTO DEI DATI PERSONALI**

Il/La sottoscritto/a **Irene Stevenazzi**

matricola n° **25435**

nato/a a **Varese**

il **20/02/1997**

autore della tesi di Laurea dal titolo **An investigation of waste management within the fashion industry: the critical barriers to transition to a sustainable development.**

Autorizza

~~Non autorizza~~

la consultazione della tesi stessa, fatto divieto di riprodurre, in tutto o in parte, quanto in essa contenuto.

Autorizza

~~Non autorizza~~

per quanto necessita l'Università Carlo Cattaneo - LIUC ai sensi della legge n. 196/2003 al trattamento, comunicazione diffusione e pubblicazione in Italia e all'estero dei propri dati personali per le finalità ed entro i limiti illustrati dalla legge.

Dichiara, inoltre:

- di aver preso atto che, ai sensi della legge 19 aprile 1925, n. 475 tutt'ora in vigore, per gli elaborati presentati agli esami per il conseguimento della laurea si configura il reato di plagio e che, qualora gli elaborati fossero opera, anche parziale di altri e quindi si manifestasse il plagio, il reato è punito con la reclusione da tre mesi ad un anno.
- di aver consegnato una copia dell'elaborato al Relatore e all'eventuale Correlatore;
- di aver caricato l'elaborato e il riassunto sul proprio Self Service Studenti;
- che l'elaborato in formato elettronico è conforme alla copia a stampa in tutte le sue parti;
- di non avere libri in prestito dalla biblioteca Mario Rostoni;
- di essere a conoscenza della normativa antiplagio e di essere consapevole che l'elaborato sarà sottoposto al vaglio antiplagio del software "Turnitin".

CONSAPEVOLE CHE CHIUNQUE RILASCI DICHIARAZIONI MENDACI È PUNIBILE AI SENSI DEL CODICE PENALE E DELLE LEGGI SPECIALI IN MATERIA, AI SENSI E PER GLI EFFETTI DEGLI ART. 75 e 76 DPR 445/2000.

Firma

Irene Stevenazzi

Acknowledgements

I would like to acknowledge with thankfulness the valuable assistance and support of my supervisor, Dr. Creazza. He has guided me throughout my dissertation path, especially when I had difficulties with the sampling strategy; helping to address and conceptualise my ideas, he has imparted in me his precious knowledge.

I owe a deep sense of gratitude to my family, my grandparents and my uncles and aunt, that have always been available for me to encourage and push me to give my best. Without all of them I would not feel complete.

Grateful thanks go to my friends and flatmates because they have believed in me providing constant reassurances; it is a privilege for me having them as my friends.

Special thanks go to Franz, for the unconditional and endless support that has provided me throughout these years no matter the distances; without him I would not have taken such an amazing experience.

Additionally, I would like to thank all the interviewees that have agreed to participate in the data collection transmitting me the passion for their job.

I wish to thank also all the module leaders and lecturers I had the opportunity to meet during the academic year at the University of Hertfordshire: although we all have faced a lot of challenges due to the Covid-19 pandemic, they have shown professionalism and attention to the students.

Finally, I acknowledge my home university, Università Carlo Cattaneo - LIUC, that has given me the opportunity to undertake the Double Degree Programme despite the difficult circumstances due to Covid-19 restrictions.

Executive summary

The attention on sustainability issues in the fashion field is growing exponentially and companies are adapting their products and supply chains accordingly. Even if literature on this field is wide, there is little attention on waste management and in particular on the barriers that fashion brands could face in the process of waste reduction within their supply chains. Moreover, there is no distinction between the relevance of the barriers, according to different contexts a company could be positioned. Knowing this gap in the literature, the study is aimed at helping the fashion firms in the process of their supply chain's transformation. Highlighting the barriers they could face, it is presented a comparison of two different contexts: the international companies that do not have sustainability as their main value and Italian small/ medium enterprises that started up as sustainable. The qualitative approach has been considered the best to undertake the research and the data have been collected through the conduction of 12 interviews. The respondents are experts in the supply chain within the fashion industry field and have been chosen based on the two contexts investigated. The study compares similarities and differences between the barriers explored, emphasising the relevance of them in each set. The highest barriers to transition to a more sustainable waste management are: core business, costs, know how, client, suppliers, logistics, production process and communication. Additionally, new barriers that have not been considered in the literature emerged from the analysis of the data. Finally, some implications on the future trends of sustainability in fashion field are explored, with a prediction of different scenarios the industry could face as well as the impact the Industry 4.0 and Covid-19 pandemic could have in the next years.

Table of Contents

ACKNOWLEDGEMENTS	I
EXECUTIVE SUMMARY.....	II
TABLE OF CONTENTS.....	1
LIST OF FIGURES.....	3
LIST OF TABLES	3
1. INTRODUCTION.....	4
1.1 BACKGROUND OF THE DISSERTATION.....	4
1.2 THE RESEARCH OBJECTIVES	5
1.3 METHODOLOGY' OVERVIEW.....	6
1.4 STRUCTURE OF THE CONTENTS	7
2. LITERATURE REVIEW.....	9
2.1 LITERATURE REVIEW GENERAL STRATEGY	9
2.2 THE REVIEW PROCESS ANALYSIS	9
2.3 LITERATURE REVIEW'S BACKGROUND.....	11
2.4 PROCUREMENT	13
2.5 OPERATIONS MANAGEMENT	15
2.6 DISTRIBUTION	18
2.7 COMMON BARRIERS.....	19
2.8 THE RESEARCH GAP	24
3. RESEARCH METHODOLOGY AND METHODS.....	26
3.1 PHILOSOPHY OF THE RESEARCH.....	26
3.1.1 <i>Philosophy</i>	27
3.1.2 <i>Ontology</i>	27
3.1.3 <i>Epistemology</i>	28
3.2 APPROACH TO THEORY DEVELOPMENT	29
3.3 RESEARCH DESIGN.....	31
3.3.1 <i>Research methodological choice</i>	31
3.3.2 <i>The nature of the research design</i>	32
3.3.3 <i>The research strategy</i>	32
3.3.4 <i>The Research's Time Horizon</i>	35
3.4 RESEARCH TECHNIQUES AND PROCEDURES	35
3.4.1 <i>Data collection and analysis</i>	37
3.4.2 <i>Data Analysis</i>	40
3.5 ETHICAL CONSIDERATIONS.....	40
3.6 RESEARCH POSSIBLE ISSUES AND LIMITATIONS	41
4. DATA FINDINGS AND ANALYSIS.....	44
4.1 BARRIERS AND RELEVANCE AN INTERNATIONAL COMPANY HAS TO FACE (RQ1) ..	45

4.2 BARRIERS AND RELEVANCE A COMPANY STARTED UP AS SUSTAINABLE HAS TO FACE (RQ2)	52
4.3 NEW EMERGING BARRIERS	56
4.4 COMMON BARRIERS FOR BOTH THE CONTEXTS INVESTIGATED	59
4.5 QUANTITATIVE SCORES GIVEN TO THE BARRIERS	63
4.6 IMPLICATIONS.....	65
4.6.1 <i>Speculations on the future perspectives</i>	65
4.6.2 <i>Critical factors that could influence the scenarios</i>	67
5. CONCLUSIONS.....	69
5.1 FINAL CONCLUSIONS.....	69
5.1.1 <i>Critical barriers to transition to a sustainable waste management in the fashion companies' supply chain (common to both the contexts investigated)</i>	70
5.1.2 <i>Comparison among the barriers investigated for context 1 and context 2</i>	70
5.2 RESEARCH CONTRIBUTIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH ..	73
5.3 LIMITATIONS.....	73
PERSONAL REFLECTIONS	75
OVERALL DISSERTATION'S EXPERIENCE	75
DISSERTATION DEVELOPMENT	76
PERSONAL GROWTH AND LESSONS LEARNED	78
REFERENCES.....	79
APPENDICES.....	87
APPENDIX 1 – QUESTIONNAIRE	87
APPENDIX 2 – INTERVIEWS' TRANSCRIPT	90
I1 - Interview.....	90
I2 - Interview.....	96
I3 - Interview.....	102
I4 - Interview.....	109
I5 - Interview.....	115
I6 - Interview.....	120
I7 - Interview.....	126
I8 - Interview.....	133
I9 - Interview.....	139
I10 - Interview.....	145
I11 - Interview.....	150
I12 - Interview.....	155
APPENDIX 3 – CONSENT FORM.....	160
APPENDIX 4 – APPROVAL LETTER.....	162
APPENDIX 5 – APPLICATION FORM	164

List of Figures

Figure 1. Research Onion (Saunders et al., 2019)	26
Figure 2. Comparison of philosophies in business research (Saunders et al., 2019)...	28
Figure 3. Route to follow in inductive approach for research.	30
Figure 4. Research Framework.....	36
Figure 5. Scores given by the participants that worked in an international company (context 1).....	64
Figure 6. Scores given by the participants that worked in an company started up as sustainable (context 2).....	64
Figure 7. Comparison between context 1 and 2	65
Figure 8. Worst scenario.....	67
Figure 9. Best scenario	67

List of Tables

Table 1. Correlation between barriers and bibliography sources.....	21
Table 2. Design tests and measures implemented (Yin, 1994)	34
Table 3. Interviewees' information.....	39
Table 4. Context 1 summative table.....	51
Table 5. Context 2 summative table.....	55
Table 6. New barriers that were not identified in the literature	56
Table 7. Common barriers' summative table	63

1. Introduction

1.1 Background of the dissertation

Clothing industry accounts between the 2% and 10% of environmental impact of the European consumption and, in 2017, it had a turnover of €181 billion (Šajin, N., 2019).

The volume of the total production of the fashion industry will exceed 99 million tons annually, according to the statistics (Ütebay et al., 2020, cited in Körlü, 2020) and 1.2 billion tonnes of CO₂ are emitted. Considering the significant output the fashion industry delivers each year, the consequences of this production can be significant. Every year the sector is responsible for the 4% of the global water withdrawal that means 93 billion cubic meters of water used (Ellen MacArthur Foundation, 2017). Another figure that could make the reader realise the danger and the damage the fashion industry is causing, concerns the 2000 different types of chemicals and microplastics dispersed: the production of cotton, that is considered overall a natural fabric, uses 8 millions tons of fertilizer a year (Ütebay et al., 2020, cited in Körlü, 2020).

Thus, the attention on sustainability issues from society and fashion brands is growing exponentially (Nayak, 2020). This new collective sensitivity is slowly contrasting fast fashion industry that has led to higher amounts of waste disposal and environmental impacting production processes (Choi et al., 2014). However, the way to achieve a real commitment to sustainability seems still very long for some companies, especially for the ones that do not have the right know-how to face the change.

Therefore, sustainability development is a real problem for fashion companies that need efforts and resources to implement a successful strategy to overcome the problem (Garetti and Taisch, 2012). The first step to approach the issue is the identification of the barriers firms have to face in order to approach change.

1.2 The research objectives

Sustainability and the waste production in fashion industry is a widely discussed topic in the literature. Less attention is given to the barriers and obstacles a company has to face in order to improve the way its waste is managed.

Moreover, there are not investigations on the relevance of these barriers and how it is difficult to overcome these obstacles. The challenges obviously change according to the context of the company and to the target clientele it refers to. This is the reason why this study aims to investigate which are the barriers to transition to a more sustainable waste management in fashion field, giving an overview of how they impact the strategy in two different contexts analysed. The former context is represented by fashion international firms that have not sustainability as their main value and the latter one considers Italian little/ medium sized fashion companies that have started up as sustainable and whose main value is sustainability.

Therefore, the research questions this study aims to answer are:

Overall Research Question: Waste management: Which are the critical barriers to transition to a sustainable development fashion industry should overcome?

Sub – question 1: Which are the barriers and their relevance for an international company?

Sub – question 2: Which are the barriers and their relevance for a company that started up as sustainable?

1.3 Methodology' overview

To approach the methodology chapter, it has been decided to follow a stable structure that clarifies the way the study has been addressed.

The ontological position chosen is the subjectivism while the interpretivism as the epistemology. According to this philosophy, the position is important to reach the entire picture of the contexts observed. Moreover, with the interpretivism it is possible for the researcher to use his or her perceptions in the data collection. This is critical to reach the research objectives since the topic addressed can be subject to many interpretations and opinions. Accordingly, the inductive approach is considered as the best tool to develop the research.

The methodology chosen is the qualitative one because it gives the possibility to capture all the nuances of meanings this topic has. However, the last question of the questionnaire was a quantitative one: the participants had to give scores to the barriers proposed by the researcher so that the student had the opportunity to capture the opinions or some comments given to each barrier analysed in the literature.

As just mentioned, the collection of the data has been developed through the conduction of 12 semi structured interviews in a cross-sectional time horizon, via Microsoft Teams or calls over the telephone. The participants were experts in the supply chain that work in the fashion industry and they belong to the two main contexts described above, according to the research question. The conversation with the respondents is aimed at discovering new perspectives on the barriers, based on each context.

The thematic analysis is used as the main technique to analyse the data collected and discover the new barriers to transition proposed by the interviewees.

Concerning the possible ethical concerns, the University of Hertfordshire has a clear protocol made by the Ethics Committee, to which every researcher adheres, and a consent form is signed by the interviewees.

1.4 Structure of the contents

The contexts in this dissertation have been structured as follows.

The First Chapter is the introduction and seeks to give a first view of the subject by outlining the background and the research questions the study wants to answer. Hence, it is introduced the gap in the literature and the contexts against which the research was developed. Chapter one also summarises the methodological choices and the reasons why they best suit the topic investigated.

The Second Chapter provides the review of the literature regarding the topic: the main concepts on waste management within fashion industry are highlighted, with a focus on the main barriers to transition that nowadays companies are trying to overcome. Controversial opinions of experts are discussed in this chapter, together with the state of the art on the waste management. The chapter has been divided in paragraphs, for ease of comprehension, grouping the barriers according to the different phases of the supply chain: procurement, operations and logistics. Finally, also the barriers that are common to all of the steps mentioned before, are presented. The Second Chapter it is important to show the gap in the literature the study is meant to cover and clearly states the research question.

The Third Chapter presents the methodology chosen to address the data collection and analysis. The information is presented following a precise structure, provided by Saunders et al. (2019) and all the phases needed to develop the research strategy are clearly shown: philosophy of the research (ontology and epistemology), approach to

theory development, research design (methodological choice, nature of the research, strategy, time horizon), techniques and procedures used to develop the analysis (data collection and data analysis). Moreover, some ethical considerations and possible limitations are presented.

The Chapter Four shows the findings obtained from the interviews conducted with the experts in the sector. Since two contexts were investigated, the chapter presents the common barriers outlined for both of them, the barriers an international company has to face and the barriers a company started up as sustainable has to face. Moreover, the results of the quantitative question are shown together with the new barriers emerged from the data collection. Finally, the chapter gives an overview on the trends of the sector considering also two important factors: the Covid-19 pandemic and Industry 4.0.

The last Chapter is the Fifth, that offers a comparison of the barriers defined for both the contexts, summarising the concepts analysed. Moreover, the chapter provides some recommendations for the future research and the contribution the study gives to the literature and to the fashion companies that want to approach a more sustainable waste management. Ultimately, the limitations encountered during the research are presented, with regards to the methodology, collection and analysis of the data.

2. Literature review

2.1 Literature review general strategy

This session is aimed at showing the literature review boundaries and the main topics discussed in order to help the reader understand how the review is developed and structured.

The research proposed is based on the barriers to transition to a sustainable development, focusing the attention on the waste management within the supply chain of fashion companies.

Therefore, the main areas of investigation are the fashion industry and waste management. Many academic articles focus on the topic of waste, with a specific attention given to the disposal of clothes (after the garments' life); however, this dissertation' main objective is to explore the waste management during production and logistics processes (supply chain), before the product's sale, from the firms and industry point of view.

Another important topic connected to the two just mentioned, is represented by the barriers to transition that could limit the companies in the process of improvement of waste management within their supply chain.

Hence, the main areas of research are: the waste management, the supply chain, the fashion industry and the main barriers to transition.

2.2 The review process analysis

The review has been performed through the use of specific databases. The University of Hertfordshire' Online Library was the main one, that given the author the opportunity to brows other online libraries. The latter are listed below:

- Scopus
- Ebsco (education research complete)
- IEEE Xplore (IEEE/ IET Electronic Library – IEL)
- ACM Digital Library
- Springer Journals
- Springer Online Journal Archives (through 1996)
- ScienceDirect Journals

Other online databases used are: Google Scholar and LIUC – Università Carlo Cattaneo library's database.

As mentioned in the previous section the keywords used to develop the review are: “fashion”, or “fashion industry”, in conjunction with “supply chain”, or “production process”, or “production”, or “logistics”, or “supplier”, in conjunction with “waste”, or “waste management”, or “waste reduction”, or “sustainability”. Also, for a deeper research, these keywords were also associated with: “barriers” or, “challenges” or “problems”, or “issues”.

Moreover, a translation in Italian of the keywords just mentioned were made and the publications accepted for the analysis were both in English and Italian languages.

Since the review topics were very specific, it has been decided to use the snowball methodology to reach more publications. Indeed, some new literatures have been gained through the review of the bibliographies the researcher had at disposal.

The source types filtered in the research process were only journal articles, academic articles, books and book chapters. Many results were duplicates and they were removed from the analysis, as well as some publications that did not match with the criteria chosen for the research.

The time span as a research boundary was set as 2001/2021, therefore the last 20 years of publications were chosen to investigate the topic. In fact, the literature shows how in the early 2000 the society started to become more conscious about sustainability matters and firms begun to aim for a change of their waste management.

The total number of publications analysed is 176.

2.3 Literature review's background

In the last few years, sustainability in fashion industry has become a burning issue in the society and it is increasing more and more. The reason of this growth could be the strong connection of fashion industries with the end user: indeed, they are in the spotlight for the society (Garcia-Torres et al., 2019). Another factor that has arisen these issues within the society, is represented by the fast fashion. The latter has increased the need for people to change clothes continuously at very low costs, giving the perception of being able to have a beautiful garment at a low price. At the beginning, this has done nothing but changed the perception regarding clothing and the value of material objects (Stringer, Mortimer and Payne, 2020; Jackson, 2005) and, as Lundblad and Davies (2016) assert, this contributed to increase the divergency between fashion and the concept of sustainability. However, after years from fast fashion's birth, customers are growing their awareness of both environmental and social problems, connected to fashion in general (Lundblad and Davis, 2016; Mukendi et al., 2020). This has also been caused by some dramatic events happened, such as the collapse of Rana Plaza building in Bangladesh in 2013 that employed manufacturing workers for many fashion brands such as Benetton, Prada, Gucci, Moncler or Tampoco's garments factory fire in 2016 and incidents in Cambodia in a shoe industry (Jacobs and Singhal, 2015). According to Macchion et al. (2017) this growing attention is reinforced by government and non-

government organisations aimed at increasing the awareness of the society on these topics.

As a consequence, fashion industries are moving forward to reach a more sustainable development in order both to respond to new needs of their customers and preserve resources for the future generations (Mukendi et al., 2020). Nevertheless, sustainable development is a very ambitious objective that needs a huge and continuous effort on behalf of the firms (Garetti and Taisch, 2012). Fletcher and Grose (2012) agree with that and add an interesting insight: sustainability has to be pursued regarding all its aspects but it is critical to analyse and develop both sustainable products and processes. This is the reason why the integration of sustainability has to be carefully planned and evaluated. Indeed, according to de Brito et al. (2008) it is a challenge that many firms would not be able to overcome because of difficulties to manage the supply chain, frequent collections with trends to follow and short lead times required.

As highlighted by Zhu and Sarkis (2004), the “process” mentioned before comprehends the whole supply chain, therefore all the decisions made about selection and transportation of raw materials, operations management and in general the major part of the products’ life cycle. The “process” is fully connected also to external factors the company should care about, that could compromise the final products and their costs (Oelze, 2017). Moreover, when implementing sustainability within the supply chain it is important to consider all its aspects (social, economical and environmental) (Seuring and Muller, 2008) not individually but instead, simultaneously (Tsan-Ming Choi and TCE Cheng, 2015). Witt (2001) agrees with the possible coexistence of the three aspects and adds that this could represent a competitive advantage, increasing at the same time the complexity of their implementation. Not all the literature agrees with this, indeed, according to Karaosman et al. (2018), there should be a trade-off among the aspects because firms are not able to develop all of them at the same time.

In general, it is important for the firms to implement sustainability, aiming at the maximum results but still remaining within the feasibility constraints. Regarding this topic, Gazzola et al. (2019) assert that the decision-making process should be based on the commitment to reduce the environmental impact as much as possible in terms of waste management strategy that will not burden the environment.

In particular, waste management seems one of the major problems of implementing sustainability in the supply chain of fashion industries: according to recent studies, every year 400\$ billion value of clothes are wasted by industries and 23 kilograms of 27 kilograms of clothes bought is dumped (Shirvanimoghaddam et al., 2020). Nevertheless, as Binotto and Payne (2016) clearly state, waste is unavoidable and the questions to answer are: how the waste is going to impact the environment and if it is for a good cause or only represents a whim for the industry. The waste management approach affects the whole value chain, indeed, Hoffmann and Coste-Maniere (2012)'s research demonstrates that the best-in class companies can integrate sustainability in all their internal and external processes, exploiting the opportunity to use it as a competitive advantage.

All the stages of the supply chain have to deal with waste management (Li et al., 2020) and below the literature is reviewed with regards to the barriers each stage has to deal with.

2.4 Procurement

The focus of the research on sustainable waste management tends to be on the retailers and brand owners, shifting the attention from the suppliers that play a very important role within the supply chain (Mukendi, 2020). According to Kim and Zorola (2018), suppliers' position on this concern is very delicate because they have to offer a

competitive price to the firm and satisfy its demand as well, feeling also the pressure of being sustainable. On the other hand, Oelze (2017) claims that the commitment to sustainability depends also on the values owned by the supplier and secondly on the support given by the brand. Becker-Leifhold and Heuer (2018) show how the suppliers' relationships with the brands differ significantly and this relationship can be seen as a barrier that could lead to lack of transparency in the sustainable waste management. Indeed, sometimes the firm requires some specific sustainability standards to follow while the suppliers, as argued by Moretto et al. (2018), do not have the right knowledge or the financial resources to invest.

Another barrier that the firms should overcome at all costs is represented by the capability to embrace corporate social responsibility that means ensuring safety to the suppliers' labourers as well as avoiding the emission of pollutants that could be harmful to the air, jeopardising their health (Macchion et al., 2017). Concerning this topic, Kogg (2003) claims that there is not much research analysing with primary data the waste management and work environment's conditions of suppliers, because many of them have something to hide. On the other hand, Schneider and Schwerk (2010) introduces another barrier with a different perspective in regard to suppliers: they may have different cultures and habits from the firm and this could lead to misunderstanding and miscommunication.

In conclusion, the understanding of the suppliers' perspective, is a critical barrier to overcome in order not to leave them behind and to build a more sustainable supply chain (Jacobs and Singhal, 2017).

2.5 Operations management

The operations management process needs much attention from the industry that wants to become sustainable and a critical amount of research has been developed on the environmental consequences of the production of clothes (Utebay et al., 2020). According to De Brito et al. (2018), companies are focusing their attention on the improvement of resource usage because of the stakeholders' interests in this topic, while waste management is actually being considered but with less concern. Despite this, the analysis of how to reduce the critical resources usage means also finding a solution to lower the amount of waste and make its management more sustainable.

Muthu (2019) focuses on the water consumption during operations. He asserts that the amount of water needed depends on many factors, such as the material type, the type of machines and the process needed. The amount of water required in spinning and weaving is less than the one needed during the garments chemical phase. In general, in order to produce 1 kg of clothes, from 50 to 100 L of water are needed (Uquaili and Harijan, 2011). Chemical phase cited before also includes the colours application. Becker-Leifhold and Heuer (2018) consider colours' choice as the most critical and important part of fashion and textile industry. It is not mandatory to avoid colours to be sustainable, otherwise it could be useful to adopt different processes like printing, in which colours are imparted onto the garment (Muthu, 2019).

Moreover, as Muthu (2019) highlights, the risk of water pollution causes irreversible damages and can also increase if a company does not use adequate treatments after its utilisation. Some machines such as CDR and CBR systems and many other systems as UV, digital printing, nanotechnologies and similar, use a low water ratio but they are still not known by the major part of the industry.

The barriers that the companies face regarding reduction of water consumption are the initial investments (i.e. buy machines) and subsequent adjustments (i.e. possibility

that machines do not provide a uniform application and could lead to have materials with less viscosity) (Muthu, 2019).

The water consumption is strictly related to another important challenge to face during the production stage: material definition and its working process. Hu et al. (2014) underline the issues that the choice of materials could bring to higher or lower water consumption as well as many chemicals that could heavily damage the environment. The authors focus their attention on cotton and wool: the production process they require needs high quantities of water and chemical substances like pesticides. To emphasise this problem, Moretto et al. (2018) add that over 8000 synthetic chemicals are needed in order to transform the raw cotton. Moretto et al. (2018) introduce also another topic that can represent a barrier within a more sustainable operation management: the control factor.

On the other hand, also synthetic fibres can have an impact on the amount of waste produced. Indeed, they need a huge quantity of power and non-renewable sources (Hu et al., 2014). A solution is proposed by Shen (2014) and consists of the utilisation of organic cotton, that does not need fertilizers or pesticides during the production process. However, he argues that the processes to produce the raw cotton need a huge investment. Nevertheless, Nassivera et al. (2017) claim that this investment allows some other savings such as the ones in terms of energy: in 2015 with organic cotton, about 289 million kilowatts of energy were saved, other than saving 92,5 million kg of carbon dioxide and 218 billion litres of water. In their study, they introduce an important aspect: a larger set of customers is becoming more and more aware of the benefits of the organic cotton and they are willing to pay it more. Moreover, companies can also promote behavioural change and show to the society their sustainability commitment (developed later in the section).

Another commonly used fabric that can be considered disastrous for the planet is the polyester. According to Palacios-Mateo et al. (2021), more than half of the fibres uses oil-based polyester for its production; moreover, the trend of producing polyester is increasing and increasing, doubling in 20 years and representing the 90% of world filament production (Utebay et al., 2020). The process to produce this material starts with the extraction and refining of crude oil used to produce polyethylene terephthalate (PET) that is manufactured with the addition of other additives. Following this trend, by 2050, 300 million tons of crude oil will be used in the fashion industry (Utebay et al., 2020).

Palacios-Mateo et al. (2021) also add that the dyeing and finishing steps are the most unsustainable in terms of climate change, waste of water, resources withdrawal and human health. In their study they underline the lack of transparency and poor sorting of waste, as barriers to discard clothes in a sustainable manner. Interestingly, a recent research conducted by Satti and Shah (2020) draws the attention to the chemical reactions in the laboratory environment to dispose polyester. They demonstrate that PET can be actually degraded with the use of microbial enzymes, but this would be complex in a real environment and more dedicated studies are necessary to a sustainable waste management of polyester. Thus, it follows that lack of transparency and poor sorting can be still considered as barriers, but they are strictly connected to the lack of research on the biodegradation matter. More studies should be done in order to develop new methods and collections systems to manage the waste of polyester properly.

Regarding transparency, Henninger et al. (2015) clearly state that this factor is ensured only within micro-organisation that have sustainability as their main value and therefore are more interested in developing research and find alternative solutions to waste management. On the other hand, Kunz et al. (2020) in their structured literature review, highlight the urgent need for research throughout the production process but

asserts that the small companies could have problems with CSR's setting because of the limited economic means they have.

Within this paragraph about the operations management, it is important to mention also the waste in terms of clothes disposed before their sale, known as "pre-customer textile waste" (textile swatches, offcuts, cut and sew waste and end of rolls, selvages, sampling yardage, shearing, damaged textiles, clothing samples and unsold) (Redress, 2017). Clean waste consisting of an average of 15% of the fabric, is usually sent to the landfill or incinerated instead of being reused, even if it is simpler to recycle than post-customer waste (Lau, 2015). Though, this amount of waste depends on the requirements in terms of shape and seams the garment needs and this can be considered as a high barrier to overcome, determined mainly by the stylist and the trends.

2.6 Distribution

Transport and logistics strategies in fashion industry can represent critical competitive advantages for the firms, because of the significant number of collections that have to satisfy a more and more picky customer in the shortest delivery time possible. It depends on the type of the company and on its core business, for example fast fashion turns the stock about every two or three weeks while a slow fashion company develops a new collection twice a year (Henninger et al., 2015). Moreover, in order for the firms to produce the pieces with lowest labour costs, products are imported from different continents and long trips are required to move them; according to a research made by the European Commission, fashion industry represents the 7% of the world total material's exports (European Commission, 2013). In particular, Fernie and Sparks (2019) in their book, focus their attention on the impact of online retail logistics, that has increased more and more especially after the pandemic incurrence. However, according to Šajn (2019) the phase of distribution and transport accounts for only the 2% of the

impact the industry makes, in terms of climate-change. Nevertheless, it is important to consider also this phase when dealing with waste management, considering that transport and distribution contribute heavily to the increase of carbon footprint in the industry (Hu et al., 2014; Granskog et al., 2019). The design of a transportation system that minimises the emission and optimises the loads could be a solution, as reported by Shen (2014), but the organisation could face some barriers in terms of customer satisfaction and ability to design the supply chain properly.

Another aspect that must be consider regards the packages, tags and bags. Most of the time firms use plastic and paperboard to protect clothes but sometimes they adopt not needed materials; as Karaosman et al. (2018) claim, luxury brands, that tend to produce closer to the market, on the other hand provide oversized packaging to carry the garments and shoes. In their research, they also add that the vehicles are not fully loaded in order to satisfy quickly the demand and not to incur the risk of ruining the packaging. Lesti (2017) holds a similar view and compares it with fast fashion industry: many fast fashion companies are shifting their packaging' material to a more sustainable solution while luxury firms want their packaging to represent the high value of the product inside them. Thus, the barriers to transition to a different waste management can also be strictly connected to the business strategy of the firm and to the image it wants to show to the clients since the packaging is considered as waste if not properly recycled or fully made with ecologic materials.

2.7 Common barriers

The previous paragraphs have highlighted the major barriers the literature shows specifically on the stages of the supply chain. Therefore, it is possible to identify some barriers, that are connected to the organisation and strategy of the firms and that are not strictly linked with any of the stages listed above.

The implementation of sustainability practices within the stages of the supply chain is a financial and temporal investment (Fletcher and Grose, 2012). They also focus the attention on the barriers related to the know-how needed to change the way to manage waste or to adopt different strategies. This is a responsibility of the top management, that often lacks commitment and awareness of the problem, as underlined by Oelze (2017), that further explains how financial constraints could act as drivers, especially if the size of the company is small.

Moreover, it is also important to identify external values, such as the “customer awareness”, a wide topic that has been discussed in many publications. De Brito et al. (2018) claim that clients are becoming increasingly sensible to these concerns but that they are still not ready to change, especially in terms of consequences and costs that sustainable garments could cause. Lesti (2017) partially anticipates this statement, asserting that customers are more and more concerned about the sustainability and waste issue but are sceptical of the environmental statements that companies make; therefore, this prevents them from making a sustainable choice.

Indeed, many firms adopt some strategies to show commitment with regards to waste, but without a real dedication and only for marketing purposes: this phenomenon is called “green washing” and is considered exactly as something the sustainability’s real advocates want to avoid at all costs (Markham et al., 2014). It is important to mention the concept of green washing in the waste management’s context because the commitment and CSR (Corporate Social Responsibility) of the firms depend first of all on the willingness to be sustainable that is driven also by the customers that could represent a barrier to transition (Parguel, Benoît-Moreau and Larceneux, 2011).

The Table 1 shows the barriers to transition proposed by the literature in the rows, while the columns report the related academic sources.

2.8 The research gap

As discussed in the Chapter two, the literature is very broad on sustainability of waste management in the supply chain of fashion industry and the barriers identified are many and strictly interconnected each other not. Moreover, the barriers and their relevance change according to the contexts the firm is positioned and to the target clientele it has. Indeed, there are not specific studies that focus their attention on the topic of waste management, based on different types of companies; there is no clear evidence of the connection among contexts and related relevance. Therefore, for a fashion company that aims to manage waste more sustainably, it is challenging to know which are the highest barriers it has to overcome and to which it should be prepared.

Thus, this dissertation seeks to identify which are the barriers that can really prevent the firms from being sustainable, according to two specific contexts investigated: the former context is represented by fashion international firms that have not sustainability as their main value and the latter one considers Italian little or medium fashion companies that have started up as sustainable and whose main value is sustainability. The study also aims at investigating the relevance of the different barriers highlighted, by making comparisons and differences among them.

Hence, the purpose is to fill the gap in the literature by answering the Research Questions:

Overall Research Question: Waste management: Which are the critical barriers to transition to a sustainable development fashion industry should overcome?

Sub – question 1: Which are the barriers and their relevance for an international company?

Sub – question 2: Which are the barriers and their relevance for a company that started up as sustainable?

By presenting and comparing different points of discussion, the aim is to classify the barriers according to their relevance in the contexts investigated, in order to help fashion industries understand on which factors they should focus, since sustainability is a challenging objective to achieve.

3. Research methodology and methods

The methodology chapter follows the structure proposed by Saunders et al. (2019), called “Research Onion” that has been chosen to investigate the research topic as deeply as possible. The Figure 1 represents the phases needed to develop the research strategy just mentioned.

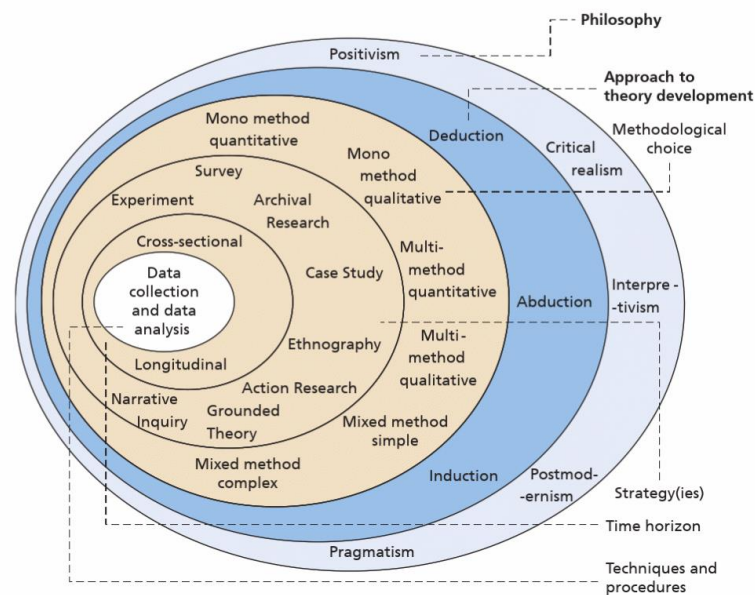


Figure 1. Research Onion (Saunders et al., 2019)

Starting to read the diagram from the external layer, each stratus of the onion provides more and more detail on the research process, as the reader advances from one layer to the next ones.

3.1 Philosophy of the research

The research philosophy relates to the assumptions and attitudes about the understanding of the situations and circumstances under study; in particular, in the research process, the philosophy helps to understand how the knowledge has been developed in a particular field (Johnson and Clark, 2006).

3.1.1 Philosophy

There are many types of views in the literature to investigate and look at the circumstances when dealing with the research methodology. The philosophy chosen is very important because it strongly affects the results and findings of the research and is fundamental to justify the methodology (Saunders et al., 2019).

According to recent studies, it is better to consider the philosophy adopted as a set of “multi-dimensional set of continua” and not as independent views (Niglas, 2010). The following sections concern ontology and epistemology, that allow a deeper and clearer understanding of the methodology’s aims.

3.1.2 Ontology

Ontology concerns the nature of reality and studies the science of being. It is connected to the view of the social entities with subjectivism or objectivism (Saunders et al., 2012). The latter, subjectivism, is the ontological position that best suits the topic investigated within this dissertation. Indeed, according to it, the social entities behave and interact with social actors, that are part of the reality and contribute to affect the social entities’ existence (Blaikie and Priest, 2019).

To approach the research, the objective view would not fit well, because the aim is to investigate the perceptions and the individual picture human beings give to the topic. The term “subjectivism” is strictly correlated to the term “social constructionism” according to which the reality is socially constructed and therefore, in this study the experts in the supply chain and fashion fields offer their interpretations on the circumstances they found.

The challenge the researcher has to face is represented by the interpretation and organisation of the subjective reality that the stakeholders give, to deeply investigate their perceptions, observations and experiences (Saunders et al., 2012).

3.1.3 Epistemology

The term epistemology takes its roots from epistēmē (ἐπιστήμη) that means “real knowledge” and logos (λόγος), “speech”. It deals with the approaches and methods aimed at investigating the deep knowledge in the field of study (Hallebone and Priest, 2009). Hence, according to Saunders et al. (2012), epistemology answers the question “What is considered as acceptable knowledge?” hence it studies what the researcher considers as important to address the research topic.

The Figure 2 shows all the research philosophies considered in the epistemology of business and management research.

	Pragmatism	Positivism	Realism	Interpretivism
Ontology: the researcher's view of the nature of reality or being	External, multiple, view chosen to best enable answering of research question	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple
Epistemology: the researcher's view regarding what constitutes acceptable knowledge	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data	Only observable phenomena can provide credible data, facts. Focus on causality and law-like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions
Axiology: the researcher's view of the role of values in research	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective
Data collection techniques most often used	Mixed or multiple method designs, quantitative and qualitative	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative

Figure 2. Comparison of philosophies in business research (Saunders et al., 2019)

The aim of the research presented is to achieve some unmeasurable aspects such as feelings and attitudes of the experts transmitted to the researcher.

Consequently, among all the research philosophies associated to epistemology and showed above, the one that best suites the issue of waste management within the fashion industry was the Interpretivism.

According to this philosophy, human view is very important in order to reach the entire picture of the world observed. Interpretivism is also called Interpretivist and, in contrast with the Positivist philosophy, allows the researcher to use his or her perception as part of the data collection (Myers, 2008). Thus, one of the aspects of the research is represented by the focus on the details of the situations and the hidden perspectives behind them (Dudovskiy, 2018).

When dealing with such a burning topic as sustainability in fashion industry, it is fundamental to access and analyse the language, consciousness, attitude and behaviour of the people, enclosed in this philosophy with the term “social construction”. Since sustainability is a controversial issue and unique, it is considered as “a function of a particular set of circumstances” (Saunders et al., 2012). Therefore, a subjectivist perspective is developed and the awareness that the knowledge generates is dependent on many factors such as the time, the culture and the situation. Moreover, in contrast to the positivist philosophy, the approach to the interpretivism allows an interactive relationship between the subject and the researcher.

3.2 Approach to theory development

The second layer of the onion is represented by the Research approach. It is very important to state the approach when starting a research because it represents a fundamental basis to develop the methodological choice and the strategies (Saunders

et al., 2019). There are three different types of approach: deductive, inductive and abductive.

The research developed within this dissertation uses an inductive approach, that is aimed at generating new theories from the data found. When using this approach, the researcher makes generalisations and shows common themes without formulating hypothesis before starting the research (Bryman et al., 2015). The process followed by the inductive approach is well represented in the Figure 3.

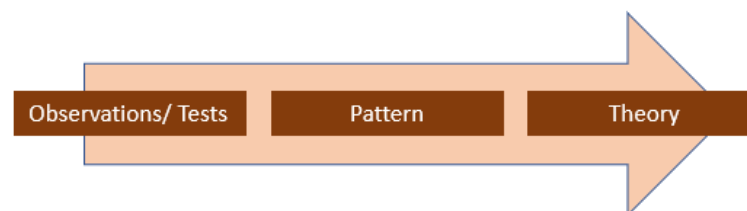


Figure 3. Route to follow in inductive approach for research.

The inductive approach best suits the topic because there is no hypothesis to formulate prior the research, since the literature review has evidenced the gap according to which there are many barriers, but “critical” barriers according to different contexts are not clearly highlighted yet.

Therefore, fashion companies that want to approach sustainability for the management of their waste, are not prepared about the major challenges to face. As argued before, this research is aimed at investigating viewpoints and perceptions of the stakeholders involved; hence an inductive approach is considered as the best tool to reach the objective.

3.3 Research design

3.3.1 Research methodological choice

To well address the research question, it is possible to choose from mainly two types of methods for the research design: quantitative and qualitative.

The former involves generally numeric data and uses questionnaires and statistics to pursue the objective, while the latter is used for non-numeric data and approaches the research with interviews or qualitative approaches (Saunders et al., 2012). The qualitative methodology best fits with the purposes of this dissertation because sustainability in fashion industry needs to be captured with a conceptual framework to analyse all the nuances of opinions that only discussions and reflections can give. Moreover, with the qualitative methods, it is possible to reach a very sensible and cognitive vision of the topic, that is something fundamental when investigating in this context (Kumar, 2018).

In the sections that concern ontology and epistemology it was claimed the interpretivism and subjectivism this research wants to pursue. Indeed, the methodology chosen is suitable with the two philosophies analysed.

Moreover, it is important to underline that this dissertation is mono method, therefore it involves only the qualitative method. However, as it is explained in the section 3.4.1 “Data collection and analysis”, the questionnaire comprehends a question that needs a quantitative answer, in which the respondents have to give a quantitative score to the barriers proposed. This choice has been made in order to capture the opinions of the participants regarding all the barriers and to deeply understand if some barriers were omitted during the interview intentionally or were simply forgotten. Therefore, the participants, when they were given the scores, added precious information and opinions

regarding each barrier. Since it is only one question, this study cannot be considered as a multi methods one.

3.3.2 The nature of the research design

To address the research question proposed, the nature of the research design should be discussed and claimed.

It has been decided to explore the research area through exploratory and descriptive studies. The former is used to gain insights about the topic by relying on the contributions experts give (Saunders et al., 2012). According to the insights obtained, it is possible to reach new data and deepen the highlighted issues, thanks to the flexibility of the research design' s nature chosen.

On the other hand, the descriptive nature is helpful to draw some conclusions regarding the topic investigated. The research pursuing the nature mentioned, aims at capturing the experiences of the interviewees. Hence, it has been decided to synthesise the data collected to reach some significant findings supported by all the insights given by the exploratory nature.

3.3.3 The research strategy

The research strategy determines the means the researcher uses in order to answer the research question linking the topic with the philosophy chosen in the external layers of the "research onion" (Saunders et al., 2012). According to Saunders et al. (2012), there are a lot of strategies to use: experiments, surveys, archival research, case studies, ethnography, action research, grounded theory, narrative inquiry.

The strategy chosen for this study is the case study and it is driven by the objectives of this research, the purposes and the approach explained in the previous chapters.

As claimed by CASE (2019), case studies aim at exploring situations and issues in order to draw generalisations and identify key features by using analytical frameworks. The objective relies on pursuing a high number of different situations to compare the contexts and highlight the similarities.

The choice of the case study as research strategy implies the analysis of the complexity of a context, by investigating all its facets (Yin, 2018). Hence, since this dissertation aims at exploring the different opinions of experts regarding the waste management in fashion industry, it would be important to address the research using the strategy mentioned, that would allow the identification and comparison of critical features to draw important conclusions.

As claimed by Ellram (1996), case study methodology in the logistics field can perform vigorous design and rigorous analysis. It concerns the capacity to analyse data in a objective way but at the same time explore the researcher perceptions, by identifying patterns and issues. She also suggests, in accordance also to what Yin (2018) explains, that the credibility is one of the most important aspects to gain. Therefore, it is important to make the process of the case study explicit, in order for the reader to judge the methodology him/herself.

This is the reason why validity and reliability tests are considered important requirements for a good case study research development.

Considerations on validity and reliability tests

According to Yin (2018), the research analysis, in order to be acceptable and reliable should be tested according to different levels of research. Indeed, some tests have been used for this research to check its conformity.

The Table 2 shows the tests of validity and reliability in the case study research, together with some useful tactics that ensure the acceptability.

The types of validity and reliability are listed and explained below:

- Construct validity refers to the level the data are conceptualised and the consistency to the main topic.
- Internal validity checks the relationship of cause- effect among variables and results obtained.
- External validity refers to the generalisation of the domain of findings, that means it determines if the findings are generalisable.
- Reliability aims at minimising errors in the data collection in order to reach the same results in case the data were collected using the same process.

Table 2. Design tests and measures implemented (Yin, 1994)

Tests	Case study tactic	Phase of research in which tactic occurs
Construct validity	<ul style="list-style-type: none"> • Use of multiple sources of evidence • Establish chain of evidence • Have key informants review draft case study report 	<ul style="list-style-type: none"> • Data collection • Data collection • Composition
Internal validity	<ul style="list-style-type: none"> • Do pattern matching • Do explanation building • Do time-series analysis 	<ul style="list-style-type: none"> • Data analysis • Data analysis • Data analysis
External validity	<ul style="list-style-type: none"> • Use replication logic in multiple case studies 	<ul style="list-style-type: none"> • Research design
Reliability	<ul style="list-style-type: none"> • Use case study protocol • Develop case study data base 	<ul style="list-style-type: none"> • Data collection • Data collection

3.3.4 The Research's Time Horizon

According to the objectives of the research, it is possible to select a specific time horizon: cross sectional or longitudinal.

The cross-sectional study analyses a situation at a specific time and the connections and divergencies among different factors in a specific moment (Iovino and Tsitsianis, 2020). Therefore, the cross-sectional study fits very well with this dissertation's research. Indeed, the objective is to capture the perspectives of the interviewees regarding sustainability in fashion industry at this time in history, to understand how this issue could change and improve according to them. Thus, the purpose is not about analysing the evolution within this field, as proposed by the choice of longitudinal time horizon.

It is also important to claim that the time given for this dissertation would not have allowed to have significant results, if it had been decided to use a longitudinal time horizon. Indeed, it would take at least two years of data collection to analyse the change and development of the topic addressed in this research.

3.4 Research Techniques and Procedures

This section illustrates the last layer of the onion: the research techniques and procedures, that represent how the data have been collected and how the steps to answer the research question have been developed.

The Figure 4, drawn by the author of this dissertation, represents a brief scheme showing the sequence followed to reach the main milestones for research design, data collection, analysis and findings.

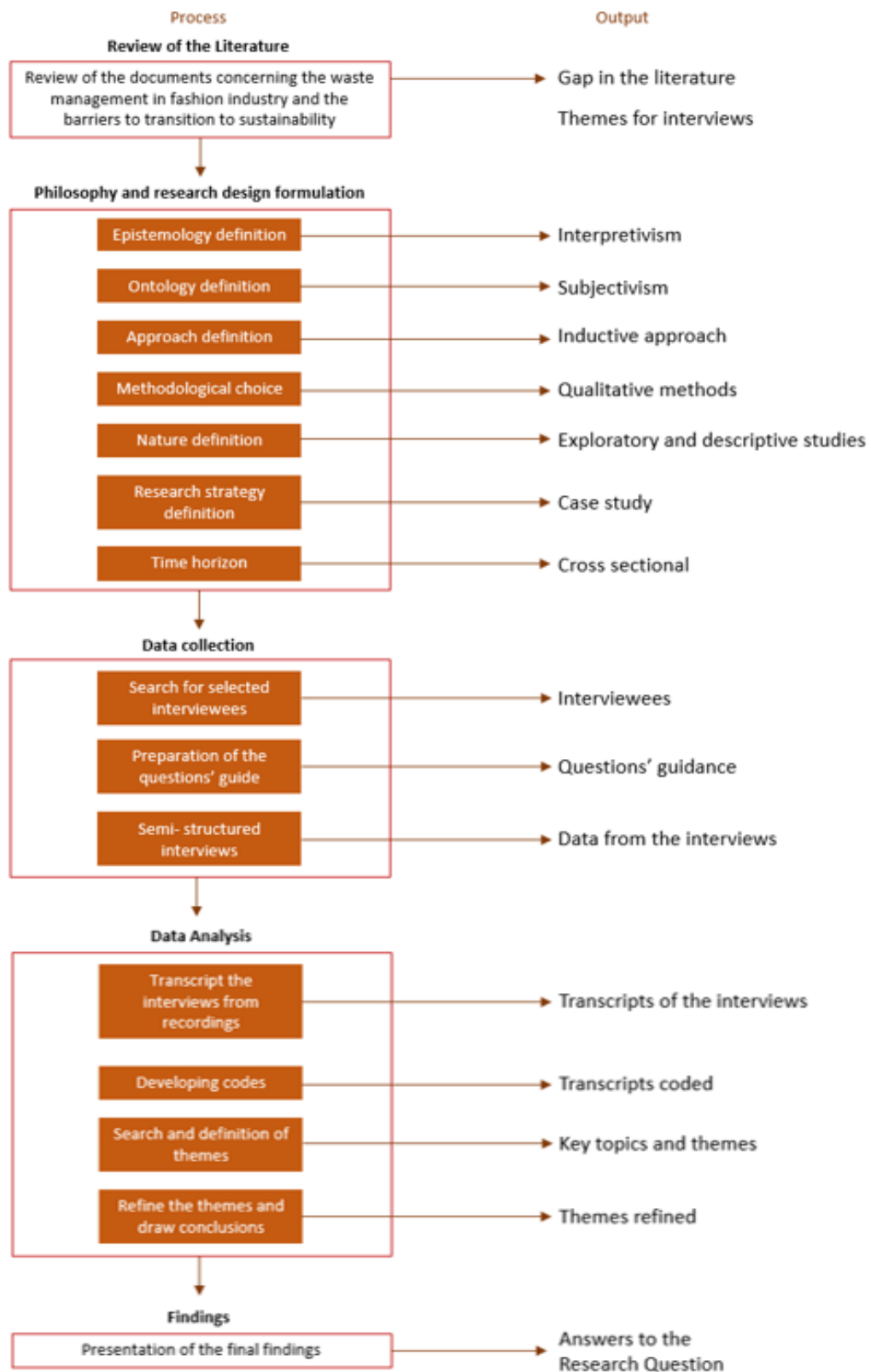


Figure 4. Research Framework

3.4.1 Data collection and analysis

The data collections' tools chosen by the researcher are strictly dependent on the approach used and deeply affect the reliability and validity of the research (CASE, 2019).

The technique in this dissertation uses primary data that are collected by the semi structured interviews. This type of interviews involves a list of key questions that will drive the meeting (Saunders et al., 2019). In the Appendix 1 it is shown the list of questions just mentioned that has the role of a "guide".

Since in the epistemology, the interpretivism was the philosophy chosen to address the methodology, the questions that have been asked during the interviews followed a flexible approach without having a determined order, with a slight change according to the flow of the discussion. Hence, depending on the respondents and the answers given, the questions have been modified.

The interviewees have been contacted mainly through LinkedIn and Instagram by the researcher.

It is important to underline that all the interviewees are experts in the supply chain within the fashion industry field and have been chosen following two main categories. The first set of respondents (5 interviewees) worked for international firms that do not have sustainability as its main value, while the second set (7 interviewees) for Italian small or medium sized companies that have started up as sustainable. Indeed, the background of the participants is very important to interpret the answers given and to answer to the research question. Furthermore, the researcher has chosen the respondents according to their professional position and the context in which they work, so that it was possible to deeply address the questions and the barriers connected to each context. Additionally, the participants have been chosen also according to their years of experience, that is at least 3. A specific academic background was not a

requirement; indeed, the researcher believe that the experience on the field is very important and can lead the participant to be experienced, bringing new valuable points of view to the research.

However, especially for the international companies that do not have sustainability as their main value, it has been decided to chose respondents that know the problem of sustainability and how sustainability is perceived by their firms.

With the interpretivist approach, even if the interviews have a structure, the conversations are meant to discover new themes and perspectives, as also mentioned in the previous paragraphs. Moreover, it has been decided to use an action research strategy, that allows the researcher to have a high engagement in interviewees' s discussion and to develop natural and spontaneous meetings (Saunders et al., 2019). The questionnaire comprehends different questions that are aimed at capturing the barriers, indeed they are meant to open deep discuss.

In order to understand the impact and the relevance of each barrier and to make every respondent deepen it, the last question is quantitative. Indeed, the respondents have to give a score to the barriers proposed by the researcher according to their difficulty to be overcome. Thus, every participant has to express his or her opinion to every barrier. According to Miles and Huberman (1194), the link between qualitative and quantitative data allows an enrichment of the analysis by confirming or contradict the results.

Since the topic is really complex and dynamic, the flexibility and the ability to capture the experiences of the respondent is fundamental to conduct a good analysis.

The interviews will be conducted on a one-to-one basis, using Microsoft Teams or calls over the telephone, due to the Covid–19 pandemic restrictions that do not allow to meet the participants in a physical place.

The Table 3 shows the data and demographic information related to each respondent that have been useful to compare the results.

Table 3. Interviewees' information

Interviewee	Academic Background	Context	Commitment of the firm to sustainability (yes/ no/ just approached)	Years of experience in the fashion field
I1	Management Engineer	International company	No	3
I2	Economics	International company	Just approached	8
I3	Mechanical Engineer	International company	Just approached	3
I4	Sustainability and communication	International company	Just approached	6
I5	High school	International company	Just approached	30
I6	Lawyer	Sustainable company	yes	3
I7	Management engineer	Sustainable company	yes	5
I8	Fashion Design	Sustainable company	yes	14
I9	Fashion culture and Techniques	Sustainable company	yes	8
I10	Fashion Design	Sustainable company	yes	6
I11	High school	Sustainable company	yes	3
I12	Fashion Design	Sustainable company	yes	7

The language of the interviews was the Italian, since all the participants were Italian. All the interviews have been recorded and translated; the transcripts are provided in the Appendix 2.

3.4.2 Data Analysis

The data analysis is conducted using a technique that is quite applied in qualitative research, called Thematic Analysis. According to Saunders et al. (2019) it is useful to categorise and summarise huge and different amounts of data by identifying important themes and drawing conclusions. The analysis of the collected data is developed through NVivo, a software provided by the University of Hertfordshire, that eases coding and organising information.

The path for data analysis can be divided in different steps that are described in the following bullet points (Saunders et al., 2019).

- 1) Coding the data: the transcripts are fragmented in parts according to their meaning; to each of the “paragraphs” a label is assigned in order for the researcher to access data easily and to develop the analysis.
- 2) Search and definition of themes: many summaries are developed to understand and synthetise the main topics.
- 3) Refine the themes and draw conclusions: redefinition of the themes by checking the activities in point 2. This phase is fundamental to create connections, to discover divergences among the themes and to highlight the findings.

3.5 Ethical considerations

In the methodology chapter it is important to clarify which are the possible ethical concerns that could arise, to be able then to deal with them in case of occurrence (Saunders et al., 2019). The researcher is external to the organisations to which the

interviewees belong, therefore the participants do not feel the “pressure” or the stress caused by a possible information’ s disclosure within the firm.

On the other hand, an external researcher could confine respondents not to say much of the organisations in which they work because they could be afraid of sharing confidential or private information. Therefore, as argued before, it is critical to build a relationship of trust with the participants, assuring them that all the information will remain confidential. Moreover, the recordings have been destroyed after the transcripts were made and the names of the interviewees and firms are anonymised. Hence, even if sustainability in fashion supply chains could be a sensitive matter, the respondents should feel secure and give their consent to increase the research in this field. However, they have the rights to withdraw from the interview whenever they prefer, if they do not feel at ease with the questions proposed.

A clear explanation of the purposes and scope of the dissertation is given to the participants and integrity is promised. Furthermore, the University of Hertfordshire has a clear protocol made by the Ethics Committee, to which every researcher adheres, and a consent form is signed by the interviewees. Nevertheless, some respondents could allow the researcher to mention their fashion companies as a title of example of some initiatives implemented with the waste management.

3.6 Research possible issues and limitations

This paragraph underlines the issues and limitations that the researcher could face due to the research methodology chosen. As Saunders et al. (2019) suggest, the use of interviews as research method, could lead to some forms of bias. There are three types of bias: the first one is called “interviewer bias” and is connected to the possibility that the researcher imposes his or her opinion on the respondents’ answers; the second one

is the “response bias” that could cause an incomplete view of the issues investigated. Lastly, the third type of bias is called “participation bias” and is related to the time needed for the interview: someone could decide not to participate or ask for a less time-consuming meeting.

Moreover, if the interviews are not conducted sensibly and with attention to all the details and nuances of the conversation, the research could lack of validity. Therefore, it is important to build a solid relation with the interviewer, made of trust and clarity. Regarding the possible issue just mentioned, the impossibility to conduct face to face interviews could increase the risk of creating a gap or detachment between the researcher and the respondent.

Some respondents, when providing their answers, could be influenced by external factors and experiences that could vary among them, hence the data collected could diverge. This could be considered a limitation (because it is not possible to have a participant that has the knowledge about everything) as well as an advantage (because every respondent can give his point of view from different perspectives).

As claimed previously, the questions vary according to the answers given but the researcher could face some difficulties if the respondent gives short answers and is not open to the discussion. In that case the student would wait for further explanations maybe by asking the reasons of his answer or helping with a better clarification of the question.

It could also happen that the answers provided does not properly respond to the question and that the participant deviates a bit without answering. In this case, it could be useful to take notes of everything he or she says because it could be helpful to capture perceptions about a specific topic. On the other hand, the researcher should also try to provide a direction by helping the respondent to draw conclusions and giving references to the question.

Concerning the limitations on findings and the analysis of the interviews, it is not possible to interview a high number of experts due to time constraints, hence the analysis could lack of some aspects regarding a theme that have not emerged during the discussions. It is the primary purpose of the researcher to deepen the topic as much as possible with the interviewees chosen.

4. Data Findings and Analysis

The research' findings chapter is aimed at presenting the results of the analysis conducted after the collection of primary data through the interviews. As anticipated earlier, the respondents belong to two main different contexts, according to what is explained.

The chapter is divided in different sections whose objective is to answer to the research question in detail. The approach to present the topics is the one suggested by Miles and Huberman (1994), according to whom a cross-case analysis follows a within-case analysis. The former's objective is to present the evidence representing the findings connected to the first scenario and the second one respectively, while the latter shows a comparison of the commonalities and divergences regarding the two different sets. However, in the within-case analysis there are some sporadic references that anticipate the cross-case, in order to allow the reader to follow the flow of the discussion.

Thus, the first section specifies which are the barriers (and the related difficulty to overcome) to transition to a sustainable waste management for the international enterprises that do not have sustainability as their main value. The second section investigates the specific barriers for the Italian SMEs that started up as sustainable. Then, the third section aims at highlighting the barriers that have not been mentioned in the literature review, and the reasons why they are considered as challenges to transit to sustainability. The fourth one explains which are the barriers investigated that are common for both the groups interviewed.

Then, the fifth section shows and discusses the results related to the quantitative question of the interview whose aim was to give a score in terms of "difficulty to overcome" to the barriers highlighted in the literature.

It is important to highlight that some interviewees have work experiences in both the contexts investigated, therefore the findings for the two sub-research questions show the data collected from all the interviewees and not specifically from the related group.

Lastly, the sixth paragraph suggests the implications and the possible future directions, according to the analysis, on how the fashion industry is changing and will change in the future according to sustainability concerns. The objective of the paragraph is to highlight the possible future scenarios that the society will have to face in terms of sustainability transformation.

4.1 Barriers and relevance an international company has to face (RQ1)

This section is aimed at deepening the barriers an international company has to face in the transition to a more sustainable waste management.

The main barrier to which all the others are connected is represented by the core business of the company and the main target customers the company addresses. This has emerged as the major challenge; it is almost impossible to change the core business, therefore only small continuous improvements are possible, point agreed also by Henninger et al. (2015).

According to the respondents, even just one sustainability-aimed project can make the company considerable as completely sustainable. An interviewee said: "The company considers as sustainable a process that has made even little improvements towards sustainability" (interview I3), another respondent: "there were sustainable projects aimed at creating only the linings of the suits with sustainable materials" (interview I1) and another one: "they have changed all the packaging of the bags, and the company has given the city 50 oak trees" (interview I9). Other companies understand that they cannot change how they are operating, due to economic problems, therefore

they address the social aspect of sustainability caring about the workers and customers' health, as confirmed by one respondent: "despite the fact that production is carried out in China and Bangladesh, the company has always taken care both of the protection of employees with whom it has undertaken joint ventures in both countries" (interview I5).

As also claimed by the literature, it is obvious that a brand who has to keep an extremely low price for a t-shirt cannot produce in Italy and therefore the company cannot choose. A respondent claims that: "The goods arriving from China and Bangladesh travel by ship, but (...) there are currently no alternatives. One of the objectives is to return to producing entirely in Italy" (interview I5). If there are no margins to increase the price and move the production, it is impossible to be "fully sustainable". Accordingly, the production in Italy is much more expensive, due to cost of labour and requirements in terms of wastes in the production process. In the last years, companies are more and more interested in acquiring certifications to verify (and then share) the quality and low impact of their processes. In Italy some certifications have been recognised by the nation that have made them as mandatory, therefore the law on waste management is quite strict. From the interviews it turned out that the multinational companies seek for certifications more than the small companies. There are certifications (such as FairTrade or ISO) for the production process but also for the product and, as a respondent claims, "the only certifications some companies have is on the material, but the production is done in the Far East" (interview I4) and another one: "many companies aim to have certifications but without really being sustainable" (interview I11).

From the interviews, it has emerged that the society is moving in the right way, but the problem is that in some countries it is almost impossible change the situation. Moreover, many companies take advantage of the broad law in other nations to produce there. An interviewee introduced a concept that maybe could turn the trend around, if implemented "At the legislative level, the "extended producer responsibility" (EPR) is

being introduced, based on a European directive. This directive is fundamental because whoever produces will be responsible for the disposal of the products he puts on the market. This is currently the case for tyres: part of the price the consumer pays, is for the disposal of the product” (interview I6).

To deeply study the barriers and their origin, the researcher has decided to highlight in this discussion two types of behaviour emerged in the analysis: the first one that do not care about sustainability but tries to approach the sensible client, and the second one who is aware of the problem and tries to reduce waste as much as possible, even with the introduction of minor initiatives. However, the results of the data collected show that the major part of the companies where the interviewees work, is part of the former behaviour and aim at sustainability only for profit purpose: sustainability is seen as a trend to pursue, and the objective is to satisfy the client with the minimum effort. This was confirmed by all the interviewees when the topic has been introduced.

Accordingly, the phenomenon of the “greenwashing” is spreading more and more. An interviewee claimed that “IKEA, despite the publicity it makes about sustainability, is obliged to accept the return of anything purchased by the customer and all returned goods are thrown away. Even the big fashion brands accept returns to satisfy the customer and then throw them away because they are already worn or slightly damaged” (interview I4). Communication with the client has been considered by the respondents as the lowest barrier for the firm but at the same time the highest barrier for the client, that is consistent to the research of Parguel, Benoît-Moreau and Larceneux (2011). It is possible to communicate the real commitment to sustainability the company pursue or, contrary, make the client assume it without actually engaging in it. As an example of the latter behaviour, two respondents reported that some brands promote sustainable actions that however they are legally obliged to carry on.

With respect to what just presented, the customer plays a fundamental role and represents a medium-high barrier. Regarding the first context, the barrier is higher than the one in the companies started up as sustainable. Indeed, in the first case, the client should accept a change of price, in the second case s/he is already prepared to spend more. However, all the respondents agreed that the transition is driven only by the needs of the client and not by their purpose.

Unfortunately, the client has been accustomed to having the final product s/he desires in a very short time, with a low price. S/He is becoming more and more sensible, especially with the Covid-19 pandemic, but there is a big part of the society that still do not care about sustainability (this is why the barrier is medium-high) and also Lesti (2017) in his study confirms that. Indeed, in the context of a watch industry with a heritage of more than 150 years for example, it is difficult to transit to sustainability because the client gives much importance to the historical factor of the product and tradition. However, the client is considered as a high barrier because “becomes the nerve centre of the development of the strategy and many of the choices are driven by what the customer wants more” (interview I3). One respondent asserted that it is important to monitor the increasing request for sustainability and to understand when we will reach a point of break-even between the different customers’ requests. According to some interviewees, there will always be a big part of clients that do not care about the issue, therefore the regulation should become stricter.

Moreover, the companies tend to satisfy the client as much as possible: the free shipping, for example, leads to lose the sight of the pollution’s emissions for transport, as a respondent asserts: “If the customer is undecided on the size he is advised to buy both sizes he is undecided on and return the one he will not use” (interview I8). Additionally, often there are not full truck loads to ship the product as quick as possible.

The logistics barrier represents a problem indeed. Also in this case, the barrier is higher than the one faced by companies that started up as sustainable. A respondent made an interesting reflection on impact of the product's value on logistics: "The logistical impact, however remains quite limited because they are products with a very high density and value" (interview I3).

The barrier represented by the packaging has been evaluated differently throughout the interviews: according to some respondents this is an easy challenge to overcome. According to others, this is a very high barrier because "Packaging is definitely an issue, new packaging systems have 10 times the impact in terms of business costs. These new types of have an impact of 182kg of CO₂, while old packaging has an impact of only 11kg" (interview I2). Moreover, in case of products with a high value, "they need an important protection during all phases of the supply chain" (interview I3) and a certain aesthetic without being recycled, as also claimed by Karaosman et al. (2018). Moreover, big brands follow precise standards for the size of the packaging and often do not have time to choose the right box size according to the clothe size.

As also discussed in the literature review, being sustainable would mean having both the product and the process sustainable. From the interviews, the multinational companies tend to have only a sustainable product also because it has the highest impact on the customer perception. Therefore, for these types of industries, a sustainable product is a lower barrier than the development for a sustainable process, while for the other context investigated it is the contrary. Indeed, if there is a high control in the entire supply chain, the product would be sustainable as well. For example, the polyester or the leather that are not considered sustainable products have an impacting process of production in terms of pollution. About the leather a respondent asserted that: "you have to use only the best part of the crocodile snakeskin ...the most difficult barriers to overcome are related to cutting and discarding the worse parts" (interview I3).

Accordingly, the shape and the colour represent a not very high barrier because many of interviewees think that this is not a relevant factor compared to all the other wastes. Contrarily, a respondent asserted that the client is used to long lasting and easily washable materials while the products made with sustainable materials have not these qualities because more delicate. A respondent gave an interesting insight about this topic: “In the collective imagination, the simpler the product is and the more it is made with raw and natural colours, the more sustainable it is, but this is not always the case” (interview I9). This is the reason why fast fashion brands use light colours and straight shapes to increase the perception of the client on sustainability, that is consistent with the research of Lesti (2017).

Comparison small/ big companies

According to most of the respondents, a multinational industry has the economic means to change, while a small company could not afford to spend much but has a high flexibility. Thus, from the analysis has emerged that big companies could have more difficulties because they are subject to more regulations, contracts and standards. Additionally, the interests are enormous, “For them saving a penny means saving millions at the end of the year” as a respondent asserts in the interview I7. The Covid-19 pandemic has changed the perspectives and has been a turning point as a respondent claimed: “a company, especially in this historical moment after the pandemic, won't think about completely renewing its supply chain; on the other hand, if the company was to go bankrupt and couldn't find a way to change its business, it would start from scratch completely” (interview I4).

The Table 4 summarises the barriers highlighted for context 1, the barriers that each of them implies, as well as a comparison with the context 2.

Table 4. Context 1 summative table

Barriers	Comparison with the context 2 (↑ / ↓ than context 2)	Implicit Barriers associated
Core business	↑	Little projects that make the firm appear sustainable
		Social aspect
Production process	↑	Costs of production
		Certifications' acquisition
		Broad low in some countries
Communication	↓	Difficulty for the client to distinguish the sustainability commitment of a brand
		Greenwashing
Client	↑	Acceptance to price's change
		Push to be sustainable
		The client is accustomed to having all at once
Logistics	↑	Value of the product (incidence of logistics in the product's value)
		Geographical location
		Higher cost of labour in certain locations
Packaging	↑	Impact on costs (sustainable packaging sometimes has higher costs)
		Some products need high protection
		Packaging has to reflect the value of the product
		Standard sizes used

Sustainable product	↓	Choice of materials with high impact
		Client accustomed to easily washable materials
Shape and colours application	↓	Client accustomed to long-lasting colours
		Perception of the client on faded colours

4.2 Barriers and relevance a company started up as sustainable has to face (RQ2)

This section is aimed at analysing the barriers a small company that started up as sustainable has to face in the transition to a more sustainable waste management.

The researcher, regarding the interviews conducted in this context, felt that the respondents were more open and enthusiastic to talk about the sustainability issues, compared with the ones interviewed for the first context.

Obviously, for a firm that started up as sustainable, it is much easier to improve and to pursue a direction because there is a full commitment since sustainability is the main value shared.

There are different barriers from the other context investigated as well as others already shared, reported with a different relevance.

Communication represents a barrier emerged: it is often difficult to make the client understand the real value of the product s/he is buying, “what it means in terms of sustainability, and what it can mean to users” (interview I12). The clients sensible to the sustainability issues, that want to be aware of the product and the production process, are still a niche that is increasing more and more. Traceability and transparency are

values that cannot be omitted, indeed “the more the consumer is aware of the issues, the more will tend to understand the strategy” (interview I6).

The choices depend on the amount of money the customer is willing to spend. All the respondents agreed on the fact that sustainable clothes (made with a sustainable process) have a higher cost. Some respondents claimed that the customer often thinks that the price of sustainable product is too high, because s/he is not fully aware of the costs needed to produce the pieces that is a point made also by Jackson (2005). Something that is considered wrong in the sustainability world is that maybe the same customer is willing to pay the same amount or more for clothes made by big fashionable brands.

Sometimes the client has too high requests in terms of sustainability, in fact some fabrics cannot be sustainable. The material chosen is indeed considered as a high barrier for sustainability, a respondent takes the example of the technical, waterproof fabrics claiming: “There are no products with waterproof and breathable characteristics at certain levels that are not treated with chemical substances and solvents... There are 3 types: C6, C8, C10 the least polluting is C6. This lasts about 10 washes before losing the property, with the C10 you can wash it 50 times” (interview I7).

The material chosen is important for the disposal too, indeed a respondent argued that some materials such as paillettes make the garment almost impossible to be disposed. She claimed that “Few people know that a mixed fabric is much more difficult to recycle: mechanical recycling of fabrics is always done on 100% of the material (100% cotton, 100% wool)” (interview I6).

According to the interviewees there are also high barriers connected to the colours and production process. Therefore, an interviewee makes a distinction between “piece-dyed” and “yarn-dyed”: the former allows the use of many colours but involves also chemical baths and a high environmental impact, the latter has already a defined colour

with limited colour scale but does not need special treatments. Another expert indeed claims that: “Often sustainability brands don’t have great varieties of colours or special inserts, this is a big limitation for those who aim for aesthetics in their choice” (interview I8). Thus, as explained before, the barrier connected to the product is higher because the “sustainable product” is the result of a sustainable process, while for the other context where the client wants to see only a sustainable product (and does not care of the process) the possible implementation of a sustainable process would be a high barrier.

Logistics and the problems connected to the packaging, are considered lower barriers in comparison with the other context investigated. Indeed, the target client is more sensible and has the patience to wait, therefore the company can rationalise the orders. Usually, suppliers are close to the production because the manufacturing is done in Italy. The company in which one of the interviewees works, only ships on Tuesdays and Thursdays but this is not a problem for the customers because they are aware of the reasons. The same discussion can be applied to the packaging: it is not difficult to change it and the costs, above all for small-medium enterprises, are affordable.

The term “ethics” has emerged many times (5 times) throughout the interviews. It seemed that all the possible changes could be made with the aim to benefit the environment and workers. Hence, the first objective should consist of ethics, together with the profit of the company. An interviewee argued that: “A responsible way to sell encourages a responsible way to buy. There will always be a part of the clients that will appreciate your choices is responsible” (interview I7). And another one: “Instead of sustainability, I would talk about ethics, that is, trying not to waste” (interview I12). According to them it is a win-win-win system because the environment, the workers and clients take advantage of that.

It is important to highlight that the barriers presented are all connected each other and that in the interviews the respondents have made many links among them.

The Table 5 summarises the barriers highlighted for context 2, the barriers that each of them implies, as well as a comparison with the context 1.

Table 5. Context 2 summative table

Barriers	Comparison with the context 1 (↑ / ↓ than context 1)	Implicit Barriers associated
Commitment	↓	Core business
		Values shared within the company
		Ethics
Communication	↑	Client's sensibility
		Transparency's transmission
Price	↑	Acceptance of the price by the market
		The price for a sustainable product that has a sustainable process is higher
Material chosen	↑	Some fabrics can not be sustainable
		Disposal of the material chosen
Production process	↓	Technical know how
		Cost to invest in production machines
Colours' application	↑	Limited colour scale
		Aesthetic of the final product
Sustainable product	↑	Sustainable process
		Sustainable fabrics
Logistics	↓	Patience of the client to wait for slower deliveries
		Orders rationalisation

Packaging	↓	Impact of the cost of packaging in the total product's value
Client	↓	Client awareness of sustainable issues
		Customer's responsibility in the process of purchase

4.3 New emerging barriers

This section is aimed at showing some barriers discussed by the respondents that did not emerge from the analysis of the literature and the examples about sustainability projects that did not take off.

The Table 6 shows the new barriers that arose, together with the description and the impact that they have in regards to the contexts analysed.

Table 6. New barriers that were not identified in the literature

Respondent	Barrier	Description	Type of firm that has to face it
I2	Technology (or wrong technology use)	Production management should be monitored carefully in order to trace and understand which are the steps that cause the major amount of waste	International firms (context 1)
I2	Time	To reevaluate and change a supply chain, the time is fundamental, also to acquire the necessary know-how	International firms (context 1)

I1	Clothes disposal	Some materials could be made sustainably and be composed of sustainable materials, but their recycling or disposal could be difficult.	International firms and sustainable firms (context 1 and 2)
I1	Routes optimisation	Firms often design their supply chain with the objective only to reduce costs. In many cases the reduction of costs also means a reduction in terms of power and emissions, but these factors are not connected.	International firms (context 1)
I3	Client's perception on waste management	Waste management is an "internal" activity and, unless the client inquires, s/he will never face this problem directly and therefore all the efforts could be an advantage only for the environment without affecting positively the sales.	Sustainable firm (context 2)
I3	Product lifecycle	The firm leads the client to consume its product more and more, and the market leads to continuous updates of it.	International firm (context 2)
I3	Heritage	Especially in the firms that has established and iconic products for years, the heritage is a barrier that is difficult to overcome because the clients do not expect changes for some products.	International firm (context 2)
I4	Wholesales packaging	Packaging (made of plastic and paper) used to transport the products from the factory to warehouses or shops is often used once and then thrown away. This happens also for hangers.	International firm (context 2)

I5	Market request and competition	Customers request more and more clothes, trend increased by social media. This leads to high production and sales rates and indeed high levels of wastes. Moreover, the change of the collections cause the disposal of many tags, labels and boxes that were unused.	International firm and sustainable firms (context 1 and 2)
I5	Low incentives	Nations give very few financial incentives to the firms that care about sustainability issues and to the academic research.	International firms and sustainable firms (context 1 and 2)
I6	Overproduction and production stocks	The company struggles to understand how much to produce according to the customer's needs especially if they require very short delivery times. In the field of fashion it costs less and is quicker to produce more than required, leaving many discards	International firms (context 1)
I7	Minimum level of orders requested by suppliers	When a company starts to produce from the pattern, there are minimum orders you can do for the sustainable fabrics because often they have to produce them on request due to lack of sustainable products in the stock.	Sustainable companies
I11	Collaboration between the departments in the company	The technical department and the research and development area should strictly collaborate to improve the waste management in the phases of production of a new product.	Sustainable companies and international companies (context 1 and 2)

4.4 Common barriers for both the contexts investigated

This section explains the barriers that are common to both the sets of participants and just mention the ones whose relevance change according to the context; these have been already explained in the specific sections.

The first barrier that emerged widely in the literature and that has the highest relevance is represented by costs. There are many aspects linked to this problem and the financial issues remains the biggest challenge to overcome. This could prevent industries from implementing strategies or even from starting an analysis of the as-is situation. As one respondent said: “often the company is not so interested in adopting sustainable strategies because of the huge costs they require” (interview I1). The costs’ concern is connected to the financial investment to change the supply chain but also to the direct and indirect costs needed to sustainably produce the garments, assuming that a company has a sustainable waste management in its entire supply chain. The latter constitutes a problem, indeed the cost to produce the single item would consequently imply an increase of the price customers have to pay, as claimed also by De Brito et al. (2018). Indeed, a respondent said: “we wanted to create an extremely sustainable product ... with a zero-miles logistics with a selection of only environmentally conscious realities but we realised we could not do it. Indeed, you can't even imagine how much it would cost to make a shirt like that, our customers are not able to buy at these prices” (interview I7).

The direct costs of changing the materials and processes are only part of what this barrier really means, “cost of training staff and acquiring competent and experienced staff in the field is even higher” a respondent argues in the interview I1. Therefore, this barrier is strictly linked to the know-how needed to develop the change and this is confirmed by another respondent according to whom: “it is not worth buying such expensive machines without knowing their real potential in reducing waste or pollution”

(interview I4). Hence, it is needed a specific analysis on the company's requirements and many tests and attempts are needed to straighten out.

Nevertheless, know how is another major barrier that has been highlighted for both the types of companies investigated. Many respondents refer to the possibility to work with consultants if the company cannot build internally its know-how. Thus, as an interviewee asserts: "The barrier is lowered when the company has the resources to buy the skills" (interview I1). However, know-how, as a barrier, is not impossible to overcome, if there is a real commitment on behalf of the company. Indeed, a respondent stated: "if the top management is not prepared to the possible alternatives and is not ready for change, it is difficult to think sustainably" (interview I4), that is consistent with the findings of Oelze (2017). This is a problem that does not affect the companies that started up as sustainable, therefore this concept is deepened in the previous paragraph. Besides to the possibility of training the employees or rely on consultants, the interviewee I8 claimed the existence of companies that produces gadget for the firm (such as pencils and stationery) only with firm's waste.

Though, there was a respondent that considered know-how as a workaround problem because universities are increasingly offering university courses focused on sustainability, training experts in this field. Thus, if the company needs to hire personnel, it could require that the new hired have knowledge about sustainability matters.

Regarding the know-how as a barrier, the highest challenge is to seek to suppliers that have the same (or higher) level of know-how in terms of sustainability. According to the respondents they represent a very high barrier to overcome because in both the contexts investigated is not easy to find suppliers that share the same values as the company, that is a point made also by Becker-Leifhold and Heuer (2018). As an interviewee said: "The difficulty lies in the fact that often the values of the company do

not coincide with the values of the supplier, as the supplier can often work with different companies and therefore the sharing of value can be a very difficult factor” (interview I3).

When the suppliers’ concern emerged during the interviews, all the respondents tended to associate it with the location of them, taking for granted that the suppliers located in certain countries do not share values of sustainability. However, it is difficult to find a compromise and the firm cannot expect from the suppliers something that they simply cannot provide due to lack of knowledge and means, that is similar to what Moretto et al. (2018) have highlighted in their research. Especially in the case of the international companies, the experts claimed that the firm has a high responsibility over the suppliers as well as a competitive advantage. The firm has to define what is meant as sustainable and require transparency from the supplier, that is another barrier highlighted in five interviews and confirmed also by Oelze (2017). Unfortunately, sometimes the suppliers willing to use sustainable processes may not be the incumbents. As stated by a respondent: “If the incumbent supplier does not have a sustainable vision, it is difficult to change, but it is essential to satisfy the customer” (interview I11).

Indeed, the customer represents another important barrier that is widely mentioned in the data collection developed. The customer is more and more sensible to sustainability concern but also requires disproportionate speed as well as high quality when buying. Unfortunately, the phenomenon of the fast fashion has made the customer more demanding than ever.

According to the findings, the responsiveness to the sustainability matter has sensibly increased for the last three years. The researcher has decided to discuss the client as a barrier deeply in the sections 4.3 and 4.4. Indeed, in the context of the international companies the client is seen as an obstacle to the profit because s/he requires something (the sustainability) the company feels obliged to develop; hence, these companies are

trying to satisfy the customer's requirements as a trend. Contrarily, for the firms that started up with a sustainable aim, the customer is seen as a target, close to the ethical needs and values the company shares.

Other barriers that are common in both the contexts investigated are connected to logistics of fashion industry. The transportation is considered from the respondents as another barrier that is difficult to overcome. It is strictly connected to other barriers such as costs and suppliers' choice. Indeed, companies often tend to think that transportation is unavoidable and that the impact of transport is negligible compared with the waste caused by the production process and this opinion emerges also from the findings of Šajn (2019). Concerning this topic, a respondent said: "If we already limit waste and production then logistics will also have lower costs, in fact, for example, if we use local suppliers who have certifications to produce, logistics will also have a lower impact by favouring rail or cargo transport" (interview I4). Therefore, this can be considered as a secondary barrier because if all the other choices regarding the design of the supply chain architecture are made sustainably, then also logistics will have a lower impact.

As discussed previously, the position in terms of sustainability of a company depends mainly on the customer it addresses and the core business it has. The logistics' barrier has emerged for both the contexts but with a different impact because the transportation is a fundamental activity.

Another barrier that was highlighted in most of the interviews was the choice of the packaging. However, also this topic has obtained conflicting answers, according to the context investigated, and the related results are reported in the specific sections.

The Table 7 summarises the common barriers highlighted for both the contexts investigated, as well as the barriers that each of them implies.

Table 7. Common barriers' summative table

Barriers	Implicit Barriers associated
Costs	Costs of investment
	Costs of production
	Costs of training
Know how	Company's Commitment
	Training staff
	Searching for consultants
	Suppliers' know how
Suppliers	Sustainability Values shared
	Geographical Location
	Lack of knowledge
	Transparency
Logistics	Transportation
	Location
	Packaging choices
	Costs of transportation
	Supplier's choice

4.5 Quantitative scores given to the barriers

During the interviews, the researcher has captured the respondents' opinion on each barrier investigated in the literature review. The participants had to give a score from 1 to 10 to the barriers according to the difficulty to overcome them (1 meant "easy to overcome" and 10 was "almost impossible"). Also, the comments that have been made about the scores have been collected and used for the analysis. The Figure 5 and 6 show the scores given by the participants to the barriers, respectively on the first and second contexts analysed, while Figure 7 gives a comparison among the two.

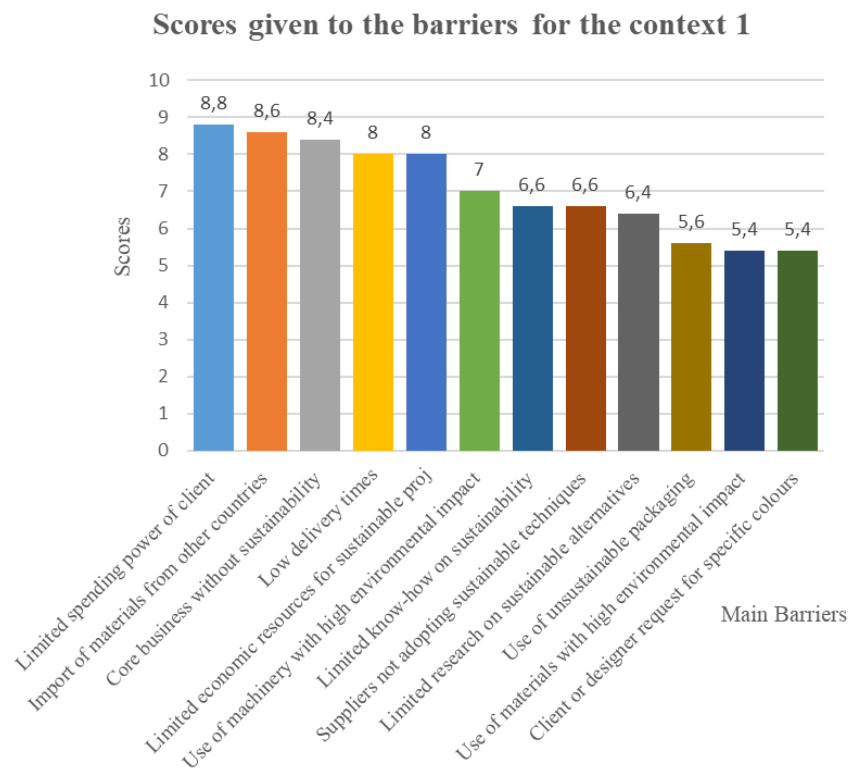


Figure 6. Scores given by the participants that worked in an international company (context 1)

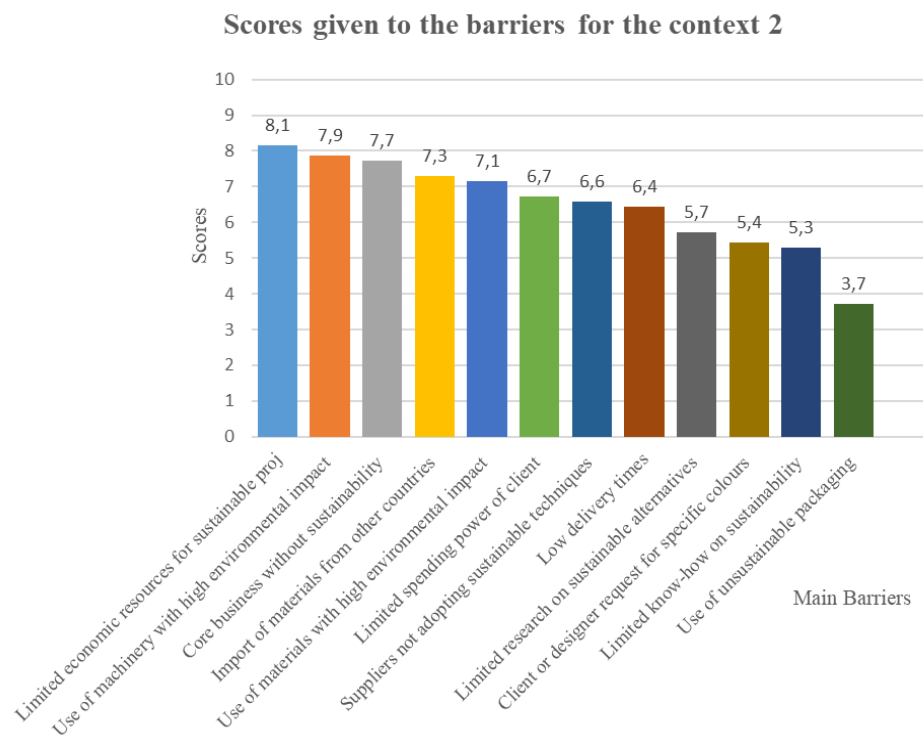


Figure 5. Scores given by the participants that worked in a company started up as sustainable (context 2)

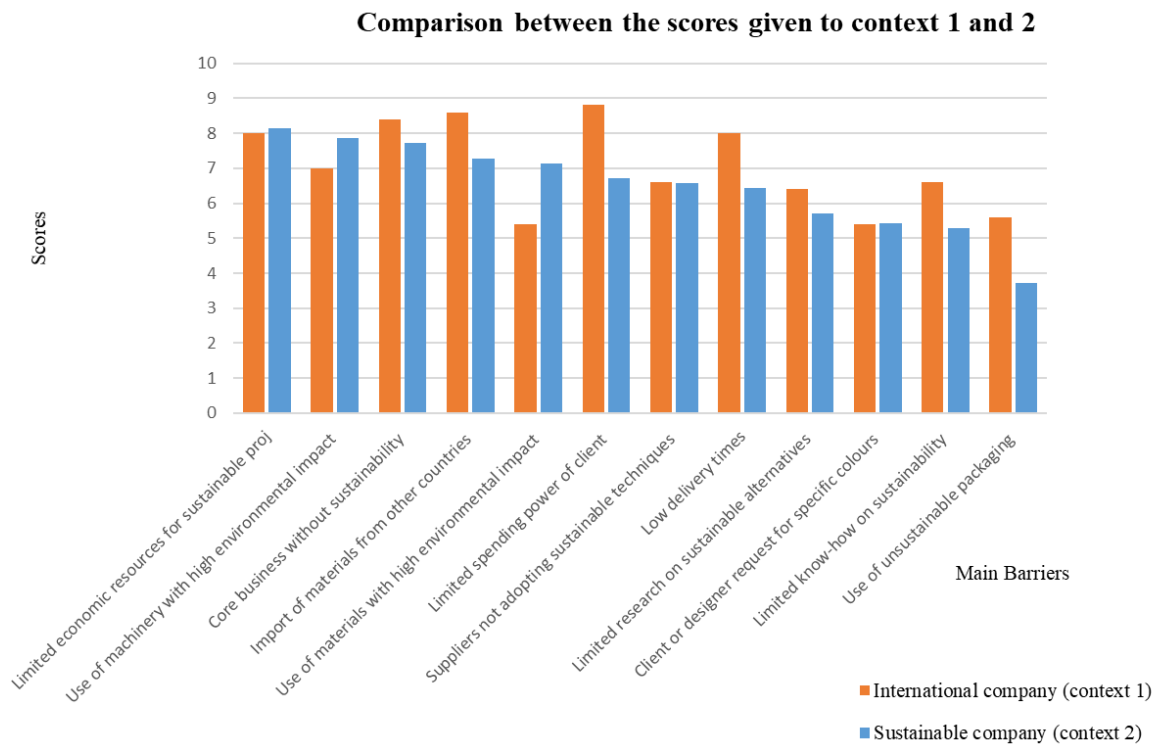


Figure 7. Comparison between context 1 and 2

The qualitative analysis confirmed the answers given during the qualitative part of the interviews and the perceptions the researcher had.

4.6 Implications

This section reports some implications on future perspectives based on the findings presented. It shows the possible scenarios that could be faced in the next years, focusing the attention on two critical factors that are seen as possible game changers: the Industry 4.0 and Covid-19 pandemic.

4.6.1 Speculations on the future perspectives

According to the respondents the expectations of sustainability on fashion industry is quickly changing, because the society is becoming more and more aware of the environmental and social impact it is causing. Also, according to the findings, the Covid-

19 pandemic will be a game changer for the fashion market but according to some, its effects are still not predictable. This section analyses the incurrence of the possible variables in the next years and hypothesise some scenarios based on the discussions the researcher had with the interviewees.

The aim is to answer to what extent the customers will start searching for sustainability and if there will be a big part of them that still will not care about it. It is possible that the number of customers sensitive to sustainability issues will continue to increase but the clients could still be victims of the greenwashing. Consequently, there would not be any improvements in terms of sustainability and waste management will still be an issue.

On the other hand, there is the possibility that the governments will impose new regulations on the greenwashing as an interviewee suggests: "It is possible a soon introduction of new regulations on greenwashing, this practice in fact makes sustainability lose its value and also damages companies that really want to be sustainable" (interview I6). Therefore, if customers will be more and more aware of this phenomenon, the companies will be obliged to change.

Another variable that should not be underestimated is represented by the request of the client of more and more clothes, a trend that is difficult to eradicate (Henninger et al., 2015). This factor, together with the willing of the society to have "all at once", could lead the clients to expect everything they need (in this case, sustainability and quantities). The latter would be an erosive situation that would lead to the increase of greenwashing and consequently to a wrong perception of improvements in terms of sustainability.

The Figures 8 and 9 represent the two opposite scenarios we could face in the next years and that summarise and integrate the viewpoints of the respondents.

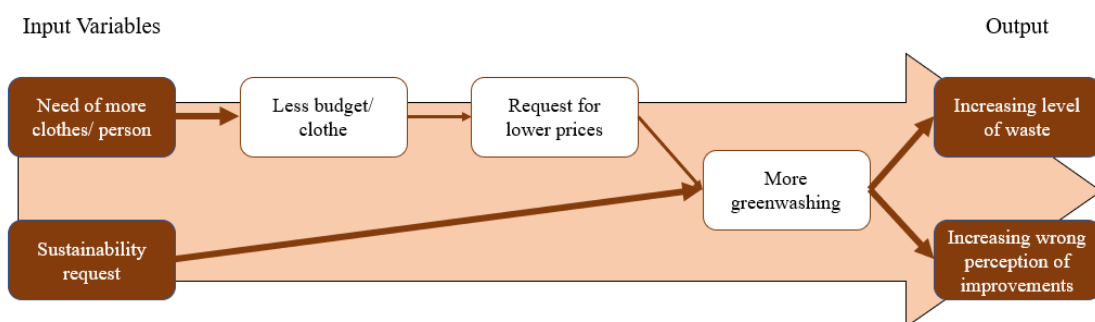


Figure 8. Worst scenario

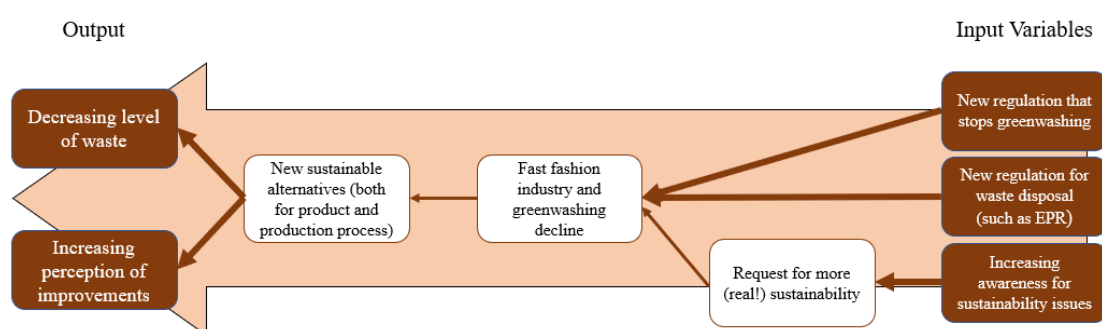


Figure 9. Best scenario

4.6.2 Critical factors that could influence the scenarios

Another factor that has emerged in the analysis is represented by the Fourth Industrial Revolution (with its model, the Industry 4.0), that with the introduction of the intelligent, virtual and digital performance in the production field, has changed forever the supply chain systems (Hamilton, 2020).

The advent of technology and Industry 4.0 is a variable that has not been inserted within the Figures 8 and 9 because it is considered independent and could push negatively or positively both the scenarios.

Technology is a powerful mean that allows the control and traceability of the production phases and inventory. It also helps for waste management and materials' disposal. As a respondent asserts: "The digital system in fact is a service that supports

sustainability, but there is a form of contradiction” (interview I2). Indeed, technology also increases the speed and tries to satisfy as much as possible the client that becomes more and more demanding, leading the firm to sell more and to leave the sustainability issue aside. Therefore, sustainability is not the main objective for Industry 4.0, the latter is only a mean to improve sustainability. The respondent adds that: “An example of this is given by Amazon: it is a leader in terms of logistics’ management, but we have a figure according to which Amazon produces 54 million CO₂ which is equal to the environmental impact that Sweden has” (interview I2). Another respondent agrees with this vision arguing that: “To save costs, the machine is made to do what could be done with manpower, but this leads to a very high waste of energy that the machinery requires” (interview I1). This shows a contradiction and a dichotomy: we aim at reaching some objectives but there are effects of the means used to achieve them, that lead in the opposite direction.

As mentioned previously, Covid-19 pandemic has been a turning point beyond which all rhythms changed for both the companies and the customers. An interviewer said: “we have had to go through several difficulties, this slowdown has however also encouraged a rethinking of synergies in order to establish lasting sustainability at the industrial level” (interview I2). Accordingly, regarding the customer, a participant claimed: “with the crisis due to covid, the world is changing and people are looking to buy quality things that last over time and have time to reflect on their choices” (interview I12). This could increase the possibility of occurrence of the second scenario showed before. Contrarily, the crisis could make the change impossible for some realities that have lost economical resources.

5. Conclusions

The section is divided in two parts, according to the similarities and differences of the barriers and their relevance in the two different contexts. This chapter is aimed at presenting also the research contributions and recommendations for the future research. Lastly, the limitations of the research are shown with regard to the methodology, collection and analysis of data.

5.1 Final conclusions

The research has presented the main barriers to transition to a more sustainable waste management in the fashion industry, analysing the similarities and making a comparison between two different contexts: the international company that is trying to approach sustainability and the Italian small or medium enterprise that has started up as sustainable.

Therefore, the research questions proposed were:

Overall Research Question: Waste management: Which are the critical barriers to transition to a sustainable development fashion industry should overcome?

Sub – question 1: Which are the barriers and their relevance for an international company?

Sub – question 2: Which are the barriers and their relevance for a company that started up as sustainable?

The qualitative methodology and in particular the semi-structured interviews, have been considered as the most appropriate to answer the research questions.

5.1.1 Critical barriers to transition to a sustainable waste management in the fashion companies' supply chain (common to both the contexts investigated)

The results show that the cost is the highest barrier that enables other sub-barriers. The main costs detected in the interviews are: the investment to change strategy, the cost of implementation, the costs related to acquire the know-how needed. Cost affects the price of the product that tends to be higher than a product whose process of production is not sustainable. The client with his/her capability to spend is indeed considered as another high barrier that however has different relevance, according to the context investigated. Indeed, in the first context the client is a higher barrier because he is accustomed to a specific price and could not agree with an increment of it. Contrarily, in the second context, the client is more sensible and accustomed to buying sustainable, therefore s/he could accept the change in the price. This is also confirmed by the quantitative analysis, according to which the scores given by the sustainable company's workers to this barrier are on average almost 24% lower than the ones given by the first context's workers.

Another barrier emerged is connected to the know-how needed to reduce waste. This is considered another high barrier to overcome because, as all the interviewees claimed when referring to it, it is time consuming and expensive in terms of education and commitment. The know-how owned by the suppliers is even more difficult to change, especially if they have worked with the firm for years, as claimed by interviewees I3, I4 and I1. Indeed, they are considered as high barriers by respondents because in many cases they do not share the same values as the firm.

5.1.2 Comparison among the barriers investigated for context 1 and context 2

One of the barriers that has been considered differently according to the contexts investigated, is represented by the core business of the firm. Interviewees working in the international fashion companies judge it as very difficult to overcome. Indeed, it is almost

impossible to change the core business and it is confirmed also in the quantitative analysis, where this barrier scored 8,4/10. This obstacle however, does not affect the sustainable company since sustainability is one of its foundation values, even if they recognise the possible difficulties to change it, giving a score of 7,7/10 on average.

In the findings chapter the role and the involvement of the client in the process of change has been further discussed. Indeed, it has been highlighted how, in the second context investigated, the clients are more sensible to the sustainability issues and more beware of what they buy.

Instead, for the multinational company the client is seen as a real obstacle because he is becoming more and more requesting towards sustainability issues that are spreading within the society. However, he requires the prices to be the same as the unsustainable products, hence creating a dichotomy. In accordance with this, international companies are trying to adapt their collections' proposals to new needs of the clients by introducing occasional sustainability projects. This is the reason of the birth of greenwashing phenomenon that has arisen to keep the same prices and give to the client the perception to take a right and environmental choice when buying such products.

Hence, the communication barrier has been considered in different ways according to the two contexts investigated. In the opinion of the major part of respondents belonging to context 1, communication is a lower barrier: if the company wants to be sustainable only in the eyes of the client, greenwashing is indeed a possible choice. In the other context, communication takes another meaning: they consider it as a higher barrier because it is challenging to communicate to the clients the choices made and making them understand the reason of a certain product's price.

Waste management in logistics' field is another barrier that emerged as one of the highest for context 1, classified as the fourth in the quantitative analysis: international

companies have their production located in countries where the cost of labour is lower, therefore it is difficult to reduce the waste connected to transportation in terms of pollution emitted.

The barrier of logistics is also connected to the process: for international companies the process is considered as a higher barrier than the one the product concerns. Differently, for the fashion firms that started up as sustainable, the process is a bit easier to overcome than having a sustainable product, even if it still remains a problematic concern. The multinational company tends to focus on the sustainable product because it directly affects the client, without considering the overall impact of the production process but, if they had to implement a sustainable system to produce, the challenge would be arduous. Hence, all the respondents agreed that it is more important to have a sustainable process than a sustainable product because the former is more impacting.

Same conclusions can be made for the colour's application, that is, according to interviewees I7 and I8, an environmentally impacting phase of the process; this is a real problem for the sustainable company because there are limitations regarding the possible colours' range. For the multinational company a different relevance is given to this barrier: for companies belonging to context 1 it is a common practice to simulate the sustainable cloth's colours by simply using light and faded shades.

For what concerns the packaging, the respondents have provided different answers according to the products the company sells. Indeed, according to some of the interviewees belonging to context 1, the packaging for certain products could be very difficult to substitute because it should contain the product safely and enhance the value of the product itself. Nevertheless, the sustainable firm considers the packaging a low barrier since the client is already more sensitive.

The study also highlights the new barriers emerged, that were not mentioned in the literature review chapter. The new ones shared by both the contexts investigated are:

clothes disposal, low incentives, market request and competition, collaboration between the departments in the company. The ones that an international firm could face are: technology, time, routes optimisation, product lifecycle, heritage, wholesales packaging, overproduction and production of stocks. Finally, the new barriers that a company started as sustainable could face are: client's perception on waste management and minimum level of orders request by suppliers.

5.2 Research contributions and recommendations for future research

This dissertation contributes toward making a distinction between the barriers to transitions to a sustainable waste management faced by different types of fashion companies and their relevance.

This research could be helpful also to the firms that are starting to approach sustainability in their supply chain or to the entrepreneurs that want to build a company with the sustainability as its main value.

The possible evolution of this study could be the investigation of the practical solutions to overcome the barriers analysed. This could be done by interviewing the same experts in few years, to see if they have succeeded.

Additional studies could be done on different contexts, by further segmenting the companies. For instance, it could be interesting to analyse the differences among the barriers in the luxury fashion industry or to do a cross-national study involving more experts than the ones involved for this dissertation.

5.3 Limitations

Due to the restrictions imposed by the Covid-19 pandemic, to preserve the society's health, the interviews have been conducted online through telephone calls or Microsoft Teams. This is considered the major limitation of the study: unfortunately, for the

researcher it was difficult to capture the perceptions the interviewees transmitted and from the perspective of the interviewee, respondents were more restrained in sharing their real thoughts, since this is a sensitive topic.

As reported in the recommendations, it would have been interesting if more contexts were investigated. Unfortunately, the number of the respondents was limited, it is indeed very challenging to find someone available to have an interview. For this reason, another constraint is represented by the time of about 7 months given by the university to develop the dissertation.

Another limitation to report is connected to the methodology. Obviously, interviews are subjective and the opinion of the participants was restrained to their experiences and beliefs. This is the reason why the dissertation reports the results that however could have been different if the researcher had interviewed other participants. Nevertheless, even with the limited number of participants, not many conflicting opinions were found, hence with a major number of participants the researcher might have collected similar results. Moreover, the dissertation gives critical insights and possible scenarios about the direction to which the fashion industry is moving, even if, to evaluate exactly the impacts of Covid-19 pandemic, it will take a few years.

Personal reflections

This section presents my personal reflection on the dissertation's journey and the lessons that I have learnt and that will always be part of my cultural background. The chapter is divided in different sub sections: firstly, it is discussed in general the long path I have experienced, together with some insights of the milestones achieved as well as the difficult moments faced. Secondly, some reflections about the specific dissertation development are shown, then, there is a focus on the data collection and methodology chosen. Finally, the last section regards the personal growth I think I have made during the last months and the lessons I have learnt.

Overall dissertation's experience

The research dissertation presented was the first one I have ever made because during the bachelor's degree in management engineering I had to write a report of the project that I developed during my internship.

Indeed, the module on dissertation proposed by the Master has been very useful to me because I had to learn how to properly write a dissertation. This made me afraid of the challenges I would have faced at the beginning but, in the end, the module was very well structured and, after a few lessons, I felt more sure and ready to develop my research. Moreover, another reason why I felt stressed at the beginning was the topic validation: as a Double Degree student, my dissertation topic had to comprehend both the fields of study I am attending, that are Management Engineering and Project management. I was really relieved when I found my tutors and they both wanted to follow me throughout my journey.

Regarding the topic, I have always been passionate of the fashion industry and this is also the field in which I would like to work. Hence, after few weeks from the start of the

first semester I begun to think about a potential research, trying to deepen as much as possible few alternatives to have clear in mind what would have been most interesting to me. I have also done several different meetings with the Dissertation's module leader, Dr. Marija Cubric and with my supervisors, Dr. Luca Sabini and Dr. Alessandro Creazza, whose advices were very helpful to make the final choice. Furthermore, in the second semester I had the confirmation that I did the right choice because I have followed a course on sustainability issues (Projects and Society) that really enhanced and nourished my passion on the sustainability topic.

During the second semester I have started to deepen the topic and to write the literature review. However, at the end of May when I had just finished my exams, I received a proposal from a big consulting company to start an internship in Italy for a job I have always sought for. Accordingly, I came back from UK to Italy, my home country, and started to work there. For this reason, I was a little bit nervous not to complete my dissertation by time. However, these fears were unfounded because I worked hardly at my dissertation during all the free times I had.

The experience of writing the dissertation was overall very interesting but very hard at the same time. Indeed, since I wanted to produce a good work with a high quality, it was very time and efforts consuming. As mentioned before, the topic was concerned on my biggest passion, therefore it was not laborious to me because I was happy to learn always more and more on the waste management in the fashion industry.

Dissertation development

At the beginning, once I chose my topic, I had no idea of the type of methodology to use. The first choice was the quantitative one, I wanted to ask to the customers what was their approach when they bought clothes and what was their interest in

sustainability. Then I changed my mind because my supervisors suggested me the qualitative analysis as the best to approach the problem. Indeed, I deepened the topic from the firms' point of view instead of the customers' one. This allowed me to meet many people working in the fashion field and to build long-lasting relationships that one day could be helpful also to find my dream-job. However, especially at the beginning, I faced some problems in finding the experts that were available to participate in my data collection.

I contacted many people on Instagram and LinkedIn, but the majority didn't even answer. It was much easier to contact the experts that work in the sustainable companies, because they were happy to discuss about values in which they strongly believe and to make people know their little realities.

Another problem faced was caused by the Covid-19 pandemic; indeed, it was not possible to conduct the face-to-face interviews: this would have created more empathy with the participants, simplifying the work.

The analysis of data was easier than what I thought: I have defined the main sections with the supervisor and according to them I built an overall connection among the barriers to give consistency to the work. Since the years of high school, when I had to write my essays, I used to create a scheme with paper and pen that helped me to write the discussion. This technique has been really useful for the contexts investigated as well.

Finally, I think that the interviews as research method, has been the best choice to make, both for the research question and for my personality. Hence, I am very empathic and I felt at ease having a direct conversation with people I have never met.

Regarding the management of my time, I think that I have done the most I could, and I feel very proud of myself. Indeed, I have started early to think about the topic and I have

scheduled some deadlines that helped me to have a guideline. I had also to modify some plans after the start of my internship that was not scheduled to start so early.

Personal growth and lessons learned

The study conducted is something I am really proud of. It is the symbol of a year that has been very challenging for me, since I have experienced a new university, a new country and a new way of learning.

The drafting of this dissertation and the discussions with the interviewees have also made me more aware of the sustainability values in which I strongly believe, pushing me also to debate the topic with my relatives and friends.

During this year, I learnt also to face the challenges with a smile without seeing them as threats, approaching positively the problems instead of negatively because the result depends on the way I decide to overcome them.

I feel grateful for this experience because I had the opportunity to deepen some topics I am passionate about and that have contributed to my personal background.

References

Becker-Leifhold, C. and Heuer, M. (2018) *Eco-friendly and fair : fast fashion and consumer behaviour*. Abingdon, Oxon ; New York, Ny: Routledge.

Bell, E., Bryman, A. and Harley, B. (2015) *Business Research Methods*. 5th ed. Oxford: Oxford University Press.

Binotto, C. and Payne, A. (2016) 'The Poetics of Waste: Contemporary Fashion Practice in the Context of Wastefulness'. *Fashion Practice*. 9(1) pp.5–29.

Blaikie, N.W.H. and Priest, J. (2019) *Designing social research: the logic of anticipation*. Cambridge: Polity Press.

Bozic, D. and Bateman A. H. (2018) 'Evaluating social transparency in global fashion supply chains'. In Heuer M. and Becker-Leifhold C. (2018) *Eco-friendly and fair: fast fashion and consumer behaviour*. Abingdon, Oxon; New York, Ny: Routledge.

CASE (2019) '6 Step Guide To Designing A Research Project: The Research 'Onion'' [Online] Available at:
<https://www.studynet2.herts.ac.uk/ptl/common/asu.nsf/Teaching+Documents?OpenView&count=9999&restricttcategory=Dissertations+and+Projects/PG+Guidance/Chapter+3:+Methodology+Resources>.

Choi, T.-M., Hui, C.-L., Liu, N., Ng, S.-F. and Yu, Y. (2014) Fast fashion sales forecasting with limited data and time. *Decision Support Systems*, [online] 59, pp.84–92. Available at: <https://dl.acm.org/citation.cfm?id=2592501>.

De Brito, M.P., Carbone, V. and Blanquart, C.M. (2018) 'Towards a sustainable fashion retail supply chain in Europe: Organisation and performance'. *International Journal of Production Economics*. 114(2) pp.534–553.

Drew, D., and Reichart, E. (2019) 'These Are the Economic, Social and Environmental Impacts of Fast Fashion'. *World Economic Forum*. Vol. 11.

Dudovskiy, J. (2018) *Epistemology*. [online] Research-Methodology. Available at: https://research-methodology.net/research-philosophy/epistemology/#_ftn1.

Ellen MacArthur Foundation (2017) *A new textiles economy: redesigning fashion's future*. [online]. Available at: https://www.ellenmacarthurfoundation.org/assets/downloads/publications/A-New-Textiles-Economy_Full-Report.pdf.

Ellram, L.M. (1996) "The use of the case study method in logistics research", *Journal of business logistics*, vol. 17, no. 2, pp. 93.

European Commission (2013) *Sustainability of textiles*. Retail Forum for Sustainability. [online] Available at: https://ec.europa.eu/environment/industry/retail/pdf/issue_paper_textiles.pdf.

Fernie, J. and Sparks, L. (2019) *Logistics and retail management: emerging issues and new challenges in the retail supply chain*. London: Koganpage.

Fletcher, K. and Grose, L. (2012) *Fashion & sustainability: design for change*. London, England: Laurence King.

Garcia-Torres, S., Albareda, L., Rey-Garcia, M. and Seuring, S. (2019) 'Traceability for sustainability – literature review and conceptual framework'. *Supply Chain Management: An International Journal*. 24(1) pp.85–106.

Garetti, M., and M. Taisch. (2012) 'Sustainable Manufacturing: Trends and Research Challenges'. *Production Planning & Control*. 23 (2–3) pp. 83–104.

Gazzola P., Pavione E. and Dall'Ava M. (2019) 'I differenti significati di sostenibilità per le aziende del lusso e della moda: case studies a confronto'. *Economia Aziendale Online*. 10(4) pp. 663-676.

Granskog, A., Lee, L., Magnus, K. and Berg, A. (2019) *This is how the fashion industry can reduce its carbon emissions*. World Economic Forum. [online] Available at:

<https://www.weforum.org/agenda/2020/11/sustainable-fashion-reduce-greenhouse-gas-emissions/>.

Hallebone, E. and Priest, J. (2009) *Business and management research: paradigms & practices*. Basingstoke Etc.: Palgrave Macmillan, [I.E].

Hamilton J. O. (2020) *Industry 4.0: current status and future trends*. London: Intechopen.

Henninger, C.E., Alevizou, P.J., Oates, C.J. and Cheng, R. (2015) 'Sustainable supply chain management in the Slow-Fashion industry'. In Choi, T.M. and Cheng, T. (eds.) (2015) *Sustainable Fashion Supply Chain Management: From Sourcing to Retailing*. Cham: Springer.

Hu, Z.-H., Li, Q., Chen, X.-J. and Wang, Y.-F. (2014) 'Sustainable Rent-Based Closed-Loop Supply Chain for Fashion Products'. *Sustainability*. 6(10) pp.7063–7088.

Iovino, F. and Tsitsianis, N. (2020) 'The Methodology of the Research', *Changes in European Energy Markets*, Emerald Publishing Limited, Bingley, pp. 79-95. [Online] Available at: <https://doi.org/10.1108/978-1-83909-107-020201004>

Miles, M.B. and A Michael Huberman (1994) *Qualitative data analysis an expanded sourcebook*. Thousand Oaks: Sage.

Jackson, T. (2005) *Motivating Sustainable Consumption. A Review of Evidence on Consumer Behaviour and Behavioural Change. A Report to the Sustainable Development Research Network*. Surrey: Centre for Environmental Strategies.

Jacobs, B.W. and Singhal, V.R. (2017) 'The effect of the Rana Plaza disaster on shareholder wealth of retailers: Implications for sourcing strategies and supply chain governance'. *Journal of Operations Management*. 49-51(1) pp.52–66.

Johnson, P. and Clark, M. (2006) *Business and management research methodologies*. London: Sage.

Karaosman, H., Perry, P., Brun, A. and Morales-Alonso, G. (2018) 'Behind the runway: Extending sustainability in luxury fashion supply chains'. *Journal of Business Research*, Vol 117.

Kim, J. and Zorola, M. (2018) 'Sustainable innovation in the apparel supply chain: case study on TAL apparel limited', in Chow P.S., Chiu CH., C.Y. Yip A. and K.Y. Tang A. (eds) (2018) *Contemporary Case Studies on Fashion Production, Marketing and Operations*. Singapore: Springer Nature.

Kogg, B. (2003) 'Greening a cotton-textile supply chain; a case study of the transition towards organic production without a powerful focal company'. *Greener Management International*. Vol. 43 pp. 53-64.

Kumar, R. (2018) *Research methodology: a step-by-step guide for beginners*. Los Angeles [U.A.] Sage.

Kunz, J., May, S. and Schmidt, H.J. (2020) 'Sustainable luxury: current status and perspectives for future research'. *Business Research*. pp.541–601.

Lau, Y. (2015) 'Reusing pre-consumer textile waste'. *SpringerPlus*. 4(S2).

Lesti, M. (2017) *La sostenibilità nel lusso e nel mass market: un'analisi empirica sulla percezione dei consumatori*. MSc Thesis LIUSS University.

Li X., Wang L., and Ding X. (2020) 'Textile supply chain waste management in China'. *Journal of Cleaner Production*. Vol. 289.

Lundblad, L. and Davies, I.A. (2016) 'The values and motivations behind sustainable fashion consumption'. *Journal of Consumer Behaviour*. 15(2) pp.149–162.

Macchion, L., Da Giau, A., Caniato, F., Caridi, M., Danese, P., Rinaldi, R. and Vinelli, A. (2017) 'Strategic approaches to sustainability in fashion supply chain management'. *Production Planning & Control*. 29(1) pp.9–28.

Markham, D., Khare, A. and Beckman, T. (2014) 'Greenwashing: a proposal to restrict its spread'. *Journal of Environmental Assessment Policy and Management*. 16(04) p.1450030.

Moretto, A., Macchion, L., Lion, A., Caniato, F., Danese, P. and Vinelli, A. (2018) *Designing a roadmap towards a sustainable supply chain: A focus on the fashion industry*. *Journal of Cleaner Production*. Vol. 193, pp.169–184. [online] Available at: <https://www.deepdyve.com/lp/elsevier/designing-a-roadmap-towards-a-sustainable-supply-chain-a-focus-on-the-A9T6RvLv63> [Accessed 27 Sep. 2019].

Mukendi, A., Davies, I., Glozer, S. and McDonagh, P. (2020) 'Sustainable fashion: current and future research directions'. *European Journal of Marketing*. Ahead-of-print.

Muthu, S.S. (2019) *Water in textiles and fashion : consumption, footprint, and life cycle assessment*. Duxford, United Kingdom; Cambridge, Ma, United States: Woodhead Publishing.

Myers, M.D. (2008) *Qualitative research in business & management*. London: Sage.

Nassivera, F., Troiano, S., Marangon, F., Sillani, S. and Markova Nencheva, I. (2017) 'Willingness to pay for organic cotton: Consumer responsiveness to a corporate social responsibility initiative'. *British Food Journal*. 119(8) pp.1815–1825.

Nawaz, H., Umar, M., Ullah, A., Razzaq, H., Zia, K.M. and Liu, X. (2021) 'Polyvinylidene fluoride nanocomposite super hydrophilic membrane integrated with Polyaniline-Graphene oxide nano fillers for treatment of textile effluents'. *Journal of Hazardous Materials*. Vol 403 pp.123-587.

Nayak, R., Houshyar, S., Patnaik, A., Nguyen, L.TV., Shanks, R.A., Padhye, R. and Fegusson, M. (2020) Sustainable reuse of fashion waste as flame-retardant mattress filling with ecofriendly chemicals. *Journal of Cleaner Production*, [online] 251(119620), p.119620. Available at:
<https://www.sciencedirect.com/science/article/pii/S0959652619344907>.

Niglas, K. (2010) 'The multidimensional model of research methodology: An integrated set of continua' in Tashakkori A. and Teddlie, C. (2003) *Handbook of mixed methods in social & behavioral research*. Thousand Oaks, Calif.: Sage Publications.

Oelze, N. (2017) 'Sustainable Supply Chain Management Implementation—Enablers and Barriers in the Textile Industry'. *Sustainability*. 9(8), pp.14-35.

Palacios-Mateo, C., van der Meer, Y. and Seide, G. (2021) 'Analysis of the polyester clothing value chain to identify key intervention points for sustainability'. *Environmental Sciences Europe*. 33(1).

Parguel, B., Benoît-Moreau, F. and Larceneux, F. (2011) 'How Sustainability Ratings Might Deter "Greenwashing": A Closer Look at Ethical Corporate Communication'. *Journal of Business Ethics*. 102(1) pp.15–28.

Redress (2017) *Organised by ecochic design award sourcing textile waste*. [online] Available at:
https://static1.squarespace.com/static/582d0d16440243165eb756db/t/59c0c087f5e23187dabd53bd/1505804510485/LEARN2014_Sourcing_ENG_REV20170808.pdf.

Šajn, N. (2019) *Environmental impact of the textile and clothing industry What consumers need to know*. European Parliamentary Research Service. [online] Available at:
[https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/633143/EPRS_BRI\(2019\)633143_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/633143/EPRS_BRI(2019)633143_EN.pdf).

Satti, S.M. and Shah, A.A. (2020) 'Polyester-based biodegradable plastics: an approach towards sustainable development'. *Letters in Applied Microbiology*. 70(6) pp.413–430.

Saunders, M., Lewis, P. and Thornhill, A. (2012) *Research methods for business students*. 6th ed. Harlow, Essex, England: Pearson Education Limited.

Saunders, M., Lewis, P. and Thornhill, A. (2019) *Research methods for business students*. 8th ed. New York: Pearson.

Schneider, A. M., and Schwerk, A. (2010) 'Corporate social responsibility in Chinese supplier firms'. *Zeitschrift Für Betriebswirtschaft*. Vol 1 pp. 39-59.

Seuring, S. and Muller, M. (2008) 'From a literature review to a conceptual framework for sustainable supply chain management'. *Journal of Cleaner Production*. 16(15) pp. 1699-1710.

Shen, B. (2014) 'Sustainable fashion supply chain: Lessons from H&M'. *Sustainability*. 6(9) pp. 6236-6249.

Shirvanimoghaddam, K., Motamed, B., Ramakrishna, S. and Naebe, M. (2020) 'Death by waste: Fashion and textile circular economy case'. *Science of The Total Environment*. Vol 718, pp.137-317.

Stringer, T., Mortimer, G. and Payne, A.R. (2020) 'Do ethical concerns and personal values influence the purchase intention of fast-fashion clothing?'. *Journal of Fashion Marketing and Management: An International Journal*. 24(1) pp.99–120.

Tashakkori A. and Teddlie, C. (2003) *Handbook of mixed methods in social & behavioral research*. Thousand Oaks, Calif.: Sage Publications.

Tsan-Ming Choi and T C E Cheng (2015) *Sustainable fashion supply chain management : from sourcing to retailing*. Cham: Springer.

Uquaili, M.A., Harijan, K. (2011) 'Energy, environment and sustainable development'.
Springer Science and Business Media.

Utebay B., Celik P. and Cay A. (2020) 'Textile wastes: status and perspectives'.
Waste in Textile and Leather Sectors. [online] Available at:
<https://www.intechopen.com/books/waste-in-textile-and-leather-sectors/textile-wastes-status-and-perspectives>.

Witt, U. (2001) 'Learning to consume—A theory of wants and the growth of demand'.
Journal of evolutionary economics. 11(1) pp. 23-36.

Yin, R. K. (2018) *Case study research and applications: design and methods*. 6th edn.
Los Angeles: SAGE.

Yin, K. (1994) *Case study research: design and methods*, Newbury park, California:
Sage publications.

Appendices

Appendix 1 – Questionnaire

1- *Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?*

2- *Do you think the company you work for has sustainability as one of its main values? If the answer is positive, how? If sustainability is not a value, do you think this could be an impediment for the future? Why?*

3- *Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?*

4- *How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?*

5- *When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?*

6- *As far as waste related to logistics is concerned in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?*

7- *In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?*

8- *How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?*

9- Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

10- Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent? Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

11- Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

12- I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome))

- Use of materials whose production has a high environmental impact
- Client or designer request for colours whose application has a high environmental impact
- Client or designer request for specific shapes and cuts that lead to waste in the material
- Limited spending power of client
- Low client demand for a sustainable process
- Low delivery times
- Core business that does not include sustainability as a core value
- Use of machinery with high environmental impact
- Import of materials from countries with low labour costs

- Use of packaging that is unsustainable and non-reusable
- Lack of knowledge of technologies that enable better waste management
- Limited economic resources to implement sustainable projects
- Limited know-how on sustainability
- Limited research on alternatives (production or transportation) in the field of sustainability
- Suppliers not adopting sustainable techniques due to limited financial resources and know-how
- Low supplier interest in sustainability

Appendix 2 – Interviews' transcript

I1 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I have worked for X for 3 years. It is a big multinational company whose products are famous in the entire world. I have studied management engineering for 5 years and I have grown my passion for the supply chain field during these years. I have worked for other firms in the field of the supply chain but that were not in the fashion industry area. I have followed some courses focused on sustainability at university but in the firm I am working at the moment this is not part of the strategy.

Do you think the company you work for has sustainability as one of its main values? If the answer is positive, how? If sustainability is not a value, do you think this could be an impediment for the future? Why?

Since in our plant we have a warehouse and not manufacturing plant, sustainability was not part of the business in the department where I worked.

The only important focus was on reducing costs related to transportation; in this way pollution was also reduced but it was definitely not a matter of sustainability issues. In other factories and departments where there was production plants there were sustainable projects aimed at creating all the linings of the suits with sustainable materials. Surely this was also a marketing issue because only the product was sustainable and not the process to produce it.

Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

There was one project aimed at sustainability: the company tried to reduce the emission of pollution in the production of some products but a calculation was made on the pollution that would have generated transportation to promote that product (distribution to influencers and posting of posters) and they realized that these emissions even exceeded what they had saved in production.

This is an example of a project that failed.

Another study was done on disposal: the process to produce certain garments was considered sustainable but the disposal of the garments following their use would not be, due to garments whose materials were not recyclable. For this reason, the project to improve the production of products that would not be disposed in a sustainable way was not developed.

How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?

For the company it is important that the customer sees that the process is sustainable and therefore has certifications related to the process. For this reason, I think it is important for the company that both the process and the product are sustainable. In my opinion, the company is only interested in profit, not that the process or the product are sustainable.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

The first problem that comes to my mind is the use of non-recoverable fabric. Another issue is also related to the process and the resources used that are not recoverable, such as the use of water. Another issue that comes to mind is related to costs: often the

company is not so interested in adopting sustainable strategies because of the huge costs they require.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

In my opinion a big problem is related to route optimization, which is often not designed to be sustainable. For example, if the cost of getting around customs justifies the cost of customs itself, people tend to make the vehicle take a longer route to save money.

Another important problem is linked to the waste of energy inside the warehouse. Often to save costs, what could be done with the manpower is made with the machine, this leads however to a very high waste of energy that the machinery requires.

In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?

Suppliers should definitely be part of the strategy, indeed if suppliers are closer, taking the example of transportation, there will be less pollution emissions.

The company I work for relies on choosing close suppliers not for sustainable issues but for cost savings. Some of the products in my company are made in very distant countries, while others are made in Italy: this depends on the quality of the products, the products made in Italy definitely had a higher quality and a higher price while those made in Bangladesh had a much lower price. For example, custom-made shirts are made in Italy, while standard shirts are made abroad.

How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

The company's know-how on waste management has a huge impact. The barrier is lowered when the company has the resources to buy the skills. This barrier is then linked to the very important barrier of cost of training staff and acquiring competent and experienced staff in the field.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

The large company is more likely to approach sustainable waste management because they have more visibility and are more interested in sustainability certification.

For example, a small company that produces leather is very unlikely to become sustainable.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent? Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

A large company is not interested in becoming sustainable regardless of the customer. A company of this size only thinks about profit, so if it becomes sustainable, it does so only because of the needs dictated by the customer. The values of the company in its core business are entirely dependent on the sales strategy.

Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

In my opinion, the entire design of a sustainable supply chain is simpler than the change of a supply chain that already exists because the study of the "as is" would not exist in the first case.

How is the path to sustainability moving? Will all companies be forced to change in a few years?

Everything will depend on legislation and on how Europe and the world move in this direction. If not forced, there will always be someone who will buy non-sustainable clothes.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome))

- Use of materials whose production has a high environmental impact = 4
- Client or designer request for colours whose application has a high environmental impact = 5
- Client or designer request for specific shapes and cuts that lead to waste in the material = 5
- Limited spending power of client = 8
- Low client demand for a sustainable process = 8
- Low delivery times (and therefore means of transport not fully loaded) = 6
- Core business that does not include sustainability as a core value = 9
- Use of machinery with high environmental impact = 7 (if it depends on sales going up, the barrier goes down)
- Import of materials from countries with low labour costs (and therefore long travel) = 8
- Use of packaging (in high quantities) that is unsustainable and non-reusable = 2
- Lack of knowledge of technologies that enable better waste management = 7

- Limited economic resources to implement sustainable projects = 9
- Limited know-how on sustainability = 5
- Limited research on alternatives (production or transportation) in the field of sustainability = 8
- Suppliers not adopting sustainable techniques due to limited financial resources and know-how = 7
- Low supplier interest in sustainability = 5

I2 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I graduated with a degree in business, had a 5 year experience in a small company in the area, then in a large company. I then worked in a corporate setting. I deal with production planning and adaptation to sustainability criteria.

Do you think the company you work for has sustainability as one of its main values? If the answer is positive, how? If sustainability is not a value, do you think this could be an impediment for the future? Why

At the moment the company is moving towards sustainability, currently in a period of transition from traditional to more sustainable production. In fact, we are strongly aware of the problem and are testing ways to approach sustainability. Due to the covid pandemic this transition period has been halted because we have had to go through several difficulties, this slowdown has however also encouraged a rethinking of synergies in order to establish lasting sustainability at the industrial level. We believe that the adaptation strategy is better than the complete rethinking of the supply chain. For example, reshoring strategies have been implemented in the logistics sector until 2020. In fact, we realized that at an economic level, production abroad had disadvantages such as the slowness of transport by ship, which is incompatible with the speed of the market, and wages that are rising in Asia and the East.

Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

We have had second thoughts that were caused by the pandemic. The impact of transport of energy consumption had proved to be losing in a pandemic situation, so we re-evaluated internal policies by moving the production of the high range to Italy.

Big companies are untethered from ethics, everything that is decided is caused by profit. If the company fails it creates more damage to humanity in terms of employment than it would save in terms of sustainability.

How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?

It is crucial that the manufacturing process is sustainable. We have carried out surveys that have confirmed that the positioning of marketing on sustainable issues has immediate results on consumer sensitivity.

Often there is a dichotomy: you want to go in one direction but there are effects that lead in the opposite direction. Some products may be made from hemp, but this leads to the erosion of the sustainability objective on the other side because these products are made by children in Bangladesh.

An example of this is given by Amazon: it is a leader in terms of logistics' management, but we have a figure according to which Amazon produces 54 million CO2 which is equal to the environmental impact that Sweden has, only concerning the transport. This is a form of contradiction that we find, the digital system in fact is a service that supports sustainability. In my opinion, there will always be contradictions, but they cannot be avoided. Companies have a certain positioning, companies that produce high-value materials and products can focus on reshoring, also focusing on appropriate communication.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

Waste management is more a political problem than an industrial one. Every day we see what the waste disposal issues are. In order to reduce waste and manage it in the best possible way, the first problem that must be faced is technological. The management of production must be specifically controlled through technology, only in this way it is possible to track waste and find a way to improve its management.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

Logistics accounts for 50% of the sustainability issues. Packaging is definitely an issue, new packaging systems have 10 times the impact in terms of business costs. Packaging of this type has an impact of 182kg of CO₂, while old packaging has an impact of only 11kg. Moreover, it cannot be a choice of a single company, it must be a common choice.

In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?

In my opinion they must be part of the strategy but I am not optimistic in this direction. The choice of supplier is not so free with respect to corporate responsibilities.

Small companies are destined to lag behind on this issue, only large companies will change in terms of sustainability.

How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

The know-how of the company has a strong influence.

At high levels, companies have a closed system of know-how, which is a great competitive advantage. Know-how can be bought, but it is much better to build it. For this reason in my opinion the main barrier is time, combined with commitment.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

A small or medium-sized company has less money available, bearing in mind that we are in a moment of crisis. The small company cannot for this reason make sustainable choices. To demonstrate this I'll give you an example, in the 70's fashion had 1 million employees, following the crisis that we have experienced and also because of the pandemic, today the employees are half. In this historical period, small and medium-sized companies have little chance to intervene.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent?

The company's commitment is not entirely dictated by the client, it is not a cause-effect relationship. At the same time, however, the company cannot go on without intercepting the new sensitivity of the client.

I say this because the company's sole objective is to generate profits.

Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

In my opinion shape and colour are elements to consider but they are not the highest barriers.

Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

In my opinion, a gradual change is more functional than a redesign because at this moment the company cannot face a complete renewal.

We have statistical data for which the adoption of sustainable strategies has positive effects on the company's turnover. That is to say, a commercial dragging effect given by the adoption of sustainable choices. Starting from retail to communication, there is a positive spin-off from the adoption of these strategies. It is necessary to analyse the trade-off between the expenses given by sustainable choices and the positive effects on turnover, not only a posteriori but also a priori through proper communication. In this way, a part of the clientele that is sensitive to sustainability and that would not have purchased your product before, is intercepted.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome))

- Use of materials whose production has a high environmental impact = 7
- Client or designer request for colors whose application has a high environmental impact = 4
- Client or designer request for specific shapes and cuts that lead to waste in the material = 4
- Limited spending power of client = 9
- Low client demand for a sustainable process = 9
- Low delivery times (and therefore means of transport not fully loaded) = 10
- Core business that does not have sustainability as a core value = 6

- Use of machinery with high environmental impact = 7

- Import of materials from countries with low labour costs (and therefore long journeys)

= 10

- Use of unsustainable and non-reusable packaging (in high quantities) = 7

- Lack of knowledge of technologies that enable better waste management = 8

- Limited economic resources to implement sustainable projects = 6

- Limited know-how on sustainability = 7

- Limited research on alternatives (production or transportation) in the field of sustainability = 7

- Suppliers not adopting sustainable techniques due to limited financial resources and know-how = 7

- Low supplier interest in sustainability = 6

I3 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I have been working in the world of luxury and fashion for a few years, following the three-year mechanical engineering courses and the engineering courses with management aspect during the master. I have worked in the food and luxury world in the accessory.

The world of luxury is very special because the customer becomes the nerve centre of the development of the strategy and many of the choices are driven by what the customer wants more and by the history of the company. The company where I work is more than 150 years old as the company values remain a very important aspect.

Do you think the company you work for has sustainability as one of its main values? If the answer is positive, how? If sustainability is not a value, do you think this could be an impediment for the future? Why?

In some aspects it is sustainable in others not, for metal and non-leather parts that are not organic the materials are recycled because we often look at the economic aspect of the material such as precious metals. For materials derived from animals such as leather strap, it is difficult to recycle because the processing of a crocodile strap is hardly sustainable but this does not exclude a future development that the company will try to bring in having new materials that can be synthetic and that in the future can be recycled that can have a more sustainable impact. Some bracelets are made of composite material whose formula allows a better recycling. The packaging is a very difficult factor to deal with sustainability because being the finished products of great value, they need an important protection during all phases of the supply chain.

Will the company be forced to go sustainable to survive sooner or later?

Despite the historical heritage, the company will have to make sustainable choices, this will remain limited in a certain part of the portfolio and not in the complete portfolio. There are competitors in our company who have just launched products made entirely from recycled materials, but this does not mean that the entire line is made up of recyclable products, but only part of it. In the future we will certainly need to understand the customer's thinking to understand what their interest is, but there will certainly remain some customers for whom sustainability is a less important factor because they give more importance to the historical factor, considering sustainability as secondary.

Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

A competitor company has been working with materials derived from leather scraps instead of the classic metal for watches.

The project involved a lot of time but led to very disappointing results especially at an aesthetic level, therefore they decided to abandon the project because it was not very successful. On the other hand, I have also seen the opposite, because a competitor of ours has sold entirely sustainable watches made from recycled materials having great success. We need to see if this new project will actually make a profit.

How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?

For our company it is quite essential because since the product is largely made of metal alloys the product becomes completely recyclable, both precious materials and gems are recyclable, so sustainability in the product goes without saying. The process is essential that it is sustainable considering how laborious and long it is at the moment. Obviously there are other details, as I mentioned earlier for leather items where even the product becomes very important for sustainability.

For example, in the logistics of after-sales, we must consider that the products are shipped from all over the world and then return from the house to Switzerland and this requires a considerable effort at the logistical level, so there are several centers and strategic places in the world to try to reduce the logistical impact, which however remains quite limited because they are products with a very high density and value. The centres I mentioned earlier are in North America, South America, Europe, Asia and Oceania, and one in South Africa.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

Certainly the need for chemicals is really relevant when we talk about tanning for leather. The same thing is true for the cleaning of metals and the various processes of shaping. Also the waste is considerable because, when we talk about bracelet you have to use only the best part of the crocodile snakeskin, for this reason waste is absolutely a problem point. In my opinion the most difficult barriers to overcome are related to cutting and discarding the less beautiful part because that is a barrier that is very difficult to overcome. And many of these raw materials are natural and you can expect imperfections. Another barrier is the technique that does not allow us to have better methodologies than using certain chemicals.

The scraps are properly disposed but they can no longer have a use, at the moment I am not aware of any processes of using real recycling of these scraps, so I think they are disposed of.

I don't think there is an improvement in waste management, but an indirect improvement, the waste could in fact be used by someone else but not directly by us, so

I don't think there can be an improvement on our part, but at least an evolution of this process. For example, the supplier could use the scrap for another purpose.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

In the luxury sector, the customer has priority over everything and there are no load full of the means of transport. High-value materials are used for packaging that are thrown away without being recycled.

Each product has a very high density of value and there can be no improvement in logistics for this reason. At the packaging level, there might be a more visible improvement, but as far as transportation is concerned, I don't think there can be an improvement.

In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?

To embark on a sustainable path, the company must necessarily include suppliers in the strategy, for a matter of consistency and for a matter of impact because the supplier is an integral part of the company. The difficulty lies in the fact that often the values of the company do not coincide with the values of the supplier, as the supplier can often work with different companies and therefore the sharing of value can be a very difficult factor to take into consideration. Also, for economic reasons it could be difficult to find the right supplier, if the company in fact requires greater attention to sustainability the price will certainly move accordingly.

How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

A small company can certainly follow all the processes more easily, but it is difficult for it to have departments dedicated only to this process, despite the fact that there are very few products to consider. However, I think that the advantage of having small companies is that in the end what large companies have is the possibility of relying on third-party suppliers who can manage the waste for them.

You can in fact outsource this problem. Know how is very much related to an economic issue. Unfortunately, the issue of sustainability in the management of waste is a very complicated matter. In fact, the customer will never interface with the actual management of waste, but rather will look for sustainable solutions in materials.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

There are two factors: the first one is the values in which the company believes and the second one is a profit value, so if the company believes in sustainability, it will change the type of customers leaving out the economic factor. There can also be a company that only tends to profit.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent?

Materials right now are the biggest barrier and this barrier is caused by an even bigger barrier that is the customer.

Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

The company considers as sustainable a process that has made even little improvements towards sustainability. For example, in my company it might be useful to proceed step by step, making small revolutions and improvements over time.

What would be the biggest issues for the company to overcome?

The shape and colour to which the customer is accustomed and to which it would be difficult to go against. The second point concerns the packaging, which the customer could hardly give up. Another important barrier concerns the technological factor and therefore the know-how that the company must have in order to become sustainable in its production process. Another important barrier is the life cycle of the product as the company often leads the client to consume more than necessary and to renew its product.

Another barrier is the aspect of traditionality in fact the customer expects the use of certain materials such as gems and precious stones and it is very difficult to switch from these precious materials to biodegradable items when he is not used to it.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome))

- Use of materials whose production has a high environmental impact = 5
- Client or designer request for colors whose application has a high environmental impact = 6
- Client or designer request for specific shapes and cuts that lead to waste in the material = 6
- Limited spending power of client = 10
- Low client demand for a sustainable process = 6

- Low delivery times (and therefore means of transport not fully loaded) = 8
- The company's core business does not have sustainability as a core value = 10
- Use of machinery with a high environmental impact = 8
- Import of materials from countries with low labour costs (and therefore long journeys)

= 9

- Use of packaging (in high quantities) that is not sustainable or reusable = 9
- Lack of knowledge of technologies that enable better waste management = 5
- Limited economic resources to implement sustainable projects = 9
- Limited know-how on sustainability = 5
- Limited research on alternatives (production or transportation) in the field of

sustainability = 3

- Suppliers not adopting sustainable techniques due to limited financial resources and know-how = 5
- Low supplier interest in sustainability = 5

I4 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I graduated in the 2015 and I started working for a small company that produces shoes. It was a great experience, but I wanted to try to work for a bigger company. This is the reason why I have decided to move to X, a multinational company producing yarns. I had my bachelor's degree in science of Communication, with a specific academic path focused on sustainability.

Do you think the company you work for has sustainability as one of its main values?

The company had sustainability as a value because it is now a strong selling point, not because companies really believe in it but because it is a trend.

If the answer is positive, how?

Thanks to the reuse of waste material, several researches have been done to understand how to reuse it, given the large amount produced.

2Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

The economic problem is very important because sometimes it is not worth buying such expensive machines without knowing their real potential in reducing waste or pollution. The lack of interest in achieving true sustainability can also be a problem for a company because there is a large segment of the market that is not and will never be interested in buying sustainable, especially as prices rise.

For this reason the phenomenon of greenwashing is spreading more and more. For example, IKEA, despite the publicity it makes about sustainability, is obliged to accept the return of anything purchased by the customer and all returned goods are thrown

away. Even the big fashion brands accept returns to satisfy the customer and then throw them away because they are already worn or slightly damaged. So many do green washing and therefore you don't know exactly which ones are sustainable.

3How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?

Often the process is not sustainable: for example, working with leather pollutes a lot, especially if the water used in the process is dispersed without being properly filtered beforehand. This is a problem that was very much present in Italy until several years ago.

There are no strict rules for labels and certifications, in the last years private companies were born, some of them have been statutorily recognized, such as BCI, Will trade, ISO. These are certifications that a company can get voluntarily to certify a product or process.

Many companies say that the final product is sustainable but the production is done in the Far East and the only certification they have is on the material (such as raw cotton). The laws we have in Italy on processing are quite strict but in other countries this does not happen. Many brands consider themselves eco-friendly and try to make the customer believe it: in this way they raise their prices a lot and manage to have a very high gain, such as H&M's "Conscious" line.

In fact the production pollutes more than the material itself. Levi's is trying to reduce the use of water in the production of jeans and use leftover stock.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

It depends on the product because waste is present in every step of production. It

would be necessary to understand which steps can be modified according to the material and the cost: certainly the priority is given to the cost; therefore, an analysis should be made on the costs linked to the material and the improvement in terms of environmental impact.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

Logistics has a big impact, but less than production. If we already limit waste and production then logistics will also have lower costs, in fact, for example, if we use local suppliers who have certifications to produce, logistics will also have a lower impact by favouring rail or cargo transport. Amazon is getting people used to the fact that they expect to receive the goods they have ordered immediately. The customer would accept to wait if they were communicated the reasons for which they wait.

Another issue regarding logistics is related to wholesales packaging: when the product arrives at the store it is full of paper or plastic or hangers. It is more convenient for the company to send the goods with the hangers, but then the store changes them to more elegant ones so that they are all the same. Those hangers don't get sent back to the company but thrown away. Many items are packaged individually, such as shirts.

When goods arrive from China sometimes customs checks are done and often garments are recalled from the market because they are made with harmful, carcinogenic substances and produced with chemical processes used for fixing that release formaldehyde.

In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?

A relationship of trust is usually established with suppliers and it is not easy to change them; you have to compromise to find common ground. Both can benefit from the change. In addition, you can try to understand the scope for change without expecting the supplier to do something it cannot do.

How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

Know-how is very important because if the top management is not prepared for the possible alternatives and is not ready for change, it is difficult to think sustainably and have a strategy, moreover it is time consuming.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

The small company is more flexible and therefore it is easier for it to change but the large company has the economic means. To reorganize a great company is not easy but a small and flexible one could have also smaller costs regarding the change of the suppliers. The great company has the means in order to change fast.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent?

If a company isn't interested in sustainability but is being forced by the marketplace, they are often trying to be fair to the customer and therefore are committed to truly implementing sustainability. If a company sees sustainability as its future, it doesn't need external stimuli because the strategy is part of the core business.

Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

The colour and the shape create many difficulties because the customer is accustomed to synthetics that are durable over time and are easily washable in the washing machine and remain the same. Natural fabrics (such as hand-dyed linen) change over time, so it is important to communicate with the customer, explaining why the natural garment could be ruined.

Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

It depends a lot from company to company: a small company, especially in this historical moment after the pandemic, won't think about completely renewing its supply chain; on the other hand, if the company were to go bankrupt and couldn't find a way to change its business, it would start from scratch completely. So in my opinion, it's easier to build a supply chain from the ground up, especially at this time in history.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome))

-Use of materials whose production has a high environmental impact = 7 (it depends on whether you have alternatives and whether your business is focused on only one material such as rubber)

-Client or designer request for colours whose application has a high environmental impact = 8

-Customer or designer request for specific shapes and cuts that lead to waste in the material = 8

-Limited ability of the customer to spend = 7 (if the company communicates well and entices people to buy less for more, the barrier is not insurmountable)

-Low demand for a sustainable process from the client = 7

-Low delivery times of goods (and therefore means of transport not completely loaded)
= 7 (always a problem of communication)

-Core business of the company that does not include sustainability as a main value = 8

-Use of machinery with high environmental impact = 8

-Import of materials from countries with low labor costs (and therefore long journeys)
= 8

-Use of unsustainable and non-reusable packaging (in high quantities) = 7

-Lack of knowledge of technologies that enable better waste management = 9
(several external services that can help)

-Lack of economic resources to implement sustainable projects = 9

-Limited knowledge on the topic of sustainability = 7

-Limited research on alternatives (production or transport) in the field of sustainability
= 7 (there is not much research but the trend is growing and for some companies it would be enough to improve even a little bit to be more sustainable)

-Suppliers that do not adopt sustainable techniques due to limited financial resources and know-how = 7 (it is a problem to change supplier)

-Low supplier interest in sustainability = 7

I5 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

Educational background: correspondent interpreter in foreign languages - I worked in a business consulting company as a pull coordinator of consultants for corporate restructuring - then as a sales manager for retail distribution on the Italian territory and later as a freelancer in collaboration with an Italian company, currently a leading company in the production and distribution on the wholesale channel of men's and women's clothing.

Do you think the company you work for has sustainability as one of its main values? If the answer is positive, how? If sustainability is not a value, do you think this could be an impediment for the future? Why?

The company is extremely attentive to sustainability, despite the fact that production is carried out in China and Bangladesh, the company has always taken care both of the protection of employees with whom it has undertaken joint ventures in both countries, and in the choice of raw materials, especially the pigments with which it makes its products, which are rigorously analyzed in its own laboratories. In Bovolenta (Padua), for example: where it starts from the treatment of cotton, received in bales, to spinning, weaving, the purification of the water used to treat the fabrics themselves is carried out, especially indigo for the production of denim.

Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

Before they became official regulations, the company had already taken care of modifying the raw material used to produce the advertising shoppers, i.e. the bags

delivered to the distributors, using pro-tempore biodegradable material (certainly more expensive but indispensable), the total elimination of paper catalogs, focusing on "online showrooms", the rationalization of deliveries to customers, in order to avoid energy waste, as well as the planning of future projects that will be illustrated to us shortly.

How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?

The protection of the environment is important but above all of the person. In fact, we consider that clothing is in contact with the skin of every single individual.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

I think I unintentionally answered this question previously.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

I am not able to imagine, for now, a different way from the one currently in place, the packaging is made of natural materials, such as cardboard, the bags that wrap the garments for delivery are made of biodegradable plastic; the company currently uses external platforms and couriers for deliveries, which are made throughout Italy. The goods arriving from China and Bangladesh, (as previously mentioned, supervised by Italian managers), travel by ship, but we are talking about millions of items per year, there are currently no alternatives. One of the objectives is to return to producing entirely in Italy.

In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?

Absolutely. The difficulty to overcome is that the market demand will settle down, that the taxation on the national territory will loosen and the idea to come back to produce in Italy will become concrete.

How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

The know-how absolutely is involved, it has been imposed in foreign countries where the company realizes part of the production, in order to respect as much as possible the dictates for the management especially of the finishing waters of the post-pigmentation fabrics. Also the decision to gradually overcome the use of synthetic yarns, concentrating on transferring them to natural fibers.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

It will certainly be possible, unfortunately I believe that the market demand, especially now (post-Covid) with the economic problems we are experiencing, is focused on products with a very low price-quality ratio. The Company is in charge of improvements, it must surely have also strong economic resources to implement them. We hope that also our country will speed up the process, helping the manufacturing companies.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent? Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

To the first part of the question, I refer back to the previous answer. For the second part, I don't think shape and color are that important. I think the first thing that needs to

change is the DNA of the population to interpret a product for its sustainability, even if it is slightly more expensive and not just focusing on price. I hope we undertake an educational path to raise awareness of the topic among the masses, that would be important, as a starting point.

Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

I think it depends on the economic energies and synergies of the individual company.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome))

- Use of materials whose production has a high environmental impact = 4
- Client or designer request for colors whose application has a high environmental impact = 4
- Client or designer request for specific shapes and cuts that lead to waste in the material = 4
- Limited spending capacity of client = 10
- Low customer demand for a sustainable process = 8
- Low delivery time of goods (and therefore means of transport not fully loaded) = 9
- Core business of the company that does not include sustainability as a main value = 9
- Use of machinery with high environmental impact = 5
- Import of materials from countries with low labor costs (and therefore long journeys) = 8

- Use of packaging (in high quantities) that is unsustainable and non-reusable = 3
- Lack of knowledge of technologies that allow for better waste management = 7
- Scarce economic resources to implement sustainable projects = 7
- Limited know-how on the topic of sustainability = 8
- Limited research of alternatives (production or transport) in the field of sustainability = 7
- Suppliers not adopting sustainable techniques due to limited financial resources and know-how = 7
- Low supplier interest in sustainability = 7

I would argue that all of the above are equally important, but there must necessarily be moral receptivity on the part of both companies and the end consumer. Many companies are committing, increasing, despite themselves, the costs of the finished product, which is naturally penalized by the masses. It 'a problem that will remain so until the full entry of all companies producing any item, creating a more fair competition tomorrow.

I6 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)? Do you think the company you work for has sustainability as one of its main values? If the answer is positive, how? If sustainability is not a value, do you think this could be an impediment for the future? Why?

Within the company there are two partners that have never worked in the fashion world. In fact, we are a somewhat atypical company because our background has nothing to do with the fashion industry. Indeed, at the high school and college level we have no business or sustainability skills. I am a former lawyer and my partner is a former nutritionist. Our passion for sustainability and fashion was born after a course on entrepreneurship that the other girl and I took and through which we got to know each other.

During this course we acquired transversal knowledge of economics and supply chain and our start-up was born from this. All our expertise was developed in the field. We started our project in 2019 and it was born to reduce the environmental impact in the field of fashion. Our activity is based on upcycling, which consists in using old garments to create new ones.

At the beginning the idea was to create a tailor's shop, but after a careful analysis we realized that the union of different tailor's shops with the same purpose would have created a large network with the goal of sustainability. The project evolved with the connection of social tailoring because we thought that upcycling could increase jobs' positions. The used clothing supply chain is very complex; in fact, it lacks transparency. In fact, the clothes that are donated in Charity Shops are often not suitable for people in need, so they are all sold after being reclassified by hand.

Other clothes are brought to developing countries but are often thrown away because there are more clothes than needed.

We are trying to create a system to better manage used clothes.

Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

In this period different realities aimed at being sustainable are being born, in my opinion these problems you are talking about are not yet noticed. We'll know how they will go in a few years, at the moment the failures are not visible because the projects were born recently.

How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?

It is very important that the realization process is sustainable. However, it is very difficult to be sustainable from transportation because it is a necessary activity for sales. At the legislative level, the "extended producer responsibility" is being created, based on a European directive. This directive is fundamental because whoever produces will be responsible for the disposal of the products he puts on the market. This is currently the case for tyres: part of the price the consumer pays, is for the disposal of the product.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

The main problem in my opinion is related to inventory during its production.

There is always a problem of overproduction because the company struggles to understand how much to produce according to the customer's needs especially if they

require very short delivery times. In the field of fashion it costs less and is quicker to produce more than required, leaving many discards.

There are small initiatives in the fashion field where production is on demand, i.e. according to needs.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

In our little projects, we tell our customers that we only ship on Tuesdays and Thursdays and the courier takes 48 hours at most to deliver the package.

Consumers are sensitive to this issue and do not have a problem if a package arrives later. We thought about giving incentives to the people closest to the company; the closer they are to the company, the less it will cost to deliver.

In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?

A sustainable brand divinely must think about the supplier. The inclusion of them in the strategy is difficult, especially in a large company, but being transparent about who the suppliers are, from fabric to packaging, can be a good strategy for sustainability.

How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

The know-how is a barrier that can be easily overcome. Companies should understand that it is important to implement their staff with people experienced in sustainability. It is not important to have a university education, but rather experience. However, I believe that the university can provide the basis and the knowledge to direct people to certain roles.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

Right now, companies are struggling more than small companies. Small companies may have a competitive advantage towards sustainable models; it is easier for them to change and innovate. On the other hand, large companies have the funds and facilities to make the transformation process faster. In terms of waste, large companies produce more and are constrained by more regulations and therefore may have more difficulties.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent?

Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

There are several factors: certainly, the customer is the main factor, on the other hand there is the political and regulatory push. The combination of these two things is spreading sustainability, otherwise there would be no change.

It is possible a soon introduction of new regulations on green washing, this practice in fact makes sustainability lose its value and also damages companies that really want to be sustainable.

There are materials that are certainly more difficult to dispose and that sustainable brands should not consider. An example is represented by sequins that make the garment more difficult to dispose. Few people know that a mixed fabric is much more difficult to recycle: mechanical recycling of fabrics is always done on 100% of the material (100% cotton, 100% wool). However, the more the consumer is aware of the issues, the more will tend to understand the strategy. The brand must be a skilled communicator of the reasons and sustainable choices it makes. Another barrier is the cost of the products;

having sustainable products costs money and, in order to overcome this, brand communication is involved here as well. For example, in this case the brand could justify the cost of the product by explaining that it is long-lasting, unlike what can be found in the fast fashion industry.

Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

In my opinion it is easier to design a supply chain from scratch. In fact, when it comes to change, there is much more room for manoeuvre than in a large company.

I would now like to propose a list of barriers to the transition to sustainable supply chain management. Could you sort them according to how critical they are to overcome? (mark with a progressive number on the side, 1 = very difficult to overcome)

- Use of materials whose production has a high environmental impact = 5 (techniques can be found to avoid wasting resources to produce the fabrics)

- Client or designer request for colors whose application has a high environmental impact = 1

- Client or designer request for specific shapes and cuts that lead to material waste = 1

- Limited spending capacity of client = 8

- Low client demand for a sustainable process = 6

- Low delivery times (and therefore means of transport not fully loaded) = 8 (at supply chain level this is the thing on which we can move the most

- Core business that does not have sustainability as a core value =9 (almost impossible)

- Use of machinery with a high environmental impact = 8

- Import of materials from countries with low labor costs (and therefore long journeys) = 7 (also difficult because unfortunately tailoring has been lost over the years in Italy and Europe)

- Use of unsustainable and non-reusable packaging (in high quantities) = 1

- Lack of knowledge of technologies that allow for better waste management = 5 (it is possible to rely on consultants)

- Limited economic resources to implement sustainable projects = 9

- Limited know-how on the topic of sustainability = 5

- Limited research into sustainability alternatives (production or transportation) = 3 (research is ahead)

- Suppliers not adopting sustainable techniques due to limited financial resources and know-how = 5 (across all fields)

- Low supplier interest in sustainability = 5 (it is difficult but you can always change suppliers)

17 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I have studied management engineering after the scientific high school. I have started my project when I was at my first year of the bachelor because I was already passionate of fashion industry and sustainability. Therefore, I have 5 years experience in the field and the firm is increasing in terms both of number of employees and sales every year.

Do you think the company you work for has sustainability among its main values?

We have changed so many things in our business plan from the start of the project. The project was born for charity, for environmental sustainability. However, as the project progressed, sustainability immediately became the value to be added to charity. So, on one hand it has the social aspect because when the client buys, he supports a cause, on the other hand each capsule will support a cause on its own. For example, we have specific goals and every two months with this capsule we want to donate €10000 to Telethon and then all the money from those shirts is donated to them. This is our core; sustainability is our core for two reasons: the first is that nowadays it is becoming a necessary requirement and no longer a plus, the second reason is that the use of organic cotton or recycled does not mean being truly sustainable, it is so much marketing because to be truly sustainable a network of truly sustainable suppliers should be part of the strategy. The processes must be sustainable as well as logistics: for example Patagonia produces in Bangladesh and the t-shirt are made for 90% from recycled bottles, most people just appreciate sustainability in the product but transportation really affects sustainability. For the reality in which I work, sustainability is our identity but environmental sustainability is not our competitive value today.

Are you aware of projects aimed at sustainability, in the company where you work or in other companies that you know, that have not been successful due to issues detected and what were these issues?

Honestly I know our suppliers who also have their own commitments to environmental sustainability, for example a company that produces fabrics that uses only renewable energy, which doesn't seem much but it is a big commitment for those who have decided to make the looms work fabric with renewable energy. The only thing I can tell you is that we wanted to create an extremely sustainable product that was produced in the province of Varese, then with a zero-miles logistics with a selection of only environmentally conscious realities but we realised we could not do it. Indeed you can't even imagine how much it would cost to make a shirt like that, our customers are not able to buy at these prices and especially when you start to produce from scratch, from the pattern there are minimum orders you can do for the fabrics, accessories and packaging. It becomes a real investment to stock up and so the main reason is that we could not afford with the budget a project like that right away. So, we can say that it is an economic limit.

We have created a supply chain with careful suppliers with certifications but nothing is taken for granted, for example we did a screen on 100 companies that produced fabrics and only 4 responded to our parameters. As far as technical fabrics are concerned, sustainable suppliers don't really exist, there are no products with waterproof and breathable characteristics at certain levels that are not treated with chemical substances and solvents. It's not only a problem of money but also of research.

It is important to do as much as you can, but then other factors come in and it is not possible to be fully sustainable. But I believe that now people are becoming aware: it's not only about the sustainability of raw material, it's a system that must be made sustainable. We must commit ourselves to make the system ethical, it's the bare minimum we have to do.

How important is that the process is sustainable in addition to the product?

The process is fundamental; in fact if a company produces recyclable raw cotton but then it is made by children in Bangladesh, it is better to produce non-recyclable cotton.

When you think about waste management, what is the first issue regarding the production process that comes to mind in the process to be more sustainable?

In my opinion it is important how you use the waste, in terms of pollution and type of materials chosen. I think it makes sense to reduce waste, but you have to think about a way to use it. For example, we wanted to make bags out of T-shirt waste, so we were not thinking of how to produce less waste, but how to recover it.

That means turning it into something else, for example, we had thought of using the packaging box in another way so that it would not be thrown away. However, in production processes there is waste and it is impossible not to have it; even if it is possible to reduce it upstream, both in the production process and in ordering the right amount of fabric. It is unpleasant to throw things away, in companies there are many products that are produced but then thrown away for certain reasons: tags, labels and boxes that are thrown away due to the change of collection. Volume reduction and just in time could be the solution. For example, we reuse all the boxes that come in from suppliers and even plastic bubbles to protect the product. The solution might be to communicate that to the customer. The certifications (such as FairTrade or ISO) that companies disclose as sustainable are actually often controlled by law.

Do you think that in a company a supplier has the competitive advantage over the company or the opposite, that means the company decides on the sustainability requirements of its suppliers. In your opinion, when a company wants to become sustainable, how should it approach the supplier? What difficulties could it encounter?

In my opinion, the company must define parameters, so it must have a clear understanding of what it means for a supplier to be sustainable. I believe these parameters should be sought to be respected, as we said before, out of 100 we selected four. Of these four, one reflected everything we wanted. Of course I believe that we can also look for compromises, as I was saying before about the technical side, you can't ask a supplier to produce a sustainable product if he doesn't have the technology to do so. You have to push suppliers making them understand that this is the future, that sustainability is a win-win system, with sustainability you sell more. The company gains because it builds itself a reputation and the environment gains.

It must be the company that specifies to their fabric suppliers what a sustainable fabric is and how it should be made. Once you define the parameters you know that company is either respecting them or not. I think it's wrong for the company to just trust what the supplier says.

Do you think that a large company has a better chance of approaching sustainable waste management than a small company? If the answer is no, why would a small company have an advantage in this sense?

I think that the small company has an advantage because it is much more flexible; a large company has all the standard processes and contracts to comply with; I think that sustainable needs to be verified. So we need to understand if it works or not. Therefore a small company can, in my opinion, move from one part to another without major problems, while large companies, which are the ones that have the greatest impact, have big interests. Maybe for them saving a penny means saving millions at the end of the year, so in my opinion for the small company becoming sustainable is an easy process.

Do you think that the company's commitment to sustainability is entirely dictated by the client and his spending power of this client, or could it also be something independent?

I think it is a win-win system, so I believe in these values and therefore my dream is to have an ethical purpose and in any to commit to give to the society in which I live, so I try to reflect my values to the company and this is what the customer is asking for. A responsible way to sell encourages a responsible way to buy. There will always be a part of the clients that will appreciate your choices is responsible. So I don't see how a company that is not sustainable at all, that doesn't believe in those values, that doesn't rely on certain things, that has workers inside that don't believe in those values, could work. Unless a watch company like Rolex, where maybe the customer is looking for sustainable but still buys a Rolex.

On the contrary, there can't be a customer who pushes on sustainability on something that by definition can't be sustainable: let's take gasoline. That sector is really considered today as one of the most controlled as far as the environment is concerned, but you can't ask a company that sells gasoline to be sustainable. So it has to be something that comes from both sides in my opinion.

Do you think it's easier to design an entire sustainable fashion supply chain from the ground up or to change and renew one that already exists?

A: Well, at the level of processes, at least in fashion, the process should certainly not be changed because it remains the same, therefore the product should be adapted to the new process. I'll give you a small example: if I want to be truly sustainable, I shouldn't make piece-dyed, but yarn-dyed. Basically, you buy rolls of fabric, yarn-dyed means that the thread used to create the fabric is already of a certain color, whereas piece-dyed means that I take a white thread and I colour it, so it has to be treated in a chemical bath. This is something that no one says and before entering this sector I didn't know what they were but if it's piece-dyed or yarn-dyed it changes a lot as to its impact. Obviously the piece dyed allows you to create all the colors you want, to have a stock of white fabric and then color it according to the request you have without limitations, with yarn dyed

you have limitations. So in reality the process remains the same you have to take into account constraints and then you have to look for the right suppliers.

In your opinion how much the fabric that undergoes chemical treatments to apply a certain type of color or the shape can be considered barriers to sustainability?

A: Absolutely yes, at a technological level there are still very high constraints for certain performances and for certain processes, for example technical fabrics undergo chemical baths to be waterproof, breathable. There are 3 types: C6, C8, C10 the least polluting is C6. This lasts about 10 washes before losing the property, with the C10 you can wash it 50 times. For certain performances there are very high constraints, but if you have to make a T-shirt the biggest constraint is money.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome)

-use of materials whose production has a high environmental impact such as polyester cotton 7

-customer's request for colors whose application has a high impact: 8

-customer's spending power 6 (this is reflected on the garment because they have more expensive processes)

- Limited spending capacity of client = 6

-low delivery times: 6 (that affects even if for me you can find the way so I would give a 6 because in the end just maybe have the means of smaller not only means giant. Obviously, then it affects the cost.)

- core business of the company that does not have sustainability as its main value: 8

- use of machinery with a high environmental impact, therefore possibly changing the machinery: 6

- import of materials from countries with low labour costs and therefore long journeys:8
(it depends on how you are positioned so if a company produces in countries where labor is cheap it is difficult to go back)

- use of unsustainable non-reusable packaging :4 (low because finding sustainable packaging is not difficult, there are boxes that you can plant and from which a flower is born. In my opinion it's raising awareness. At Primark, when you see a sustainable t-shirt for 2.50 euros, how is it possible that the VAT, transport, production, packaging, manufacturing... are all included?)

-scarce economic resources to implement sustainable projects:10 (ask for higher minimums for sustainable, often in stock they do not have them and have to produce them)

-limited scientific research on alternatives in the field of sustainability, i.e. in your opinion research in this field is limited or we are already at a good point: 8 (it is backward, there is a lot of potential to create fabrics in a different way and I say this because in Italy many realities are emerging in this sector but the good ones are very few).

Suppliers that in your opinion do not adopt sustainable techniques for limited financial resources and know-how: 7

18 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I studied fashion design at the polytechnic school, 14 years of experience, passionate about the world of fashion and sustainability thanks to university projects in which I took part. For this reason I decided to write my thesis on this topic. After graduation I worked in a non-sustainable company for a few years. The project I'm taking part in was born by chance but then it became an established business with loyal customers. We only use sustainable materials such as hemp and nettle; I used to sew the pieces myself but at the moment I am getting help from a seamstress because the demand is increasing.

Do you think the company you work for has sustainability as one of its main values? If the answer is positive, how? If sustainability is not a value, do you think this could be an impediment for the future? Why?

It's really difficult to be sustainable at 360 degrees, taking into account that the company I work for is very small. For us, a sustainable product is certainly fundamental. Our core business is centred on the choice of sustainable fabrics, which require equally sustainable processes for their production. Sustainability in our company starts upstream with the choice of materials, we also try to use colors that can always be matched to create a garment that fits all seasons and can be used many times, this is a type of sustainability that goes beyond the process and the product itself. However, the process is very important, we focus on sustainable waste management, of course it is impossible to have zero waste but, being a small company, we have the possibility to think how to use every excess part and every waste. If the scraps are small, maybe we create earrings, while in other cases, if the fabric is white, we give it to a girl who produces paper made of hemp or, in other cases, we take the scraps to nursery schools so that children can use the scraps for handicrafts.

Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

Some collaborative projects that were planned did not go through because of Covid. For example, one project involved the selection of scrap parts in the company to create some new materials but unfortunately this was not possible due to the restrictions imposed for Covid -19. The size of the company certainly is a limitation; a collaboration with supplier companies often does not even begin, due to too small orders for product quantities to be accepted.

How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?

The manufacturing process is very important for us, since ours is a handmade production, sustainability is at the core of the strategy. Few suppliers guarantee a transparent process throughout the entire supply chain, in terms of animal welfare, such as how the animal is sheared, and also values on pollution or the type of dye that is applied. In fact, it is necessary to rely on certifications when choosing suppliers.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

Certainly a major issue is the choice of materials and the resource requirements in their production processes. Very often people think that an organic cultivation is completely sustainable. However, this is not the case because the fields of normal and organic cultivation occupy the same cultivated area. Other materials such as hemp require less use of water and pesticides.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

This barrier depends a lot on how much the customer can wait, but I am convinced that if things are explained in detail, the sensitive customer can understand. As far as packaging is concerned, small companies can have different sizes for boxes and choose them according to the garment they are putting in, while larger companies usually have standards that they follow, inherent to the size of the box, also avoiding the loss of time in choosing a box of the correct size.

The customer is also accustomed to having everything immediately, often free shipping makes them lose sight of the emission of pollution that is concerned in transport. Companies tend to incentivize this, trying to get as close as possible to the customer: for example, if the customer is undecided on the size he is advised to buy both sizes he is undecided on and return the one he will not use.

How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

When the waste management issue cannot be solved in an initial study, there are really several alternatives on how to engage the waste. The important thing is the commitment, the ingenuity of figuring out how best to manage the waste, and the know-how will come consequently. Know-how is not a very high barrier because if a company does not know how to move in this field, it can ask for external help.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

The small company has more control and is more flexible, it is able to track the various steps, while a very large company in which the management is stock-based, it is very difficult to assess the amount of waste and track the exact waste. However, there are external figures that deal with sustainability consulting. For example, Alisea is a company that deals with creating company gadgets only through the company waste (such as stationery and pencils). The advantage of a large company is that they can use the figures of consultants, if there is the will.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent? Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

The commitment of the company and the client are linked variables but on two different levels. From the customer's side, a desire is emerging, so as a result companies are running for cover, trying to improve or be seen to improve in the area of sustainability. So the customer has a strong power, but if these choices are real choices born from the will to be sustainable and not from a customer request, there must be a strong basic will at the corporate level.

By now we are used to having everything we want and we don't even ask the question of what is involved in having certain things. There are dyes that they only take on mixed natural and synthetic fabrics, for example a yellow sweater can only be made of 100% cotton, while a fluorescent yellow cannot be made on cotton, it must have a synthetic percentage inside. Often sustainability brands don't have great varieties of colours or special inserts, this is a big limitation for those who aim for aesthetics in their choice.

Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

The former, especially on large company sizes.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome)

- Use of materials whose production has a high environmental impact = 8
- Client or designer request for colors whose application has a high environmental impact = 6
- Client or designer request for specific shapes and cuts leading to waste in material = 7
- Limited spending capacity of client = 6
- Low customer demand for a sustainable process = 4
- Low delivery times (and therefore means of transport not fully loaded) = 7
- Core business that does not include sustainability as a core value = 8
- Use of machinery with high environmental impact = 9
- Import of materials from countries with low labour costs (and therefore long journeys) = 6
- Use of unsustainable and non-reusable packaging (in high quantities) = 2
- Lack of knowledge of technologies that enable better waste management = 6
- Limited economic resources to implement sustainable projects = 7
- Limited know-how on sustainability = 6
- Limited research on alternatives (production or transport) in the field of sustainability = 8 (scientific research is far behind)

- Suppliers not adopting sustainable techniques due to limited financial resources and know-how = 6
- Low supplier interest in sustainability =7

19 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I work in a three-person company, operating in Florence with many contacts in Milan, that recovers vintage designer clothes, often damaged, and gives them a second life. The brand was born out of a great passion for fashion. With my twin brother I attended Fashion Culture and Technique in Rimini, a course at Polimoda in Florence in accessory design, courses in theatrical tailoring, courses to create fabrics with flowers and plants.

I have experiences in the world of fashion initially with internships at Cavallini, which is a brand that has stores in Milan on Via della Spiga. In 2015 we were already maturing a certain attention towards sustainability, in fact we followed a special unique project. The company was buying broken and damaged cashmere garments from a company in Prato and making the regenerated cashmere yarn. Then pieces such as collars, buttons and cuffs were recovered and new garments were created from scratch such as pants, tops, outerwear, skirts. Then I did another internship in the accessories office at Ferragamo and then for a year I worked at a leather goods company. This gave me more awareness about the life of the garments. The important thing is to know where you want to go and not to be too conditioned in your choices because it's a very dispersive environment, you have to make choices to grow and leave certain environments. The persons that make up our creative team are, along with me, my brother who specializes in accessories and a girl who has a degree in architecture. The project was born in December 2020 and is a very young reality.

Do you think the company you work for has sustainability as one of its main values? If the answer is positive, how? If sustainability is not a value, do you think this could be an impediment for the future? Why?

The company I work for has become very sensitive to the issue of sustainability: they have changed all the packaging of the bags, reducing plastic to a minimum and the company has given the city of Florence 50 oak trees that were planted in the shape of a star, which is the symbol of the company. In addition, there is a particular attention to the material: for zippers it is used the selvedge and not polyester, for the tanning of the leather is preferred less bathing in pollutants and then conceived vegetable. Therefore, in the last period, the company's offer has expanded to include sustainable materials.

In order to remain in the industry, it is now mandatory to propose a sustainable strategy.

Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

Most of the time a sustainable product is expensive. There is difficulty in finding products in quantity. Despite willingness and sensitivity, the costs are too often excessive.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

It is inevitable that waste of materials will always be there. It is important to use a product that works in the market and therefore the use the same materials always helps. To avoid large stocks, the choice of material is fundamental, the flexibility with which you can use the same material in multiple ways helps, rather than diversifying.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

This also depends on the size of the company and the number of locations it has; certainly a focus on the local side with a supply chain that develops products within 30-40 km helps the strategy towards sustainability. Also important is the company's location in an easily accessible focal point, which allows for nearby labour and avoids unnecessary transportation.

In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?

Certainly suppliers are very important for the sustainable process, they are the key but they must be transparent i.e. offer exactly the product they describe. They cannot sell a product as sustainable without being sustainable. The product must pass the tests. Transparency and choice of suppliers are the basis. In addition, suppliers must provide documentation that must certify the real sustainability and certificates on materials and their care. There are also materials that change over time and in fact have a specific life process.

How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

If the company is small and has an internal development of products and models, it can certainly transmit a more sustainable working method to the workers. If, on the other hand, the product is made outside the company with external workers, it is more difficult.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

Both can approach sustainability if they want to. A large company would benefit from approaching sustainable waste management and it can do so as a marketing strategy or

to avoid stock in warehouses that would otherwise be full of unused material. In my opinion either a company already starts with the idea of being sustainable or it is more difficult if a small established company with old materials tries to be sustainable. An idea for a small company could be to engage in its own reality: it could make gadgets with waste materials to give away to advertise and dispose.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent

There are companies that have historic customers who are attached to that brand and less sensitive to sustainability. On the other hand, a consumer who does not reason on the basis of a brand might approach that product only because it is sustainable or made in a certain way. If there were no market demand, no company would approach sustainability.

Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

They are definitely barriers, but it is important to underline one aspect. In the collective imagination, the simpler the product is and the more it is made with raw and natural colours, the more sustainable it is, but this is not always the case.

Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

An established company may struggle in terms of suppliers: those willing to use sustainable processes may not be the incumbents. Instead, if something is set up from scratch, a supplier roll is created by selecting the best available. By starting from scratch, you have more freedom of choice and selection.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome)

- Use of materials whose production has a high environmental impact = 8
- Client or designer request for colors whose application has a high environmental impact = 8
- Client or designer request for specific shapes and cuts that lead to material waste = 8
- Limited spending capacity of client = 8 (a sustainable product costs money, has a high target)
- Low customer demand for a sustainable process = 8
- Low delivery times of goods (and therefore means of transport not fully loaded) = 8
- Core business of the company that does not foresee sustainability as a main value = 9 (it also depends very much on the strategy)
- Use of machinery with high environmental impact = 9
- Import of materials from countries with low labor costs (and therefore long journeys) = 7
- Use of unsustainable and non-reusable packaging (in high quantities) = 5 (due to purchasing experience)
- Lack of knowledge of technologies that enable better waste management = 9
- Lack of economic resources to implement sustainable projects = 8
- Limited knowledge on the topic of sustainability = 5

-Limited research of alternatives (production or transportation) in the field of sustainability = 5 (heading in the right direction)

-Suppliers not adopting sustainable techniques due to limited financial resources and know-how = 5 (company decides)

-Low supplier interest in sustainability = 3

I10 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I am the designer as well as founder of x, I was born in 1991, I am from Milan, graduated in 2014 at Politecnico di Milano in Fashion Design and completed my master studies in Sustainability in Fashion at Esmod Berlin in November 2015.

In 2016 I won a 12-month research grant offered by Salvatore Ferragamo and Scholarship Foundation for Climate and Sustainability for the research project "Natural fibres, new materials and recovery of traditional craftsmanship for ecologically and socially sustainable fashion industry". In the following years I was often invited as a guest-speaker in various schools and universities (Axis College, University of the Incarnate Word, Bocconi, 24Ore Business School and Polimoda Florence) to talk about the value of zero-waste and deepen the discourse on design strategies. Since 2021 I have been a member of the jury of Redress Design Award, the largest sustainable fashion design competition in the world organized by Redress and I currently collaborate with C.L.A.S.S. Eco Hub as project coordinator.

Do you think the company you work for has sustainability as one of its main values? If the answer is positive, how? If sustainability is not a value, do you think this could be an impediment for the future? Why?

0 means zero waste, less pollution and reduced emissions as well as 0% gender

100 means 100% high quality, Made in Italy, traceability, sustainability and transparency of production

Our company does not revolutionize but re-shapes the values of the textile and fashion industry, breaking free from seasonal trends and restrictions imposed by age and gender, creating a product that can embrace and accompany anyone who chooses

it in the different stages of their life, adapting to changes in the body, style and personality.

The brand redefines the production processes and choices that go into the creation of a collection as each element is designed to achieve zero-waste, modelling type and commitment achieved at 360 degrees, with single-fibre products that include selvedge and avoiding accessories difficult to disassemble. Made in Italy is a choice of values, it represents the means to trace every step of production, collaborating with excellent suppliers who are open to change.

The brand is founded on the idea of creating pieces that last and can be passed down through the generations.

The company uses only certified Made in Italy raw materials, giving priority to GRS (Global Recycled Standard) certified regenerated materials. In addition, the brand has been analysed in terms of corporate and product responsibility by Cikis and Sustainable Brand Platform.

Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

I do not know.

How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?

100%, as per brand commitment.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

The lack of optimization, i.e. of a holistic approach to production that allows a proper analysis of the same.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

every type of waste, at each level, is of fundamental importance.

In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?

Absolutely yes, they should be proactive in finding solutions and sharing information.

How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How?

not very easy to overcome. deep analysis and possible support from consultants.

To which other important barriers is it linked?

Know-how is the basis of every choice and therefore of every sustainability strategy.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

I do not think that a large company has more possibilities to approach sustainability. A small company is more flexible and can have the control over many processes. Know-how is the basis of every choice and therefore of every sustainability strategy.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent?

The trend to be sustainable is increasing and increasing and I think that many companies are going to do it to meet the clients' requests.

Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

I do not think this can be considered a barrier to sustainability.

Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

The change and revamp one that already exists.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome))

- Use of materials whose production has a high environmental impact = 8
- Client or designer request for colors whose application has a high environmental impact = 6
- Client or designer request for specific shapes and cuts that lead to waste in the material = 5
- Limited spending capacity of client = 7
- Low customer demand for a sustainable process = 5
- Low delivery time of goods (and therefore means of transport not fully loaded) = 4
- Core business of the company that does not include sustainability as a main value = 4
- Use of machinery with high environmental impact = 6
- Import of materials from countries with low labor costs (and therefore long journeys) = 8
- Use of packaging (in high quantities) that is unsustainable and non-reusable = 3

- Lack of knowledge of technologies that allow for better waste management = 9
- Scarce economic resources to implement sustainable projects = 7
- Limited know-how on the topic of sustainability = 6
- Limited research of alternatives (production or transport) in the field of sustainability
= 4
- Suppliers not adopting sustainable techniques due to limited financial resources and
know-how = 8

I11 - Interview

- Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I did not have any experience in the world of luxury until the birth of this new start up. I have never worked in the fashion industry. But last year I started with an idea driven by the fact that a lot of brands show themselves as sustainable but they aren't; so I wanted to create a product that was truly sustainable and responsible. For us the process is very important, many companies aim to have certifications but without really being sustainable, in my opinion they are different things. We want to give a real alternative to those who want a different product.

- Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

The problems depend on economic issues. Becoming sustainable costs money: packaging, machinery and staff training.

- How important is for your company that the manufacturing process is sustainable too, in addition to the product? Why?

For us, the manufacturing process is just as important as the product.

- When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered a barrier that would prevent the development of a sustainable strategy?

In order to limit waste, we have thought of a product that has as little waste as possible, also by evaluating exactly how much material is really needed. Starting from the prototyping phase of the product, we calculate exactly how much waste will be generated during its production. As far as the production process is concerned, we have

had a lot of problems because we have developed a new material and therefore an in-depth study of it is necessary.

- As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

Certainly they are a fundamental part, it is difficult to recognize customer needs and satisfy them, as well as to find biodegradable packaging. Also, our product must be returned at the end of its life cycle so we look for solutions to incentivize this process.

- In designing a sustainable supply chain, do you think that the suppliers should be part of the strategy? What difficulties should the company overcome on this front?

Absolutely because they are the heart of the company, it is essential that the supplier is aligned with the sustainable idea. If the incumbent supplier does not have a sustainable vision, it is difficult to change, but it is essential to satisfy the customer.

- How much does the company's know-how influence waste management? Do you think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

Know-how is fundamental because production is based on prototypes. Moreover, we do not throw them away but recycle them, the technologies we use are fundamental to allow this. For a historical company with a certain mentality, it is more difficult to go sustainable because they lack know-how.

An artisan doesn't do mass production so it's definitely sustainable, the problems start with the industries.

- Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

A large company is more likely to decide to change, but at the same time the processes are standard and thought out in detail. A small, established firm is unlikely to change spontaneously, unless it is driven by strong reasons, such as declining sales.

- Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent?

In my case by developing a new material the cost is higher because it is not produced in industrial quantities; it is fundamental that customers become informed and aware so that companies adapt. Communication is very important, if the customer is explained the reasons why certain cost choices are made, they will understand and decide what to spend their money on. For example, vintage is more expensive than the regular store in some realities and yet they sell a lot. The tradition of manufacturing in Italy is still strongly present and it is more difficult to eradicate unsustainable companies because they are full of tradition, this can be another barrier in my opinion.

- Staying on the topic related to customer demands: how much can shape, colour and style be considered barriers to sustainability?

In my opinion it depends on the relationship between the technical department and the research department, how they manage to collaborate together and find ways to reduce waste. There is always a solution. Shape, color and style are barriers but it depends on the research that is done on them.

- Is it easier to design an entire sustainable supply chain or to change and renew one that already exists?

In my opinion, it's better to reorganize an existing supply chain than to redesign another one, because you already know the strengths and weaknesses of the one you've already tried. Of course, it always depends on the context, but for example the cost of inserting a filter in a machine is lower than buying one.

- I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome))

- Use of materials whose production has a high environmental impact =6
- Client or designer request for colors whose application has a high environmental impact =4
- Client or designer request for specific shapes and cuts that lead to waste in the material =4
- Limited spending power of client =8
- Low client demand for a sustainable process =7
- Low delivery times (and therefore means of transport not fully loaded) =7
- Core business that does not have sustainability as a core value =10
- Use of machinery with high environmental impact =8
- Import of materials from countries with low labour costs (and therefore long journeys) =7
- Use of packaging (in high quantities) that is unsustainable and not reusable =6 (a fashion brand that wants to have a certain type of packaging can have it using sustainable materials or weigh packaging as an object that can serve later)
- Poor knowledge of technologies that allow for better waste management =9
- Limited economic resources to implement sustainable projects =9
- Limited know-how on the topic of sustainability =6
- Limited research of alternatives (production or transport) in the field of sustainability =5

- Suppliers not adopting sustainable techniques due to limited financial resources and know-how =8
- Low supplier interest in sustainability =10

I12 - Interview

Could you tell me about your experience in the field of supply chain and fashion (years of experience, educational background, company contexts in which you have worked)?

I live in a small town in the south of Italy and I did my mandatory internship in a small tailor's shop. I was already working in this tailor's shop before I decided which academic path to take: whether to choose design or to enter the tailoring academy. So I've always stayed within the craft and for me this is already a vision of sustainability because the avoidance of all industrial processes reduces waste. This makes a garment practically unique because every time you reproduce it will always be different. Therefore, uniqueness, less waste of resources and also less transportation because, since we are a small company, I personally select the products. If I wanted to order fabrics such as silk, for example, which are natural fabrics, the price would be higher and therefore I prefer to choose products locally, without placing large orders but I order meter by meter. I also prefer to support the area where I live and place orders in local stores where you can buy limited quantities. Instead of sustainability, I would talk about ethics, that is, trying not to waste. Today, however, there is less desire to research, because there is the all and immediately, this is satisfied by large chains that offer a wide choice of products and everyone is sure to find what he is looking for.

Are you aware of any projects aimed at sustainability in the company where you work (or in other companies) that have not been successful due to problems (also from an economic point of view)?

The problems are mainly at economic level. Starting from research, PhDs are not paid enough and people who want to follow this path tend to go abroad.

When you think about waste management, what is the first issue regarding the production process that comes to your mind? In your opinion, could this be considered

a barrier that would prevent the development of a sustainable strategy?

As far as I'm concerned, I buy products that are already processed, i.e. already dyed and produced. Contrary to popular belief, there is more waste of resources (water) in creating cotton than polyester, so it is not a sustainable choice to buy cotton, rather polyester creates pollution not so much in the production phase as in the processing phase because toxic plastic particles are released into the environment. It would take a system to purify water but it is too expensive and above all too many nations do not do it. Often there are political interests that do not allow a clear legislation and strict rules on the requirements that a production plant should have.

As far as waste related to logistics is concerned (everything related to pollution due to transport, speed of goods delivery and packaging), in your opinion, how much and in what way do they affect the improvement of a sustainable supply chain?

Based on the demand we have, the products come from abroad because the production orders made in Italy have to be consistent, arrive after a long time and cost a lot. Production is done abroad because in China, for example, there are no laws regulating the use of more or less toxic materials (in fact, it is one of the most polluted countries). It is not possible to be sustainable without having an economic return. The market has changed: there is no longer a middle ground between luxury and cheap; Zara, for example, sells bags that cost €1.50 all-inclusive at the same price as the bags I produce. Now with the crisis due to covid, the world is changing and people are looking to buy quality things that last over time, in fact, since they spend more time at home, people have more time to inform themselves and do not want to spend money on unnecessary things that they would wear a few times or that are not necessary.

How much does the company's know-how influence waste management? Do you

think this is a barrier that can be easily overcome? How? To which other important barriers is it linked?

Today there is a real generational change in terms of the information people have access to.

The last generation didn't care about sustainability because they lived in a real economic boom, they created new materials and did research on materials without caring that they were sustainable; for example many companies have antiquated machinery dating back to the last century and today the knowledge has changed but with more awareness on how to make something more functional. The problem is that the costs of breaking down these barriers are unsustainable. For example, companies that deal with leather are going out of business, they are in crisis because of sustainability, in fact, working and treating the skins pollutes a lot and wastes many resources. It would be necessary to redesign all these machines but the cost would be unsustainable. In recent years, regulations have been introduced to protect the environment, but governments do not provide economic incentives to steer companies towards sustainability.

Do you think a large company has a better chance of approaching sustainable waste management? If the answer is positive, why? If the answer is negative, why might a small company have a competitive advantage in this?

In my opinion, big brands can turn this around by training students and making them aware of these issues. That way they break down these barriers and approach sustainability differently. This would only cost the company the cost of the materials and would allow them to get advice and ideas from people who do not have preconceptions or superstructures and would therefore meet the needs of today's youth, who is also the customer.

Can the company's commitment to sustainability be entirely dictated by the client and its ability to spend, or do you consider it as independent? Staying on the topic related to

customer demands: how much can shape, colour and style be considered barriers to sustainability?

In my opinion it is important that the target market understands the true meaning of the product that the company is presenting. You have to explain why the product is priced, what it means in terms of sustainability, and what it can mean to users. For example, my target clientele was the one most affected by the pandemic because women and children were the ones most affected both economically and socially. You have to meet certain needs, respond to the target clientele you're aiming at, even on a psychological level. Explaining what you do drives the customer to buy, you give them a particular value by transmitting ethics and consistency. So, in my opinion the company's commitment is not completely dictated by the customer, in my opinion it must be a mix of communication by the company and customer demand. This obviously can only happen if the company is driven by sustainable goals.

A low-medium budget customer can have high expectations to buy sustainable, if he is convinced of what the company communicates to him.

I am now proposing a list of barriers to the transition to sustainable supply chain management, could you mark them according to the criticality in overcoming them? (mark with a progressive number, 1 = very easy to overcome; 10= difficult to overcome))

- Use of materials whose production has a high environmental impact = 8
- Client or designer request for colors whose application has a high environmental impact = 5
- Client or designer request for specific shapes and cuts that lead to material waste = 3
- Limited spending power of client = 4

- Low customer demand for a sustainable process = 5 (many companies are not transparent, so the customer is not aware of the process, it is at the discretion of the company)

- Low delivery times (and therefore means of transport not fully loaded) = 7

- Core business that does not include sustainability as a core value = 6

- Use of machinery with high environmental impact = 9

- Import of materials from countries with low labour costs (and therefore long journeys)

= 8

- Use of unsustainable and non-reusable packaging (in high quantities) = 5

- Lack of knowledge of technologies that enable better waste management = 7

- Limited economic resources to implement sustainable projects = 7

- Limited know-how on sustainability = 5

- Limited research on alternatives (production or transportation) in the field of sustainability = 3

- Suppliers not adopting sustainable techniques due to limited financial resources and know-how = 7

- Low interest of the supplier in sustainability = 7 (it is determined by the target of the supplier, on the one hand if the company exports fine silks, just one load of goods is enough to have a nice profit, on the other hand if the customers use in fast fashion the company will be forced to provide more loads)

Appendix 3 – Consent form



UNIVERSITY OF HERTFORDSHIRE

ETHICS COMMITTEE FOR STUDIES INVOLVING THE USE OF HUMAN PARTICIPANTS

(‘ETHICS COMMITTEE’)

FORM EC3

CONSENT FORM FOR STUDIES INVOLVING HUMAN PARTICIPANTS

I, the undersigned *[please give your name here, in BLOCK CAPITALS]*

.....

of *[please give contact details here, sufficient to enable the investigator to get in touch with you, such as a postal or email address]*

.....

hereby freely agree to take part in the study entitled

“An investigation of waste management within the fashion industry: the critical barriers to transition to a sustainable development”

(UH Protocol number BUS/PGT/UH/05009)

1 I confirm that I have been given a Participant Information Sheet (a copy of which is attached to this form) giving particulars of the study, including its aim(s), methods and design, the names and contact details of key people and, as appropriate, the risks and potential benefits, how the information collected will be stored and for how long, and any plans for follow-up studies that might involve further approaches to participants. I have also been informed of how my personal information on this form will be stored and for how long. I have been given details of my involvement in the study. I have been told that in the event of any significant change to the aim(s) or design of the study I will be informed, and asked to renew my consent to participate in it.

2 I have been assured that I may withdraw from the study at any time without disadvantage or having to give a reason.

3 In giving my consent to participate in this study, I understand that voice, video or photo-recording will take place and I have been informed of how/whether this recording will be transmitted/displayed.

4 I have been told how information relating to me (data obtained in the course of the study, and data provided by me about myself) will be handled: how it will be kept secure, who will have access to it, and how it will or may be used, including the possibility of anonymised data being deposited in a repository with open access (freely available).

5 I understand that if there is any revelation of unlawful activity or any indication of non-medical circumstances that would or has put others at risk, the University may refer the matter to the appropriate authorities.

6 I have been told that I may at some time in the future be contacted again in connection with this or another study.

Signature of participant.....Date.....

Signature of (principal) investigator  Date.....

Name of (principal) investigator

IRENE STEVENAZZI

Appendix 4 – Approval letter



SOCIAL SCIENCES, ARTS AND HUMANITIES ECDA

ETHICS APPROVAL NOTIFICATION

TO Irene Stevenazzi
CC Luca Sabini
FROM Dr Brendan Larvor, Social Sciences, Arts and Humanities ECDA Vice Chairman
DATE 26/04/2021

Protocol number: **BUS/PGT/UH/05009**

Title of study: An investigation of waste management within the fashion industry: the critical barriers to transition to a sustainable development

Your application for ethics approval has been accepted and approved with the following conditions by the ECDA for your School and includes work undertaken for this study by the named additional workers below:

no additional workers named

General conditions of approval:

Ethics approval has been granted subject to the standard conditions below:

Permissions: Any necessary permissions for the use of premises/location and accessing participants for your study must be obtained in writing prior to any data collection commencing. Failure to obtain adequate permissions may be considered a breach of this protocol.

External communications: Ensure you quote the UH protocol number and the name of the approving Committee on all paperwork, including recruitment advertisements/online requests, for this study.

Invasive procedures: If your research involves invasive procedures you are required to complete and submit an EC7 Protocol Monitoring Form, and copies of your completed consent paperwork to this ECDA once your study is complete.

Submission: Students must include this Approval Notification with their submission.

Validity:

This approval is valid:

From: 03/05/2021

Please note:

Failure to comply with the conditions of approval will be considered a breach of protocol and may result in disciplinary action which could include academic penalties.

Additional documentation requested as a condition of this approval protocol may be submitted via your supervisor to the Ethics Clerks as it becomes available. All documentation relating to this study, including the information/documents noted in the conditions above, must be available for your supervisor at the time of submitting your work so that they are able to confirm that you have complied with this protocol.

Should you amend any aspect of your research or wish to apply for an extension to your study you will need your supervisor's approval (if you are a student) and must complete and submit form EC2.

Approval applies specifically to the research study/methodology and timings as detailed in your Form EC1A. In cases where the amendments to the original study are deemed to be substantial, a new Form EC1A may need to be completed prior to the study being undertaken.

Failure to report adverse circumstance/s may be considered misconduct.

Should adverse circumstances arise during this study such as physical reaction/harm, mental/emotional harm, intrusion of privacy or breach of confidentiality this must be reported to the approving Committee immediately.

Appendix 5 – Application Form

UNIVERSITY OF HERTFORDSHIRE

FORM EC1A: APPLICATION FOR ETHICS APPROVAL OF A STUDY INVOLVING HUMAN PARTICIPANTS

(Individual or Group Applications)

Please complete this form if you wish to undertake a study involving human participants.

Applicants are advised to refer to the Ethics Approval StudyNet Site and read the Guidance Notes (GN) before completing this form.

<http://www.studynet2.herts.ac.uk/ptl/common/ethics.nsf/Homepage?ReadForm>

Applicants are also advised to read the FAQ General Data Protection Regulation (GDPR) before completing this form.

<http://www.studynet2.herts.ac.uk/ptl/common/ethics.nsf/Frequently+Asked+Questions/4AD88CD88D0F3F2D8025829800300621>

Use of this form is mandatory [see UPR RE01, 'Studies Involving Human Participants', Sections 7.1-7.3]

Approval must be sought **and granted** before any investigation involving human participants begins [UPR RE01, S 4.4 (iii)]

If you require any further guidance, please contact either hsetecda@herts.ac.uk or ssahecda@herts.ac.uk

Abbreviations: GN = Guidance Notes UPR = University Policies and Regulations

THE STUDY

Q1 Please give the title of the proposed study

An investigation of waste management within the fashion industry: the critical barriers to transition to a sustainable development

THE APPLICANT

Q2 Name of applicant/(principal) investigator (person undertaking this study)

Irene Stevenazzi

Student registration number/Staff number

19064722

Email address

irene.stevenazzi@gmail.com

Status:

☒ Undergraduate (Foundation)

☐ Undergraduate (BSc, BA)

☒ Postgraduate (taught)

☐ Postgraduate (research)

☐ Staff

☐ Other

If other, please provide details here:

[Click here to enter text.](#)

School/Department:

Hertfordshire Business School

If application is from a student NOT based at University of Hertfordshire, please give the name of the partner institution: N/A

Name of Programme (eg BSc (Hons) Computer Science): MSc Project Management

Module name and module code: 7BSP1266-0909-2020 - Dissertation

Name of Module Leader if applicant is undertaking a taught programme/module:

Marija Cubric

Names and student/staff numbers for any additional investigators involved in this study (students should read GN Sections 1.5 and 2.2.1 concerning responsibilities of all members of the group)

N/A

Is this study being conducted in collaboration with another university or institution and/or does it involve working with colleagues from another

institution?

☐ Yes

☒ No

If yes, provide details here:

N/A

DETAILS OF THE PROPOSED STUDY

- Q3 Please give a short synopsis of your proposed study, stating its aims and highlighting where these aims relate to the use of human participants (See GN 2.2.3)

Sustainability in fashion industry is a burning matter the companies have to deal with. The aim of this dissertation would be to identify and deeply analyse the critical barriers that fashion companies have to overcome when implementing a sustainable waste management. The research will adopt a qualitative methodology by undertaking individual semi-structured interviews to professionals in the chosen sector.

- Q4 Please give a brief explanation of the design of the study and the methods and procedures used. You should clearly state the nature of the involvement the human participants will have in your proposed study and the extent of their commitment. Ensure you provide sufficient detail for the Committee to, particularly in relation to the human participants. Refer to any Standard Operating Procedures SOPs under which you are operating here. (See GN 2.2.4).

The strategy to answer the research question consists in collecting qualitative data in order to deeply identify and analyse the barriers to transition to a sustainable development and the implications in practice.

The interviewees will be selected and then invited to participate: they would surely give some insights and real-context views about the topic and would provide me a better understanding of the issue.

The semi-structured interviews will be online and 50 interviewees will be contacted through the researcher's social media platforms, in particular LinkedIn will be critical to contact the professionals.

- Q5 Does the study involve the administration of substances?

☐ Yes

☒ No

PLEASE NOTE: If you have answered yes to this question you must ensure that the study would not be considered a clinical trial of an investigational medical product. To help you, please refer to the link below from the Medicines and Healthcare Products Regulatory Agency:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/317952/Algothrim.pdf

To help you determine whether NHS REC approval is required, you may wish to consult the Health Research Authority (HRA) decision tool: <http://www.hra-decisiontools.org.uk/ethics/>

If your study is considered a clinical trial and it is decided that ethical approval will be sought from the HRA, please stop completing this form and use Form EC1D, 'NHS Protocol Registration Request'; you should also seek guidance from Research Sponsorship.

I confirm that I have referred to the Medicines and Healthcare Products Regulatory Agency information and confirm that that my study is not considered a clinical trial of a medicinal product.

Please type your name here: Click here to enter text.

Date: Click here to enter a date.

Q6.1 Please give the starting date for your recruitment and data collection: 03/05/2021

Q6.2 Please give the finishing date for your data collection: 20/06/2021
(For meaning of 'starting date' and 'finishing

date', see GN 2.2.6)

Q7.1 Where will the study take place?

In this research only online interviews will take place through online meetings via MS Teams or Zoom. The meetings will be recorded with the softwires used during the meetings or with the private telephone of the researcher. It is not required any physical room.

Please refer to the Guidance Notes (GN 2.2.7) which set out clearly what permissions are required;

Please tick all the statements below which apply to this study

Q7.2 Permissions

This question is about two types of permission you may need to obtain. Depending on the study you may need more than one of each of these:

- i Permission to access a particular group or groups of participants to respond to your study
- ii Permission to use a particular premises or location in which you wish to conduct your study

If your study involves minors/vulnerable participants, please refer to Q18 to ensure you comply with the University's requirement regarding Disclosure and Barring Service clearance.

TICK THE APPROPRIATE BOXES IN EACH COLUMN

(i) Permission to access participants		(ii) Permission to use premises/location	
(tick)		(tick)	
	I confirm that I have obtained permission to access my intended group of participants and that the permission is attached to this application		Permission has been obtained to carry out the study on University premises in areas outside the Schools and the agreement is attached to this application.
X	I have yet to obtain permission but I understand that this will be necessary before I commence my study. <u>For student applicants only:</u> I understand that the original copies of the permission letters		Permission has been obtained from an off-campus location to carry out the study on their premises and the agreement is attached to this application

	must be verified by my supervisor before data collection commences		
	This study involves working with minors/vulnerable participants. I/we have obtained permission from the organisation (including UH/UH Partner Institutions when appropriate) in which the study is to take place and which is responsible for the minors/vulnerable participants. The permission states the DBS requirements of the organisation for this study and confirms I/we have satisfied their DBS requirements where necessary		I have yet to obtain permission but I understand that this will be necessary before I commence my study. <u>For student applicants only:</u> I understand that the original copies of the permission must be verified by my supervisor before data collection commences
	Permission is not required for my study. Please explain why:	X	Permission is not required for my study. Please explain why: As stated in the Q7.1, the research will be conducted online, this is the reason why the permission to use premises is not needed.

-

HARMS, HAZARDS AND RISKS

Q8.1 It might be appropriate to conduct a risk assessment (in respect of the hazards/risks affecting both the participants and/or investigators). **Please use form EC5, Harms, Hazards and Risks, if the answer to any of the questions below is 'yes'.**

If you are required to complete and submit a School-specific risk assessment (in accordance with the requirements of the originating School) it is acceptable to make a cross-reference from this document to Form EC5 in order not to have to

repeat the information twice.

Will this study involve any of the following?

Invasive Procedures/administration of any substance/s?

☐ YES

☒ NO

IF 'YES' TO THE ABOVE PLEASE COMPLETE EC1 APPENDIX 1 AS WELL AND INCLUDE IT WITH YOUR APPLICATION

Are there potential hazards to participant/investigator(s)

☐ YES

☒ NO

from the proposed study? (Physical/Emotional or other non-physical harm)

Will or could aftercare and/or support be needed by participants?

☐ YES

☒ NO

Q8.2

Is the study being conducted off-campus (i.e. not at UH/UH Partner?)

☒ YES

☐ NO

It might be appropriate to conduct a risk assessment of the proposed location for your study (in respect of the hazards/risks affecting both the participants and/or investigators) (this might be relevant for on-campus locations as well). Please use Form EC5 and, if required, a School-specific risk assessment (See GN 2.2.8 of the Guidance Notes).

If you do not consider it necessary to submit a risk assessment, please give your reasons:

There are no risks related to the location of study since the research will be conducted online. No invasive procedures are undertaken for this research neither emotional discomfort or distress is expected. The possibility of aftercare is not considered to occur as a result of this research.

In case of adverse effects' occurrence during the interviews (i.e. the participant gets upset or feels judged), the latter will be stopped and the data won't be recorded for the research.

ABOUT YOUR PARTICIPANTS

- Q9 Please give a brief description of the kind of people you hope/intend to have as participants, for instance, a sample of the general population, University students, people affected by a particular medical condition, children within a given age group, employees of a particular firm, people who support a particular political party, and state whether there are any upper or lower age restrictions.

The participants of the interviews will be specialists and professionals working in different fashion companies. The participants will be all legal age (18+).

- Q10 Please state here the maximum number of participants you hope will participate in your study. Please indicate the maximum numbers of participants for **each** method of data collection.

The interviews' maximum number of participants is 50.

- Q11 By completing this form, you are indicating that you are reasonably sure that you will be successful in obtaining the number of participants which you hope/intend to recruit. Please outline here your recruitment (sampling) method and how you will advertise your study. (See GN 2.2.9).

The interviewees will be selected mainly through LinkedIn. An individual message will be sent to them including the presentation of the researchers, the aims of the research and a request to participate in the interview. I am confident I could reach a high number of participants since there are a lot of fashion companies that are trying to become more and more sustainable and maybe are willing to discuss about the topic.

CONFIDENTIALITY AND CONSENT

(For guidance on issues relating to consent, see GN 2.2.10, GN 3.1 and UPR RE01, SS 2.3 and 2.4 and the Ethics Approval StudyNet Site FAQs)

- Q12 How will you obtain consent from the participants? Please explain the consent process for each method of data collection identified in Q4

☒ Express/explicit consent using an EC3 Consent Form and an EC6 Participant Information Sheet (or equivalent documentation)

☒ Implied consent (participant information will be provided, for example, at the start of the questionnaire/survey etc)

- ☐ Consent by proxy (for example, given by parent/guardian)

Use this space to describe how consent is to be obtained and recorded for each method of data collection. The information you give must be sufficient to enable the Committee to understand exactly what it is that prospective participants are being asked to agree to.

The EC6 Participant Information Sheet and EC3 Consent Form will be sent to the participants of the interviews before the beginning of the meeting. They will be also read to the participants in case the hard copy will not be returned.

If you do not intend to obtain consent from participants please explain why it is considered unnecessary or impossible or otherwise inappropriate to seek consent.

N/A

- Q13 If the participant is a minor (under 18 years of age) or is unable for any reason to give full consent on their own, state here whose consent will be obtained and how? (See especially GN 3.6 and 3.7)

Research with minors will not be conducted.

- Q14.1 Will anyone other than yourself and the participants be present with you when conducting this study? (See GN 2.2.10)

☐ YES

☒ NO

If YES, please state the relationship between anyone else who is present other than the applicant and/or participants (eg health professional, parent/guardian of the participant).

N/A

- Q14.2 Will the proposed study be conducted in private?

☒ YES

☐ NO

If 'No', what steps will be taken to ensure confidentiality of the participants' information. (See GN 2.2.10):

N/A

- Q15.1 Are personal data of any sort (such as name, age, gender, occupation, contact

details or images) to be obtained from or in respect of any participant? (See GN 2.2.11) (You will be required to adhere to the arrangements declared in this application concerning confidentiality of data and its storage. The Participant Information Sheet (Form EC6 or equivalent) must explain the arrangements clearly.)

☒ YES

☐ NO

If YES, give details of personal data to be gathered and indicate how it will be stored.

For the research, the personal data needed is the occupation, years of experience (in time frames) and contact details of the participants. The consent forms, data and any downloaded recordings will be stored in the student's UH-supplied online One Drive System.

PLEASE NOTE: If you are processing personal information you MUST consider whether you need to complete a Data Protection Impact Assessment (DPIA). Please read the DPIA guidance available from the FAQ section of the UH Ethics Approval StudyNet site:

<http://www.studynet2.herts.ac.uk/ptl/common/ethics.nsf/Frequently+Asked+Questions/935D97CDBC546E69802583A9005213A6>

If you need to complete one, please find the DPIA template in the University's website at the following link:

https://www.herts.ac.uk/_data/assets/pdf_file/0006/233619/IM08-apxl-Template-Data-Protection-Impact-Assessment.pdf

The DPIA must be completed in consultation with the University's Data Protection Officer and submitted with your application for ethics approval.

Will you be making audio-visual recordings?

☒ YES

☐ NO

If YES, give details of the types recording to be made and indicate how they will be stored.

The data will be stored as MP3 or MP4 files and the recordings will be collected via the mobile phone of the researcher, Zoom meeting or MS Teams. The devices are password protected and only accessible by the researcher.

Q15.2

If you have made a YES response to any part of Q15.1, please state what steps will be taken to prevent or regulate access to personal data and/or audio-visual recordings beyond the immediate investigative team, as indicated in the Participant Information Sheet.

All the recordings will be transferred on the student's UH supplied online One Drive System. It is only accessible by the researcher and protected by a password.

Indicate what assurances will be given to participants about the security of, and access to, personal data and/or audio-visual recordings, as indicated in the Participant Information Sheet.

The participants will be reassured that the data are confidential and strictly protected, as also stated by the EC6.

State as far as you are able to do so how long personal data and/or audio-visual recordings collected/made during the study will be retained and what arrangements have been made for its/their secure storage and destruction, as indicated in the Participant Information Sheet.

The data recorded will be kept until the publication of the dissertation's results and then destroyed under secure conditions. The data are stored in the UH supplied online One Drive system.

Q15.3 Will data be
anonymised prior to
storage? ☐ YES

☒ NO

Q16 Is it intended (or possible) that data might be used beyond the present
study? (See GN 2.2.10) ☐ YES ☒ NO

If YES, please indicate the kind of further use that is intended (or which may be possible).

N/A

If NO, will the data be kept for a set period and then destroyed
under secure conditions? ☒ YES ☐ NO

If NO, please explain why not:

N/A

- Q17 Consent Forms: what arrangements have been made for the storage of Consent Forms and for how long?

As stated above, the consent forms will be saved in the 'Dissertation' folder on the researcher's UH-supplied online One Drive system and it is accessible by the researcher only.

- Q18 If the activity/activities involve work with children and/or vulnerable adults satisfactory Disclosure and Barring Service (DBS) clearance may be required by investigators. You are required to check with the organisation (including UH/UH Partners where appropriate) responsible for the minors/vulnerable participants whether or not they require DBS clearance.

Any permission from the organisation confirming their approval for you to undertake the activities with the children/vulnerable group for which they are responsible should make specific reference to any DBS requirements they impose and their permission letter/email must be included with your application.

More information is available via the DBS website -
<https://www.gov.uk/government/organisations/disclosure-and-barring-service>

REWARDS

- Q19.1 Are you receiving any financial or other reward connected with this study? (See GN 2.2.14 and UPR RE01, S 2.3)

☐ YES ☒ NO

If YES, give details here:

Click here to enter text.

- Q19.2 Are participants going to receive any financial or other reward connected with the study? (Please note that the University does not allow participants to be given a financial inducement.) (See UPR RE01, S 2.3)

☐ YES ☒ NO

If YES, provide details here:

N/A

- Q19.3 Will anybody else (including any other members of the investigative team) receive any financial or other reward connected with this study?

☐ YES ☒ NO

If YES, provide details here:

N/A

OTHER RELEVANT MATTERS

Q20 Enter here anything else you want to say in support of your application, or which you believe may assist the Committee in reaching its decision.

[Click here to enter text.](#)

DOCUMENTS TO BE ATTACHED

Please indicate below which documents are
attached to this application:

- ☐ Permission to access groups of participants
- ☐ Permission to use University premises beyond areas of School
- ☐ Permission from off-campus location(s) to be used to conduct this study
- ☐ Form EC5 (Harms, Hazards and Risks: assessment and mitigation)
- ☒ Consent Form (See Form EC3/EC4)
- ☒ Form EC6 (Participant Info Sheet)
- ☐ Data Protection Impact Assessment (DPIA)
- ☒ A copy of the proposed questionnaire and/or interview schedule (if appropriate for this study). For unstructured methods, please provide details of the subject areas that will be covered and any boundaries that have been agreed with your Supervisor

☐ Any other relevant documents, such as a debrief, meeting report. Please

provide details here:

DECLARATIONS

1 DECLARATION BY APPLICANT

- 1.1 I undertake, to the best of my ability, to abide by UPR RE01, 'Studies Involving the Use of Human Participants', in carrying out the study.
- 1.2 I undertake to explain the nature of the study and all possible risks to potential participants,
- 1.3 Data relating to participants will be handled with great care. No data relating to named or identifiable participants will be passed on to others without the written consent of the participants concerned, unless they have already consented to such sharing of data when they agreed to take part in the study.
- 1.4 All participants will be informed **(a)** that they are not obliged to take part in the study, and **(b)** that they may withdraw at any time without disadvantage or having to give a reason.

(NOTE: Where the participant is a minor or is otherwise unable, for any reason, to give full consent on their own, references here to participants being given an explanation or information, or being asked to give their consent, are to be understood as referring to the person giving consent on their behalf. (See Q 12; also GN Pt. 3, and especially 3.6 & 3.7))

Enter your name here: Irene Stevenazzi

Date 14/04/2021

2 GROUP APPLICATION

(If you are making this application on behalf of a group of students/staff, please complete this section as well)

I confirm that I have agreement of the other members of the group to sign this declaration on their behalf

Enter your name here: N/A

Date N/A

DECLARATION BY SUPERVISOR (see GN 2.1.6)

I confirm that the proposed study has been appropriately vetted within the School in respect of its aims and methods; that I have discussed this application for Ethics Committee approval with the applicant and approve its submission; that I accept responsibility for guiding the applicant so as to ensure compliance with the terms of the protocol and with any applicable ethical code(s); and that if there are conditions of the approval, they have been met.