

Article

Social Life Cycle Assessment in the Textile Sector: An Italian Case Study

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Abstract: This study presents the first application of the Social Life Cycle Assessment (S-LCA) to a textile product made in Sicily (Italy), according to the Social Life Cycle Assessment guidelines (UNEP). The main goal is to assess and present the social values of a product manufactured in a particular territorial area where the presence of an industry represents the main source of employment. The first part of the study is a literature review of the current state of the art of the S-LCA and its implementation to textile products. In the implementation, particular attention is paid in identifying the positive impacts and in highlighting the strengths and weaknesses of the method when applied in this specific sector. The functional unit of the study is an order for a garment (consisting of 495 capes in a soft blend of wool and cashmere), produced by a textile company located in Sicily (Italy). The system boundaries of the study include all phases from cradle-to-gate, i.e. from raw material production through fabric/accessory production to the manufacturing process of the product itself at the company. Background and foreground processes are taken into account using specific and generic data. Two stakeholder groups have been considered (workers and local communities) as those that can better represent the company's value in the territory. The analysis carried out on the functional unit of the study allowed assessing social performance related to the specific textile product, but also to outline the general behaviour of the company. Results offer to scholars a perspective on which to focus their future researches in the sector and highlight that S-LCA is a valuable tool to support business decisions, assessing the social impact of the product to improve the social conditions of stakeholders. However, the access to primary and/or good quality local, national and global data is essential to draw credible conclusions; consequently, every effort to promote the application for S-LCA is highly suggested.

Keywords: textile product; Social Life Cycle Assessment; workers; local communities; social performances

1. Introduction

In comparison with the fierce competition from emerging countries, Italy has been able to maintain its edge in the global market, especially in the segments related to fashion and luxury goods. The textile industry is a strategic sector for the “made in Italy”, representing a productive sector of huge importance for the economy of the country. The latest data from the Italian Fashion System (SMI), the federation representing more than 400,000 employees and nearly 50,000 companies in the industry, report about a turnover of €52 billion (+1.8%) in 2016 [1]. Traditionally, the sector generates a trade surplus, second only to that of the mechanical industry. The competitiveness of the fashion sector is due to investments in innovation, research and product development, as well as

the tradition of certain phases of the production process, know-how, and synergistic collaboration among the various stages of the supply chain.

However, even for Italy, it has been difficult to maintain this supremacy in the fashion world economy. Surely, the textile industry has a complex supply chain, with raw material often produced in Asian countries where the labour conditions do not necessarily conform to ILO conventions. This complexity of the textile and clothing industry has made difficult assessing the social issues along this supply chain. The complexities of the competitive environment in which companies operate are steady growing. In this sector, this development is decisively affected by several factors, such as the constant drive towards internationalization and the presence of a high number of companies, of different dimensions, operating in different countries.

Over recent years, the transformation of consumers' interests, more and more oriented towards highly customized products and services, has become predominant in the fashion industry [2]. This difficulty is further exacerbated by other aspects, such as consumer expectations of low price products and companies competing for market share, which sometimes results in reducing the cost of labour by preferring to move production plants from Italy and Europe to countries where workers earn less and labour rights are often ignored. Indeed, some of the significant issues in the textile and clothing value chain include low worker wages, gender discrimination, excessive working hours, temporary work contracts or child labour and local residents subjected to health risks [3].

In this context, sustainability is a topic providing endless inputs for reflection. Indeed, following the example of other sectors, the textile and fashion industry is also addressing the issue of sustainability. This is a necessary effort given, on the one hand, the level of polluting activities and social impacts in the clothing and textile production chain [4] in general and, on the other hand, the growing environmental and social awareness of customers.

As an example, proving that the fashion and sustainability concepts are approaching more and more, in 2012 the Sustainability Committee of the National Chamber of Italian Fashion (CNMI) [5] published the "Sustainability Manifesto for Italian Fashion", a decalogue of principles that traces the path towards responsible management models throughout the entire fashion value chain. The following step was the publication, in 2015, of the guidelines for hazardous chemical toxic substances in textiles, leather and footwear. Indeed, today, the value co-creation approach is strongly focused on the targets of a novel "Sustainable Oriented Theory of Firms" [6,7]. However, the pursuit of sustainability goals for an industry largely based on traditional mature processes is not easy, involving compliance with ecological and ethical standards characterized by low resource consumption, reduced pollution, recycling of materials, working conditions and fair wages, traceability, transparency and all the other challenges that fall within the definition of sustainability [8].

For companies operating in this sector, a first step along this path is being able to assess the environmental, economic, and social impacts associated with their production processes, from a life cycle perspective including the different actors in the supply chain. This is well addressed by Life Cycle Thinking techniques in which the three sustainability dimensions are covered by different methods with a different methodological maturity: Life Cycle Assessment (LCA) is the only technique already internationally standardized [9], Life Cycle Costing (LCC) (with the only exception of the ISO 15686-5:2008 Buildings and constructed assets—Service-life planning—Part 5: Life-cycle costing, which refers only to the LCC of buildings) and Social Life Cycle Assessment (S-LCA) still lack international harmonization and standardization (although guidelines and general frameworks are available) [10].

For this reason, the main topic of this study will mainly be focused on the S-LCA method and its application, in order to verify its applicability and the potentiality to integrate its results into the company decision-making process, as well as to provide scholars with a general picture describing limits and implications of the implementation of the S-LCA method in the textile sector, useful to direct their future researches on this methodology and in the activity sector.

2. Literature Background

To better understand the state of the art and characteristics of S-LCA studies, a literature review was carried out in December 2016. The search engines Google Scholar, Web of Science and the software “Ebsco” have been used in this review. The total dataset includes 186 publications from 2000 to 2016. The analysis focuses on the aggregate number of publications and the three different terms “social-lca”, “societal lca” and “s-lca case study”. Among the total number of 186 publications in the dataset, 46.24% (86) apply the term “social-lca”, 29.03% (54) the term “societal-lca” and 24.73% (46) the term “S-LCA case study”. In reference to the term “case study” only 46 application cases were acknowledged, five articles on the energy sector, seven on Information and Communication Technologies, nine on the agri-food sector, and seven on waste management. The remaining 18 articles can be classified as “others” due to the variety of the questions concerned.

Furthermore, considering the LCSA approach, various articles on LCA and LCC studies have been published in international scientific literature, such as: Woolridge et al. [11], Nieminen et al. [12] and, Costa Maia et al. [13].

Many inputs to improve the structure of the S-LCA can be obtained by the revised articles. Some, for example, stress the significance of incorporating social aspects in an LCA; some concern to describe the main stages that make up the methodological framework; some stress the importance to dwell on the concept of indicator of social impact, or on the liability of the enterprise involved in the life cycle, or even, investigate the possibility of combining the S-LCA method with the environmental assessment of the life cycle of a product (LCA) [14].

For example, Hunkeler [15] proposes a framework, yet the only data included are on using employment for measurement of indicators.

Since S-LCA is a methodology under debate at academic level and many new indicators and/or impact category paths, and interpretation methods of results are currently proposed, the international scientific community has not defined a standardized set of indicators yet, and different proposals can be found in literature; one of the first is in Jørgensen et al. (2008) [16] who presented a matrix structure of indicators for the different impact categories divided into subcategories as fixed by UNEP/SETAC guidelines [17].

O’Brien, Doig, and Clift [18] have talked, in their work, of the possibility of combining S-LCA with the environmental assessment of the life cycle of a product, realizing a methodology known as SELCA (Social and Environmental Life Cycle Assessment). Further criticisms, put forward by for instance by Jørgensen [16], is if the instrument truly permits to valorise the social situation.

Franze and Ciroth [19] underlined the subjectivity of the process. To resolve this issue, they encourage utilizing international standard to perform a S-LCA study as much transparent as possible. They presented their methodology for illustrating the effects as an easy instrument to identify the principal social impacts of the life cycle. By applying their technique to a case study, they concluded that, despite some problems, it is possible to evaluate social impacts [20].

Dreyer, Hauschild and Schierbeck [20,21] have pointed out, talking about the S-LCA, the concept of the responsibility of the companies involved in the life cycle. These authors, in outlining the structure of the S-LCA, have highlighted the importance of the behaviour of the companies involved in the life cycle, giving more weight to the activities in the foreground and to people involved [20]. The methodological framework that they have considered is meant to be applied to companies that want to minimize the adverse impacts, which are produced in the chains of the product, on people’s lives and it is focused, in peculiar, on those activities that the company has the capacity to control with their own management solutions. They propose a framework that is based on input/output modelling of social issues, yet no proposal has been done for indicator data (except for an example). In their contribution to the framework for the S-LCA, the authors seem to reject the possibility of using generic data within the methodology because the boundaries of the system in a S-LCA must be determined on a case by case basis and are related on the influence that the producer carries on various activities in the chain of the product [21].

Instead, within their work, Brent and Labuschagne have focused primarily on the concept of indicators of social impact. The analysis in question showed that a comprehensive structure for social sustainability should define the suitable criteria to apply both the impact that the company generates on the social system in which it operates and the relations of the company with the various stakeholders [22].

For a full overview of the available literature on S-LCA and their classification see e.g., Blok Kornelis et al. [23]; this study aimed to systematically discuss the main problems encountered when applying lifecycle thinking to social assessment; to build a consistent framework for a number of indicators that is fully operationalized and aggregated, and to test the developed framework through application on a case study example. The research was carried out as part of the European FP7 project “PROspective SUstaInability Assessment of Technologies” [24].

Few, however, are the authors who studied the social aspects of the textile industry, following an S-LCA approach. For example, a book, by Koszewska [25], provides a wide range of case studies among with LCA applications in the textile and clothing industries are reported. The book examines the key developments of LCA in the textile and clothing industries, but even in this case, no evidence of S-LCA implementations according to the UNEP guidelines [17] can be identified [25].

A further work that took care of the green orientations in the textile sector, developed by Roos et al. [26] focuses on the collection of a set of social indicators with the prospective to include various stakeholders’ preferences, without making an application of S-LCA.

Instead, Zamani et al. [27] suggest a cradle-to-gate input/output-based S-LCA, referred to the Swedish clothing consumption as a case study. The purpose is to investigate the influence of the cut-off rule and the definition of “hotspots” in social hotspot assessment. A second purpose was to comprehend social hotspots of Swedish clothing on a national level. The application of S-LCA on the clothing production supply chain offered a clearer picture of the social hotspots than with traditional process-based S-LCA. The work identified various essential parameters in applying an input/output-based S-LCA. The outcomes highlighted that the cut-off values and identification of hotspots in relation to risk levels can directly influence the results. A weakness of the study was the limited set of social indicators, based on indicators prioritized by consumers.

One of the most recent articles on S-LCA is by Vander Velden and Vogtländer [28]. The purpose of this study is to benchmark production processes and production chains of clothing products, by means of S-LCA, by presenting the socio-economic costs (s-eco-costs) method for monetisation of external socio-economic burden for workers.

A unique work that regards the social aspect in the Italian textile industry (but, one more time, no-implementation of a S-LCA is still available) is that of Dansero and Caldera [29]. With this research report, the authors aim to give an overview of the textile and clothing sector (or textile-fashion) in Italy and in Piedmont (Biella), analysing problems and opportunities in terms of relations with the environment.

The literature review shows that there is a lack of S-LCA case study in the textile sector. This highlights a significant gap considering that the fashion industry has relevant social shortcomings throughout its supply chain and S-LCA still presents many open research methodological questions [28]; thus, studies focused on the assessment of the potential social impacts connected to textile production are highly necessary and customers, together with other stakeholders, have to be strongly engaged to create a sustainable common perspective [30].

For this reason, this study reports on the assessment of the social impacts of a product manufactured under an Italian brand. Two methods/data sources were used: the Subcategory Assessment Method (SAM) with primary data, and the Social Hotspot Database (SHDB) for the up-stream supply chain.

The SAM method has been used according to the Guidelines UNEP/SETAC [17]. It defines the Basic Requirements (BR) of the product social performance per each sub-category [31].

The innovative aspect of the study is the implementation of S-LCA to a selected and representative product of an Italian textile factory, located in San Marco d'Alunzio, Messina (Italy) a village of the biggest Italian Island, Sicily. The industry represents an important employment source for this area. Moreover, the choice was not random; indeed, in Sicilian companies (Italy), social assessment and reporting is still an uncommon business practice. Unfortunately, few fashion companies realize the many benefits (especially economic) that would derive from the application of S-LCA, but interest in these risk-avoidance topics is growing. Indeed, the study aims to highlight the potential of the S-LCA method for grasping the social aspects of a product manufactured in a company that has a strong link with the territory.

3. Methodology

The reference framework for the study is defined by the Guidelines for Social Life Cycle Assessment of Products [17], which reflects the structure of the standardized Life Cycle Assessment method. The S-LCA presented here assesses the social performance of a selected textile product and its impact, by adopting, for the characterization phase, the SAM method [32]. The reference points for the implementation of SAM method are defined based on norms and the socio-economic and geographic context.

The use of the SHDB method has allowed the authors to assess the entire supply chain of the product concerned, where primary data are missing. Knowing the sector and the countries where the raw materials and/or auxiliary components are produced, the database allows assessing the social risk on human rights, working conditions, community impacts and governance issues (5 social categories, 22 social themes, 137 indicators used to calculate the risk of a social issue in a country-specific sector (CSS)). Either a single indicator or several related indicators are used to characterize the risk/opportunity of a particular Social Issue.

The S-LCA allows for a more complete assessment of the social value of a product and offers the opportunity to shift the focus, rather than only on qualitative data, on semi-quantitative and quantitative data relating to the social dimension, making the evaluation process more transparent and comprehensive [33].

The development of this approach is the consideration that a social impact arises when a product interacts with the surrounding system and therefore gives rise to positive or negative consequences [34]. As a result, both the product and the company are analysed in relation to their ability to contribute positively or negatively to a security zone, identified as "well-being" [35].

This tool involves a greater control of the product social value and, if used consistently, can help the company to draw up its annual report on social and sustainable development and become a real reporting tool [33].

3.1. Goal and Scope Definition

The goal of this study is to assess the main positive and negative social impacts related to a specific Italian textile product in order to consider the various social values of the product manufactured in a company that has a strong link with the territory and to highlight the strengths and weaknesses of the methodology in this specific sector. The purpose and ultimate scope of the analysis is to provide a useful tool for identifying the aspects to be taken into account by the company's strategic decision planning.

The selected company has a strong social dimension; this is well represented in the vision of the company, which is: "*The fortune of a man is another man*". This vision clearly results from the fact that clothing-manufacturing processes are labour intensive, involving processes that require a high degree of operator competence. The company adopts a proper and successful policy of human resource management based on the respect for and the development of human capabilities.

Indeed, being able to deal with people also involves understanding cultural issues, bearing in mind that the culture of an organization is the combined effect of the values, beliefs, attitudes,

traditions, and behaviour of its members. The quality aspects, required by the market, include all those activities that the case study uses to direct, control and coordinate the company, to ensure that requirements are actually being met.

The strong link that the analysed company has within the territory is also stressed by the fact that when the Sicilian textile industry seemed destined to disappear, the company could have moved elsewhere, but it has resisted, remaining in San Marco d'Alunzio (Messina, Italy), a village situated in the Nebrodi—Sicilian mountains, in an area that does not have adequate infrastructure. San Marco d'Alunzio is an agricultural reality, characterized by farmhouses, whose activities are mostly linked to the cultivation of olive groves, vineyards, citrus fruits and orchards, reflecting an agricultural and pastoral vocation.

This fact has an important significance for the local community and it should be measured and communicated. Thanks to its strategy focused on high-quality clothing for clients in national and international markets, the company is now the centre of a constellation of workshops scattered around almost all the Nebrodi villages and its customers include all major Italian fashion brands and others. It makes more than 250 thousand garments per year, always aiming for high level of craftsmanship and quality.

The functional unit of the study is an order for a garment (consisting of 495 capes), knitted in a soft blend of wool and cashmere (60% wool and 40% cashmere). It is used as a winter jacket to protect against cold and to be elegant at the same time. The design is accentuated with military-inspired polished golden metal buttons. The whole manufacturing process of the garment was carried out from August 2016 to October 2016.

Considering the numerous orders that the company receives from its customers, this garment was randomly chosen by the authors in order to represent the general manufacture activity of the company. Indeed, the product analysed contains characteristics common to almost all the products manufactured within the study case: it involves all the process units of the company, common to almost all the products manufactured within the company.

The stages of the production process that are identical to all apparel segments are:

- **Cutting:** In this phase, priority is given to the organization of the material needed to prototype and sample. The orders are processed through the cut bubble, i.e., a card that indicates the number of accessories, the fabric, the measurements, and the number of products necessary to meet the customer's order. The cutting bubble is sent to the CAD, where the paper patterns, sent by the clients, are scanned. After checking the technical-design features of the various pieces that make up the model, it passes to the placement of the paper patterns on the fabric. Successively, it proceeds to cutting techniques; the study case employs two techniques: automatic cutting and manual cutting. Automatic cutting is a technique common to all companies operating in the textile industry and is intended to produce large quantities of articles of clothing. In addition to automatic cutting, the company also offers manual cutting to produce small amounts, which are typically the most valuable.
- **Stitching:** The sewing phase assumes features details, because the company makes several types of seams. The most widely appreciated seam is "Double-Face". The "Double-Face" stitching finish present in the product analysed consists in blind-stitching by hand of the internal seams and of the external finishing of a garment along the hems of the fabric whose width is split in half for a depth of about 12 mm. Blind-stitching is what gives the product its high artisan quality and takes up about 75% of the time necessary to make a garment. It is carried out entirely by hand, with needle and thread, by seamstresses living in the towns of the Nebrodi area who preserve and renew the ancient art of tailoring in this day and age of industrial modernity. This procedure is what gives the company's products absolutely extraordinary quality and fineness. A further type of stitching concerns lined and/or unlined fabric. The difference between the two types of processing lies in the fact that "double-face" should only be finished by hand, while the garments

made of other fabrics are finished by machine. “Double-face” is an example of the excellent and exclusive workmanship of the study case.

- Ironing: This is the final phase in the garment finish. The function of this phase of the process is to give the final look to the clothes. Once ironed, the garment is subjected to a quality check to verify that no mistakes were made during the previous processes.
- Tagging: Workers are involved in this stage, first, preparing the tag that indicates the type of fabric, the work order, the size, and the customer, along with the single garment accessories. The finished garment is then identified by the tag. Clothes are arranged according to size, and are then divided according to the number of sizes required by the customer and packaged. Thanks to the delivery note, the target countries of prepared garments for that particular customer are identified. Once these operations are completed, shipping takes place, almost always using a private carrier.

The raw materials (fabrics and accessories) are the only elements that differentiate one garment from another. In this study, in fact, a social risk assessment was carried out taking into account the countries of origin of the fabrics and accessories of the selected garment. It was made to collect at least some social data on the supply chain.

Regarding the boundaries of the system, the life cycle phases include, from cradle to gate, the stages of production of the raw materials, the production of fabrics and accessories, and the production process of the company for the manufacturing of the object of the study. Figure 1 shows the system boundaries of the study.

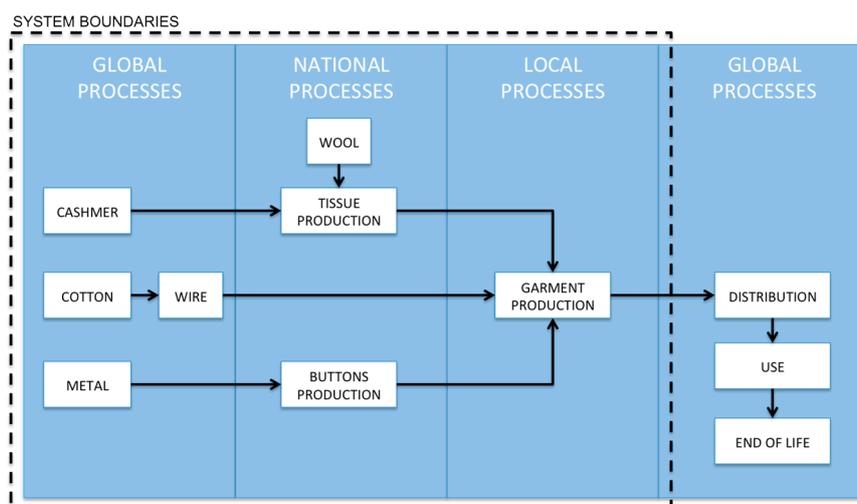


Figure 1. System boundaries considered in the implementation.

The S-LCA method defined by UNEP/SETAC [17] suggests the involvement and assessment of five stakeholder categories (Table 1): “stakeholder category is a cluster of stakeholders that are expected to have shared interests due to their similar relationship to the investigated product systems”. In addition, the guidelines provide a further element, Methodological Sheets, which are complementary documents of the UNEP/SETAC guidelines and better define the indicators to be used for each of the subcategories and suggest data sources and database. In the present study, for local processes, attention is focused on two of these stakeholder categories: “Workers” understood as actors directly involved in the production of the 495 capes (functional unit); and “Local community” designating people living in the same territory where the studied company is located who are somehow affected in their role as users of local resources [36]. This choice will emphasize the added value of the company in the local context in which it operates. Indeed, the company operates in a non-simple area: San Marco d’Alunzio is a small mountain village, situated in the Nebrodi mountains, that does not have

the necessary infrastructure to host a business complex and it is strongly influenced by the emigration of young people. The economic crisis has destroyed the hopes of thousands of young people forced to emigrate abroad and business people who have had to close their businesses. When the Sicilian textile industry seemed destined to disappear, the company could have moved elsewhere, but it has resisted, remaining in San Marco d'Alunzio. Given that, the study aims to highlight the social aspects of a product manufactured in a company that has a strong link with the territory. On the contrary, for national and global processes, because of the difficulty in obtaining the data needed by suppliers and customer, data have been gathered through the Social Hotspots Database (SHDB) [36], for which five Social Impact Categories have been assessed: Labour Rights and Decent Work, Health & Safety, Human Rights, Governance and Community Impacts.

Table 1. Stakeholder categories and subcategories from the United Nations Environment Programme S-LCA [17].

Stakeholder Categories	Subcategories
Workers	Freedom of association and collective bargaining Child labour Fair salary Working hours Forced labour Equal opportunities/discrimination Health and safety Social benefits/social security
Consumers	Health and safety Feedback mechanism Consumer privacy Transparency End of life responsibility
Local community	Access to material resources Access to immaterial resources Delocalization and migration Cultural heritage Safe and healthy living conditions Respect of indigenous rights Community engagement Local employment Secure living conditions
Society	Public commitments to sustainability issues Contribution to economic development Prevention and mitigation of armed conflicts Technology development Corruption
Value chain actors (not including consumers)	Fair competition Promoting social responsibility Supplier relationships

3.2. Inventory Analysis

Although social impacts are basically due to business attitudes, the textile world involves different sectors and countries of economy, so primary business data cannot be evaluated throughout the life cycle. As a result, given the difficulty of obtaining information from the customer that commissioned the garment from the study case, sector level and country-specific data were considered, adopting an approach similar to those used by Padilla-Rivera et al. [37], Vuaillet et al. [38] and, Martínez-Blanco et al. [39]: data collection includes both primary and specific data (at company and product level) and generic data (at country-specific sector level—global and national processes). Although social impacts are mainly due to company behaviour and the main scope of the analysis is to

evaluate its influence on territorial values, country and sector specific data are also taken into account when primary data are not available; generic data are taken into account for background processes through the use of the Social Hotspot Database.

For the foreground processes, primary data were gathered through questionnaires specifically designed for each stakeholder group (questionnaires are attached as an appendix), and structured with questions focused on evaluating each impact category. Three different questionnaires were used: (a) Company questionnaire; (b) Workers' questionnaire; and (c) Local Community questionnaire. The three questionnaires principally intended to obtain a triangulation of data received, as shown in the Table 2, where collected data are subdivided into the subcategories analysed. The Company questionnaire was directly completed by the Human Resources Manager. The questionnaire consisted of 89 questions specifically aimed at evaluating the inventory data of each sub-category examined. The Workers' questionnaire was submitted, through direct interview, to company employees and the community questionnaire was completed directly by a sample of local citizens and institutions through direct interview.

Referring to the Local community (designating actors living in the same territory where the studied company is located), the questionnaire has the main objective of checking whether problems have arisen with the local community. In addition, it seeks to highlight and interpret a possible contribution of the company to the local community in question. Two questionnaires were prepared in this case as well: one for the company, completed by the head of human resources; the other by several representatives of the local community for triangulation purposes. These include the mayor, opposition councillors, the priest and a representation of 23 citizens of San Marco d'Alunzio. The sample includes all the people that are somehow affected by the presence of the company on the territory. Consequently, in their role of residents at San Marco d'Alunzio, they can best express their opinion on the interaction of the company with the territory.

As regards the workers' questionnaire, the respondents are only those directly involved with the manufacturing of the functional unit, represented by 20 men and 23 women, of whom 12 people are aged between 18 and 30, 15 people are aged between 30 and 45, 12 people are aged between 46 and 55, and only 3 people are more than 55 (one worker did not answer the question). These respondents represent 20.8% of the total number of the company's employees, and approximately reflect the gender structure of the company's employees.

For background processes, generic data were gathered through the Social Hotspots Database (SHDB) [40]. The database was developed by New Earth over 3 years. It includes a Global Input-Output (IO) model derived from the Global Trade Analysis Project, a Worker Hours Model constructed using annual wage payments and wage rates by country and sector, and Social Theme Tables covering 22 themes within five Social Impact Categories: Labour Rights and Decent Work, Health & Safety, Human Rights, Governance and Community Impacts. The data tables identify social risks for over 100 indicators. Both the ranking of worker hour intensity and the risk levels across multiple social themes for the Country Specific Sectors (CSS) within a product category supply chain are used to calculate Social Hotspots Indexes (SHI) using an additive weighting method. The CSS with the highest SHI are highlighted as social hotspots within the supply chain of the product in question.

The primary data gathering was carried out in strong synergy with the company; the only problem was obtaining data and information from the customer that commissioned the garment from the study case. Some assumptions had to be made in reference to the place of production of certain commodities (wool and metal buttons). Consequently, the countries of production of raw materials are assumed to be: Mongolia (for cashmere); Italy (for wool and metal buttons); Germany (for wire). In addition, through the SHDB, the analysis was also extended to the textile process carried out in Italy.

Table 2. Inventory analysis.

<p>Subcategory: Working Hours</p> <p><i>Description:</i> to investigate the observance of working hours laid down by law, and highlight any anomalies. Questions have been provided both for workers and for the company; in detail, there are 11 questions put to the workers and 8 questions put to the company.</p> <p><i>Data collected:</i> this subcategory is fully respected by the company and Sunday is a rest day scheduled for everyone. In addition, the company does not promote proactive action the respect of working hours prescribed by law towards its suppliers (or to the companies in the value chain).</p>
<p>Subcategory: Child Labour</p> <p><i>Description:</i> to test the presence or absence in the company of child labour, indicating by this expression, workers who are aged less than that established by law. Article 13 of the national collective [41] bargaining agreement provides that paid work may not be offered to those who have not completed the period of compulsory education, or who are under 16 years old.</p> <p><i>Data collected:</i> there is no worker under the age of 18 years. However, the company does not adopt special measures to prevent and/or reduce child labour and does not promote proactive actions towards limiting and protection towards its suppliers and or other business partners.</p>
<p>Subcategory: Health and Safety</p> <p><i>Description:</i> to investigate the compliance with the measures on health and safety and on the prevention of any disease and/or injury in the workplace, in relation to Articles of the Negotiable, the DPR 27 April 1955 n. 547, the DPR 19 March 1956 n. 303. The questionnaire consists of 15 questions for workers and 25 for the Company administration.</p> <p><i>Data collected:</i> all tools and machinery employees use could be dangerous if not used wisely, but respondents do not perceive any particular risk in connection with their work activity, despite it being exhausting work. Most workers interviewed did not present any special clothing except for an orange lab coat for women and blue for men, though Article 71 of the Consolidated Safety Act [42] stipulates that it is the duty of the employer to have the means and the necessary equipment for the prevention of potential risks and duty of the workers is to comply with these requirements. During the inspection, a strong presence of noise pollution was found, especially in the cutting department. Finally, all are covered by health insurance for any injuries and/or illnesses. Moreover, from 2015, for employees with at least four years of service and their families additional medical care is available at health facilities in the area, at the expense of the company. This initiative in some way embodies the mission of the case study in social aspects, with particular attention towards its employees and their families, especially to protect their health. Finally, the company does not promote to its suppliers (or to the value chain companies) compliance with the health and safety rights of workers required by law.</p>
<p>Subcategory: Fair Wages</p> <p><i>Description:</i> to investigate about the “good conduct” of the company in relation to qualitative and quantitative distribution of wages.</p> <p><i>Data collected:</i> the company and employees claimed to have a permanent contract. The company pays its employees every month, but did not provide any information about the salary received by the manager; the company therefore complies with the criteria imposed by the National Collective Agreement. Finally, it does not promote to its suppliers (or to the companies in the chain of value) providing fair wages to their own employees.</p>
<p>Subcategory: Rights of Association and Collective Bargaining</p> <p><i>Description:</i> to investigate the freedom of association for workers and trade union membership. The questionnaire consists of two questions for the company and for the employees.</p> <p><i>Data collected:</i> all employees’ respondents answered they are not member of any workers’ associations; the company also confirms this. Since membership of trade unions by workers is free, it cannot be said that the company circumvents the law. Membership of trade unions and the appointment of representatives in the company is desirable but not mandatory. Anyway, the company should provide incentives for employees.</p>
<p>Subcategory: Equal Opportunity/Discrimination</p> <p><i>Description:</i> this subcategory aims to find information about the company’s ability to handle all its employees in the same way, avoiding favouritism and discrimination due to gender, nationality, and/or other personal characteristics.</p> <p><i>Data collected:</i> for employee, 35 responded yes, 3 in a negative way, while 5 did not respond. Respondents feel a sense of security from the owner of the company and feel protected in case of “ill-treatment”. Company says that there is no formal policy in this regard although it offers full availability to dialogue and resolution of any problems. There have not been cases of discrimination over the past five years and the company stating that in the last five years there have been no cases of discrimination. During the inspection, the presence of women in the company was clear; indeed, they are in the majority. The company states that the number of women in the company is 134, while there are 74 men. In addition, several women are in leadership positions. In addition, there is a woman with a disability. The company says that there is no formal policy in this regard although it offers full availability to dialogue and resolution of any problems.</p>

Table 2. Cont.

<p>Subcategory: Forced Labour</p> <p><i>Description:</i> to investigate the observance of forced labour laid down by law, and highlight any anomalies. As defined in the ILO Convention [29] of the “International Labour Organization”, forced labour is understood as all work or service exacted under the threat of sanctions and for which the person has not offered himself voluntarily. Although a convention of the International Labour Organization calls for an abolition of forced labour, it is still practiced in some countries. In certain other nations forced labour is regulated by law. In Italy forced labour was abolished in 1957. The questionnaire consists of 4 questions for workers and 4 questions for the company.</p> <p><i>Data collected:</i> the company confirms that all employees have understood the meaning of each part of the signed contract, responding to the doubts and questions posed by employees. The company instead declares that the worker is free to resign at any time, within the limits laid down by law; the employees confirm this circumstance. In addition, the company claims to provide different social benefits.</p>
<p>Subcategory: Commitment to the Local Communities</p> <p><i>Description:</i> to verify whether the company participates actively and is committed to the promotion and development of the local community.</p> <p><i>Data collected:</i> the company sponsorships events organized by the municipality but, it does not promote to its suppliers practices aimed at commitment towards the local community.</p>
<p>Subcategory: Cultural Heritage</p> <p><i>Description:</i> to identify the company’s commitment to the enhancement and/or the local cultural heritage protection.</p> <p><i>Data collected:</i> the company declares that it finances and promotes cultural and artistic events such as making charitable collections, making a financial contribution to the restructuring of some churches located in San Marco d’Alunzio (San Marco d’Alunzio is part of the circuit of the most beautiful towns in Italy, inside the Nebrodi Park and it includes 22 churches, the largest number of churches in any town in the province of Messina). Various representatives of the local community who were interviewed also confirm this. Beyond these statements, it should be highlighted that the mere fact of being a company that carries out a particular type of hand processing, double-face, is already a factor in promoting the cultural heritage. In addition, the case study contributes to cultural heritage promotion in neighbouring towns, indeed it has helped to create the Museum of Sicilian Costume and Fashion at Mirto (ME), and attended a conference aimed at enhancing the traditions and the revival of the textile industry in the Nebrodi area, at Sant’Agata di Militello (ME). The company does not promote policies towards its suppliers and business partners and/or practices aimed at respecting the cultural heritage.</p>
<p>Subcategory: Local Employment</p> <p><i>Description:</i> to investigate about the company’s willingness to take on local workers and to avail themselves of local suppliers.</p> <p><i>Data collected:</i> The company claims that 86% of its employees come from the same area, which extends in a radius of 60 km from the enterprise. However, the company does not use local suppliers, because it is not possible. Representatives of the local community also confirm this. The company has 206 workers including 178 Italians and 28 from Romania (although resident in San Marco d’Alunzio). In addition, the company does not promote its local employment practices to its business partners.</p>
<p>Subcategory: Access to Intangible Resources</p> <p><i>Description:</i> to inquire about the company’s commitment oriented to encourage and provide to the local and foreign communities greater access to intangible resources</p> <p><i>Data collected:</i> the company claims (and most of the representative of the local community confirm) to offer services to its employees, residing in San Marco d’Alunzio, literacy courses and Italian language lessons for non-Italian employees, in order to create real integration among employees not only in the factory but also in the community in which they live. In support of this, every Wednesday, the parish priest of San Marco d’Alunzio gives foreign employees of the enterprise the chance to hold Orthodox celebrations.</p>

4. Findings: Evaluation of the Social Performance

Evaluating and interpreting social performance is often difficult and frequently presents a great challenge. To date, few methods and tools that help the assessment of social impacts on a global scale and over several tiers of a product supply chain are available [43]. An example is the social impact assessment method Type 1 presented by the UNEP/SETAC guidelines [17]. It consists of a two-step assessment: (1) data are related to subcategories (carried out using performance reference points); and (2) the subcategories can be aggregated into one category that may be human well-being or fairness of relationship.

To provide a more objective assessment, in this study, SAM method (type I) is used to evaluate the primary data from the company, while SHDB (type I) is used to evaluate the generic data of the upstream supply chain. SAM is based on the framework from UNEP/SETAC guidelines and employs a four-level scale for each subcategory. This method allows an organization to be analysed according to its behaviour considering 4 levels (A, B, C and D) [31] to which a numeric scale is associated (Table 3), which transforms the qualitative data into quantitative data, providing a method to semi-qualitative characterization.

Table 3. Subcategory Assessment Method (SAM) [39].

Level	A	B	C	D
Assessment	4	3	2	1

SAM evaluates the social profile of organizations involved in the product life cycle in relation to the satisfaction of Basic Requirements (BR). The BR are defined according to the indicators contained in the Methodological Sheets (Table 4):

- level A means that the organization demonstrates proactive behaviour towards the basic requirement, as it promotes and fulfils the requirement also towards its suppliers or value chain;
- the organization that respects the basic requirement shall be assessed in the level scale B; and
- classes C and D identify the aspects that do not meet the basic requirement [44].

Table 4. Subcategory Assessment Method (SAM) for S-LCA: level and definition [43].

Level	Definition
A	The organization promotes that the workers being associated in the workers' union-along all the supply-chain
B	In the organization there is evidence of workers being associated in the workers' union
C	Workers rights score of the country where the organization is located is between
D	Workers rights score of the country where the organization is located is between

The method allows objectivity in analysing the organization's behaviour through the life cycle of the product. It can transform qualitative data into quantitative data.

From the results summarized in Table 5, in reference to the product object of the study, it is clear that the company has embarked on the path of social responsibility, establishing a strong relationship with its employees and the territory.

Table 5. Evaluations at company level- method SAM.

Stakeholders	Subcategory	Level	Assessment
Worker	Freedom of Association and Collective Bargaining	C	2
	Child Labour	B	3
	Working Hours	B	3
	Forced Labour	B	3
	Equal Opportunities/Discrimination	A	4
	Fair Wages	B	3
	Health and Safety	A	4
	Social and Social Security Benefits	A	4
Local Community	Commitment To Local Communities	B	3
	Cultural Heritage	A	4
	Local Employment	B	3
	Access to Intangible Resources	A	4

This has enabled the achievement of numerous benefits, including improving business performance, reducing operating costs, enhancing image and reputation, increasing sales and customer

loyalty, increasing productivity and quality, increased ability to attract and retain employees and improvements in relations with public authorities. Quality of life of the individuals outside of the firm (strongly linked to the company's life) represents a competitive advantage and produces a durable condition of harmony [45]. According to the value co-creation approach, the study case highlights that a good social and ethics policy, with particular attention to the needs of its employees, creates a family place of work [7] and that a higher quality of life of employees better contributes to foster the evolution of more sustainable societies.

Analysing the obtained results (Table 5), it can be said that the studied company, for the product analysed, try to have a positive impact on the company's environment focusing on the security, the integration and the sociality aspects. Of course, a positive work environment involves greater satisfaction on the part of workers and therefore greater commitment and better performance. This has also enabled the company to win over people who find consistency between their own values and those of the company, thus allowing on the one hand reduction of the costs of recruitment and selection and, on the other hand, employment of people consistent with what the company represents.

The results related to the analysed product highlight that the studied company is a socially responsible company, which takes into account the expectations of its workers, assuming an attitude inclined to meet their needs (in terms of safety, pay and career). In respect the unit functional, it has adopted appropriate policies to develop and to consider staff as a component of its competitive advantage. Thanks to these policies, the company has a qualified, engaged and committed staff, with all the advantages that derive from this.

For the manufacture of the product object of the study, the company embarked on a path of social responsibility, establishing a strong relationship with its employees and the territory. For example, the company hires home workers, thus making it possible for older workers or people who are not able to move to maintain their economic independence, carrying on the tradition of "double-face" needlework. In addition, results highlighted that the workers do not perceive their work activity as dangerous. Indeed, no accidents have been recorded in the past five years; consequently, the company seems to apply all the measures relating to health and safety. The organization not only respects the national law on health and safety, but it also provides, at its expense, additional health coverage to older employees and their families.

Moreover, the company implements a policy in favour of the local community: during the year, the company sponsors events organized by the municipality. The company promotes and finances cultural and artistic events such as making charitable collections, and financially contributing to the restructuring of some churches located in San Marco d'Alunzio. Beyond these situations, it should be highlighted that the mere fact of being a company that carries out a particular type of hand processing, double-face, is already a factor in promoting the cultural heritage. This has allowed new generations to learn a precise art of sewing, which was in danger of being abandoned. The studied company also contributes to the promotion of cultural heritage in neighbouring villages; indeed, it has helped to create the Museum of the Sicilian Costume and Fashion at Mirto (ME), and attended a conference aimed at enhancing the traditions and the revival of the textile industry in the Nebrodi, at Sant'Agata di Militello (ME).

Finally, the company provides its employees with a company canteen, company nursery and various corporate buses for transporting employees from neighbouring towns. In addition, for workers residing in San Marco d'Alunzio, the study case offers literacy courses and Italian language lessons for non-Italian employees, in order to create real integration among employees not only in the factory but also in the community in which they live. In support of this, every Wednesday, the parish priest of San Marco d'Alunzio gives foreign employees of the case study the chance to hold Orthodox celebrations.

However, the Table 5 shows that the only point in which the company obtained a "C" concerns "Freedom of Association and Collective Bargaining". Since membership of labour unions by workers is free, it cannot be said that the company evades the law [46]. The abstention by workers is probably

because they do not feel the need to join the labour union since they already feel protected and respected by the company. Besides, analysis of the questionnaires highlights the lack of proactive action against suppliers and other players in the value chain of the company. For this reason, it was thought an evaluation of the supply chain stages in the country-specific sector (background processes) of the object of the study should be carried out.

For the background processes, generic data were gathered through the SHDB system in order to identify a first-cut list of prioritized potential social impacts over the entire product category supply chain. In particular, the SHDB, developed by Benoît-Norris among others [47], is a Web Portal that opens up a world of social impact information for use by corporate directors, investors, product designers, supply chain managers, policy makers, academic researchers, international organizations, and others. Interactive and visual, the new Web Portal offers transparent information about social risks and opportunities in 227 countries and 57 sectors. It draws upon hundreds of data sources such as the International Labour Organization, the World Health Organization, the U.S. Department of Labour and State, the World Bank, etc. [47]. SHDB data are characterized according to the level of risk or opportunity (four-level scale) of an occurring social aspect instead of the real positive or negative impact experienced. The characterization levels are determined based on distributions of data for all countries or by consensus among experts.

For S-LCA general knowledge on where the production activities are taking place is necessary, because of societal, political and cultural differences. The SHDB Social Theme Tables list indicator data and qualitative information characterized according to the level of risk (low, medium, high and very high) [48]. Sector data are not applicable or available for all indicators but are used when relevant and accessible, such as for child labour and wage rates.

The textile industry in Italy may generate moderate social impacts in the supply chain. Table 6 shows the average weighted risk across all issues for each theme within the category: Low risks were weighted at 0, Medium at 1, High at 5 and Very High at 10. The CSS of interest are the country of production of raw materials.

According to the sources considered [49], Table 7 indicate the issues with very high risk at the country level in the countries involved.

In most cases, the differences range within different levels (e.g., from low to very high). According to the results, in Table 7, the cashmere sector appears to be the most relevant sector along the supply chain for this textile product. A difficulty is identified for Working Time, in Mongolia: the indicator is not available. Regarding “working time”, the risk value is higher for Italy and Germany, because we must consider that countries having a better counting and reporting system are being penalized when they are compared, for example, with emerging countries [39].

In recent years, in Mongolia the textile industry has contributed to the growth of the economy: Mongolia has thus become the third cashmere producer in the world, with a total world share of 30% (it is not a coincidence that Italy is increasing trade relations between the two countries precisely in this area) [50].

In general, in Mongolia some of the themes for the various categories are at the medium level. However, the results still show various “hot” social problems, such as: Access to Improved Sanitation (5.000); Legal System (7.000); Corruption (5.002); Occupational Toxics and Hazards (5.278); Access to Improved Sanitation (5.000) and especially Child Labour is a very important social problem (7.500).

Despite Mongolia being an emerging country, in the small rural communities, everybody lends a hand in the management of the family and cattle. Hence, for most children, it is almost impossible to receive a complete education [51]. Consequently, this situation has created a major social disease, child labour, despite it being expressly forbidden.

On the other hand, in Italy and Germany, the results for all stakeholders do not appear to have a uniform trend for different subcategories. Germany (Wire) is the country with social problems at low levels. In Italy, despite being a developed country, both the Metal product and Wool sectors have various difficulties at the Governance level and Health and Safety level. These two issues are

considerable social problems. Corruption seems to be a particularly chronic problem in Italian society. Corruption not only creates injustice, but also severely damages the country's economic life; Italians should regain the values of responsibility and respect for the rules.

As shown in Table 6, the analysis was also extended to the textile process carried out in Italy. The results confirm the same social problems identified in Italian sectors analysed: Metal product and Wool sectors. Using only the SHDB national-data, the results underlined only the classic social issues in Italy already mentioned in the other sectors. On the contrary, using the primary data and the SAM method, it was possible to highlight that the presence of the San Lorenzo Group allows a better social condition (i.e., job-creation and its best practice); in fact, the area in which the company is localised is not so critical.

Table 6. Characterization results of the SHDB method for sectors and textile process in Italy.

	Theme	Characterized Issue	Country-Specific Sector	Risk Value	Characterized Results
<i>Labour rights and Decent work</i>	Working Time	Risk of excessive working time by sector	Italy (wool)	1.000	Medium
			Italy (Metal production)	1.000	Medium
			Italy (textile process)	1.000	Medium
	Freedom of association and collective bargaining	Risk that a country lacks or does not enforce Freedom of Association rights	Italy (wool)	1.000	Medium
			Italy (Metal production)	1.000	Medium
			Italy (textile process)	1.000	Medium
	Labour Laws	Risk that country does not provide adequate labour laws	Italy (wool)	0.753	Low
			Italy (Metal production)	0.505	Low
			Italy (textile process)	0.505	Low
Child labour	Risk of Child Labour in sector, Total	Italy (wool)	No data	No Data	
		Italy (Metal production)	No data	No Data	
		Italy (textile process)	No data	No Data	
Forced Labour	Risk of Forced Labour by Sector	Italy (wool)	0.258	Low	
		Italy (Metal production)	0.258	Low	
		Italy (textile process)	0.258	Low	
<i>Health and Safety</i>	Occupational Injuries and Deaths	Risk of no access to an Improved Source of Drinking Water-total	Italy (wool)	7.750	High
			Italy (Metal production)	5.500	High
			Italy (textile process)	5.500	High
	Occupational Toxics and Hazards	Risk of loss of life years by airborne particulates in occupation	Italy (wool)	2.448	Medium
			Italy (Metal production)	2.448	Medium
			Italy (textile process)	2.448	Medium
<i>Human Rights</i>	Gender Equity	Risk of Gender inequality by Sector based on representation in the workforce	Italy (wool)	1.006	Low
			Italy (Metal production)	1.006	Low
			Italy (textile process)	1.006	Low
	Human Health Communicable Diseases	Risk of Mortality from Communicable Diseases	Italy (wool)	1.805	Medium
			Italy (Metal production)	1.805	Medium
			Italy (textile process)	1.805	Medium
	Human Health Non communicable Diseases and other health risks	Risk of Mortality from Non-communicable Diseases	Italy (wool)	0.384	Low
			Italy (Metal production)	0.384	Low
			Italy (textile process)	0.384	Low
Indigenous Rights	Risk that indigenous people are negatively impacted at sector	Italy (wool)	No Evidence	Low	
		Italy (Metal buttons)	No Evidence	Low	
		Italy (textile process)	No Evidence	Low	
<i>Governance</i>	Corruption	Risk that corruption is a hindrance to doing business in a country	Italy (wool)	3.402	Medium
			Italy (Metal production)	3.402	Medium
			Italy (textile process))	3.402	Medium
	Legal System	Overall Risk of fragility in the legal system	Italy (wool)	1.800	Medium
			Italy (Metal production)	1.800	Medium
			Italy (textile process)	1.800	Medium
<i>Local Community</i>	Access to Improved Sanitation	Risk of no access to an Improved Source of Sanitation	Italy (wool)	No data	No Data
			Italy (Metal production)	No data	No Data
			Italy (textile process)	No data	No Data
	Access to Improved Drinking Water	Risk of no access to an Improved Source of Drinking Water-total	Italy (wool)	No data	No Data
			Italy (Metal production)	No data	No Data
			Italy (textile process)	No data	No Data
Access to Hospital Beds	Risk that there are too few hospital beds to support population	Italy (wool)	1.000	Low	
		Italy (Metal production)	1.000	Low	
			Italy (textile process)	1.000	Low

Table 7. Characterized results.

	Theme	Characterized Issue	Country-Specific Sector	Risk Value	Characterized Results
<i>Labour rights and Decent work</i>	Working Time	Risk of excessive working time by sector	Mongolia	No data	No Data
			Italy (wool)	1.000	Medium
			Italy (Metal production)	1.000	Medium
	Freedom of association and collective bargaining	Risk that a country lacks or does not enforce Freedom of Association rights	Germany (wire)	1.000	Medium
			Mongolia	5.333	High
			Italy (wool)	1.000	Medium
	Labour Laws	Risk that country does not provide adequate labour laws	Italy (Metal production)	1.000	Medium
			Germany (wire)	1.000	Medium
			Mongolia	5.202	High
	Child labour	Risk of Child Labour in sector, Total	Italy (wool)	0.753	Low
			Italy (Metal production)	0.505	Low
			Germany (wire)	0.505	Low
Forced Labour	Risk of Forced Labour by Sector	Mongolia	7.500	Very High	
		Italy (wool)	No data	No Data	
		Italy (Metal production)	No data	No Data	
<i>Health and Safety</i>	Occupational Injuries and Deaths	Risk of no access to an Improved Source of Drinking Water-total	Germany (wire)	No data	No Data
			Mongolia	1.000	Medium
			Italy (wool)	0.258	Low
	Occupational Toxics and Hazards	Risk of loss of life years by airborne particulates in occupation	Italy (Metal production)	0.258	Low
			Germany (wire)	0.258	Low
			Mongolia	2.000	Medium
	Gender Equity	Risk of Gender inequality by Sector based on representation in the workforce	Italy (wool)	7.750	High
			Italy (Metal production)	5.500	High
			Germany (wire)	0.010	Low
	Human Health Communicable Diseases	Risk of Mortality from Communicable Diseases	Mongolia	5.278	High
			Italy (wool)	2.448	Medium
			Italy (Metal production)	2.448	Medium
Human Health Non communicable Diseases and other health risks	Risk of Mortality from Non-communicable Diseases	Germany (wire)	2.448	Medium	
		Mongolia	1.571	Low	
		Italy (wool)	1.006	Low	
Indigenous Rights	Risk that indigenous people are negatively impacted at sector	Italy (Metal production)	1.006	Low	
		Germany (wire)	0.151	Low	
		Mongolia	1.140	Medium	
<i>Governance</i>	Corruption	Risk that corruption is a hindrance to doing business in a country	Italy (wool)	1.805	Medium
			Italy (Metal production)	1.805	Medium
			Germany (wire)	0.741	Low
	Legal System	Overall Risk of fragility in the legal system	Mongolia	3.753	Medium
			Italy (wool)	0.334	Low
			Italy (Metal production)	0.334	Low
<i>Local Community</i>	Access to Improved Sanitation	Risk of no access to an Improved Source of Sanitation	Germany (wire)	0.741	Low
			Mongolia	2.600	Medium
			Italy (wool)	No Evidence	Low
	Access to Improved Drinking Water	Risk of no access to an Improved Source of Drinking Water-total	Italy (Metal buttons)	No Evidence	Low
			Germany (wire)	No Evidence	Low
			Mongolia	5.002	High
Access to Hospital Beds	Risk that there are too few hospital beds to support population	Italy (wool)	3.402	Medium	
		Italy (Metal production)	3.402	Medium	
		Germany (wire)	0.010	Low	

Considering that the product object of the study was randomly selected by the authors (and not by the company) and that it has similar characteristics to almost all the products produced within the company, it is possible to extend the evaluation of the product to the whole social behaviour of the company. In reference to the local community, the evaluation is at the company level, because

the perception of the respondents is not related to the single product, but to the whole company production process.

Therefore, through an overall evaluation of all phases, it is noted that the study case, both at corporate and local levels, applies a careful and well-structured social policy, obtaining a positive assessment by applying the SAM method (Table 5). However, the company does not adopt special measures to prevent and/or reduce social problems and does not promote proactive actions towards limiting and protecting its suppliers and or other business partners. Surely, the application of S-LCA would be very beneficial for the company, as it may identify those suppliers and customers with the best social performance to guide decision-making and promote projects and sustainability pathways, through evaluation of the entire life cycle of the product.

5. Conclusions and Further Research

There are few studies on textiles industry focused on the measurement of the social impacts of clothing products, even if the textile sector, in the last years, is facing a huge challenge in terms of social impacts especially working conditions, child labour and so on. Choosing the right tool to suit the needs of different players in the field of sustainability is very much crucial [52].

S-LCA can be used for the measurement of the social impacts of textiles and clothing products but some weaknesses still affect the method and its implementation in this context. The main problem refers to a limited availability of data, or their total absence in different processes or activities [53]. In addition, in this case study, problems have been encountered in finding information from customers and suppliers of the company being analysed [39].

This limitation, however, have been overcome through an approach based on the two values levels. Thus far, the papers in the literature apply the SAM and SHDB methods distinctly; the SAM method is used to parse the primary data (company level), while the SHDB method is used to analyse generic data (national and global). This approach is not new, being already similarly implemented in Padilla-Rivera et al. [37], Vuailat et al. [38], and Martínez-Blanco et al. [39].

However, at the same time, the combined use of these two methods leads to a fundamental shortage: the SAM method allows for a true impact analysis, while with the SHDB method only a risk analysis is obtained and it is not possible to aggregate the results.

In addition, the SHDB is one of the few databases that can be found in literature; this shows a further shortage of S-LCA: both databases and indicators are difficult to find, especially at a small business level [19].

Another limitation is the impossibility of the company to check their suppliers for lack of means and power. This is a specific characteristic of the textile and clothing industry, in which manufacturing firms (generally SMEs) have a limited power to control the decisions along the supply chain, generally controlled by multinationals or the big fashion companies. Often, market games are so strong that they do not allow a company to prefer a supplier rather than another or to be able to test whether that vendor applies a sustainability policy.

Surely, there are further difficulties for a significant and reliable application, mainly due to the complexity of social indicators selection and the weighting system between the three pillars of sustainability. However, the great strength of the methodology is that of creating a full review on a product, going to add the social aspects of the latter to the environmental and economic aspects.

The implementation of the Social Life Cycle Assessment (S-LCA) method, defined by the UNEP/SETAC S-LCA guidelines, to a specific Italian textile product highlighted that local processes fully respect human needs and local communities. Indeed, the firm has embarked on a path of local social responsibility, establishing a strong relationship with its employees and the territory. However, the textile production chain is complex and long, thus preventing the company from adopting special measures to prevent and/or reduce social problems at national/global level and does not promote proactive actions towards limiting and protecting its suppliers and/or other business partners.

This shows that the problem is not at the local level, but problems arise at the national/global level. The studied company is located downstream in the production chain, while the customers, the giants of the textile sector, do not demonstrate any attention to the social aspects. In particular, the analysis shows that in multinationals the concept of social sustainability is not prominent; it is not a priority.

Greater investments are needed, so that companies can learn the necessary culture in order to understand that sustainability is a competitive key factor for businesses in all economic sectors, because it increases the added value of a company, especially in terms of image and credibility, in addition to improving the relationship with all stakeholders.

The company perceived positively the results obtained, and has decided to match the social results with the environmental certifications that it owns to improve its visibility and commitment to the local community.

In reference to the S-LCA method, this study combines, but not integrates, two approaches for the social impact assessment: SAM method and SHDB, involving diverse stakeholders. These different approaches gave greater efficiency and efficacy to the application of S-LCA as a decision-making tool. The decision maker may choose the decision alternatives leading to the most favourable social impacts.

However, assessment of the social impacts of a product, through the assessment of its life cycle, which is still not extensively used, lacks proper quantitative indicators. Indeed, the methodology presents certain complications, above all in relation to the procedures of application (e.g., data retrieval, a limited availability of data, or their total absence in different processes or activities). The difficulty is to link social indicators with the functional unit of the system/product to make them convenient and considerable. Precisely for this reason, the current qualitative and semi-quantitative approaches suffer from a lack of quantitative and well-defined indicators [54].

At the same time, the S-LCA allows companies to conduct its business easily in a socially responsible manner, helps companies to identify further improvement goals and encourages the company's social performance with a life cycle perspective. In particular, for the value co-creation, social sustainability is a priority and competitive key factor for businesses in all economic sectors, because it increases the added value of a company, especially in terms of image and credibility, in addition to improving the relationship with all stakeholders [55]. The results show that S-LCA is a valuable tool to support decision-makers in prioritizing resources and investing them where there are more chances of positive impacts and less risk of negative ones. However, the access to primary and/or good quality local, national and global data is essential to draw credible conclusions. The access to these data is a consequence of the availability of good quality databases, as well as the presence of highly integrated and cooperating supply chains, which is lacking in many industry realities. Thus, there are still difficulties for significant and reliable application of the S-LCA; consequently, further developments are still needed to improve the quality of S-LCA results. Future research should be mainly focused on improvements and standardization of indicators, data collection and relative database. Further efforts should be paid to the development of reliable weighting systems between the three pillars of sustainability to integrate S-LCA results with LCA and LCC ones.

Furthermore, every methodological improvement of the S-LCA technique will be in vain if there is no strong commitment to improving the cooperation and control of decisions along the supply chain, which appears as an insurmountable obstacle in many industries, such as the textile and clothing ones.

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