

## A CASE OF SUSTAINABLE INNOVATION APPLIED TO TEXTILE INDUSTRY

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### ABSTRACT

In Italy a great amount of rustic wool is now discarded every year, with high environmental costs, or exported at very low price, because it constitutes a waste of the systems of ovine production of meat or milk. This wool is not of enough good quality for the traditional textile industry and for this reason is considered a waste which often is burned for avoiding its disposal cost, with further damages for the environment. In the last years some innovative enterprises and projects are trying to transform it from waste to sustainable resource, using it for the creation of high intrinsic value clothes, because sustainable for the environment and for the economic system.

This paper present a case of sustainable innovation applied to textile industry and discusses structure and activity of a supply chain which is still under construction, where the organizational and managerial analysis (i.e. vertical integration, externalization) becomes very relevant and the costs are still high and extremely variable.

The paper analyses in particular the results of an Italian National project born with the aim of experimenting the use of local rustic wools for creation of clothing, implementing a short chain sustainable productive process where starting from handcrafted knowhow, innovation should improve its social and environmental impact.

The empirical analysis was based on interviews with operators and enterprises, focus-groups with operators and consumers and a questionnaire directed to different target of consumers.

After a mapping of operators and firms involved in this new production chain (about 100 subjects along all the chain from sheep-breeding to clothes production), the paper analyses and discusses in particular two aspects: a) how concept of social and economic sustainability is declined, in terms of innovation and in relation to entire supply chain of textile; b) possible target market.

The analysis of the new production chain shows the positive effects of network cooperation among small textile operators – still active throughout Italy despite growing production delocalization – in order to create an end product which combines local traditions and technological innovation.

The early analysis of consumers reveals that the products manufactured through the experimental chain still have few sustainability attributes, insufficient to stimulate the purchase of a very different

type of product, in terms of quality, from those usually found on the market. In particular, the short production chain and origin of the raw materials are the attributes which cause consumers to appreciate the project, but these attributes alone are not enough to make them truly like the end products.

**Keywords:** sustainability, textile industry, innovation, rustic wool, consumer, supply chain.

## **INTRODUCTION: THE RUSTIC WOOL AS A WASTE**

Around 6 million sheep are bred in Italy to produce cheese and meat. It is also estimated that the wool from their shearing amounts to about 8,500 tons per year. This extremely large quantity of fleece can yield 1,700 tons of fabric, corresponding to a production output of around 6,000 items of clothing per day. At present, this wool is considered a waste by-product of sheep and goat breeding, since it cannot compete with finer quality wool (for instance, merino) imported from Australia, New Zealand, or Argentina. It is therefore buried in spite of disposal regulations currently in force, which involve excessive costs for breeders, or sold at a loss to be exported to foreign markets, where it is used for the manufacturing of carpets. This paper illustrates and discusses the rationale for the project "Filiera del Tessile Sostenibile (FTS)" (Sustainable Textile Production Chain) of the CNR (Italian National Research Council), as well as its structure, implementation, and results. FTS is an operating project involving the joint collaboration of the research sector and the entrepreneurial sector. Its purpose is to evaluate a case of sustainable innovation applied to the Italian textile production chain, i.e. using rustic wool from Tuscany for the manufacturing of garments.

Garments made from rustic wool can be classed as sustainable because the raw materials used in their production are currently considered waste products. A further reason is that their manufacturing relies on local skills and craftsmanship linked to the Made in Italy tradition, with an all-Italian production chain which does not imply the delocalization of production to countries with lower labor costs. Consequently, environmental and social sustainability make up a great portion of the value added of these garments.

The issue addressed here therefore concerns the production and consumption of goods with significant symbolic and intangible, social and identity-related characteristics. Depending on its style, materials used, and manufacturing procedure, an item of clothing embodies values and meanings, thus allowing the person wearing it to identify with them and to communicate them during social interaction. Choosing to purchase a certain garment implies a sense of belonging to a certain status group – a social group which, beyond economic differences, brings together actors who share a similar lifestyle. As seen in the food sector, also fashion has recently been permeated by greater awareness of the places and procedures characterizing the textile production chain and new concepts have emerged, such as those of responsible, critical, ethical, organic, eco-sustainable, fair-trade, and second-hand fashion (Camera Nazionale della Moda Italiana, 2012; cfr. Unioncamere 2011, 2012). Companies as well as consumers are starting to see the combination of ethics and aesthetics as something which is not only attainable but also strategic for the future of fashion, and necessary to ensure the protection of our planet. Green and sustainable fashion is gaining ground in both the elite market segment and in that of mass consumption (Hetbhorn e Ulasewicz, 2008; Dansero e Caldera, 2013; Rinaldi e Testa, 2013; cfr. Barrère e Santagata, 2005).

Nevertheless, the matter is made more complicated by the countless ways in which the concept of sustainability can be interpreted and developed in the textile sector: is an item of clothing

sustainable if it respects the environment, human labor, or animals? Is it sustainable if its production chain is short, if it is made following local traditions, if it is handcrafted? Hence, besides considering whether implementing this innovation within the production chain is feasible from an operational point of view, the assessment of the project must also take into account how the market might respond to the introduction of garments made from Italian rustic wool. Yet, a market comprises several different “souls” and attitudes, as many as the consumers of which it is made up. Starting from these theoretical premises, the research project dealt with in this article splits the market of sustainable clothing into three ideal types of consumers: those who wish to distinguish themselves, critical consumers, and mass consumers. The analysis was performed using a combination of different qualitative techniques, among which interviews, focus groups, and an online questionnaire.

### **METHODOLOGIS OF ANALISYS**

The FTS project consisted of two main phases. The objective of the first phase was to determine whether the use of Italian rustic wool for the manufacturing of garments could be technically feasible, while the second phase aimed to assess the potential for the creation of a market for the garments manufactured via this experimental production chain. This article refers to the second phase of the project.

Since no structured databases exist for this research area and the literature on the topic is rather limited, the investigation involved a large amount of fieldwork. Therefore, it was decided to contact the main local wool producers/processors directly in order to gather data on their production and reference markets. One hundred cases were mapped (projects/brands of firms/operators involved in the production chain) and material about them was collected from different sources (Internet sites, magazine articles, previous studies, etc.). Twenty-six of these firms were then contacted for in-depth interviews and, in the most interesting cases, visits to their production facilities were organized. Various channels were used to identify relevant subjects, such as participants and exhibitors in textile fairs and participants in previous projects for the promotion of sustainable textile products.

For what concerns analyzing the consumers’ point of view, the study involved drafting and circulating questionnaires, carrying out direct interviews, and gathering a considerable amount of qualitative data from key informants. Using qualitative techniques, such as interviews and focus groups, was particularly important since the aim was to find out whether consumers were willing to accept products with alternative characteristics compared to those traditionally found on the market. Our concern was not merely to quantify the phenomenon – i.e., who would buy what – but also to explore the consumers’ motivations, reconstructing “the contexts of purchase and use” of garments, which provide information on the meaning attributed to items of clothing in terms of both self-image expression and promotion of what is deemed appropriate and fair at a social level (see Sassatelli, 2006).

Three different types of consumers were identified: “mass/undifferentiated”; “distinctive/exclusive”; and “critical/responsible”. The analysis of “mass/undifferentiated” consumers aimed to evaluate whether rustic wool garments might potentially snatch away a market share from traditional wool garments by leveraging elements of the marketing mix such as price, advertising, and large-scale retailing. To this end, a questionnaire was elaborated and distributed to consumers in front of large clothes retailers. It was also circulated online, on selected websites and via targeted mailing lists, using a web intercept approach. The questionnaire, which had almost one thousand respondents,

was tested at the abovementioned textile fairs and on the Internet. The online channel makes it possible to reach a portion of the population which is better informed and more fully aware of life and consumption styles than the average respondent. Hence, it represents a “critical case” to test an innovative product. Besides displaying an excellent cost-benefit ratio, the online investigation targets a segment which is more receptive to the key topics of this study. A section of the questionnaire concerned the users’ level of appreciation for the garments of the FTS project, whereas other sections focused on general consumption habits in relation to sustainable clothing, also asking respondents to explain what they mean by “sustainability”.

As for “distinctive/exclusive” consumers, two case studies were chosen – a tailor’s shop in Florence and a knitwear firm in Turin – to investigate how the clientele responded to garments made from rustic wool using different manufacturing techniques. These results were complemented by interviews with consumers at two specialized fairs where FTS wool and garments were on display and digital photos of other examples were also available (*Sant’Orso Fair* in Aosta, January 2013, and *Tracht and Country Fair* in Salzburg, March 2013).

To analyze “critical consumers”, some relevant organizations were contacted, such as the ethical purchasing networks “*Gruppi di Acquisto Solidale*” (GAS) and “*Distretti di Economia Solidale*” (DES) in Turin and some cooperatives managing the chain of fair-trade shops “*Botteghe del Mondo*”. Two focus groups were organized with some of the people involved in these networks in order to gather data on their appreciation for the FTS products and on their consumption habits in relation to sustainable clothing.

The case studies on “distinctive/exclusive” and “critical” consumers made it possible to further examine the features of sustainability and uniqueness of the FTS garments. Yet, these are cases of niche consumption, unable to absorb the number of items that could be produced with the large volumes of rustic wool considered in this project.

### **THE SUPPLY CHAIN ANALYSIS: SOME RESULTS**

Here follows a description of the rustic wool production chain experimentally implemented in collaboration with textile sector operators during the first phase of the FTS project. The short production chain was set up in the area of Prato (Florence), a well-known textile district. A spinning factory was given the role of project leader, which involved coordinating the other companies dealing with individual processing phases, like wool cutting or weaving. These small firms usually operate as contract manufacturers and, differently from large specialized companies, their machines can be easily readapted to suit production at a very limited cost. Lastly, professional operators processed the yarns and fabrics to create the garments, the final output of the production chain.

The main concepts that inspired the development of this experimental production chain were:

- the idea of a short production chain with low environmental impact, since the wool comes from Italian breeding farms and the yarns and fabrics are produced in the vicinity of the farms;
- traditional know-how; the knowledge, skills, and culture of Italian craftspeople are promoted, also in line with the training actions supported by the Green Paper on Entrepreneurship of the European Commission, which recommends applying technological innovations combined with handcrafting techniques to improve the environmental and

economic sustainability of local productions (cfr. CAN, Ibimet e CIA, 2006); for example the *Med-laine project* in Sardinia, Corsica and Grosseto Province (Guercini e Ranfagni, 2011; MED-Laine, 2011); the *Pecunia project* at Gran Sasso Park);

- the use of equipment and technologies already available in Italy;
- the manufacturing of stylish and attractive garments.

These guidelines were developed considering the specific features of rustic wool processing, which requires particular skills and tools, partially different from those used in industrial production.

The analysis performed during the first phase of the project confirms that, in most phases of production, Tuscan rustic wool can be processed at a cost comparable to that associated with the processing of traditional wool (see Dunford, 2006).

Despite this encouraging evidence, it must be underlined that the wool currently produced in Tuscany each year (500 tons) cannot be absorbed by the market. Today, rustic wool is processed by small firms or even by self-employed individuals, operating in market niches in which they can sell their products at fairly high prices and build up a loyal customer base. An example of best practice in this segment is the cooperative *Les Tisse-rands - Lo Drap Della Valgrisanche*, Aosta Valley, Italy. Drape is a rustic fabric made from coarse wool and, before the Second World War, each family living in this mountain area had a loom for the weaving of drape cloth. The tradition was abandoned due to heavy emigration and then reintroduced; a cooperative was set up for the production of fabrics from different types of wool: coarse and organic wool for scarves, blankets, and shawls; wool from Rosset sheep, an indigenous breed, for items of clothing. The looms used by the cooperative resemble the ancient local looms and the products are sold through medium-high range retail channels, with prices between 500 and 1,000 Euros.

The analysis of this case shows that the coming together of operators in consortia is an effective way to share the high cost of the machinery needed for the processing of rustic wool, a typical problem of short production chains. To place their products on the market, the operators relied on the concept of Made in Italy and on the unique features of each garment, taking advantage of the dissatisfaction felt by high-end consumers, disappointed by the standardization of some well-known fashion brands.

In the last few years, an increasing number of firms have started using rustic wool to manufacture garments characterized by high intrinsic value. They have implemented production processes combining handcrafting knowledge and innovative methods to ensure a low social and environmental impact, while their strategy has been driven by greater attention to marketing and a less bottom-up approach. These firms try to bring together the concepts of ethics and aesthetics following a growing worldwide trend – see, for instance, The Green Carpet Challenge by Livia Firth, or C.L.A.S.S. (Creativity Lifestyle and Sustainable Synergy), an eco-platform which supports and promotes eco-compatible fashion, design, and furniture products from various raw materials.

## **THE CUSTOMERS ANALYSIS: SOME RESULTS**

The result of the FTS experiment was the creation of entirely traceable products with high value added in terms of sustainability – thanks to the raw materials used – and promotion of traditional handcrafting skills. The key issue is to understand how the above can be communicated to the end consumers, whether they recognize and share these values, and to what extent they are willing to

transfer said values into actual spending by purchasing an item at a set price. Hence, given the encouraging results as to the feasibility of processing Italian rustic wool and the recent eco-friendly market trends, the second phase of the FTS project focused on studying the potential end markets for rustic wool garments.

At the aggregate level, the answers to the questionnaire confirm that the “average consumer” of wool garments appreciates the FTS products, above all because they are manufactured through a short production chain and completely Made in Italy. However, said consumer is not willing to pay higher prices than those of traditional wool garments and would like the collection to be more captivating and modern, especially in the use of more fashionable colors. On the contrary, those who wish to distinguish themselves and are regular customers of tailors recognize the high value added of the FTS garments in terms of sustainability, prizing their craftsmanship and exclusivity in particular. They are the only ones who, for the most part, are willing to pay a premium price for the value added of these garments, i.e. a price higher than that of traditional wool garments. Lastly, critical consumers shun Tuscan rustic wool; being vegetarian or vegan, they prefer clothes from natural fibers, such as hemp.

The results of the study, which are currently still being analyzed, make it possible to put forward some hypotheses, especially for what concerns the social construction of the concept of “sustainability”. The so-called “consumer actors” – active and responsible consumers who consider the purchasing of an item a political act and a means to reshape the market and its rules – follow criteria which are not uniform but highly differentiated depending on how they interpret the concept of sustainability.

Distinctive consumers seem to appreciate the FTS rustic wool garments above all because of their originality, attaching particular importance to the fact that each item is unique, manufactured by hand, and possibly tailor made. In this context, sustainability mostly means craftsmanship, which allows the customer to have control over the final phase of the production chain and ensures that the final garment is unique. A key element in branding an item as sustainable is the way in which it is purchased, i.e. from a tailor’s shop, after measurements have been taken and several fittings have been scheduled. In addition, the characteristics of rustic wool fabrics, such as their roughness and the incomplete cleaning of their fibers, make the garments more exclusive and precious, to be worn as unique and unusual, also due to the high price paid.

The aggregate results of the questionnaire, referring to average/undifferentiated consumers mainly shopping at major fashion retail chains, show that the short production chain of rustic wool garments as a whole, from the first to the last manufacturing phase, is the main feature which causes them to be seen as sustainable. This lends the garments great value added, as they are examples of the Made in Italy tradition, guaranteeing high-quality manufacturing and respect for the health of consumers. Yet, although they might be willing to purchase them, average consumers refuse to pay more for rustic wool garments than for traditional wool garments due to some characteristics seen as flaws, like their roughness, unoriginal colors and conservative cuts – the very features seen as crucially positive by the customers of tailor’s shops. To allow the value of rustic wool garments to be recognized by average consumers, the items should be provided with a label describing the FTS project and its innovative production chain. Yet, the label should be of large size and either presented as part of the packaging or rolled up and placed next to the garments on

display. This is because most of our respondents who shop at retail chains state that they do not read the standard labels found on clothing.

The following tables (1-5) summarize the main answers to the questionnaire, which was completed by over 900 respondents and elaborated by Ceris-CNR.

*Tab.1 Motivation to purchase*

	Number	%
Textile quality	487	70
Price	272	39
made in Italy	163	23
uniqueness	102	15
handcraft and / or traditional	94	13
Brand	57	8
sustainability	42	6
Other...	15	2

*Tab.2 What means "sustainable" clothing for the Consumer*

	Number	%
ecological	468	51
ethical (working conditions)	381	42
attentive to animal welfare	274	30
local	187	20
handcraft and / or traditional	155	17
others	10	1

*Tab.3 Willingness to buy clothing of rustic wool*

	Number	%
No	332	37
Yes	558	63
Total	890	100

*Tab.4 If not, what not persuade the consumer to the purchase*

	Number	%
Style	210	63
Row material (rough)	195	59
Price, probably too high	19	6
Sustainability	15	5

*Tab. 5 Respect to a classic wool, how much would be available to pay for a clothing of rustic wool?*

	Number	%
Much less	106	12
A little less	251	29
Some price	356	41
A little more	153	18
Much more	6	1
Total	872	100

## CONCLUSION

This article has illustrated the framework and results of a research project on sustainability in the Italian textile sector. The project consisted of two phases: in the first phase, a short production chain was experimentally set up to transform rustic wool – currently considered a waste by-product of sheep and goat breeding – into items of clothing; then, the second phase analyzed how end consumers might respond to products which appear to be of lower quality but are supposed to be of high intrinsic value in terms of environmental and social sustainability.



The experiment shows the positive effects of network cooperation among small textile operators – still active throughout Italy despite growing production delocalization – in order to create an end product which combines local traditions and technological innovation.

Nevertheless, the early analysis of consumers reveals that the products manufactured through the experimental chain still have few sustainability attributes, insufficient to stimulate the purchase of a very different type of product, in terms of quality, from those usually found on the market. In particular, the short production chain and origin of the raw materials are the attributes which cause consumers to appreciate the project, but these attributes alone are not enough to make them truly like the end products. In the clothing sector, perhaps more so than in the food sector, the feature of sustainability should be combined with other fundamental elements to stimulate the decision to purchase. These elements are related to personal creativity, self-expression, and individual taste and culture. They change depending on the types of consumers considered, are probably linked to the consumers' reference status group and usual consumption habits, and include, for instance, the garments being tailor made or one or more of the operators being trusted suppliers of ethical purchasing groups. Other key characteristics are the innovativeness and originality of the items, such as the opportunity for end consumers to modify and personalize the garments, following the most recent trends in contemporary fashion and design.

The analysis of the project will continue by looking at possible alternative scenarios for the development of the production chain. It will focus on new key ideas to create a reference framework for rustic wool and its potential consumers and, by elaborating the concept of “sustainability” in a way that is more specific and appropriate to the context, it will also contribute to defining marketing strategies suited to a sector with rather challenging features and positioning.

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