Consumer Behavior relating to Circular fashion, Innovation and Usage of QR code

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Survey Presentation

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1 Report introduction

In order to gather further useful information for the TRICK vision definition, consumers' needs, behaviours and barriers and expectations have been also investigated and outlined by means of a questionnaire-based survey carried out by Scuola Superiore Sant'Anna (SSSA) and administered to a representative sample of five European countries (France, Italy, Spain, Germany, Poland and Italy).

After a brief overview of the textile-clothing sector and the role of the consumer plays in textile value chain transition towards the circular economy, with reference to the use of traceability technologies, such as the blockchain, this Report illustrates the main characteristics of the TRICK project, with particular reference to pilot projects in the textile-clothing and food supply chains and to the need for a more sustainable production and consumption system and the importance of having reliable information on the value chain of this sector. Then, the Report present the methodology used for the construction of the above-mentioned survey developed by SSSA research team with the aim of investigating consumers' perceptions of the circularity of the textile-clothing sector and of information and traceability technologies. The results of the survey are then reported, divided by thematic area.

In this context, the role that the consumer plays within this transition is of vital importance, acting as a lever for change and intervening in different phases of the product life cycle. In this context, the blockchain is configured as an enabling technology, able to transparently provide a large amount of information to the end user.

1.1 Purpose and objectives of the TRICK project

The European TRICK project "Product data traceability from cradle to cradle by blockchains interoperability and sustainability service marketplace" supports the adoption, tracing and demonstration of sustainable approaches by means of an innovative and circular product information management system based on Blockchain. This system will be able to provide stakeholders of the supply chains and final consumers with all the relevant data needed to implement end of waste practices and aware purchasing choices. Thanks to the implementation of a data collection system based on different Blockchain solutions, TRICK will show how EU companies can achieve full traceability and transparency of supply chains, guaranteeing data privacy and confidentiality throughout the entire process and informing consumers about all stages of the value chain. In the design phase, a marketplace will also be created that will allow third parties to market certified solutions and exploit the data collected by new business models, creating a series of standard services to support all stakeholders in the supply chains, starting with SMEs. The starting point of this process, with reference to the textile supply chain, is the creation of a roadmap for the conversion of production processes from linear to circular, with a particular focus on consumer behaviour in relation to the purchase and recycling of second-hand clothing, and the use of digital product information technologies, such as the blockchain.

TRICK demonstration will be run in two of the most highly relevant, complex, and polluting domains: Textile-Clothing and Food, to demonstrate the replicability of the approach. The overarching goal to support the adoption of sustainable and circular approaches and to enable enterprises to collect secured product data will be addressed on both innovation and implementation sides, by means of a

wide range of activities. The project's concept envisages the development of a set of services targeted on the pilots of the project, the creation of roadmap encompassing state of the art and the improvements able to support the transition to circular economy and the deployment of a set of new technologies.

1.2 Textile-clothing sector

The textile and clothing sector is an important part of the European manufacturing industry, which plays a crucial role in the economy and social well-being in many regions of Europe. According to 2019 data, 160,000 companies in the sector employ 1.5 million people and generate a turnover of 162 billion euros. The sector, particularly at EU level, is based on small businesses (SMEs). Companies with fewer than 50 employees represent over 90% of the workforce and produce nearly 60% of the added value. The textile and clothing industry is one of the most globalized sectors, with 38% of the EU turnover coming from the global market, also thanks to the existence of free trade agreements. Textiles and clothing recorded a strong export performance: they increased by 58% between 2010-2019, while textiles increased by 43%. 99.8% of the total companies in this sector are micro and SMEs, of which 67% in the clothing sector and 33% in the textile sector[1].

The ecosystem of the textile-clothing supply chain is a complex system, made up of a multiplicity of raw materials, processes and actors that intervene in every phase of the supply chain, both upstream and downstream of the production process. Clothing is the largest area of textile use, accounting for around 60% of the global demand for fibres. On the other hand, the shares of home and industrial textiles are almost equal, each representing approximately 20% of the global demand for fibres[2].

The textile-clothing value chain includes all activities that provide or receive value from the design, manufacture, distribution, retail and consumption of a textile-clothing product (or from the provision of the service rendered by it). It also includes the extraction and supply of raw materials, such as activities involving the product after the end of its useful life. At all stages of the value chain and in the transport of intermediate and finished products between the different stages, raw materials and energy are required and large emissions are released into the environment[3]. Textile Clothing plays a significant role in climate change with 1,7 million tons/year CO2 emissions, 10 % of substances of potential concern to human health, 87% of the workforce (manly women) below living wages. Permitted by lowered cost and fast fashion, a garment is worn an average of 3 times in its lifecycle, with €400 billion lost a year due to discarding clothes which can still be worn. The waste in fashion reaches 92 million tons per year, with 87% of clothes ending up in landfills. Activities associated with a value chain are often shown as a linear representation, from raw material production to end-of-life treatment. With operations for reuse, repair / repurposing and recycling of materials add a new "cycle" to this linear representation. The objective of circularity is in fact to move from a "take-make-dispose" value chain into a closed-loop system, in which materials are not lost after use but remain in the economic system, circulating for as long as possible with the highest possible value[4].

[1] EURATEX, "FACTS & KEY FIGURES OF THE EUROPEAN TEXTILE AND CLOTHING INDUSTRY", 2020.
[2] PCI Wood Mackenzie, 2016.
[3] Sustainability and Circularity in the Textile Value Chain: Global Stocktaking, UN Environmental Program, 2020.
[4] Ellen MacArthur Foundation, A new textiles economy: Redesigning fashion's future, (2017, http://www.ellenmacarthurfoundation.org/publications).

In addition to the activities described above, the textile-clothing value chain also includes the actors who directly undertake the activities included in the value chain and the stakeholders who can influence these activities. The value chain therefore incorporates not only physical processes, such as farms and factories, but also business models and the way products are designed, promoted and offered to consumers. These non-manufacturing activities, including design, marketing, retail, advertising and communication campaigns, largely determine the way in which textile-clothing products are produced and consumed. While some stakeholders, in particular direct actors, are involved in a specific phase of the value chain, others are more transversal and operate in some or all phases of this[5]. One of the main challenges to circularity is represented by the collaboration of the actors along the supply chain. Strong collaboration between partners throughout the supply chain of the textile-clothing sector is required to ensure a real circularity of products and processes, which is not always easily reachable. Close cooperation between manufacturers, suppliers, retailers and customers is a key element in improving the capacity for innovation and meeting the needs of the market[6]. Manufacturing companies have always recognized the importance of good relationships between partners and have clearly identified the need for trusting relationships with suppliers. Furthermore, suppliers represent a very important piece for achieving circularity, as they represent a connection point between the various phases in the manufacturer's value chain[7].

Consumers and stakeholders need to overcome the opacity of the value-chain with reliable and secured information about products as regards production tracing, PEF and environmental footprint, recycling and circular practices, health protection, worker social conditions, anti-counterfeiting and raw material flows. TRICK Textile-Clothing pilot will fulfil this need covering all the main phases of circular production with a concrete implementation of circular flows in real business with end-of-waste as final goal.

1.3 Consumer behaviour

Over the past 14 years, the number of clothes purchased by an average consumer has grown by 60% every year and world production of clothes has doubled; moreover, 15 years ago people wore twice as much clothing than today[8]. This trend has inevitably led to a more massive exploitation of both the workforce and the natural environment[9], as well as an increase in sector waste. With demand steadily increasing (according to the Ellen MacArthur Foundation, annual consumption in emerging markets is expected to increase from $ 12 trillion in 2010 to $ 30 trillion in 2025), consumer behaviour is being used as a lever and aid towards the transition. to a more sustainable model, thanks to their power of influence on the value chain. Indeed, thanks to their purchasing choices, consumers can contribute to

[5] Sustainability and Circularity in the Textile Value Chain: Global Stocktaking, UN Environmental Program, 2020.
[6] Lieder, M., Rashid, A., 2016. Towards circular economy implementation: a comprehensive review in context of manufacturing industry. J. Clean. Prod. 115.
[7] Hyder, A.S., Chowdhury, E., Sundstrom, A., 2017. Balancing control and trust to manage CSR compliance in supply chains. Int. J. Supply Chain Manag. 6 (2).
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[9] Koszewska, M., 2011. Social and eco-labelling of textile and clothing goods as means of communication and product differentiation. Fibres and Textiles in Eastern Europe 19 (4), 20e26.

reducing their impacts on the planet by adopting a greener behaviour[10] and influence the offer of environmentally friendly products.

Recent studies have shown how sustainability is playing an increasingly significant role in the decision-making process of consumers[11], thus increasing expectations for more sustainable products and for the behaviour of companies, increasingly called to pay attention to materials. the processes and other factors that can affect the surrounding nature, communities and environment. The role of consumers is crucial in moving to a more sustainable economy, as the environmental impacts of products largely depend on them in two phases of the product life cycle, i.e., in the use and disposal phases.

In this context, technologies for information capacity adapt to an important tool available to companies and consumers to guarantee and track their sustainability. From a consumer-centric perspective, blockchain technology has the potential to substantially transform the relationships between businesses and consumers by improving data and information transparency, improving privacy and security, and allowing brands and consumers to bypass intermediation and to form stronger relationships. To strengthen trust and transparency in digital marketing, blockchain technology can enable brands and consumers to operate in a safer and more transparent ecosystem[12]. Based on characteristics such as consistency of information, transparency and immutability, blockchain technology helps to create trust in the system itself, ensuring the adoption of honest behaviour by both parties[13]. Furthermore, blockchain technology responds to the need for privacy protection.

The role of a consumer in supporting the transformation of the textile and clothing industry towards a CE already concerns some fundamental aspects, both direct and indirect. User behaviours have effects throughout the life cycle of the textile-clothing product, thus making the consumer a key player in the supply chain.

Among the aspects of consumer behaviour that influence the extent and timing of the transformation towards the circular economy authors find active involvement in the product design process, openness to cooperation with producers and the adoption of conscious and rational behaviour in phases of purchase and use of a product, attention to methods of treating used, broken or useless textile and clothing products, as well as willingness to reduce textile waste generated by households[14]. There is also an openness to new business models, which involve activities such as the sharing of products, the purchase of a "user experience service" rather than a product itself and the adoption of conscious and rational behaviours in the purchasing and use of a product[15].

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[15] Koszewska, M., 2019, Circular economy in textiles and fashion—the role of a consumer, Processing, Manufacturing, and Design. The Textile Institute Book Series, 183-206.

2 Methodology

Below there is a detailed explanation of the methodology used in the construction of the survey, administered in five countries of the European Union and which led to the analysis of 5124 usable questionnaires. It is also specified that the results reported in the following sections concern:

- Awareness and involvement;
- Purchasing and consumption behaviours;
- Use and after-use behaviours;
- Trust in information;
- Driver to use the QR-code;
- Intention to use the QR-code;
- Attitude toward blockchain technology;
- Tensions between conflicting objectives

2.1 Context and design

A questionnaire-based survey has been developed in order to assess consumer circular behaviours relating to the textile and clothing sector and their attitude towards certain kinds of technology, in particular towards the QR-code and the blockchain technology. According to that approach, the primary aim of this research was to outline some specific consumer behaviours defining their extent, but also to understand the relative importance of the factors that influence consumers preferences, choices and actions, and to explore motivations, barriers and relations among variables. To further deepen their knowledge on the subject, authors decided to realize an experimental study to investigate cause-effect connections between different informative stimuli and the direction and the intensity of circular behaviours.

Concerning the scope of the study, the research has been conducted in five countries within the European Union that represent some of the biggest markets in the Continent, namely France, Germany, Italy, Spain, and Poland. In fact, they are among the most populated nations in Europe, having about 294 million out of 447 million people (data referring to 2020), more than half of the overall European population. Moreover, even if they belong to the same Continent, there are remarkable differences in terms of culture, habits and consumption patterns, and this can certainly lead to a difference in behaviours related to both fashion and technologies in everyday life. For instance, Mediterranean countries share common or similar social habits which greatly differ from northern countries. The variety of socio-cultural aspects of those countries, combined with their magnitude in terms of market size and population, make these countries exceptional candidates for the study.

In order to investigate consumer behaviours and the most relevant factors influencing them, a quantitative study has been chosen because it suits the need for analysing numerical data and

generalizing results obtained from the five samples selected to a wider population. The choice of the questionnaire-based survey is due to its characteristics to be one of the most effective tools to collect information in an objective and reliable way. Once the research objectives had been identified, questions have been formulated so that they could be easy to understand for the respondents, trying to minimize the systematic error that occurs when people respond to a survey. Indeed, some distortions may occur when people are asked to report on their own perceptions, attitudes, and behaviours, unconsciously trying to appear consistent and rational in their choices. Subsequently, the response options have been defined using different scale formats (Likert scale, frequency scale, semantic differential scale, true or false, ranking scales) with different anchors, in order to minimize the common method bias. Finally, the questionnaire was pre-tested and administered online to reach a broader number of respondents in the five targeted countries. In order to reduce sampling error, an external provider have been recruited to send out the questionnaire that a representative sample of about one thousand people for each country involved in the study, for a total number of 5124 questionnaires completely filled and sent back. All the representativeness parameters of the sample that have been settled a priori were satisfied: gender, age range, and geographical distribution. Moreover, the sample guaranteed a 95% interval of confidence, and a confidence level of 3,5%.

The questionnaire was divided into four sections. The first section, ***Circular fashion behaviours***, is the biggest one and encompasses four sub-categories. The first is relating to sustainable fashion awareness and involvement and aims to understand if the respondent is informed and concerned about the environmental impacts generated by the textile industry and if he/she perceives his actions as an effective instrument to tackle the current linear model of production and consumption. In the second part, respondents were asked to rate the frequency of sustainable clothing purchasing and sustainable clothing consumption (i.e., use of rental and second-hand stores/platforms). This part aims also to explore the motivations and barriers behind consumer choices. Then, use and after-use behaviours have been investigated in order to define how often respondents take care, repair and correctly dispose of garments. Lastly, the survey explored the influence of environmental information on purchasing decisions and the extent to which information is considered a trustworthy source.

The second set of variables investigated in the questionnaire relates to ***Innovation and QR-code*** and is based on the assumption that technologies can be an enabling factor to foster circular behaviours. In particular, the first questions are designed to understand if there are some factors (e.g. habit, quality, perceived usefulness and ease of use) that can be considered as drivers to the use of QR-code. The last questions aim to assess the intention to use the QR-code and, finally, the attitude toward blockchain technology.

A third cluster of variables focused on ***Tensions between conflicting objectives*** that can emerge when people are faced with a choice (for example, during clothing purchasing) and they have to satisfy personal needs and environmental objectives simultaneously. More specifically, questions intend to investigate which kind of tensions people are used to experience and if they can get them through.

Lastly, a final section on ***Socio-economic characteristics*** have been included, including gender, age, family size, income class, education level, profession and size of the built-up area.

2.2 Sample description

The questionnaire was administered to a sample of citizens, from 18 to 70 years old, living in France, Germany, Italy, Spain and Poland from the end of December 2021 to the beginning of January 2022. A total of 5124 usable questionnaires have been collected, equally distributed among the five countries selected. Respondents have been chosen randomly in order to guarantee the representativeness of targeted European populations. Moreover, when feasible, demographics have been cross-checked against available data on the Eurostat website.

Gender is equally distributed across all the countries. Even if Eurostat data show that in Europe there are 4.7 % more women than men. In particular, among the five countries included in the sample, France is the one with the wider disproportion, recording 106.9 women per 100 men, while the German population is the most proportionally distributed with 102.7 women per 100 men.

The distribution of the age classes of the sample has been examined and, comparing the five countries, distributions are almost equal to each other. France records a slight difference in the percentage of Millennials (identified as those belonging to the 18-24 age group) with 13% in the total population compared to the 10-11% of the other countries. The impact of millennials is undoubtedly relevant for this study because they are the generation with a greater sensitivity towards both environmental and technological issues, as demonstrated by previous research. Baby boomers (identified as those belonging to the age group 55-70) represent the largest percentage of the population, with the highest value recorded in Germany (32% of the population of the sample) and the lowest in Spain (28% of the population of the sample). These trends are confirmed by Eurostat data according to which the share of elderly people continues to increase in Europe, and France is among the countries with the highest shares of young people in the total population. On the contrary, Eurostat data shows that Italy is the country with the highest share of elderly people.

In Germany, families consisting of one or two people are more numerous than those with multiple family members (65% of the population of the sample). By contrast, in Poland, Italy and Spain families composed of a single person are 11%, 12% and 13% respectively. In addition, Italy and Poland record the highest percentage of families composed of four or more members (32% in the total sample population). Except for Germany, the majority of the population is made up of families ranging from 2 to 3 members (about 60% in the total).

Concerning the distribution of wealth, respondents were asked to declare their class (from very low to very high) instead of their income, as it is a more precise measure that avoids errors or missing answers due to privacy reasons. Wealth looks almost well distributed among the citizens and, technically, it is “normally distributed” among the countries and within each country. With a percentage that ranges from 35% in France to 52% in Spain, the middle-class is the largest cluster of people in all the five countries. Indeed, people who declared to belong to the highest or the lowest class represent a small minority, although data revealed some slight differences among countries. France is the nation with the lowest percentage of wealthy citizens, since people belonging to the very low class are 6% in the total population (the highest value among the countries) while people belonging to the very high class are only 1%. On the other hand, Poland is the first ranked for wealth as it results the country with the smaller percentage of very low-status citizens (1%) and the larger percentage of very high-status citizens (4%) among the countries.

Finally, it has been noticed that the average level of education is relatively high as, in every country, high school graduated citizens represent the larger group (about 50%). The average of people having a graduate degree, or a postgraduate qualification stands at 28%, with the highest value recorded in Spain (37%) and the lowest in Germany (19%).

Table 1: Sample description

		Poland		Germany		France		Spain		Italy	
		N	%	N	%	N	%	n	%	N	%
Gender	Men	520	50,73%	503	49,41%	514	50,79%	510	50,20%	530	50,33%
	Woman	505	49,27%	515	50,59%	498	49,21%	506	49,80%	523	49,67%
Age class	18-24	105	10,24%	109	10,71%	128	12,65%	107	10,53%	107	10,16%
	25-34	205	20,00%	194	19,06%	181	17,89%	169	16,63%	169	16,05%
	35-44	232	22,63%	176	17,29%	192	18,97%	226	22,24%	208	19,75%
	45-54	182	17,76%	213	20,92%	207	20,45%	231	22,74%	250	23,74%
	55-70	301	29,37%	326	32,02%	304	30,04%	283	27,85%	319	30,29%
Family members	1	113	11,02%	308	30,26%	228	22,53%	134	13,19%	126	11,97%
	2	288	28,10%	359	35,27%	351	34,68%	300	29,53%	253	24,03%
	3	300	29,27%	186	18,27%	206	20,36%	317	31,20%	335	31,81%
	4	190	18,54%	101	9,92%	143	14,13%	198	19,49%	229	21,75%
	5+	134	13,07%	64	6,29%	84	8,30%	67	6,59%	110	10,45%
Class	Very low	13	1,27%	30	2,95%	59	5,83%	17	1,67%	28	2,66%
	Low	46	4,49%	61	5,99%	149	14,72%	40	3,94%	75	7,12%
	Low-middle	213	20,78%	209	20,53%	176	17,39%	224	22,05%	238	22,60%
	Middle	483	47,12%	390	38,31%	357	35,28%	527	51,87%	536	50,90%
	Middle-high	174	16,98%	226	22,20%	190	18,77%	163	16,04%	142	13,49%
	High	49	4,78%	53	5,21%	53	5,24%	26	2,56%	9	0,85%
	Very high	36	3,51%	28	2,75%	14	1,38%	10	0,98%	8	0,76%
	Not specified	11	1,07%	21	2,06%	14	1,38%	9	0,89%	17	1,61%
Education	Elementary school or no education	35	3,41%	12	1,18%	46	4,55%	34	3,35%	2	0,19%
	Middle school	164	16,00%	145	14,24%	79	7,81%	73	7,19%	84	7,98%
	High school without obtaining a degree	65	6,34%	59	5,80%	74	7,31%	77	7,58%	100	9,50%
	High school	340	33,17%	504	49,51%	342	33,79%	315	31,00%	440	41,79%
	Bachelor without obtaining a degree	79	7,71%	106	10,41%	244	24,11%	141	13,88%	132	12,54%
	Bachelor's degree or more	342	33,37%	192	18,86%	227	22,43%	376	37,01%	295	28,02%

3 Circular Fashion behaviours

Circular products are those that operate within the circular economy model i.e., those products that have reduced or completely no need for virgin resources and are designed with the end of their life in mind, made without the use of particular chemical substances, where priority is given to recycled raw materials, with packaging that minimizes the impact on the environment. Circular economy also involves the introduction of principles such as sustainable design strategies, zero-waste design, product-life extension, resource recovery, repair and remanufacture services. Nowadays, green and circular products are becoming abundant in many sectors of our economy as consumer demand in on the rise.

In the past sustainable consumption choices could be associated to gender, economic availability, and education levels[16]. However, nowadays it is more difficult to link this type of behaviour to the socio-economic characteristics of consumers as other factors, and trends, come into play, alongside the increasing presence and advertising for green products. Consumer perception is becoming more important in the textile industry[17]. This opens up a further problem for consumers, namely the difficulty of choosing products and brands that do have the reduced environmental impacts that they claim to have. Differing from manufactures, consumers often lack the necessary information to assess the environmental characteristics of products.

The impossibility of consumers to be fully aware of the environmental attributes of products or brands leads to an asymmetric distribution of information[18]. Such asymmetry can harm both consumers and producers, and society as a whole[19]. This may be due to the subsequent creation of market inefficiencies[20], where consumers are no longer capable of identifying green products and distinguishing them from traditional ones, thus making it more difficult to identify the real environmental benefits of such products[21]. This outcome is problematic for consumers because it leads to sub-optimal purchasing decisions, in particular for people who would prefer to buy products with reduced environmental impacts[22].

Studies on consumer behaviour have shown there is a misalignment between consumer perceptions about the environmental performance of products and their real performance based on life cycle assessments. In this respect, not only do producers need to provide information, but consumers need to seek that information that can guide them in their purchasing choices. Consumer propensity to gather additional information on the environmental impacts of green products along their life cycles

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may be particular important to understand their environmental benefits, which may not be always immediately perceived. Moreover, from a circular economy perspective, knowing how consumers interact with their products both in the use and disposal phases is an important aspect that needs further attention.

As previously introduced, the initial section of the questionnaire is addressed to investigate the set of variables related to ***Circular Fashion behaviours*** adopted by European consumers among the five countries involved in this study. Firstly, awareness about fashion-related impacts on social-ecological systems and perceived effectiveness of individual actions are examined. Further, the predisposition of respondents to adopt sustainable clothing purchasing behaviours, sustainable clothing consumption behaviours (i.e., use of rental and second-hand stores/platforms), sustainable use and after-use behaviours is investigated. Lastly, authors explored the influence of environmental information on purchasing decisions and the extent to which information is considered a trustworthy source.

3.1 Awareness and Involvement

In the following paragraphs, results on sustainable fashion awareness, perception of self-effectiveness in sustainable fashion and the relative importance of clothing attributes are reported. These variables are intended to investigate personal beliefs and attitudes underpinning sustainable behaviours, based on the social-psychological assumption that ideas, convictions and values shape people's attitudes and affect their decision-making process.

3.1.1 Sustainable fashion awareness

Sustainable awareness related to fashion encompasses both environmental and social aspects. More specifically, the textile and fashion industry is linked to social issues like harsh and dangerous working conditions, child-labor, unfair wages but also to environmental problems, such as the negative impacts generated on ecosystems during production, distribution, consumption and disposal of clothing. Moreover, the traditional linear model, that follows the "take-make-dispose" approach, together with the current system established by fast fashion, have led to a large consumption of virgin resources used to produce clothes, which are bound to end their short life in landfill, generating a big waste of not recycled garments.

The extent to which an individual is concerned about these social and environmental issues can influence his consumption choices[23] [24]. In fact, environmental concern underlines a sense of urgency and apprehension that can be mitigated through the activation of specific behaviours aimed at achieving a more sustainable model of production and consumption. Additionally, consumers' knowledge of sustainability-related issues is positively associated with their attitude towards sustainable apparel brands with transparent practices[25] [26] [27].

From the study, it emerges, at the aggregate level, that the majority of respondents (about 75%) is aware of the amount of waste generated by fast fashion system and believes that reusing garments through recycling can help to prevent such a huge waste of resources (Figure 1). Social problems and environmental negative impacts related to clothing sector are known by the 73% and the 68% of respondents, respectively. A slightly lower share of consumers (64%) declares to know the implications linked to the current linear model of fashion production and consumption.

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[26] Pookulangara, S., Shephard, A. (2013). Slow fashion movement: Understanding consumer perceptions—An exploratory study. Journal of Retailing and Consumer Services, 20(2), 200-206.
[27] Bhaduri, G, & Ha-Brookshire, JE. (2011). Do Transparent Business Practices Pay? Exploration of Transparency and ConsumerPurchase Intention. Clothing and Textiles Research Journal, 29(2), 135149

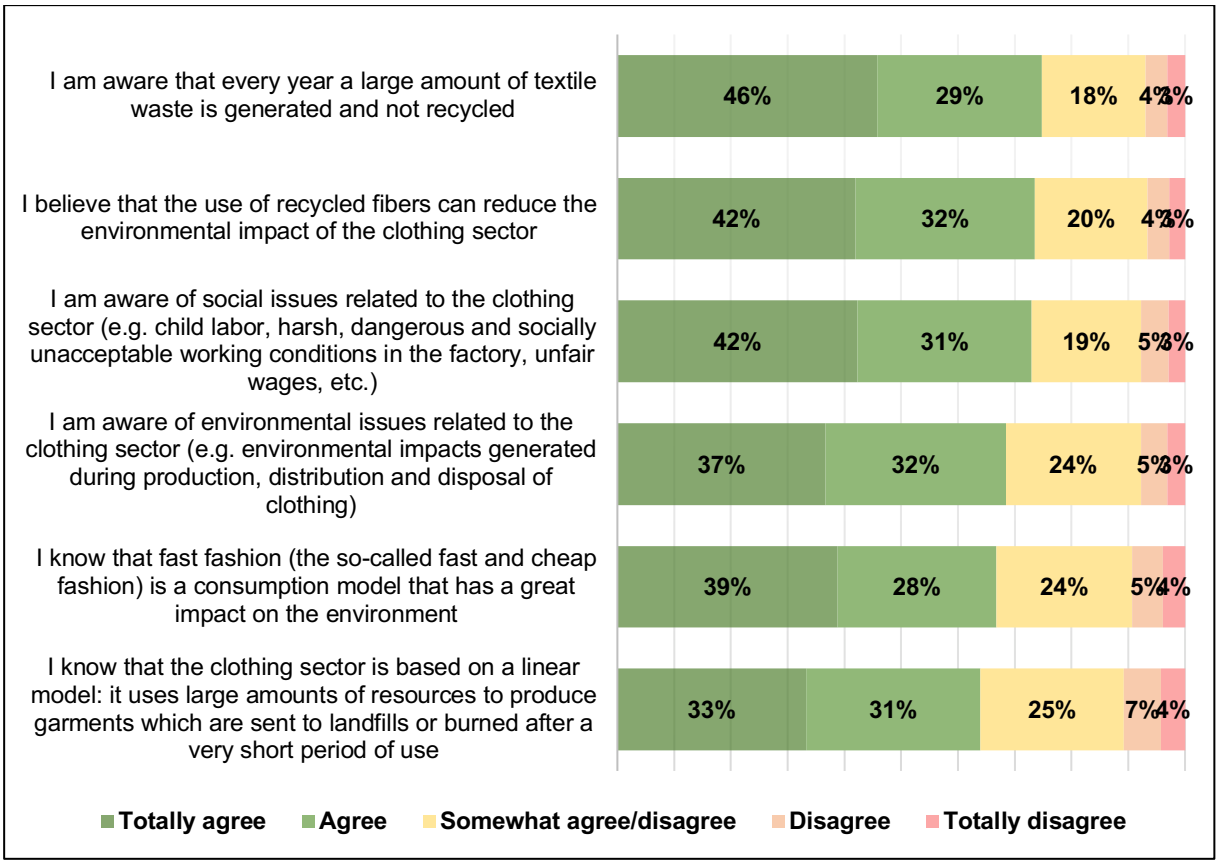


Figure 1 Sustainable fashion awareness (overall)

Figure 2 reports the same set of questions concerning sustainable fashion awareness but broken down by country. Spanish respondents highlight the highest percentage of "*Totally agree*" and "*Agree*" answers (74% averaging the six questions), meaning that Spain is the most aware country of sustainability-related problems in fashion industry. On the contrary, Italian and German consumers score the lowest percentage of agreement (on average 68%). France and Poland position themselves on a mid-level of awareness with, on average, the 71% of "*Totally agree*" and "*Agree*" answers. In conclusion, there is a fairly high level of awareness in each country, with a percentage of concerned consumers ranging between 74% and 68%.

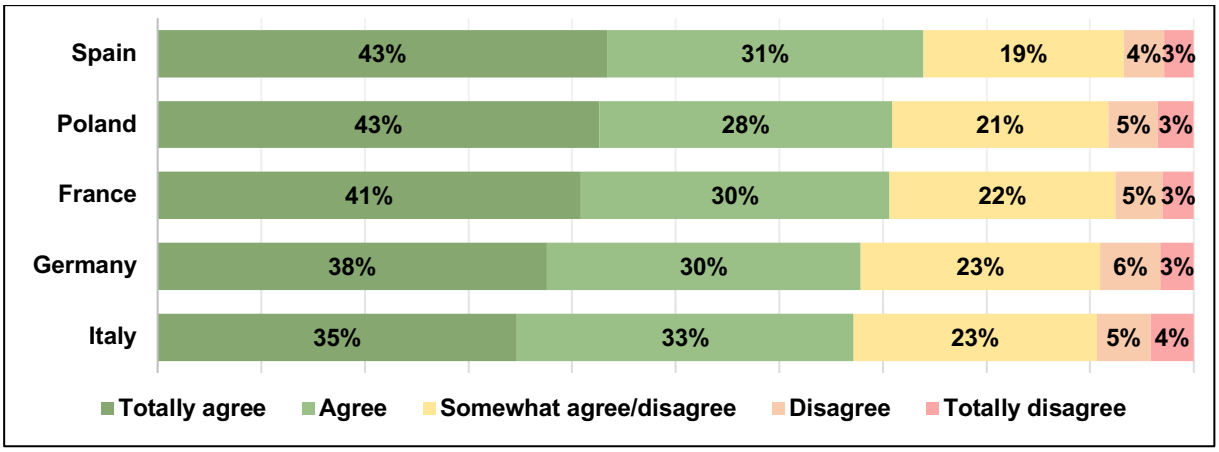


Figure 2 Sustainable fashion awareness (by country)

3.1.2 Perception of self-effectiveness in sustainable fashion

People aware of environmental and social problems related to the textile and clothing industry could not act in a consistent way, that is to say, awareness is a necessary but not sufficient condition for enacting sustainable behaviours. In literature, the gap between environmental concern and sustainable behaviour can be partly explained with the concept of the **Perceived Consumer Effectiveness** (PCE), namely, the individual perception of being able to affect the occurrence or aversiveness of an event thorough his own actions. As postulated by the Theory of Planned Behaviour[28], perceived behavioural control, together with personal attitudes and social norms, is a key factor in determining behaviours. In fact, PCE was found to directly affect environmentally and socially sustainable consumption[29] [30] [31] [32]. For this reason, this section is designed to investigate the extent to which consumers believe to be able to influence sustainability-related problems in fashion industry through their purchasing and consumption choices.

In Figure 3, single items that describe PCE in sustainable fashion are shown at the aggregate level. The 80% agree that it is worth disposing of end-of-life clothing properly. Another important share of consumers believes that it is important to extend product life by choosing long-lasting clothes (77%) or by giving a new function to those that are no longer used (74%) – e.g., making rags or tote bags. The 73% declare that buying clothing made from recycled materials can have a positive impact on the environment, while the 70% think that to make a difference everyone should tackle the source of the

[28] Ajzen, I., (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes. Environment and Behavior, 50 (2), 179-211

[29] Kang, J., Liu, C., & Kim, S. H. (2013). Environmentally sustainable textile and apparel consumption: the role of consumer knowledge, perceived consumer effectiveness and perceived personal relevance. International Journal of Consumer Studies, 37(4), 442-452.

[30] Vermeir, I., & Verbeke, W. (2006). Sustainable food consumption: Exploring the consumer "attitude–behavioral intention" gap. Journal of Agricultural and Environmental ethics, 19(2), 169-194.

[31] Kim, Y., & Choi, S. M. (2005). ASSOCIATION FOR CONSUMER RESEARCH Antecedents of Green Purchase Behavior: an Examination of Collectivism, Environmental Concern, and Pce Antecedents of Green Purchase Behavior: An Examination of Collectivism, Environmental Concern, and PCE. 592 Advances in Consumer Research, 32, 592–599

[32] Webb, Deborah J., Mohr, Lois A. and Harris, Katherine E., (2008), A re-examination of socially responsible consumption and its measurement, Journal of Business Research, 61(2), p. 91-98.

problem reducing their purchases. Finally, renting is considered the most useless behaviour (57%) to tackle environmental issues.

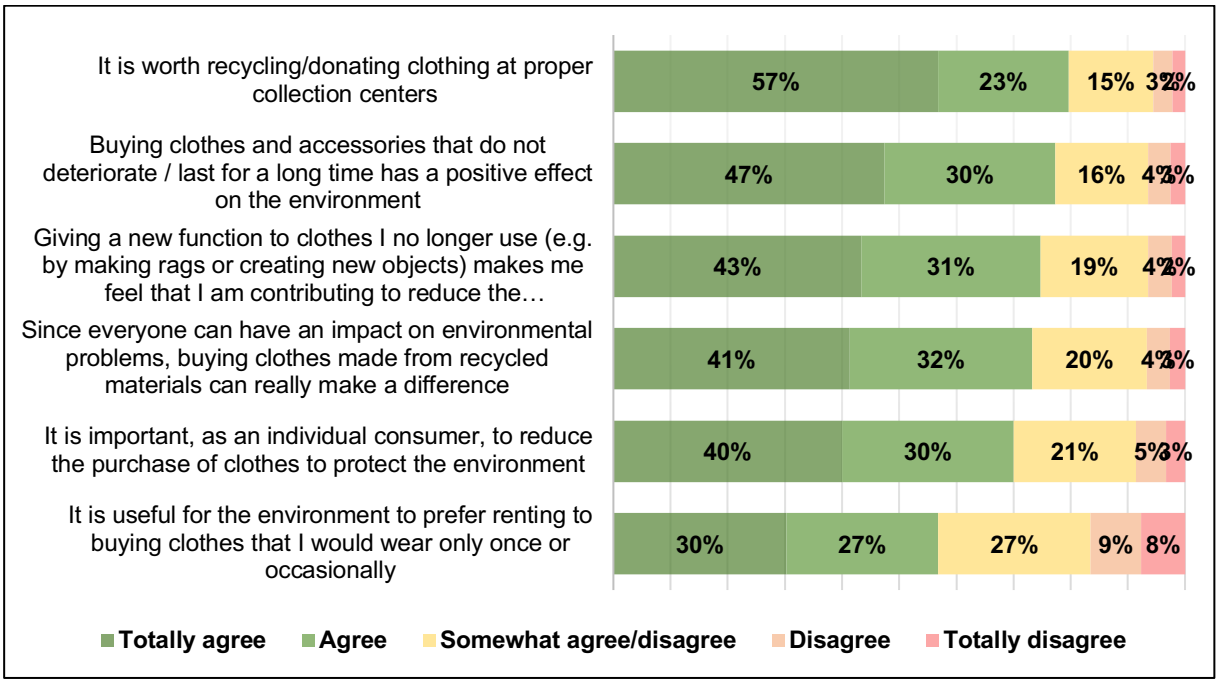


Figure 3 PCE in sustainable fashion (overall)

Looking at the results of PCE by country, Figure 15 does not show remarkable differences among the five European countries. Poland rates the highest (with the 75% of "*Totally agree*" and "*Agree*" answers on the total), followed by Spain (74%), France (73%), Italy (71%) and Germany (67%), which deviates the most from Poland score.

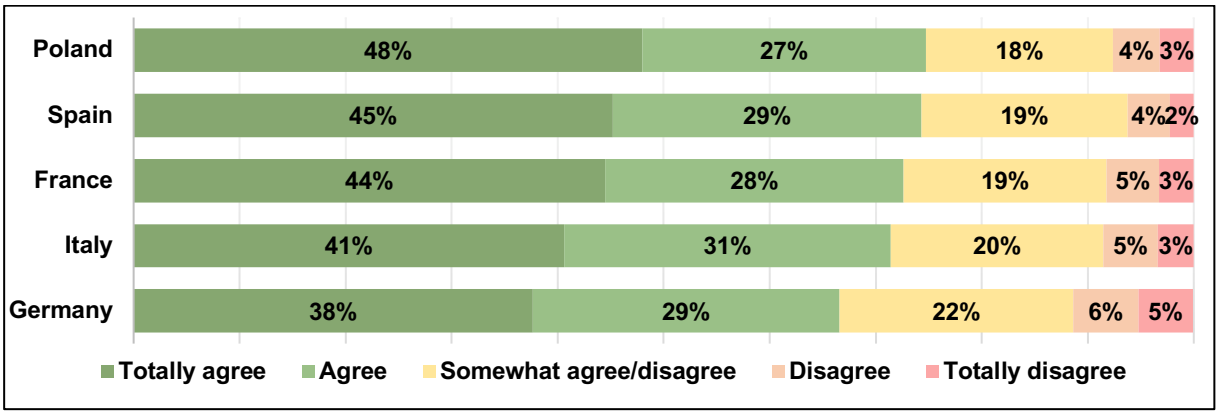


Figure 4 PCE in sustainable fashion (by country)

3.1.3 Product-related attributes

Product-related attributes are considered as tangible and intangible characteristics of the product, which are related to product's features and performance like product design, quality, aesthetics and price. Each feature can fulfil different consumers' needs, such as physical necessities for protection and functionality, emotional need of showing their personality and psychological need of creating their identity[33] [34] [35]. The wide range of attributes related to clothing – linked with as many personal needs – makes sustainable consumption decisions very hard because consumers are not often willing to compromise their other benefits to be environmentally friendly[36] [37]. With a view to explore consumers' preferences, respondents have been asked to rank the product-related attributes considered more important when they purchase clothes and accessories (Figure 5).

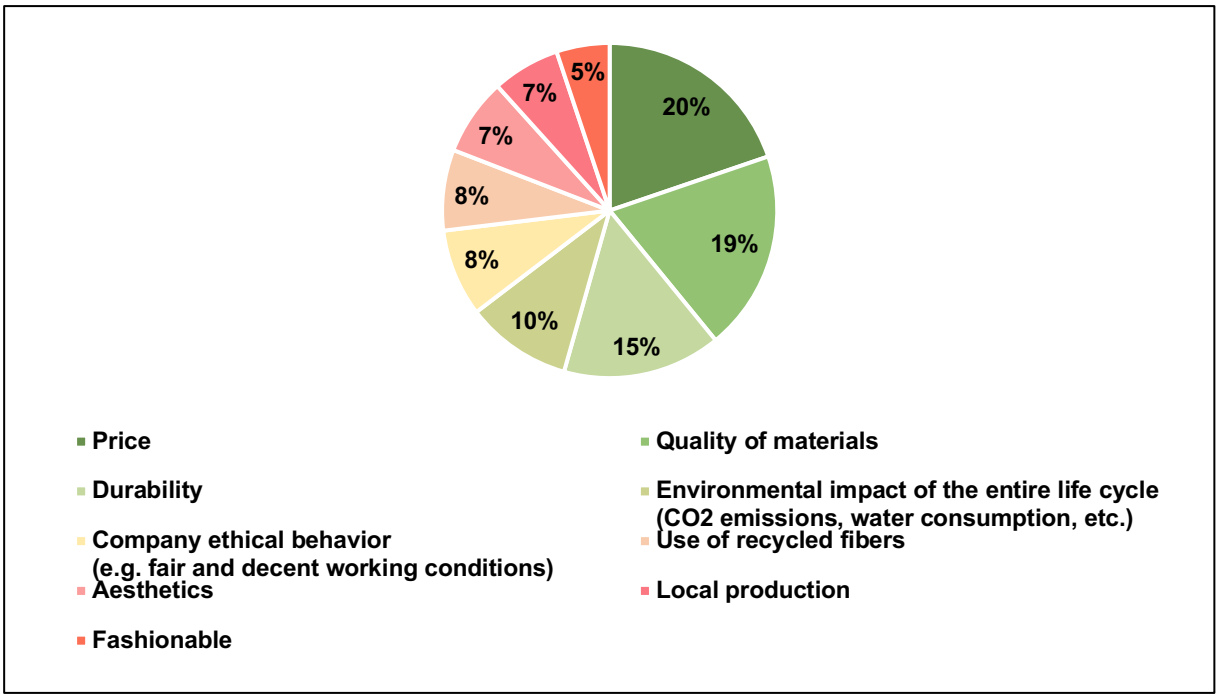


Figure 5 Importance of clothing-related attributes (overall)

Respondents have ranked their top three attributes out of the nine proposed: aesthetics, fashionable, quality of materials, durability, price, use of recycled fibres, environmental impact along the entire life cycle (CO2 emissions, water consumption, etc.), local production and company ethical behaviour. Figure 5 shows aggregated results obtained by calculating a weighted average for each attribute according to its ranking position. At the aggregate level, the most important characteristics are related

[33] Niinimäki, K. (2010). Eco-clothing, consumer identity and ideology. *Sustainable development*, *18*(3), 150-162.
[34] Kaiser, S.B. The social psychology of clothing: symbolic appearances in context. New York: Macmillan, 1990
[35] Max-Neef, M. A. Human scale development. New York and London: The Apex Press, 1992
[36] Ginsberg, J. M. and Bloom, P. (2004). Choosing the right green marketing strategy. MIT Sloan Management Review, 46(1), 79-84.
[37] Joergens, C. (2006), "Ethical fashion: myth or future trend?", Journal of Fashion Marketing and Management, 10(83),360-371.

to economic factors like *Price* (20%), as well as to product features like *Quality of materials* (19%) and *Durability* (15%). Although quality and durability are critical factors to enhance life extension of clothing, attributes directly linked to environmental aspects, that is *Impact of the entire life cycle* and *Use of recycled materials,* are ranked fourth and sixth, collectively selected by the 18% of respondents. With regards to social issues, *Company ethical behaviour* and *Local production* are in fifth and eighth position, respectively, chosen by the 15%. Finally, attributes linked with hedonistic needs and social image result like those less impactful in decision-making process, that is, *Aesthetics* (in seventh position) and *Fashionable* (in the last position), together amount to 12%.

	Overall	Germany	Spain	France	Italy	Poland
Price	20%	0%	-1%	2%	0%	-1%
Quality of materials	19%	3%	-2%	-2%	0%	1%
Durability	15%	-4%	1%	0%	-2%	5%
Environmental impact of the entire life cycle (e.g., CO2 emissions, water consumption)	10%	1%	1%	-2%	1%	-2%
Company ethical behaviour (e.g., fair and decent working conditions)	8%	1%	1%	-1%	0%	-1%
Use of recycled fibres	8%	-1%	0%	0%	0%	1%
Aesthetics	7%	-4%	0%	3%	2%	-1%
Local production	7%	0%	0%	1%	1%	-1%
Fashionable	5%	4%	-1%	0%	-1%	-2%

Figure 6 Importance of clothing-related attributes (countries' deviation from average)

Observing Figure 6, countries don't deviate significantly from the average results. In fact, *Price, Quality of materials* and *Durability* always appear as the top three choices in each country. Nevertheless, there are some small variances: German consumers place *Quality of materials* (22%) before *Durability* (11%), while French people pay much more attention to price (22%) rather than *Quality* (17%) and, lastly, Polish respondents declared to look for more *Durable* clothing (20%) with respect to other countries. Other remarkable deviations concern *Environmental impact*, that results less significative for French and Polish consumers (8%), *Aesthetics*, which appears less important for German (3%) but more relevant for French (10%) and Italian (9%) people and, finally, *Fashionable* clothing are much more preferred by German respondents (9%) and less by Polish consumers (3%).

3.2 Purchasing and consumption behaviours

In the last decades, consumer habits have changed rapidly. They are less likely to choose products and services just taking into account variables like brand loyalty or price, instead they try to make purchase decisions aligned with their values, preferring more sustainable goods from an environmental, ethical and social point of view[38] [39]. This section is designed to rate the frequency of sustainable clothing purchasing and sustainable clothing consumption (i.e., use of rental and second-hand stores/platforms) adopted by European consumers, but also to investigate the motivations and barriers behind consumers' choices and their willingness to pay for circular clothing. In the following paragraphs, results are reported and debated.

3.2.1 Sustainable fashion purchasing

As agent of change, consumers can greatly affect organizations' production decisions through their purchasing choices, shifting market demands towards greener and more sustainable goods[40]. Together with policymakers, investors, social movements and mass-media, consumers are one of the most powerful drivers to lead companies towards a sustainable transition. However, as the number of sustainable products increases, there is a marked diversity in terms of sustainable features. In this question, several items have been deployed trying to encompass all kind of clothing sustainable characteristics, such as the environmental impact of production processes, the nature of raw materials, the packaging design, as well as social aspects like local production and working conditions.

As shown in Figure 7, a pretty large number of respondents pays attention to environmental characteristics. In fact, the 62% (considering "*Often"* and *"Very often/Always"* answers) prefers clothes with natural fibres or fabrics produced through low environmental impact methods, such as the organic cotton (50%), while the 57% chooses long-lasting clothes of the highest quality available. It should be pointed out that these kinds of behaviours prove also a personal benefit in terms of health or economic advantages. In addition, there is a particular attention to the packaging. Indeed, the majority of respondents declares to "*Often"* or *"Very often/Always"* buy clothes without wrapping/packaging (60%) or with sustainable wrapping/packaging (48%). Considering social aspects, just under half of consumers avoid buying garments made in countries with unfair working conditions or exploitation (47%) or buy locally produced clothing (46%), and only the 38% choose garments with labels that demonstrate the ethical behavior of the manufacturer. Less frequently adopted behaviors (with the 33% of "*Often"* and *"Very often/Always"* answers) relate to purchasing of clothes made with recycled materials or indicating a low usage of water.

[38] Gilg, A., Barr, S., Ford, N., 2005. Green consumption or sustainable lifestyles? Identifying the sustainable consumer. Futures 37, 481–504.

[39] Griskevicius, V., Tybur, J. M., Delton, A. W., & Robertson, T. E. (2011). The influence of mortality and socioeconomic status on risk and delayed rewards: A life history theory approach. Journal of Personality and Social Psychology, 100(6), 1015–1026.

[40] Steg, L., Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *Journal of Environmental psychology*, 38, 104-115.

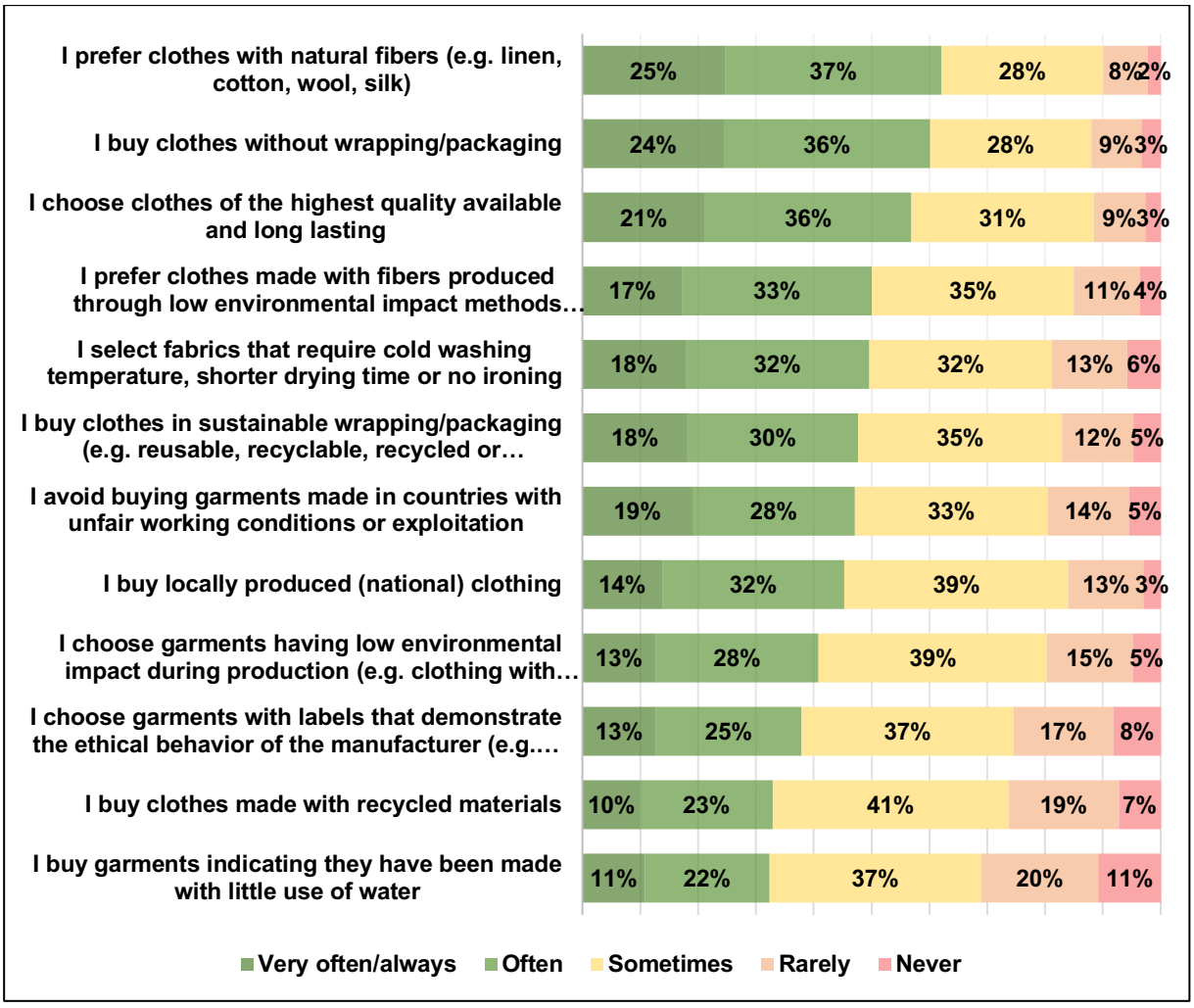


Figure 7 Sustainable fashion purchasing (overall)

In Figure 8 and 9, it is reported the sustainable fashion purchasing behaviour broken down by country, that generally follows a similar trend compared to the behaviour emerged in the aggregated results. However, in their clothing purchasing decisions, respondents from Italy, Poland and Spain consider environmental impacts and social aspects from 10% to 20% more than Germany and France consumers. In particular, the highest difference in percentage is about the frequency to buy long lasting and high-quality garments, as well as ethically and locally produced clothing. On the contrary, respondents from all the countries give a particular importance to buy clothes without or in sustainable wrapping/packaging.

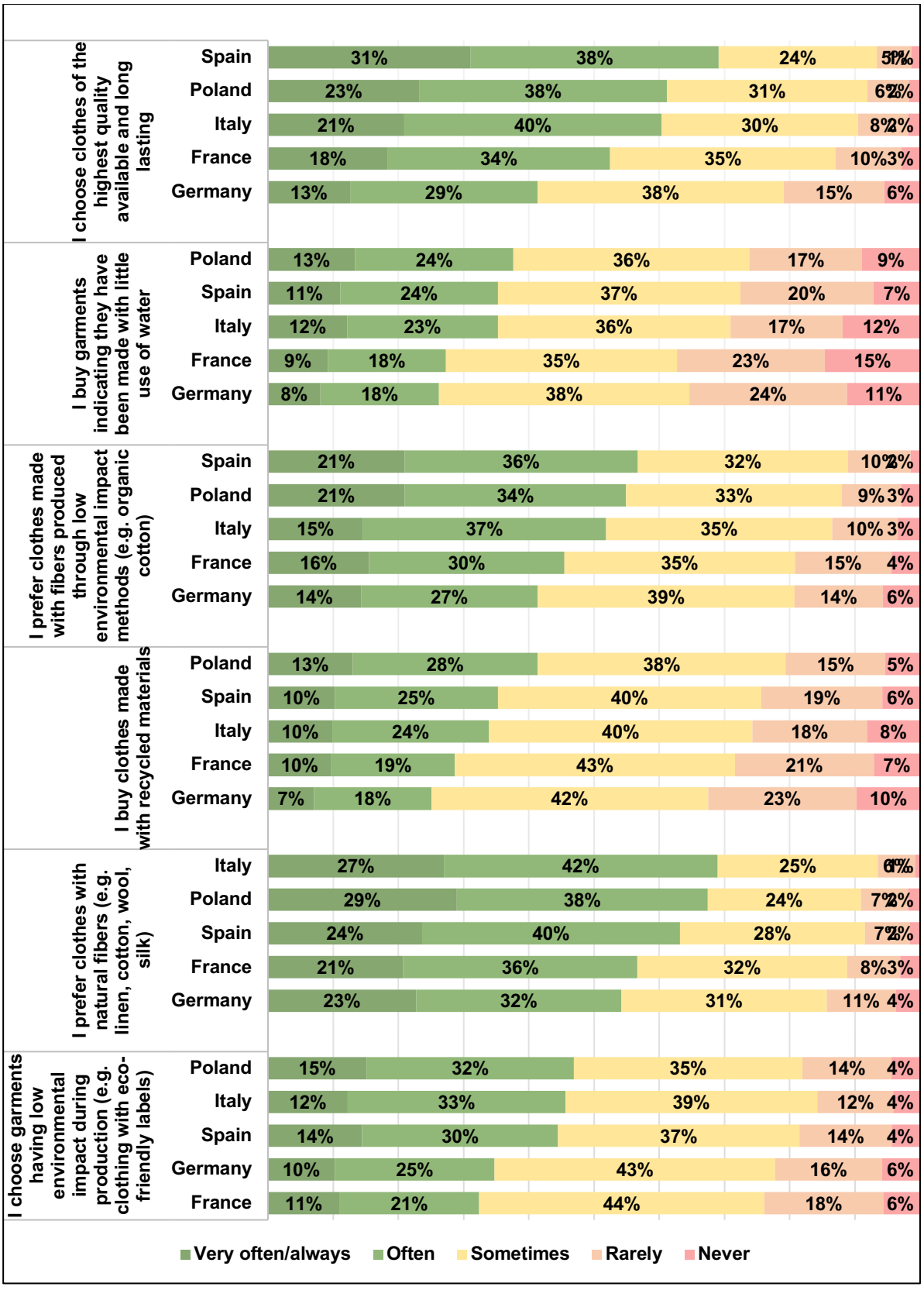


Figure 8 Sustainable purchasing behaviour (by country – first part)

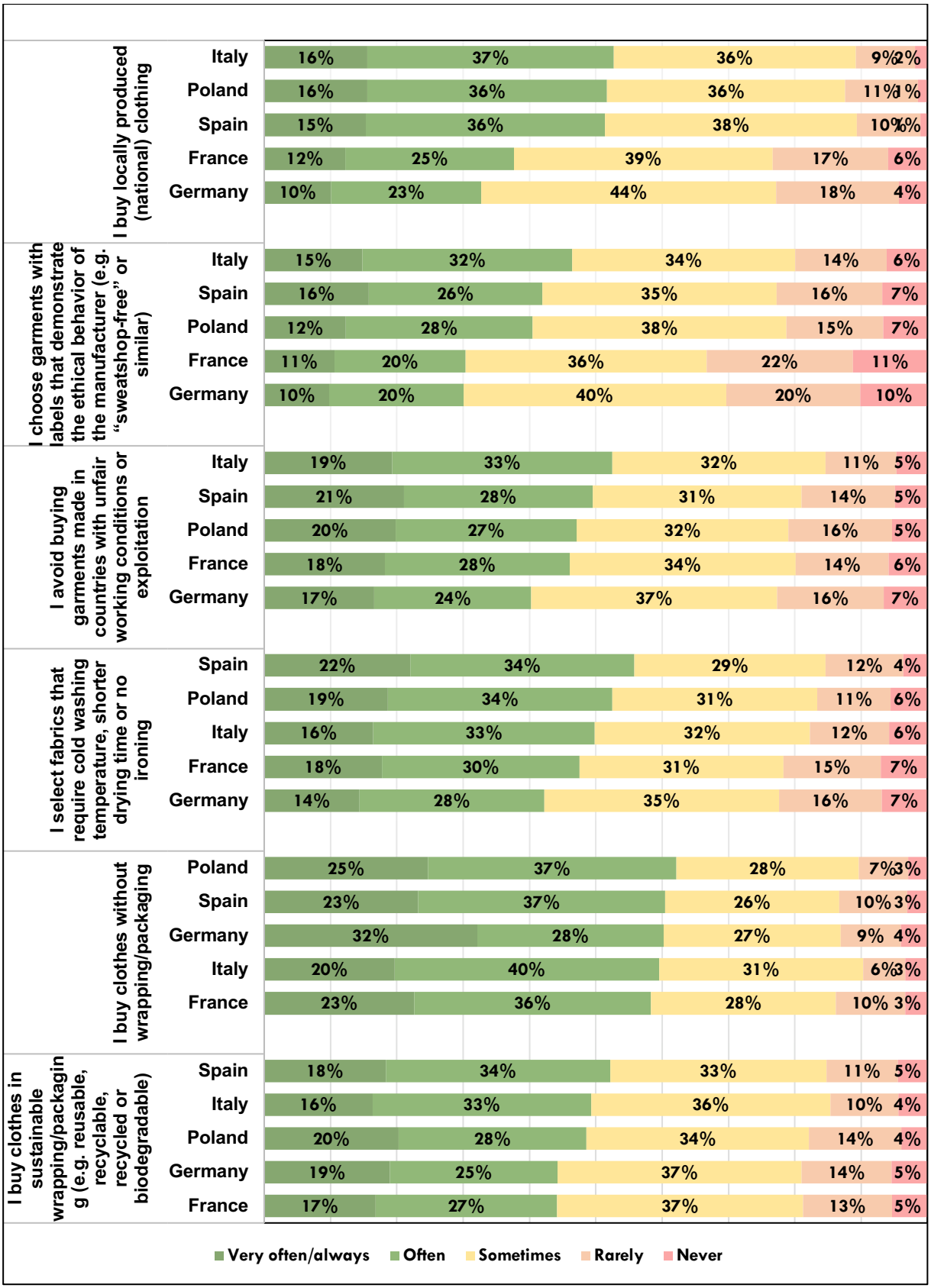


Figure 9 Sustainable purchasing behaviour (by country – second part)

3.2.2 Willingness to pay

The price of sustainable goods is a controversial issue because, in certain cases, the sustainable option is cheaper (as for remanufactured technological products)[41], whereas, in other cases, it is the most expensive alternative (as for electric vehicles)[42]. Looking at the previous question, only a few respondents (33%) affirm to purchase clothes made with recycled materials, even if they are starting to recognize the additional value of the use of secondary raw materials in the production of a new garment.

Figure 10 reports the willingness to pay, at the aggregate level, for a sweatshirt made with recycled fibres, considering the cost of a sweatshirt made with virgin fibres is about € 40. The majority of respondents (about 54%) is willingness to pay more compared to the product with virgin fibres: the 51% of respondents would pay from € 41 to € 60 and the 3% would pay from € 60 to € 70. Nevertheless, about the 39% of respondents expressed their willingness to pay much less (from € 20 to € 39) than the cost of a sweatshirt made with virgin fibres and, lastly, the 7% of consumers would pay the same.

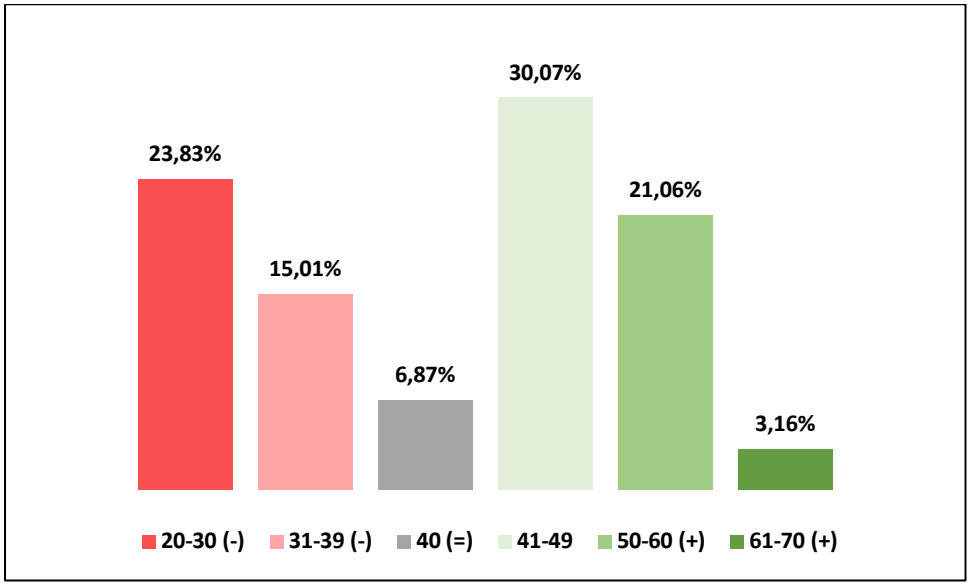


Figure 10 Willingness to pay for sweatshirt made with recycled fibres

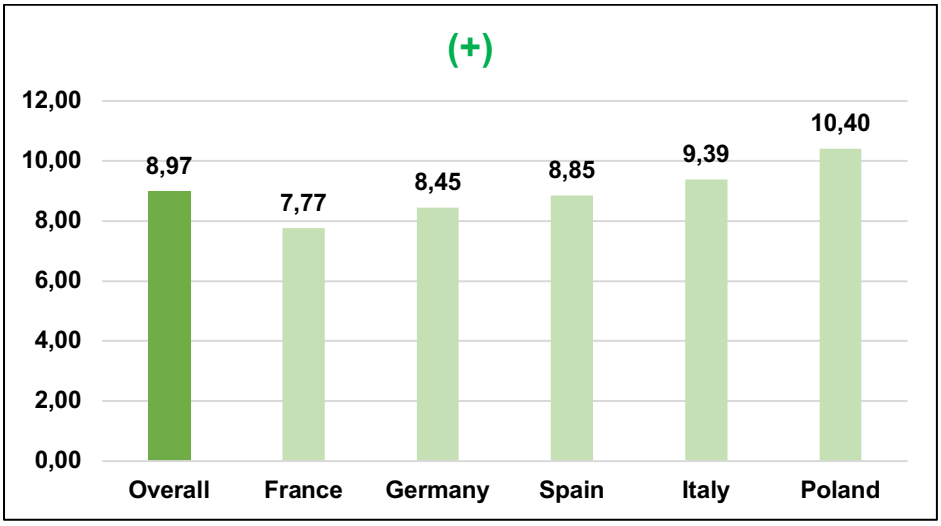
In Figure 11 it is reported a deep dive about the willingness to pay more for the sweatshirt made with recycled fibres for each single country and overall. More in details, it can be seen that, on average, the respondents expressed a willingness to pay a plus of € 9 than the price of a traditional sweater. In all the countries, it can be observed that there is an important share of respondents that are willing to pay more. In particular, the 67% of German respondents are willing to pay, on average, about € 8.5 more. The 58% of Italian consumers express a willingness to pay more of € 9.4, while the 54% of Polish

[41] Jimenez-Parra, B., Rubio, S., Vicente-Molina, M.-A. (2014). Key drivers in the behavior of potential consumers of remanufactured products: a study on laptops in Spain. Journal of Cleaner Production, 85, 488-496

[42] He, X., Zhan, W. (2018). How to activate moral norm to adopt electric vehicles in China? An empirical study based on extended norm activation theory. Journal of Cleaner Production, 172, 3546-3556.

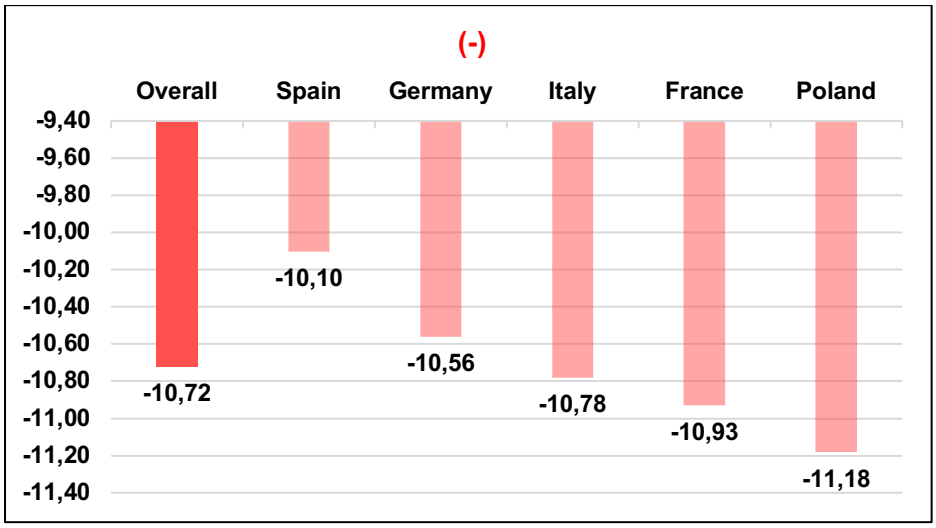
people of € 10,4 and, finally, the 53% of Spanish and French respondents of € 8.9 and € 7.8, respectively.

On the opposite, in Figure 12 is reported the willingness to pay less for the sweatshirt made with recycled fibres for each single country and overall. More in details, it can be seen that, on average, the respondents expressed a willingness to pay a minus of € 10.7 than the price of a traditional sweater. In particular, Spain reports the major percentage of respondents (42%) willing to pay around 10 € less and another important percentage of Polish respondents (41%) express the will to spend € 11.2 less, recording both the highest and the lowest value deviating from the initial price of € 40 (Figure 11 and 12).



	Average value, € (+)	€ (+)	Sample (%)
Overall	48,97	+8,97	54%
France	47,77	+7,77	53%
Germany	48,45	+8,45	67%
Spain	48,85	+8,85	53%
Italy	49,39	+9,39	58%
Poland	50,40	+10,40	54%

Figure 11 Details of willingness to pay for the sweatshirt made with recycled materials (+)



	Average value, € (-)	€ (-)	Sample (%)
Overall	29,28	-10,72	39%
Spain	29,90	-10,10	42%
Germany	29,44	-10,56	38%
Italy	29,22	-10,78	39%
France	29,07	-10,93	35%
Poland	28,82	-11,18	41%

Figure 12 Details of willingness to pay for the sweatshirt made with recycled materials (-)

3.2.3 Sustainable fashion consumption

With respect to consumption, circular economy promotes the implementation of new models based on sharing and collaborative consumption approaches[43]. In fact, increasing the average number of times clothes are worn is one of the most effective ways to capture value and design out waste and pollution in the textiles sector. In the apparel system, sustainable consumption models can be the following: the rental model (a rental of garments for a short time period); the re-commerce model (the recovery and resale of garments by the original retailer); the second-hand buying model (the purchase of used garments); the swapping model (the exchange of garments through specific modes and places).

Observing the trend emerging from the study, it appears that sustainable fashion consumption is still little adopted among consumers (Figure 13). The most frequent behaviours involve the modification/adaptation of old clothes to create new ones (29%), the purchase of modern second-hand clothing (29%), the purchase of clothes made with reused materials (28%) and the swapping

[43] Ellen MacArthur Foundation (2017). A new textiles economy: redesigning fashion's future

(26%). A remarkable reduction is registered for buying original vintage clothing (16%) and renting clothes (14%), that are behaviours never adopted by the 40% and 55% of respondents, respectively.

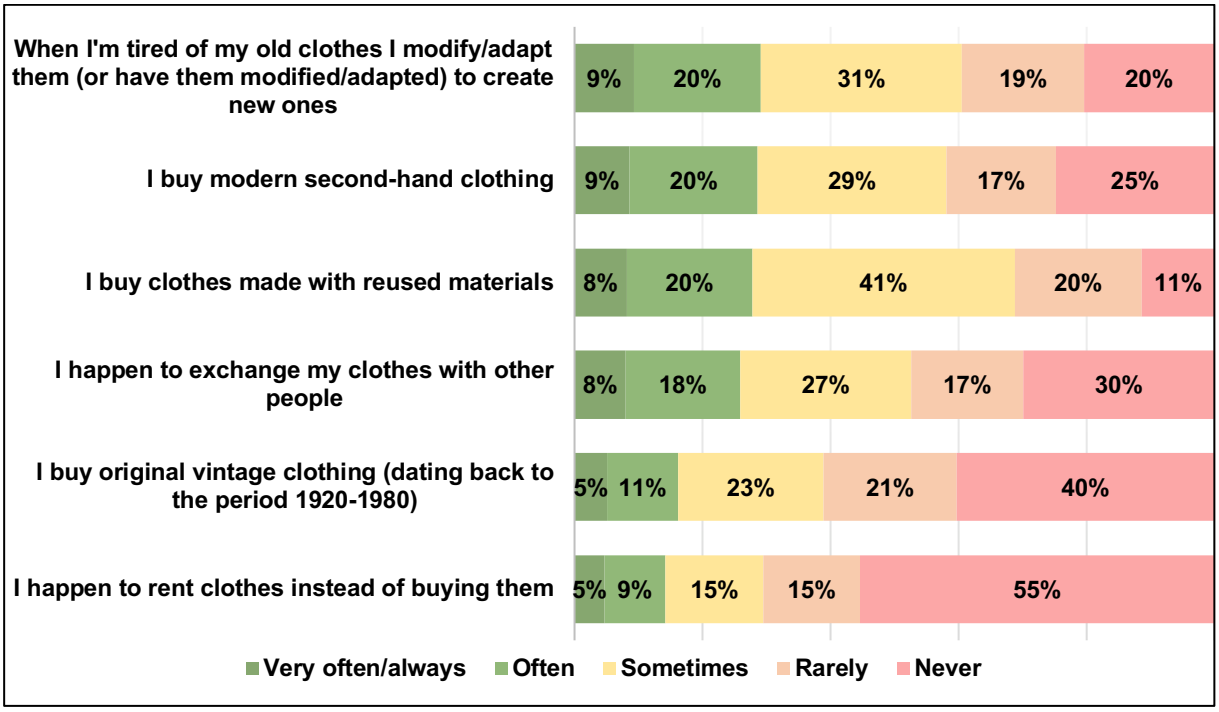


Figure 13 Sustainable fashion consumption (overall)

Figure 14 reports the sustainable fashion consumption by country. The scenario described is coherent with the overall representation debated above. The most of respondents place themselves in a mid-level with mainly "*Sometimes"* answers for buying upcycled garments, buying second-hand and modifying old clothing, while "*Never*" answers prevail in the other items, such as renting and swapping. The majority of respondents from Germany and France has never rent clothes (64% and 60% of respondents) and never bought vintage pieces (47% and 43%). An interesting result came from Poland: it is the most virtuous country in comparison to others. In particular, Poland stands out for "O*ften"* and *"Very often/always"* answers for buying modern second-hand clothing (42%).

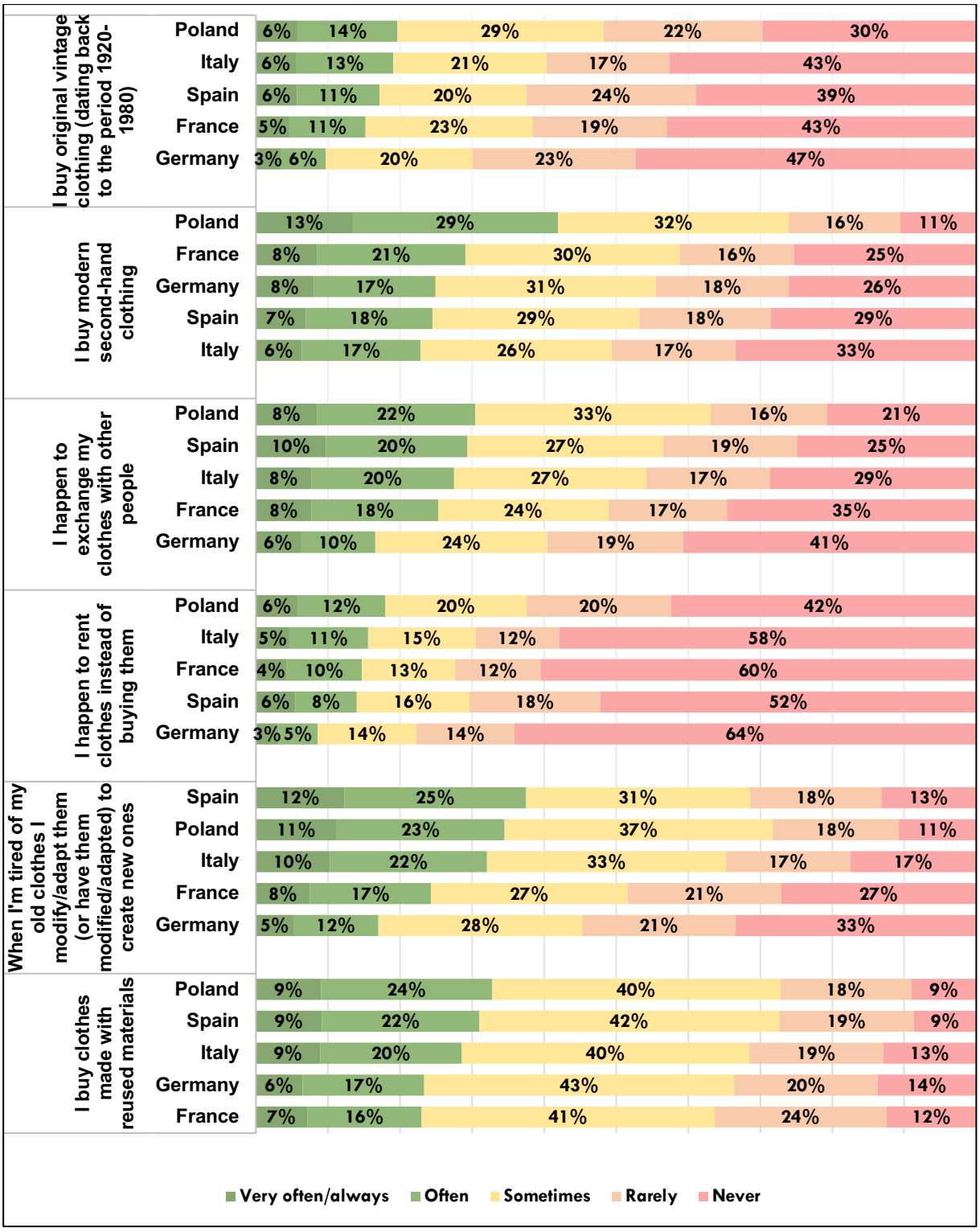


Figure 14 Sustainable fashion consumption (by country)

3.2.4 Motivation to buy/use sustainable fashion

Consumption value – defined as "*the cognitive expression of the most basic and fundamental desires and goals that consumers want to obtain*" – is the basis for consumer behaviour associated with purchasing[44]. Therefore, exploring the intrinsic meaning of consumption value can help to understand why consumers choose sustainable clothing. According to previous literature, core consumption values that affect consumer choices are the following: emotional value, functional value, social value, conditional value, and epistemic value[45]. Starting from Sheth's theory and taking into account several findings from more recent studies [46] [47] [48] [49] [50] [51], a set of drivers affecting consumer purchasing and consumption decisions has been developed, and divided in four macro-categories. Specifically, **Personal drivers** involve both the emotional state that consumers feel when they shop or wear sustainable clothing, such as pleasure and good feelings, and the need of express their personal identity through wearing certain kind of clothing. Secondly, **Social drivers** encompass social norms, both injunctive and descriptive norms, which reflect people's perceptions of which behaviours are socially approved and which are typically performed by others. Thirdly, **Epistemic drivers** emphasises the value associated with perceived uniqueness, novelty, or rarity of clothing that are not readily available in the traditional market. Lastly, **Functional drivers** represent utilitarian benefits related to clothing, in this specific case related to rented clothing, such as flexibility to match trends, space saving and cost reduction.

Figure 15 reports an overall situation regarding motivations to buy/use **sustainably produced clothes**, that is, clothing made from recycled/natural raw materials and/or with low environmental impacts in production/distribution processes. At the aggregate level, it appears that the respondents from all the five countries have a good feeling regarding wearing sustainability. In fact, as reported in Figure 15, the majority of respondents "totally agrees" or "agrees" that wearing sustainable clothes would make they feel better (53%) and allow them to express their identity (42%). Then, the 42% of consumers thinks that sustainably produced clothes have new characteristics and uniqueness that differ from traditional clothes. Finally, injunctive norms and descriptive norms motivate the 38% and the 25% of respondents, respectively.

[44] Kim, I.; Jung, H.J.; Lee, Y. (2021) Consumers' Value and Risk Perceptions of Circular Fashion: Comparison between Secondhand, Upcycled, and Recycled Clothing. Sustainability, 13, 1208.
[45] Sheth, J. N., Gardner, D. M., Garrett, D. E., Marketing Theory: Evolution and Evaluation. New York: John Wiley & So, 1998
[46] Shim, H., Lim, S., Jung,E. E., Shin, E. (2018). I hate binge-watching but I can't help doing it: The moderating effect of immediate gratification and need for cognition on binge-watching attitude-behavior relation, Telematics and Informatics, 35(7).
[47] Lin, P. C., & Huang, Y. H. (2012). The influence factors on choice behavior regarding green products based on the theory of consumption values. Journal of Cleaner Production, 22(1), 11-18.
[48] Kim, I.; Jung, H.J.; Lee, Y. (2021) Consumers' Value and Risk Perceptions of Circular Fashion: Comparison between Secondhand, Upcycled, and Recycled Clothing. Sustainability, 13, 1208.
[49] Lee, C.; Jung, D.R.
[50] Haines, S., Lee, S.H. (2021). One size fits all? Segmenting consumers to predict sustainable fashion behavior. Journal of Fashion Marketing and Management: An International Journal.
[51] Lee, J.A., Sudarshan, S., Sussman, K.L., Bright, L.F., Eastin, M.S. (2021). Why are consumers following social media influencers on Instagram? Exploration of consumers' motives for following influencers and the role of materialism. Int. J. Advert. 1–2

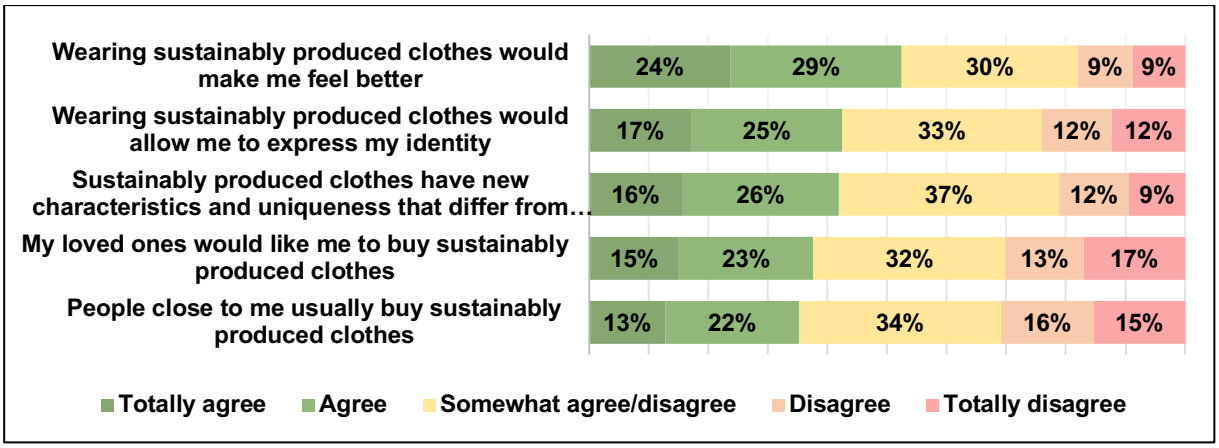


Figure 15 Motivations to buy/use sustainably produced clothes (overall)

Figure 16 shows the overall representation regarding motivations to buy/use **second-hand clothes**, that is, second-hand clothing or clothing redesigned/upcycled from deconstructed garments that resulted from the take-back of used clothing items. At the aggregated level, consumers agree that wearing second-hand garments generates the perception to have done something worthwhile (48%) or make them feel accomplished (36%). Moreover, second-hand clothes are recognized as unique for the 37% of respondents. On the other hand, there is an important level of respondents that disagrees or totally disagrees to have people close to them that usually buy second-hand clothes (45%) or having their beloved that would like them to buy second-hand clothes (44%). Therefore, exactly as in sustainable clothes, the main drivers are represented by personal factors, following by epistemic driver and, finally, by social ones.

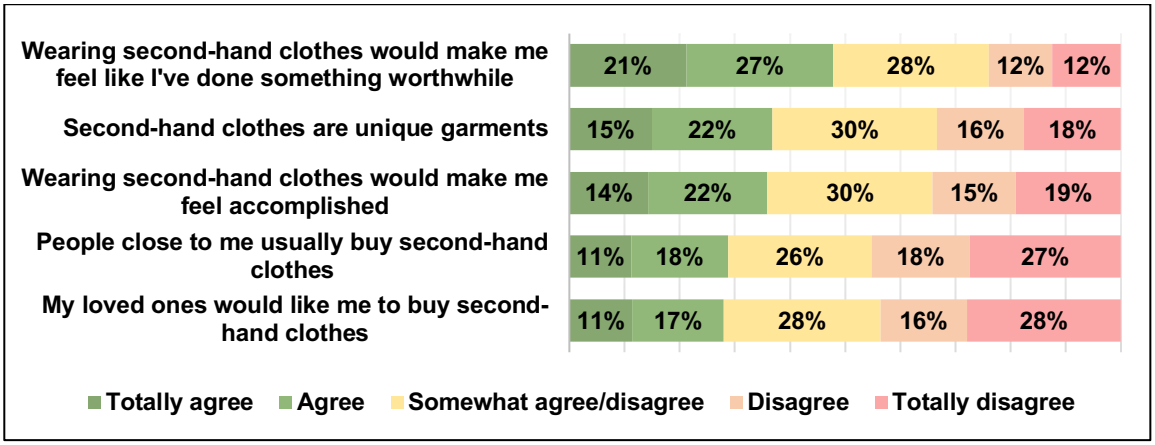


Figure 16 Motivations to buy/use second-hand clothes (overall)

Figure 17 reports the overall situation regarding motivations to buy/use **rented clothes**, that is, clothing rented for a shorter period of time from clothing libraries or online platforms. At the aggregated level, it appears that the majority of respondents is motivated mainly by functional drivers, such as favourable economic conditions (49%), space saving in the closet (48%), style conformity in

specific occasion (46%) and flexibility to match fast-changing trends (38%). On the contrary, the majority of consumers disagrees or totally disagrees to be motivated by social factors (57% on average), by epistemic drivers (44%) and personal ones (40% on average).

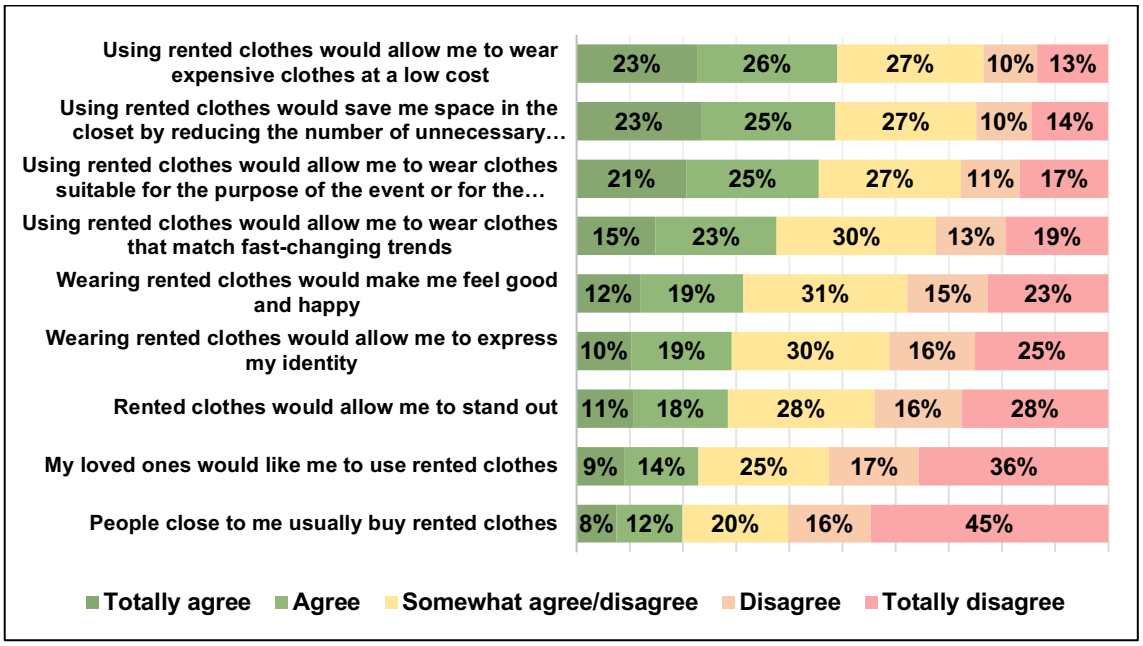


Figure 17 Motivations to buy/use rented clothes (overall)

Figure 18 reports the motivations to buy/use **sustainably produced clothes** by country. Respondents from Spain, Italy and Poland give more importance than Germany and France to the majority of all factors explored in this study. Furthermore, as in the aggregated level, the majority of respondents "totally agrees" or "agrees" that wearing sustainably produced clothes would make them feel better and gives them the possibility to express their own identity. In addition, Spain and Poland stand out for epistemic drivers like the perceived uniqueness of sustainable clothes. Having or not relatives/friends that usually buy sustainable clothes and that expect others to do the same seems to be a quite irrelevant aspect for respondents, taking into account all the investigated items.

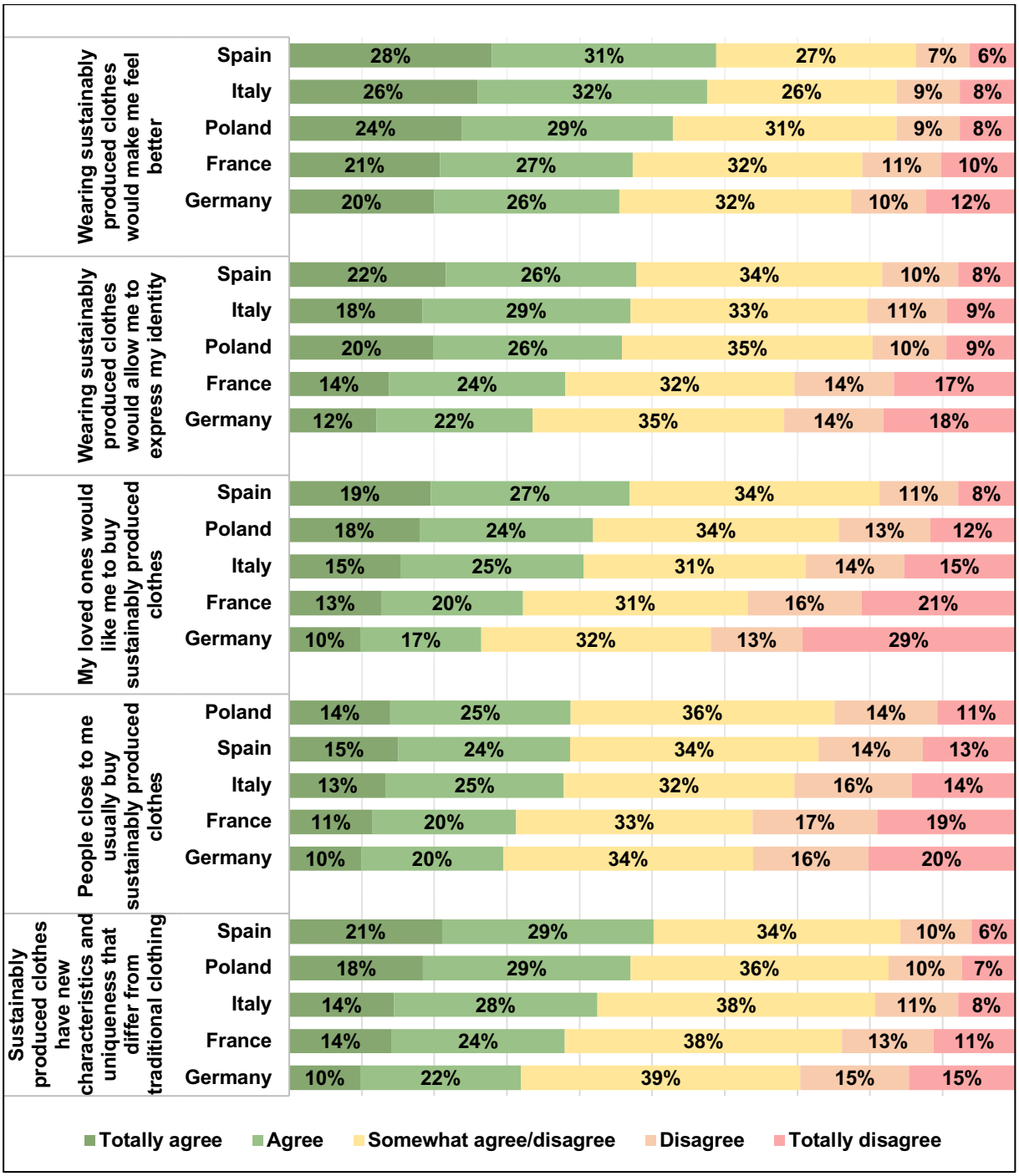


Figure 18 Motivations to buy/use sustainably produced clothes (by country)

Figure 19 reports the motivations to buy/use **second-hand clothes** by country. As it is possible to observe, Poland has the majority of "*Totally agree/Agree*" answers regarding all the motivations to buy/use second-hand clothes. On the other hand, Italy, Spain and France highlight a similar mid-level profile, regarding all the items investigated, whereas Germany always records the lowest percentage of "*Totally agree/Agree*" answers.

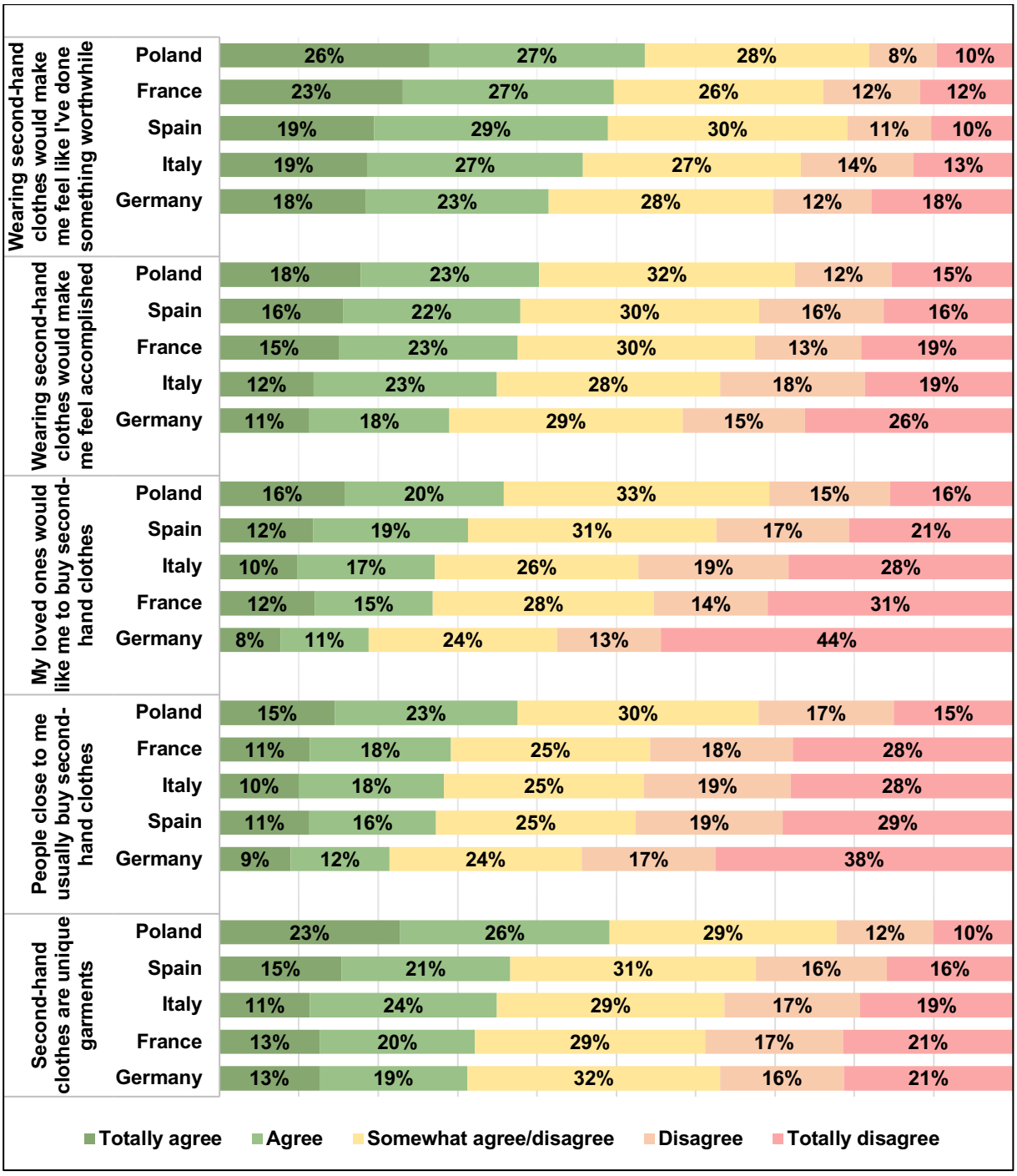


Figure 19 Motivations to buy/use second-hand clothes (by country)

Figure 20 reports motivations to buy/use **rented clothes** by country. As for sustainable and second-hand clothes, a great percentage of German and French respondents "disagrees/totally disagrees" to feel good and happy or to express their own identity when wearing rented clothes. In the same way, the opinion and the behaviour of relatives and friends has a very little influence on them. On the contrary, Spanish, Italian and Polish consumers are much more affected by all kind of drivers but mainly by functional ones. In particular, they think rented clothes allow to match fast-changing trends, respect dress codes, save space in the closet and wear expensive pieces at a low cost.

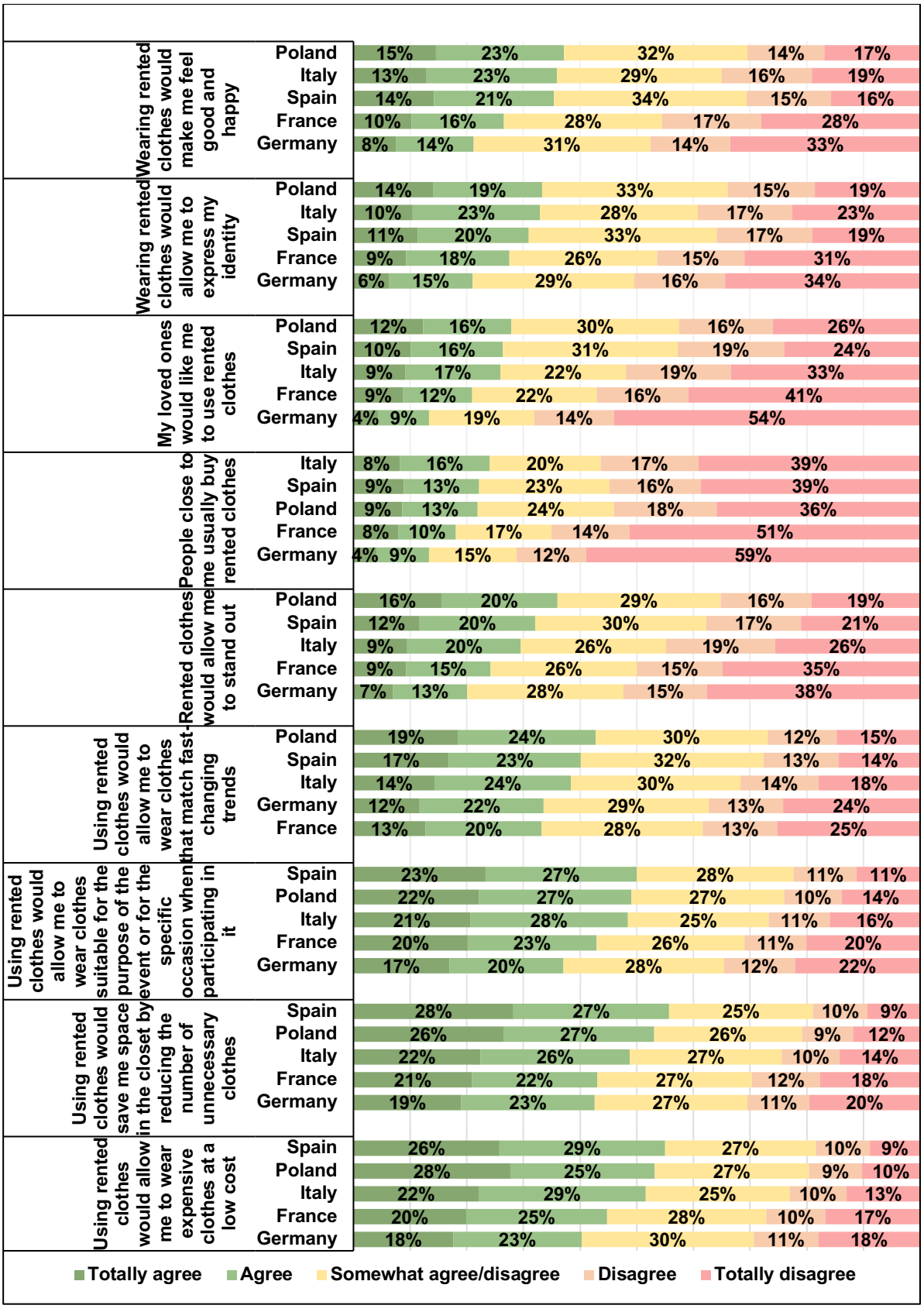


Figure 20 Motivations to buy/use rented clothes (by country)

3.2.5 Barriers to buy/use sustainable fashion

Barriers to buy and use a product can be considered as *perceived* risks, distinct from objective risks, that means consumers' perceived anxiety or danger when making a purchase decision about unexpected consequences and losses that may occur after purchasing and using a product[52] [53] [54] [55]. Mitchell (1999) [56]stated that "*perceived risk is more powerful at explaining consumers' behaviour since consumers are more often motivated to avoid mistakes than maximize the utility in purchasing".*

With regards to clothing and textile, among the numerous studies conducted on the perceived risks in this field[57] [58] [59] [60] [61], Kim et al. (2012)[62] identified four dimensions for perceived risk: economic, functional, aesthetic and sanitary risk. In particular, **Financial risk** refers to consumers' perceived higher cost of not mass-produced clothing (which applies to sustainable or second-hand clothes) or the perception to pay for clothing without owning them (which applies to rented clothes). **Functional risk** refers to the uncertainty associated with the performance of clothing that can be perceived as less durable or sturdy because it has been already worn and fibres are more stressed (which applies to sustainable or second-hand clothes) or manufactured with discarded materials (which applies to sustainable clothes). Used and recycled clothing can also be associated to a Sanitary risk, meaning the anxiety that garments are not clean or hygienic and may have been contaminated during the prior use. Lastly, **Aesthetic risk** expresses the concern that second-hand clothing is out of fashion or that sustainably produced clothing does not match last trends. Following the above-mentioned structure, respondents are asked to rate the four categories of risks that perceived when purchasing/using sustainable fashion products.

The graph reported in Figure 21, showing the overall data for **sustainably produced clothes** (clothing made from recycled/natural raw materials and/or with low environmental impacts in production/distribution processes), reveals a clear financial risk that is the main barrier perceived by the 50% of consumers: sustainably produced clothes are likely to be expensive as they are not mass-produced. On the other hand, it can be observed that there is a greater heterogeneity of answers for the aesthetic risk, where the aggregate percentages of "*Totally agree*/*Agree*" answers is 29%, the percentage of "*Somewhat agree-disagree*" is 35% and the aggregate percentages of "*Disagree*/T*otally*

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[59] Kawakita, M. (2014), "Perceived risk and information resources choice," The journal of the College of Business Administration and Information Science, 28(1/2), 79-98
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[61] Kim, H.Y.; Kim, J. (2018) The effect of perceived value and risk on purchasing intention of up-cycling fashion product—Moderating role of ethical consumption attitude. Res. J. Costume Cult., 26, 899–918
[62]Kim, H.W., Xu, Y., & Gupta, S. (2012). Which is more important in Internet shopping, perceived price or trust? Electronic Commerce Research & Applications 11(3): 241-252.

disagree" answers is 36%. For the functional barriers, the percentages amount to similar value of the aesthetic ones, while for the Sanitary risk there is a higher share of "*Disagree*" and "*Totally disagree*" answers (47%).

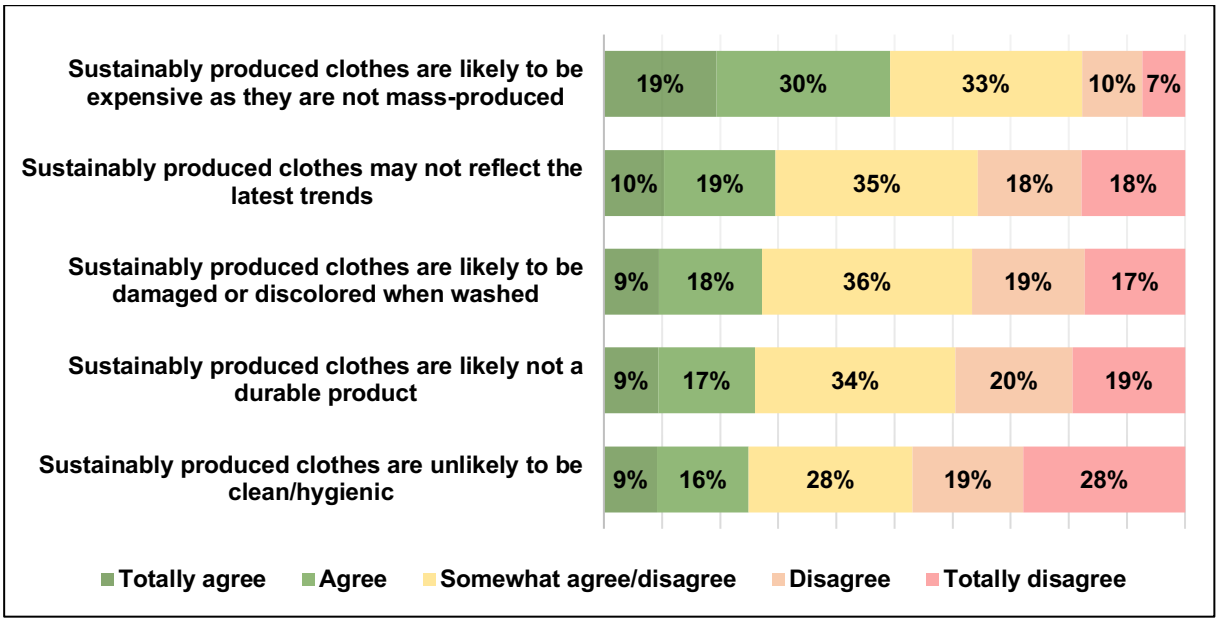

Figure 21 Barriers to buy/use sustainably produced clothes (overall)

Figure 22 reports the overall situation regarding barriers to buy/use **second-hand clothes** (second-hand clothing or clothing redesigned/upcycled from deconstructed garments that resulted from the take-back of used clothing items). At the aggregate level, it appears that the majority of respondents *totally agrees/agrees* second-hand clothes are likely to be expensive as they are rare (41%) and may not reflect the latest fashions (39%). However, considering all the five items, there is not so much difference in percentage for each level of response (*totally agree/agree; somewhat agree/disagree; disagree/totally disagree*). Even in the case of second-hand clothes, economic and aesthetic risks are more perceived than sanitary and functional ones, but slightly. Nevertheless, if financial barriers for sustainably produced clothes are more important compared to second-hand clothing (49% and 41% respectively), people are much more concerned about hygienic and cleaning conditions of second-hand clothing (37% compared to 25% for sustainable clothes).

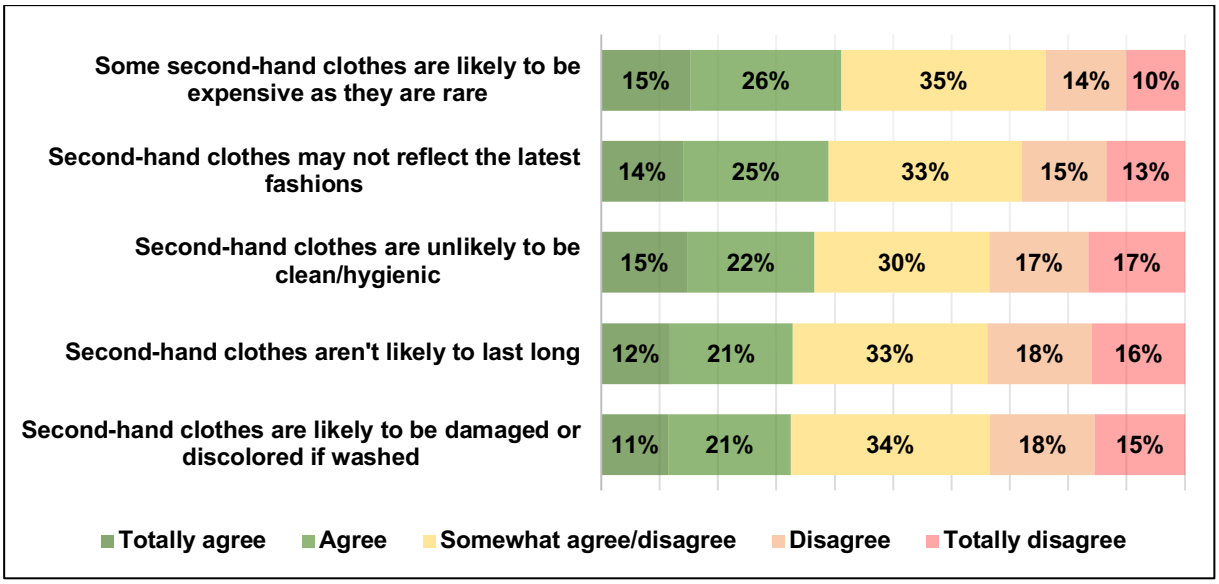

Figure 22 Barriers to buy/use second-hand clothes (overall)

Figure 23 reports the overall situation regarding barriers to buy/use **rented clothes** (clothing rented for a shorter period of time from clothing libraries or online platforms). As can be seen, functional and aesthetic barriers have been removed because not suitable for rented clothing. At the aggregate level, it appears that the majority of respondents *"totally agrees/agrees"* that rented clothes are unlikely to be clean/hygienic (38%) and that renting clothes for a short time, seems like a waste of money (36%). In contrast to previous situations (recycled and second-hand clothes), sanitary risk prevails over financial one in the case of rented clothes. Nevertheless, it is important to notice that there is not so much difference in percentage between *"somewhat agree-disagree"* and *"disagree/totally disagree"* answers.

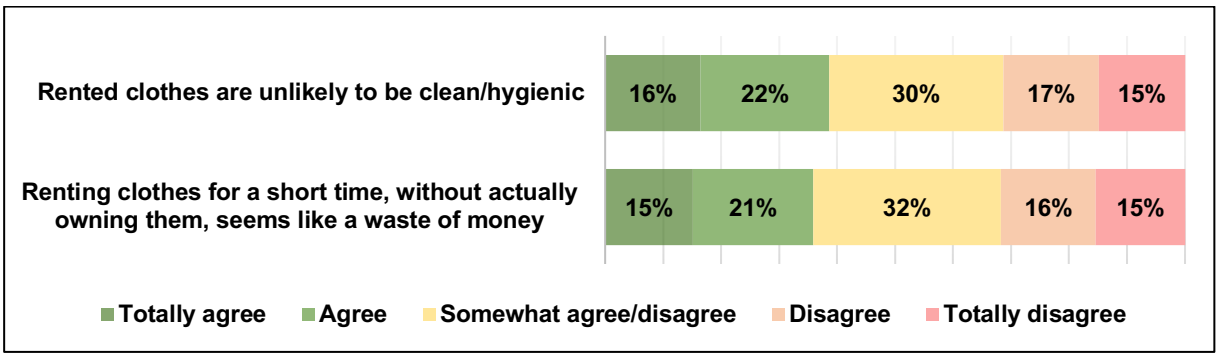

Figure 23 Barriers to buy/use rented clothes (overall)

Figure 24 shows the barriers perceived by consumers in the various countries related to the purchasing of sustainable garments. It reports a general agreement on a particular barrier, namely the economic risk, confirming the overall trend. The percentages for the other barriers also reflect the trends emerged from the aggregate data, although some exceptions can be noticed. In fact, Spanish and

Italian people are more worried about aesthetic and functional risks compared to other countries. On the contrary, German respondents are very little worried about sanitary risk and Polish consumers are less concerned about the price than others.

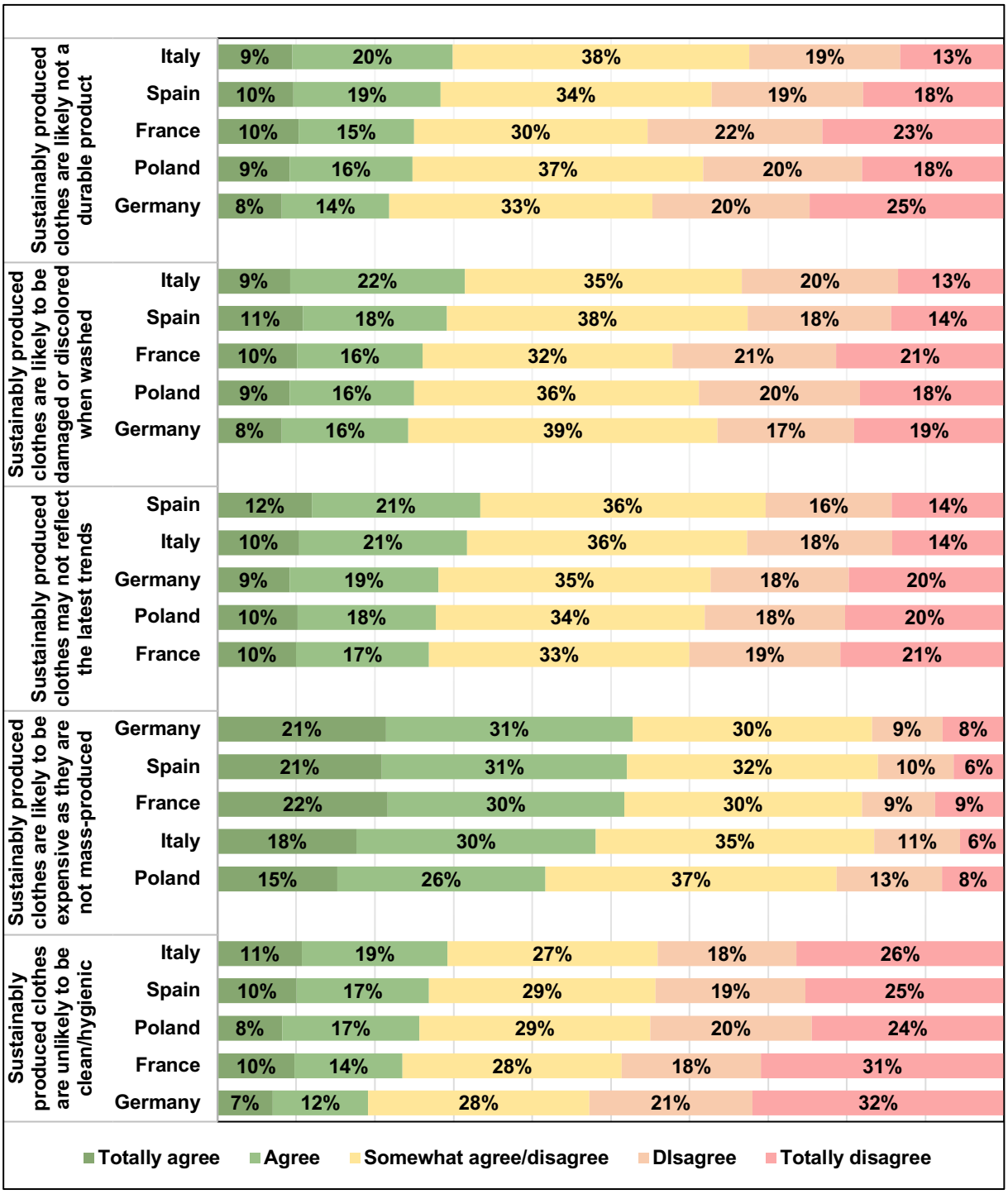

Figure 24 Barriers to buy/use sustainably produced clothes (by country)

Figure 25 reports the barriers to buy/use second-hand clothing by country. As it can be seen, Germany reports the lowest share of agreement for each item, except for the aesthetic risk. Italy, Spain, Poland and France, on average, show similar percentage, even if Italy stands out for sanitary risk and, together with France, for durability-related concern.

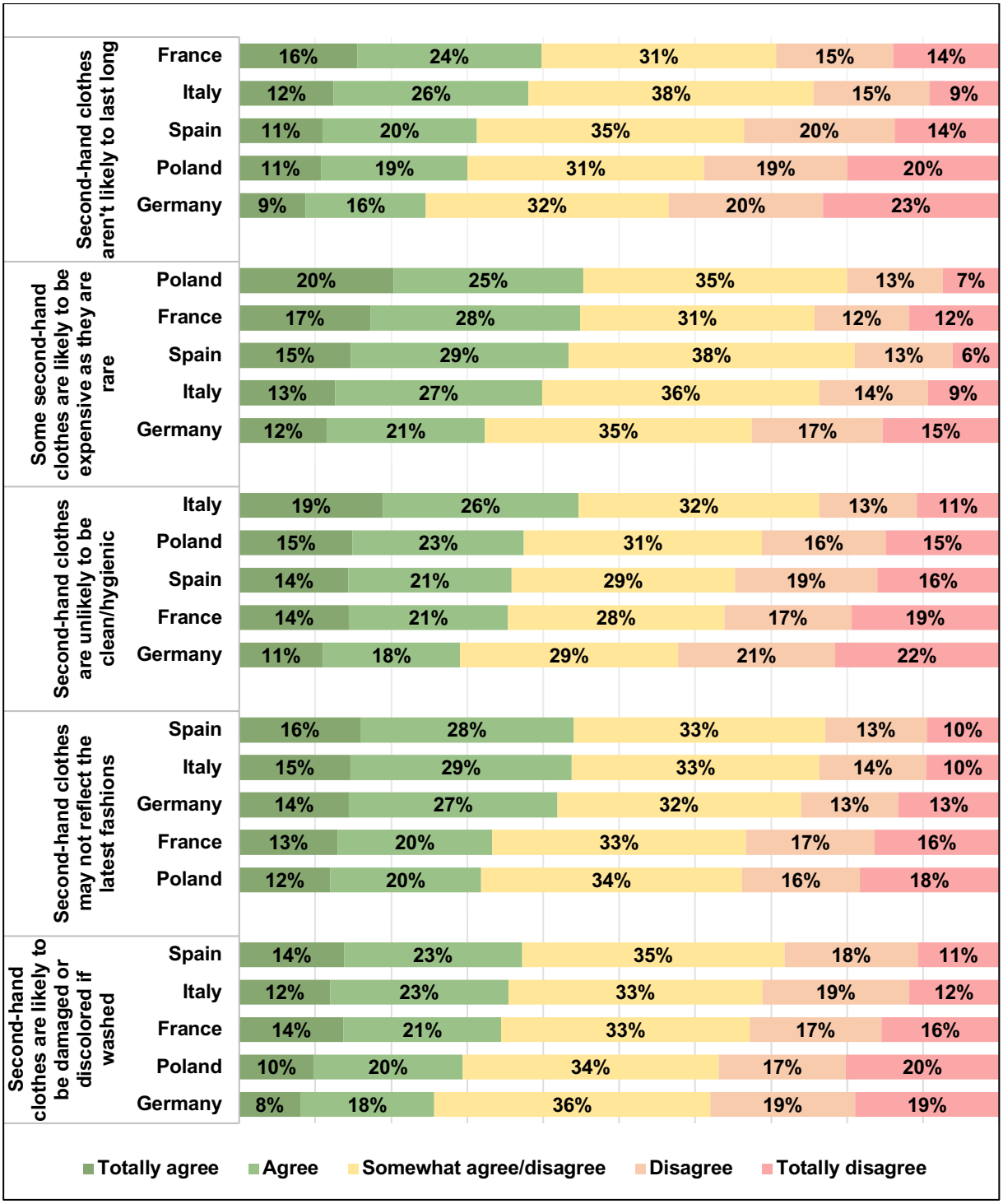

Figure 25 Barriers to buy/use second-hand clothes (by country)

The graph of barriers to buy/use rented clothes by countries (Figure 26) confirms the evidence found also in the aggregate form. The percentages are in fact distributed fairly evenly between agreement and disagreement. However, Italian users show higher percentages of agreement than those of disagreement (the sum of "*Totally agree*/*Agree*" answers is 44% for the sanitary risk and 40% for the financial one). Moreover, a significant variation in percentages between agreement and disagreement can also be found in Polish answers for sanitary risk (42% of agreement compared to 27% of disagreement). Finally, Germany remains the country with the smaller share of concerned citizens.

Figure 26 Barriers to buy/use rented clothes (by country)

3.3 Use and after-use behaviours

Circular consumption manifests itself over and beyond the purchase phase, by including also a more responsible use and a less harmful final disposal of the products[63] [64] [65]. Just as consumers can boost green and circular products development through their demands, they can reduce the environmental impact of clothing even in the use and after-use phases through eco-friendly behaviors.

The waste hierarchy prioritizes prevention over material recycling. This means that slowing the loop – namely, prolonging the useful life of products through design for long-life as well as life-extending measures such as maintenance, repair, remanufacturing, refurbishment and reconditioning – is fundamental in the circular approach[66]. In fact, increasing product lifespans is one of the most effective environmental strategies that can reduce negative impacts in all stages of the supply chain. According to Laitala et al. (2021)[67], consumer has a pivotal role in "nurturing" product lifespan extension, even if effective maintenance and repair are linked to proper product design and available information about how to repair it.

With regards to textile and fashion industry, since there is a 20–30% annual reduction in the carbon, water, and waste footprints of clothing just by extending the average life of clothing by nine months[68], it is imperative that consumers are empowered as they transition to sustainable lifestyles. In this perspective, both caring (i.e., paying attention to clothing care instructions and trying to reduce washing/drying/ironing) and repairing practices should be implemented. Unfortunately, consumers are often hindered to repair by the consistently low price of new products. Many researches[69] [70] [71] identified that the lack of time and repair skills and the high costs associated with clothing repair discourage consumers from engaging in clothes mending practices. Moreover, fast fashion has had a disabling effect, as consumers perceive that they no longer need the skills to repair their clothes (often cheap and low-quality) and, consequently, no longer feel emotionally attached to them and hence have no incentive to repair and properly maintain them in order to extend their useful life.

Effects of fast fashion have also a negative impact during the end-of-life phase. In fact, the low quality, the ease of access and the short-term relevance of fast fashion clothing have led to a drastic increase in post-consumer waste[72]. Nevertheless, in addition to purchasing and use behaviors, consumers can

[63] Borrello, M., Caracciolo, F., Lombardi, A., Pascucci, S., & Cembalo, L. (2017). Consumers' perspective on circular economy strategy for reducing food waste. Sustainability (Switzerland), 9(1).
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[67] Laitala, K., Klepp, I. G., Haugrønning, V., Throne-Holst, H., & Strandbakken, P. (2021). Increasing repair of household appliances, mobile phones and clothing: Experiences from consumers and the repair industry. Journal of Cleaner Production, 282
[68] Cooper, T.; Claxton, S.; Hill, H.; Holbrook, K.; Hughes, M.; Knox, A.; Oxborrow, L. (2014) Clothing Longevity Protocol; Project Code: REC100-008; Nottingham Trent University Banbury: Nottingham, UK
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[70] Laitala, K.; Klepp, I. (2018). Care and production of clothing in Norwegian homes: Environmental implications of mending and making practices. Sustainability, 10, 2899
[71] McNeill, L.S., Hamlin, R.P., McQueen, R.H., et al. (2020). Fashion sensitive young consumers and fashion garment repair: Emotional connections to garments as a sustainability strategy. Int J Consum Stud. 44, 361– 368
[72] Cline EL (2012) Overdressed: the shockingly high cost of cheap fashion. Portfolio/Penguin Group, New York

contribute to environmental protection through a proper disposal of garments. Following the textile waste hierarchy, used or unwanted clothes can be, firstly, resoled in second-hand market, as well as donated or handed down; secondly, recovered by repairing or customizing them; thirdly, reused or upcycled for other purposes; fourthly, recycled to generate new fibers; lastly, thrown away, ending up in a landfill. In the last years, it has been noted that there is an increasing attention to proper dispose of cloths. To confirm this trend, the global textile recycling market grew at a CAGR of around 19% during 2014-2019[73], driven primarily by the rising environmental concerns of the consumers. Additionally, the secondhand market is increasing with an estimate value of USD 64 billion by 2024[74] (considering resale and traditional thrift and donations) and is expected to be larger than fast fashion by the 2028[75].

In the following section, results highlighting use and after-use behaviours adopted by European consumers involved in the study are reported and debated, focussing on clothing care behaviours, repair actions and post-consumption behaviours.

3.3.1 Clothing care

As shown by the graph in Figure 27, representing the aggregate data on clothing care, the behaviour most adopted by respondents is washing clothes at low temperatures ("*Very often/always*" 31% and "*Often*" 35%). This is followed, with a slightly lower percentage, by paying attention to the instructions on labels for washing and take care of fabrics ("*Very often/always*" 33% and "*Often*" 30%) and by avoiding the use of dryer and iron when possible ("*Very often/always*" 36% and "*Often*" 27%). The behaviour less adopted by the consumers participating in the survey is to limit the number of garments washes ("*Very often always*" 20% and "*often*" 31%), while washing with mild and/or natural detergent was a little more adopted behaviour ("*Very often/always*" 25% and "*Often"* 33%).

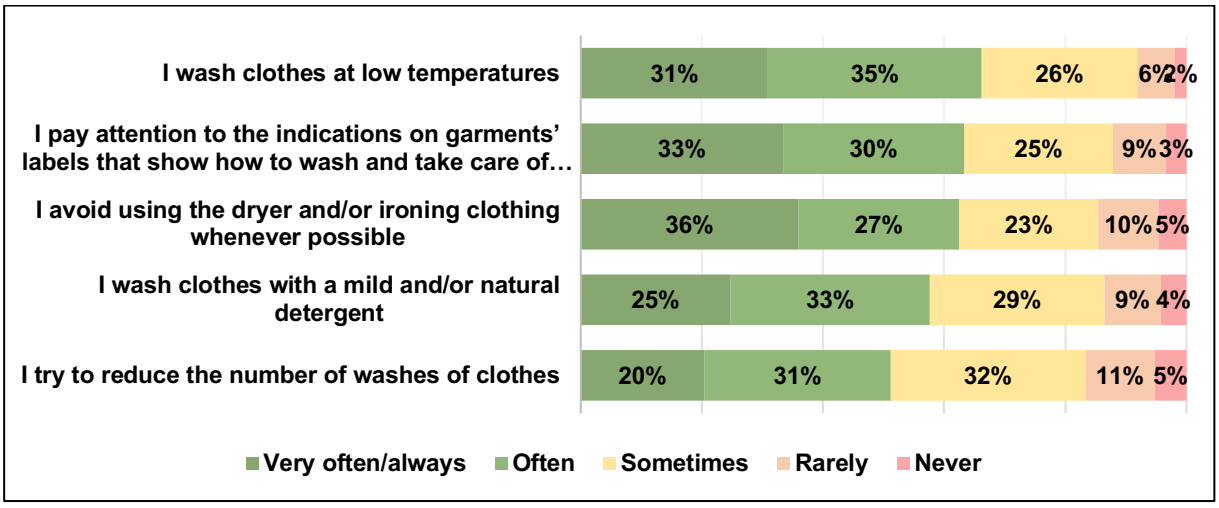

Figure 27 Clothing care (overall)

[73] IMARC (2020) Textile Recycling Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026
[74] ThredUP (2019) Resale report
[75] ThredUP (2019) Resale report

The graphs by country (Figure 28) shows trend similar to those emerged from the overall results. In fact, in all the countries, the most selected answer was washing clothes at low temperatures, followed by paying attention to information on labels (more than a half of respondents declared to adopted them). Generally, it is found a medium-high frequency rate concerning clothing care behaviours, with the exception of Germany and France, that less frequently reduce the number of washes (about 45%) and wash with a mild/natural detergent (50%). Finally, the graph shows uniformity also for the "*rarely*" and "*never*" options, which were selected in a very low percentage in all the countries.

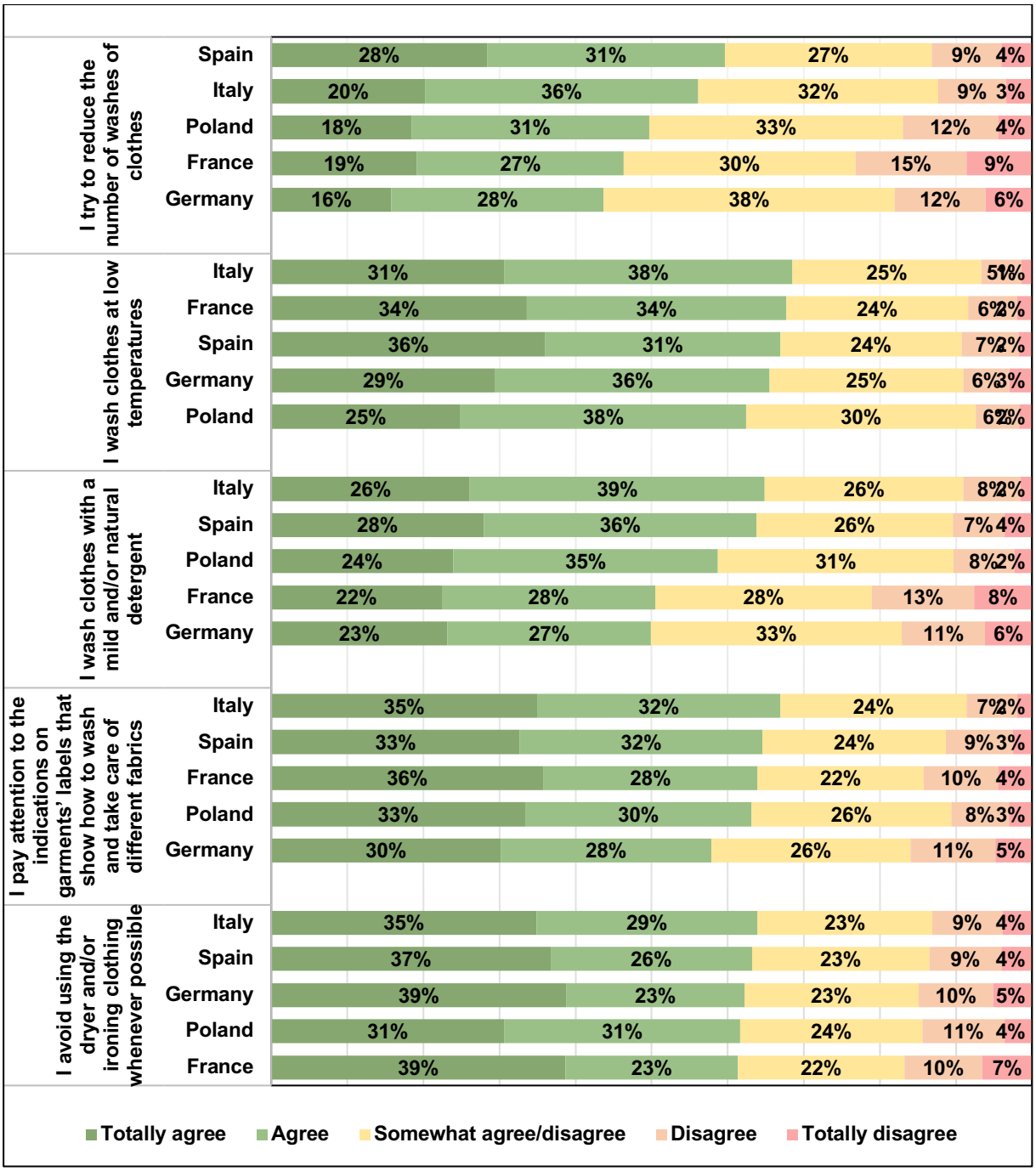

Figure 28 Clothing care (by country)

3.3.2 Repair

Regarding the repair of clothes (Figure 29), the most frequent behaviour is the repair done by oneself (40% of "*Very often/Always*" and "*Often*" answers), followed by asking friends and relatives help to repair, (36% of "*Very often/Always*" and "*Often*" answers). The least suitable answer was "I help my family and or friends to repair/mend their clothes", with only 12% of respondents saying they do it "*Very often/always*" and 19% "*Often*". The answer "I go to the seamstress or the shop where I bought the clothes when I can't repair them by myself" was selected in the 33% of cases (13% "*Very often/always*" and 21% "*Often*"). However, the graph presents quite uniform answers, finding a fairly high percentage of answers corresponding to "*Rarely*" or "*Never*".

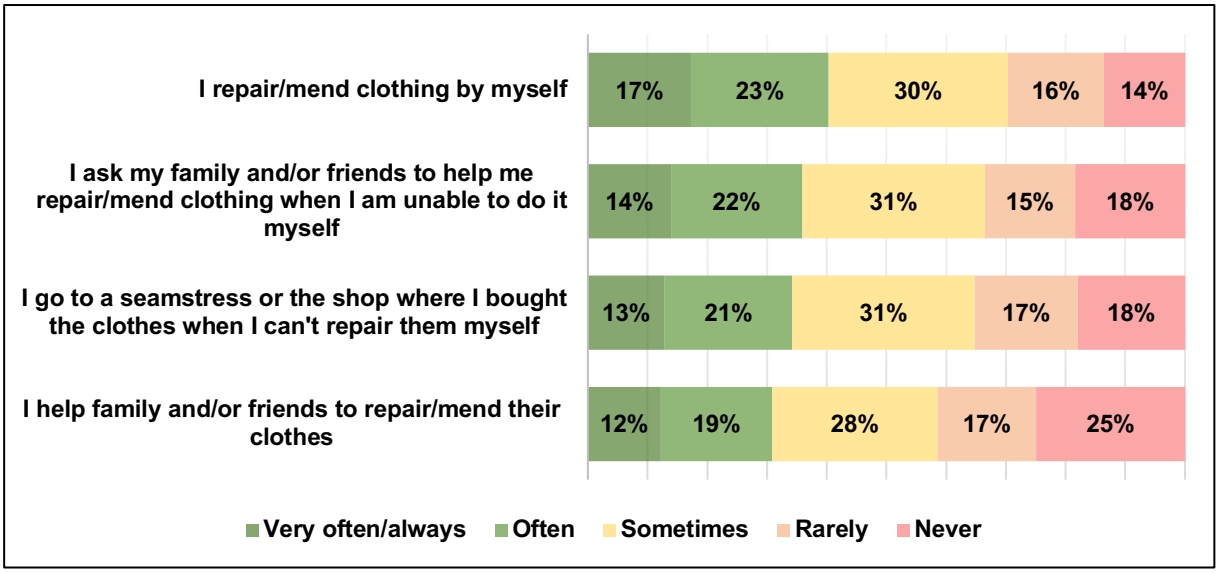

Figure 29 Repair in the use phase (overall)

The graph in Figure 30 shows consumer behaviour towards clothing repair, broken down by country. As regards the most common practice, i.e., self-repair, the country with the highest number of positive respondents is Spain, with 19% of "*Very often/always*" and 26% of "*Often*" answers, followed by France (19% "*Very often/always*" and 23% "*Often*") and Poland (18% "*Very often/always*" and 24% "*Often*"). The country whose respondents adopt less self-repair is Germany, where instead the "*Very often/always*" answers are the 14% and the "*Often*" answers are the 19%. Spain and Italy result to be the countries in which respondents ask for more help from friends and family to repair their clothes (in Italy 17% "*Very often/always*" and 26% "*Often*", while in Spain 16% *"Very often/always*" and 28% *"Often*"). The behaviour "I go to the seamstress or the shop where I bought the clothes when I can't repair them by myself" is more frequently adopted in Spain, followed by Italy (47% and 40% of positive answers, respectively).

However, analysing data of individual countries it is possible to note that the self-repair option has been selected as the most practiced in France (42%), Germany (33%) and Poland (42%). On the other hand, the most commonly adopted behaviour in Italy is the request for help from friends and family

(43%), while in Spain the most selected repair behaviour was going to a seamstress or to the shop where the dress was purchased (47%). However, as previously stated in the aggregate form, there is a certain kind of uniformity in each level of response in each country. In fact, by considering the three levels ("*Very often/always*" and "*Often*"; "*Sometimes*"; "*Rarely*" and "*Never*"), very similar percentages for each answer can be noticed in all the countries.

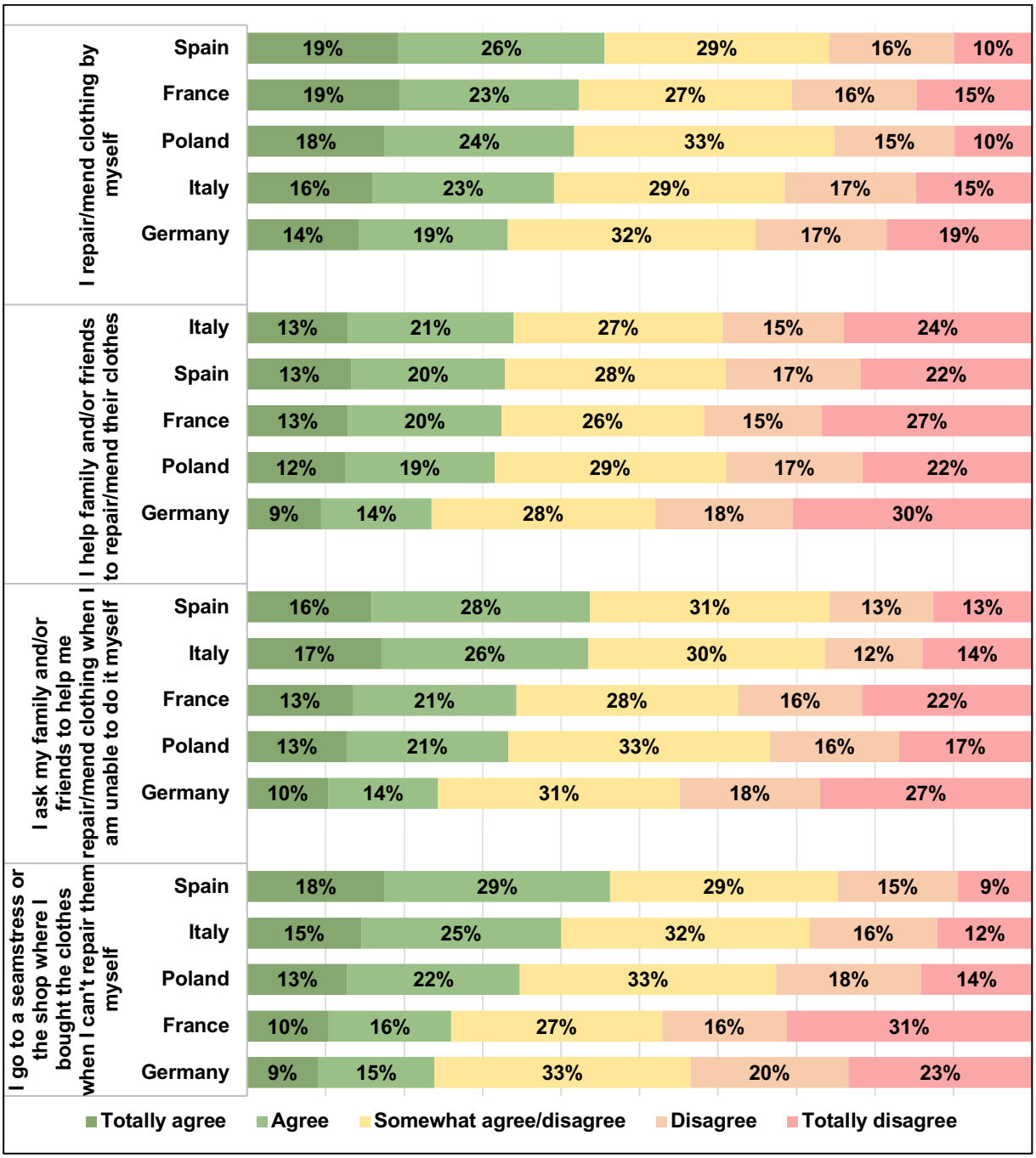

Figure 30 Repair (by country)

3.3.3 Post consumption

The aggregate representation of the answers given by the survey participants, reported in Figure 31, shows a very virtuous behaviour towards clothes at the end of their useful life: in fact, only the 19% of respondents throw away clothes (6% "*Always/very often*" and 13% "Often"). The respondents also highlighted a low attitude towards obtaining an economic advantage by selling clothes to thrift stores or swapping them (9% for "*Very often/always"* and 16% for "*Often")*. It is also interesting that the most common behaviour is taking clothes to collection centres or shops where fabrics are collected for recycling ("*Very often/always*" 21% and "*Often*" 30%). The second most adopted behaviour is the donation of clothes ("*Very often/always*" 19% and "*Often*" 28%).

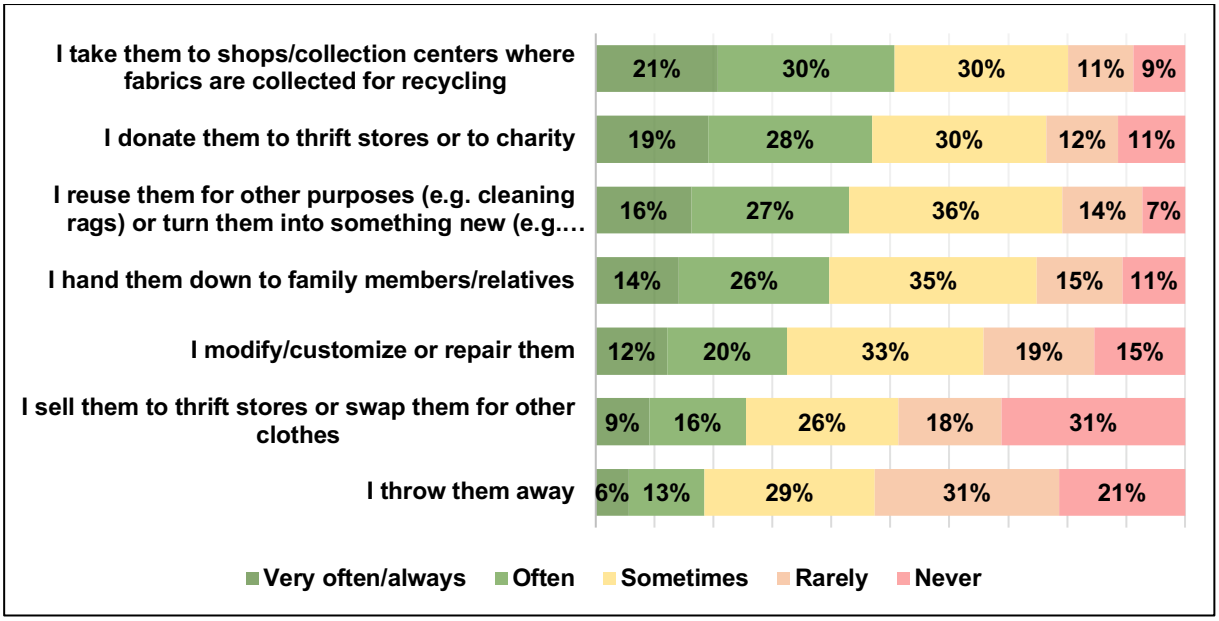

Figure 31 Post consumption in the after-use phase (overall)

The graph in Figure 32 represents the habits of consumers in the post-use phase broken down by country. In general, practices such as the creative recycling (turning clothes into canvas, bags etc.), donation and taking clothes to collection centres/shops are the options most selected by all the countries. Countries having a greater aptitude for donation are Italy and Spain (more than half of positive answers), while those with more aptitude for taking clothes at collection centres/shops are Germany, France and Spain (more than half of positive answers). The countries reusing the oldest clothes for other purposes are Poland (51%), Italy (45%) and Spain (45%). The practices implemented less frequently in all the countries ("*Rarely*" or "*Never*" answers), turn out to be "I throw them away" (Italy 47%, Spain 56%, France 57%, Germany 51% and Poland 53%) and "I sell them to thrift stores or swap them for other clothes" (Italy 46%, Spain 48%, France 50%, Germany 51%, Poland 49%).

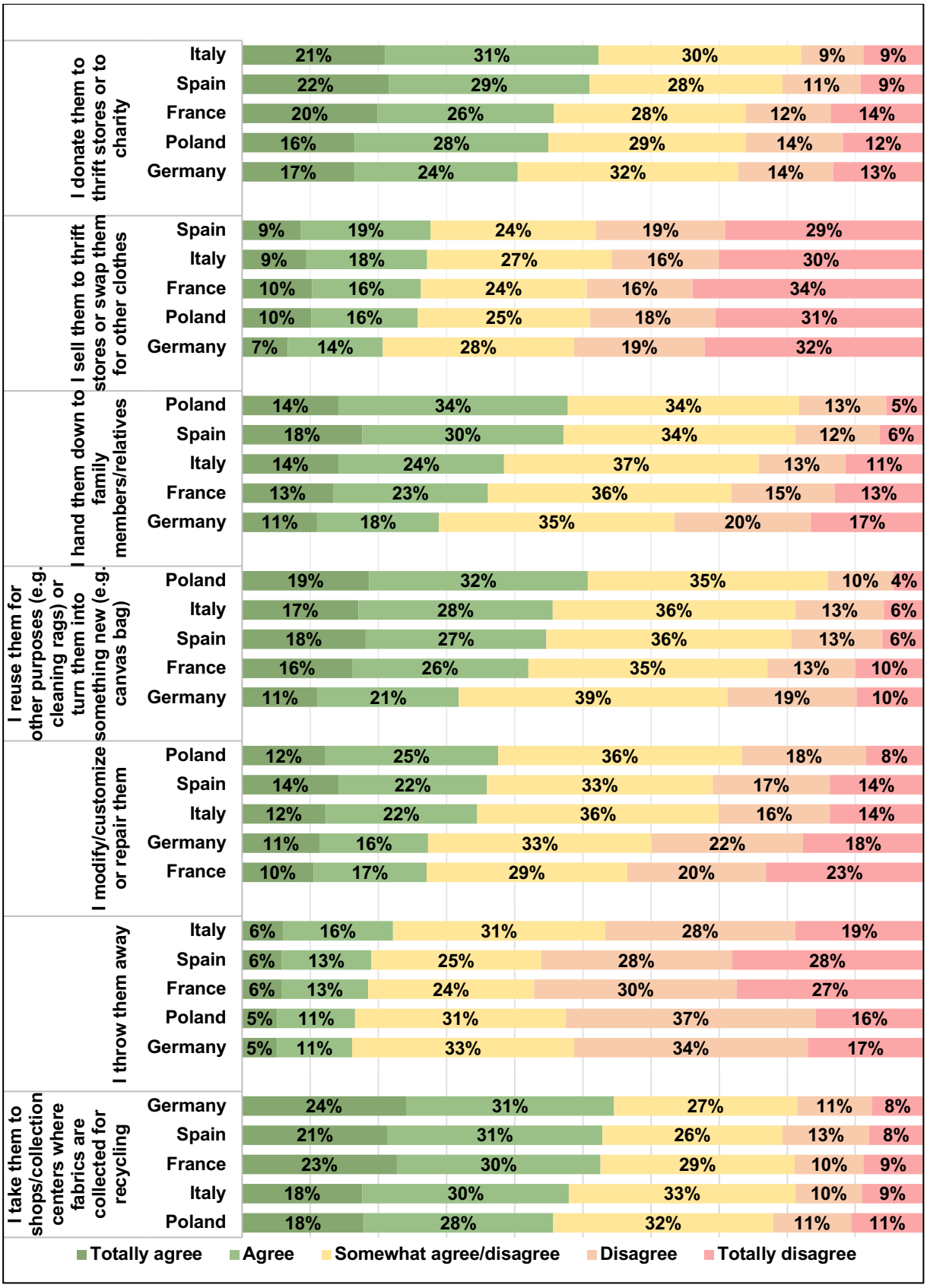

Figure 32 Post consumption in the after-use phase (by country)

3.4 Trust in information

Information plays an important role in purchasing decisions since it gives access to further elements which consumers can take into account during decision-making process. Moreover, an organization that is willing to disclose information about its business, goods and processes demonstrates its transparency and, consequently, enhances consumer trust.

Considering environmental and social aspects, it is becoming increasingly difficult to choose really sustainable products. Often, consumers are not provided with the necessary elements to make informed choices or organizations' statements are perceived as untrustworthy. Such asymmetric distribution of information has been discussed extensively in literature and green management studies[76] [77] [78] [79] because it can lead to sub-optimal purchasing decisions and market inefficiencies. In order to overcome these obstacles, organizations that have developed sustainable business model should communicate their efforts and commitments, but always being careful to declare environmental and social claims that are both accurate and effective, otherwise misleading information might risk falling under the category of greenwashing practices[80].

This section is intended to explore the extent to which information is considered a trustworthy source and, ultimately, the influence of sustainability-related information on purchasing decisions. In particular, this set of variables encompasses both self-declared claims and third-party certified declarations, with the aim of understanding if external sources can affect consumers' attitude and choices more positively than internal ones.

3.4.1 Access to further information

Concerning the role that information can play during fashion purchase decisions, from the study it emerges that about half of respondents feels more reassured if a piece of clothing offers additional information (Figure 33). Availability of easily accessible information can help consumers to be more confident towards apparel products even if they don't check it. In fact, on average, the 51% of respondents feels confident and the 34% feels somewhat confident when presented with additional information that may specify several clothing's characteristics.

[76] Darnall, N., & Aragón-Correa, J. A. (2014). Can ecolabels influence firms' sustainability strategy and stakeholder behavior?.
[77] Chen, Y. S., & Chang, C. H. (2012). Enhance green purchase intentions: The roles of green perceived value, green perceived risk, and green trust. Management Decision, 50(3), 502-520.
[78] King, A. A., Lenox, M. J., & Terlaak, A. (2005). The strategic use of decentralized institutions: Exploring certification with the ISO 14001 management standard. Academy of management journal, 48(6), 1091-1106.
[79] Alchian, A. A., & Demsetz, H. (1972). Production, information costs, and economic organization. The American economic review, 62(5), 777-795.
[80] Delmas, M. A., & Burbano, V. C. (2011). The drivers of greenwashing. California management review, 54(1), 64-87.

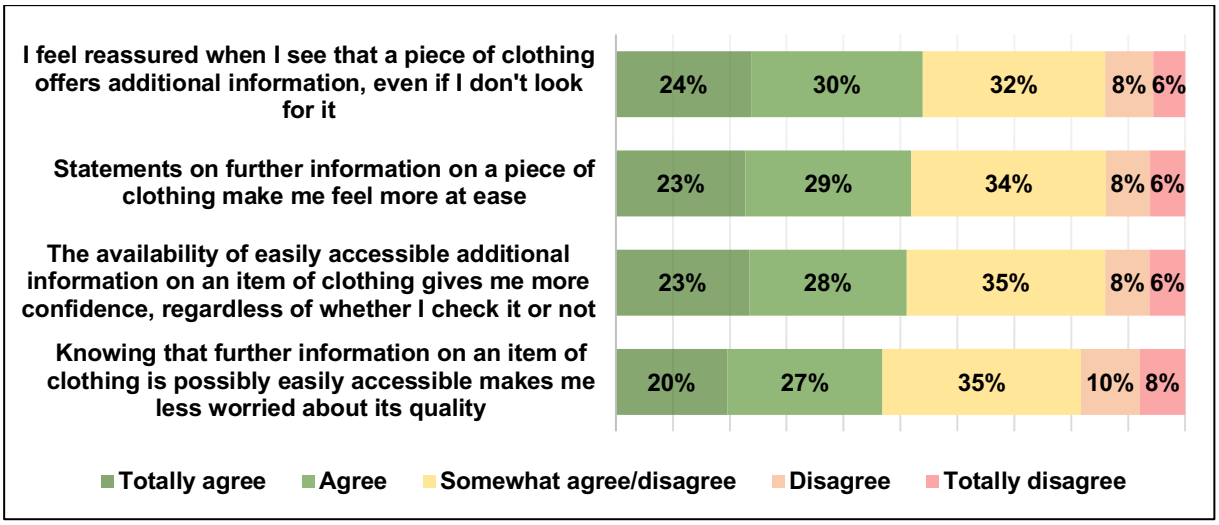

Figure 33 Access to further information (overall)

Figure 34 shows the results broken down by country. Southern countries, namely Spain and Italy, feel more reassured by the availability of further information on clothing with a percentage of positive answers ("*Totally agree*" and "*Agree*") of 59% and 55%, respectively. On the contrary, France and Germany present a more sceptical population, reporting a lower share of positive answers (33% and 34%). Poland places itself in a mid-level but closer to Spain and Italy (53% of "*Totally agree*" and "*Agree*" answers).

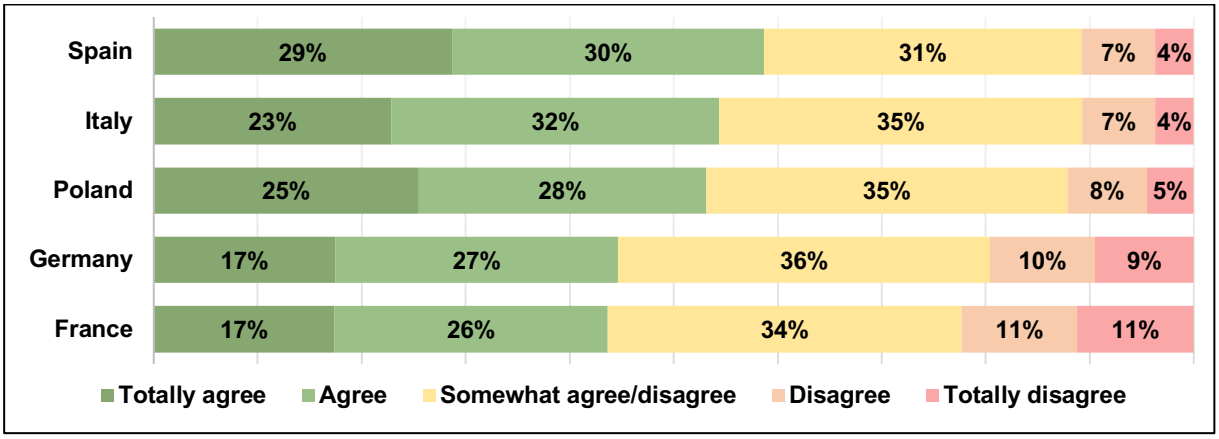

Figure 34 Access to further information (by country)

3.4.2 Trust in environmental claims and eco-labels

With regards to environmental information, respondents are asked to state their trust towards self-declared claims on clothing. At the aggregate level, about 44% of respondents affirmed to trust environmental claims and about 39% declare to moderately trust them (Figure 35). It is noteworthy

that, comparing self-declared claims and eco-labels (Figure 35 and 36), trust increases by 10% when the information is third-party certified reaching, on average, the 54% of positive answers (*"Totally agree" and "Agree"*), while reporting a slight reduction for "*Somewhat Agree"* answers (about 32%). However – although green labels enhance credibility and foster pro-environmental attitudes – a lower share of consumers (46%) affirms to be influenced by eco-labels in their shopping habits.

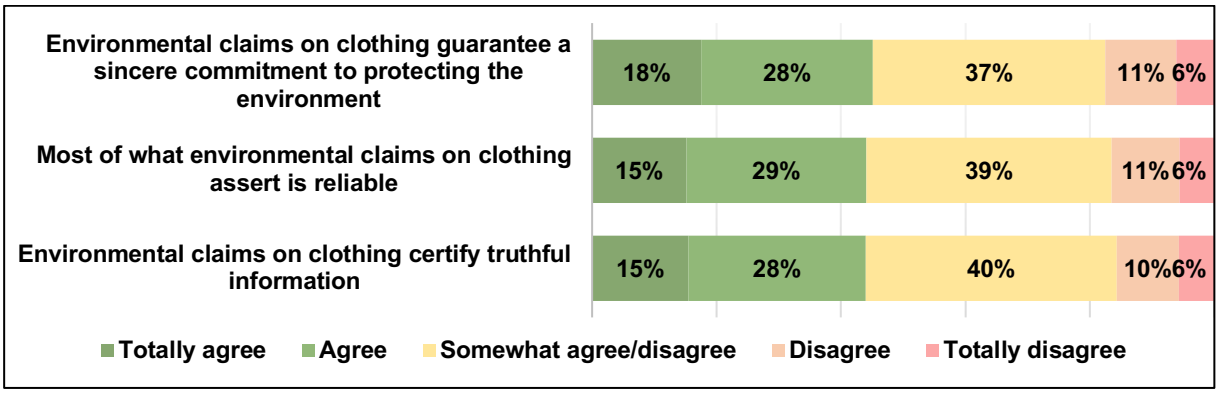

Figure 35 Trust in environmental claims (overall)

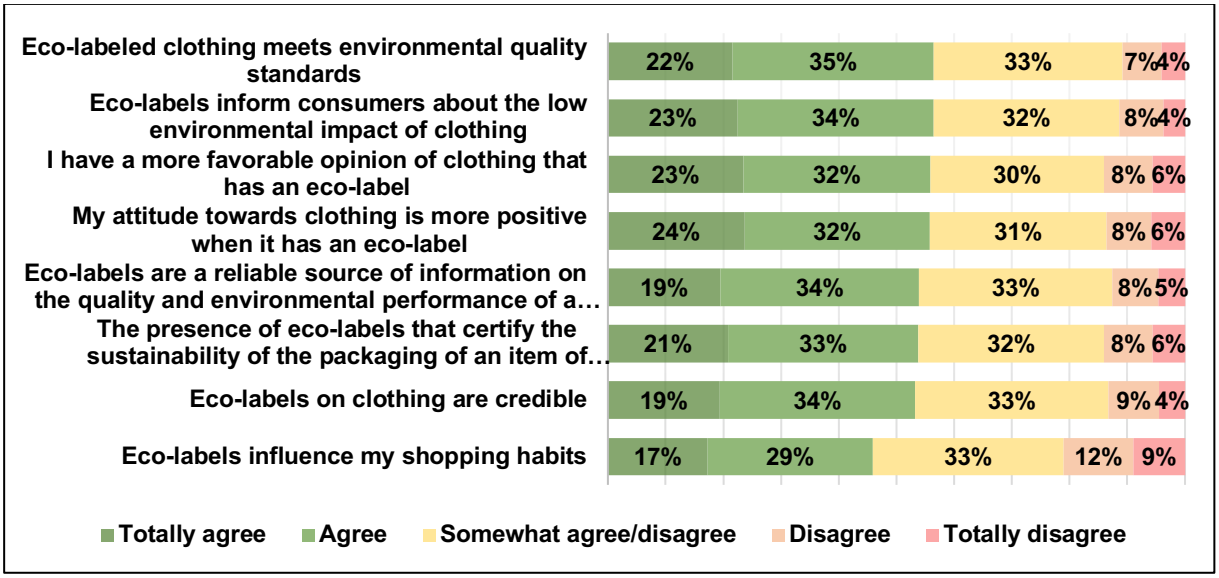

Figure 36 Trust in eco-labels (overall)

Looking at the results by country (Figure 37 and 38), the same trend can be observed with regards to environmental claims and eco-labels, that is, external verified information increases trustworthiness in every country. In particular, as emerged previously (par. 3.4.1 Access to further information), Southern countries trust more both environmental claims and eco-labels than others, with the highest values recorded in Spain (54% for self-declared and 60% for certified claims) and the lowest in Germany (35% for self-declared and 47% for certified claims).

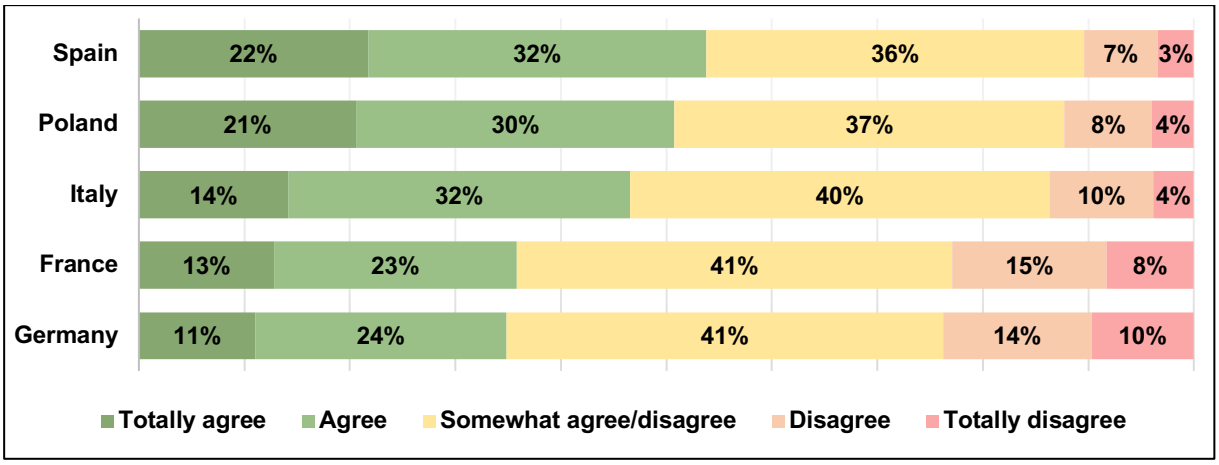

Figure 37 Trust in environmental claims (by country)

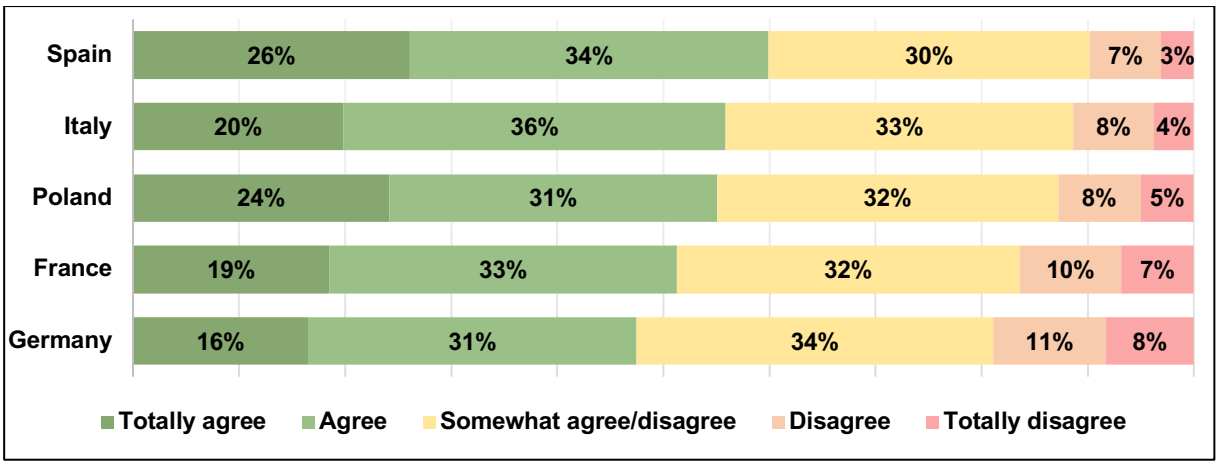

Figure 38 Trust in eco-labels (by country)

4 Innovation and QR-code

As previously introduced, the present section of this questionnaire is addressed to investigate the set of variables related to ***Innovation and QR-code*** and is based on the assumption that technologies can be an enabling factor to foster circular behaviours. In particular, the first questions are designed to understand if there are some factors (e.g., habit, quality, perceived usefulness and ease of use) that can be considered as drivers to the use of QR-code. The last questions aim to assess the intention to use the QR-code and, finally, the attitude toward blockchain technology. Questions in the QR-code section were elaborated considering the act of scanning a QR-code associated with a garment in order to obtain usable information to support circular consumers' purchasing behaviour and/or increasing consumers' awareness on circular story of clothes. Blockchain section foresees questions aimed to in-depth the knowledge level of respondents on this topic and their trust toward this technology and corresponding benefits.

The use of the QR code is increasing globally[8182], but even with its introduction for textile traceability in the textile industry, there has been limited research on consumer acceptance of its usefulness for providing relevant information or the scan of the QR code for the textile traceability system in the context of textile research. Furthermore, its use in connection with blockchain technology has few investigated.

4.1 Drivers to use the QR-code

The acceptance and use of a new information technology, such as in this case of a QR-code to obtain information on a circular garment, as emerges in literature[83848586], may be explained through various determinants.

In this questionnaire, various types of drivers have been explored, involving respondents from five different European countries (Germany, Spain, France, Poland and Italy). The main evidences are debated in following paragraphs in order to analyse the tendency of individuals in these five countries to engage in circular innovative and technological behaviours.

[81] Tarjan, L., Senk, I., Kovac, R., Horvat, S., Ostojic, G., & Stankovski, S. (2011). Automatic identification based on 2D barcodes. Journal of Industrial Engineering and Management, 2,151–157.
[82] Shin, D., Jung, J., Chang, B. (2012). The psychology behind QR codes: User experience perspective. Computers in Human Behaviour 28, 1417-1426
[83] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340.
[84] Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: Development and test. Decision Sciences, 27(3), 451–458.
[85] DeLone, W. H., & McLean, E. R. (1992). Information systems success. Information Systems Research, 3(1), 60–95.
[86] Kim, G. Y., Woo, E. (2016). Consumer acceptance of a quick response (QR) code for the food traceability system: application of an extended technology acceptance model (TAM)

4.1.1 Perceived Characteristics of technology: perceived usefulness, perceived ease of use, perceived quality information and system quality

Main drivers that may influence the usage/adoption or not of a new specific technology can be firstly related to the main characteristics of the technology itself (as, for example, its usefulness and ease of use along with the quality of information provided), in other words to its capacity to meet the need of a potential user in an easy and efficient way (in this case the potential purchaser of a garment who may be interested to obtain integrated/additional/supporting information).

Any new technology needs to be perceived as being useful in order for it to be accepted and assimilated into people's daily routines. However, this is not the only thing that matters in the widespread adoption of technology. Ease of use is another important factor. A technology should be easy to use, with little or no guesswork on the part of the consumer. More importantly, the consumer who takes time and spends money to use a technology (in this case, to scan a QR-code) should derive degree of satisfaction and utility from this activity. According to these considerations, various Authors[87][88][89] have identified that user's attitude toward the use of a particular technology is strongly determined by the individual's ***perceived usefulness*** and ***perceived ease of use*** of the technology itself. The perceived usefulness refers to "the degree to which a person believes that using a particular technology will enhance his or her activity performance", whereas the perception of ease of use refers to "the degree to which a person believes that using a particular technology will be effortless" [90].

From this survey, it emerges, at the aggregate level, that majority of respondents tends to perceive a QR-code system associated with a garment on average *useful/highly useful* to obtain relevant purchase information, as well as an information technology capable to save much time during their shopping and also practical to use. Indeed, as reported in Figure 39, about 77% of respondents agrees with this evaluation (49% *very high* and *high*; 28% *medium*), whereas about 20% of respondents perceives limited useful this technology to support their purchase choices.

[87] Davis, F. D., Bagozzi, P. R., &Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. Management Science, 35(8), 982–1002
[88] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340.
[89] Viswanath Venkatesh, Fred D. Davis, (2000) A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. Management Science 46(2):186-204
[90] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340.

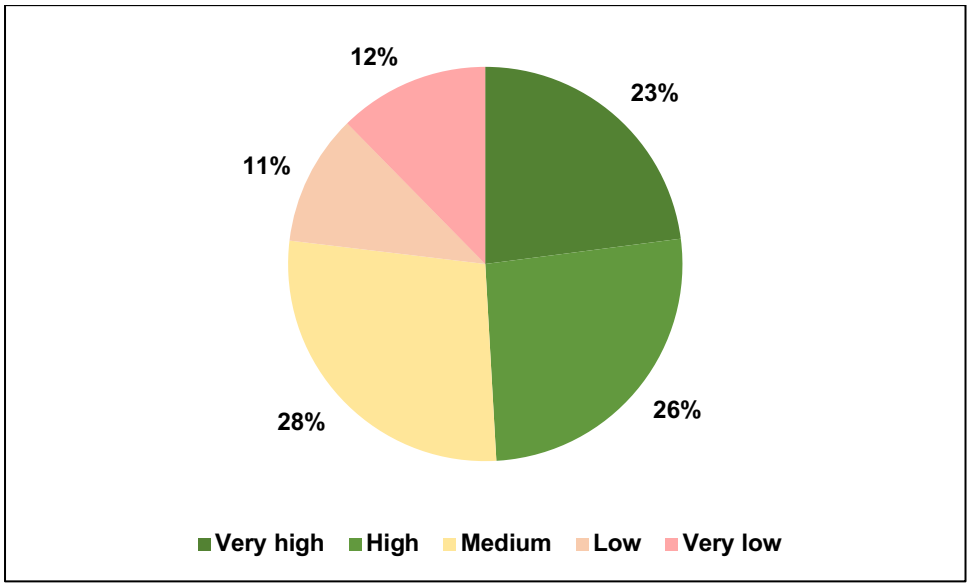

Figure 39: Perceived usefulness of a QR-code associated with a garment (total)

In figure 40, the perceived usefulness of a QR-code associated with a garment by country has been reported. It can be seen that respondents from Spain, Italy and Poland perceive *highly usefulness* this kind of information system for their purchasing choices (more than/equal to 50% of corresponding respondents expressed this consideration). Instead, respondents in Germany and France perceive *moderately/less useful* this system for supporting their purchasing choices.

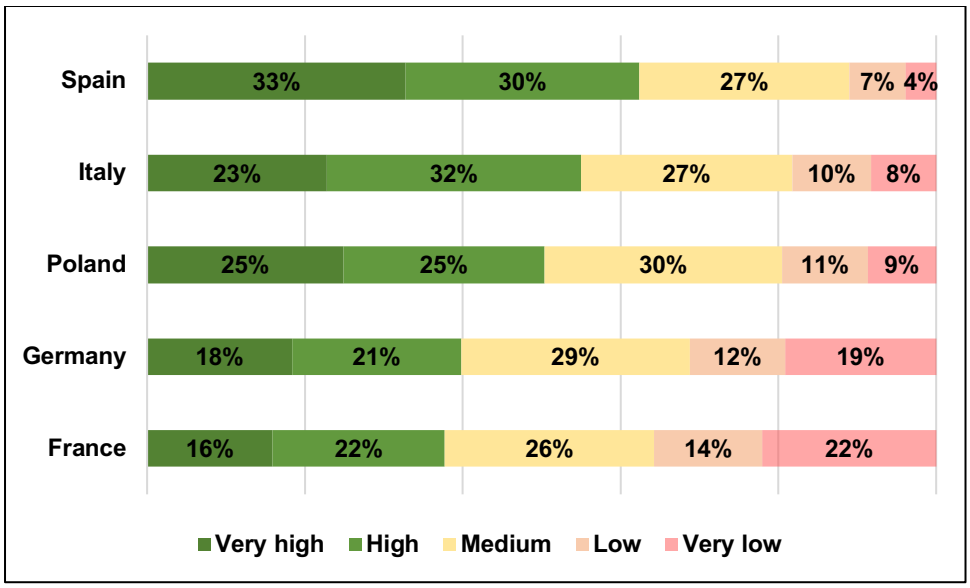

Figure 40: Perceived usefulness of a QR-code associated with a garment (by country)

Regarding the perception ease of use of a QR-code associated with a garment, in Figure 41 the aggregated value is reported, taking into account all respondents involved in this survey. As it can be observed, more than 80% of respondents perceives as *highly/moderately ease to use* the QR-code

system to access additional information and the scanning of a QR-code an operation highly/moderately ease to learn and to understand (63% *very high* and *high*; 24% *medium*). Only 13% of respondents perceives difficult to use this kind of information system.

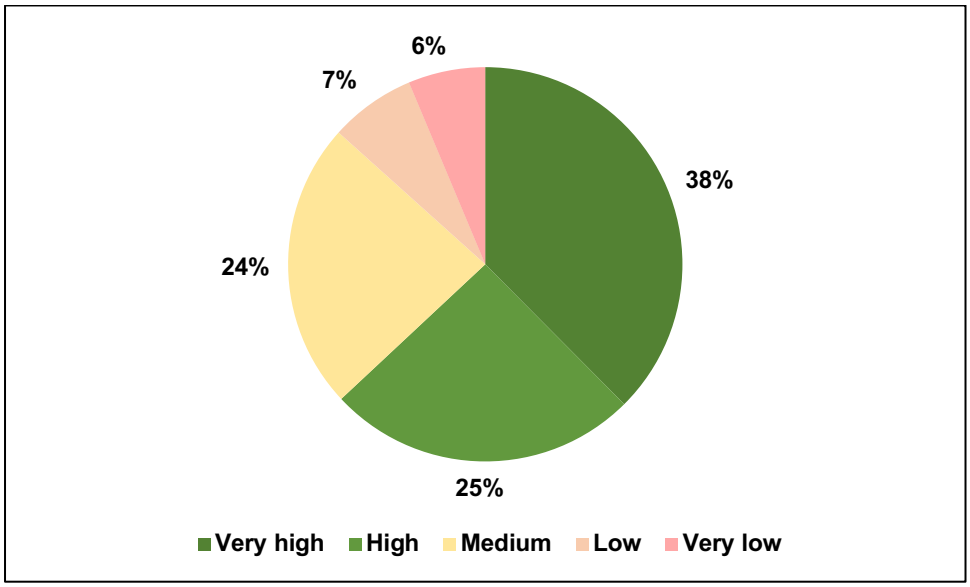

Figure 41: Perceived ease of use of a QR-code associated with a garment (total)

Figure 42 displays the perceived ease of use a QR-code associated with a garment by country. Respondents in all countries perceive as an *easy operation* the scanning of a QR-code to support their purchase choices as can be seen below. The representation is almost homogenous (more than 50% of respondents in each country perceives *highly easy to scan a QR-code* associate with a garment). Spain, Italy and Poland reported percentages slightly higher (more than 60% of total considered expressed this consideration).

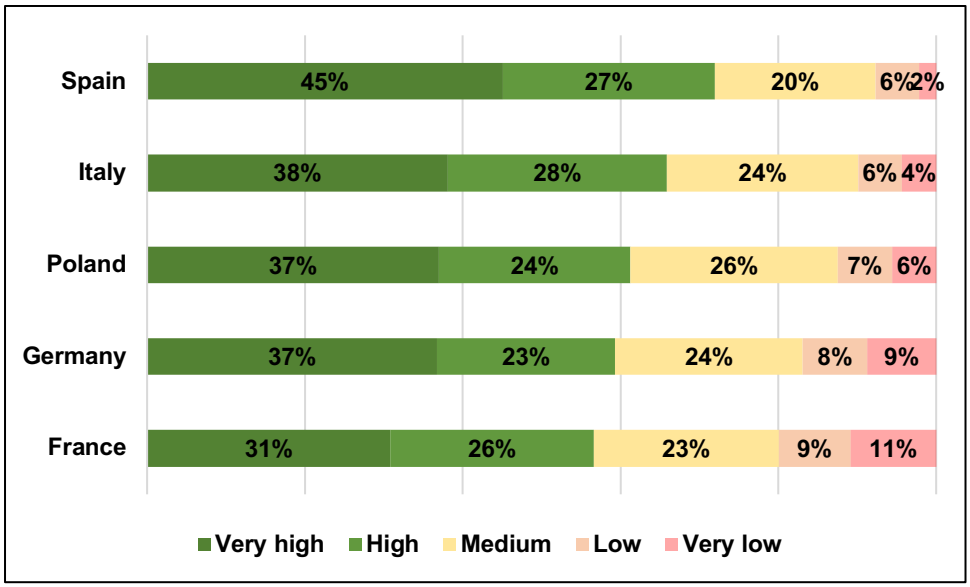

Figure 42: Perceived ease of use of a QR-code associated with a garment (by country)

To evaluate the success of an information system, also the perception of quality information provided by the system and of the system itself are considered very relevant. Information quality captures the

user perceived value of the output produced by a system and can be measured by information accuracy, relevance, timeliness and completeness[9192]. System quality is a measure of the functionality of a system, including usability, availability, reliability and response time. In the QR-code context, ***perceived information quality*** is defined as "cognitive beliefs about the favourable or unfavourable characteristics of the accuracy, completeness, relevance and reliability of the information derived from QR codes". ***Perceived system quality*** of QR codes can be defined as "the degree to which individuals perceive that the connection between a mobile device and the QR code is satisfying in terms of transfer speed and reliability"[93].

Respondents in the sample, in reference to perception quality of information obtainable by scanning a QR-code associated with a garment, perceive the obtainable information *highly/on average good* (in other words, relevant, in-depth, useful and reliable information). Specifically, as can be seen in Figure 43, about 80% of respondents agrees with this evaluation (49% *very high* and *high*; 31% *medium*), whereas about 20% of respondents perceives low the quality of information provided by this kind of information system.

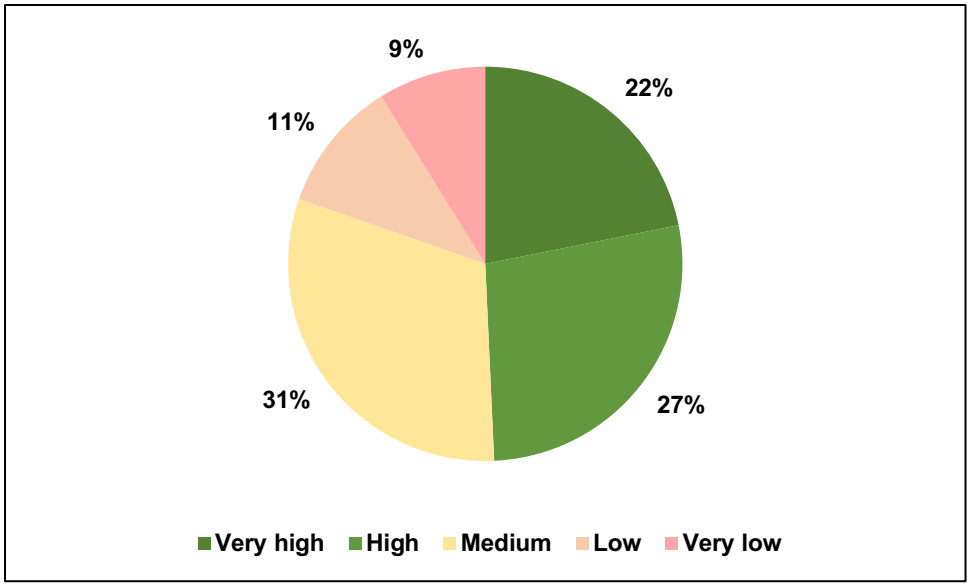

Figure 43: Perceived quality of information obtainable by scanning a QR-code associated with a garment (total)

As previously observed for perceived usefulness section, Spain, Italy and Poland reported the highest number of respondents that perceives the information provided by a QR-code as *highly* relevant, in-depth, useful and reliable as can be seen below in Figure 44 where results by country are reported (more than 50% of corresponding respondents expressed this consideration). Instead, respondents in Germany and France perceive the quality of information provided by this system *moderately/less relevant* for supporting their purchasing choices.

[91]Parasuraman, A., Zeithaml, V. A., & Berry, L. (1988). SERVQUAL: a multiple item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64(1), 12–40.
[92] Lee, Y., Strong, D. M., Khan, B. K., & Wang, R. Y. (2002). AIMQ: A methodology for Information quality assessment. Information & Management, 40(2), 33–146.
[93] DeLone, W. H., & McLean, E. R. (1992). Information systems success. Information Systems Research, 3(1), 60–95.

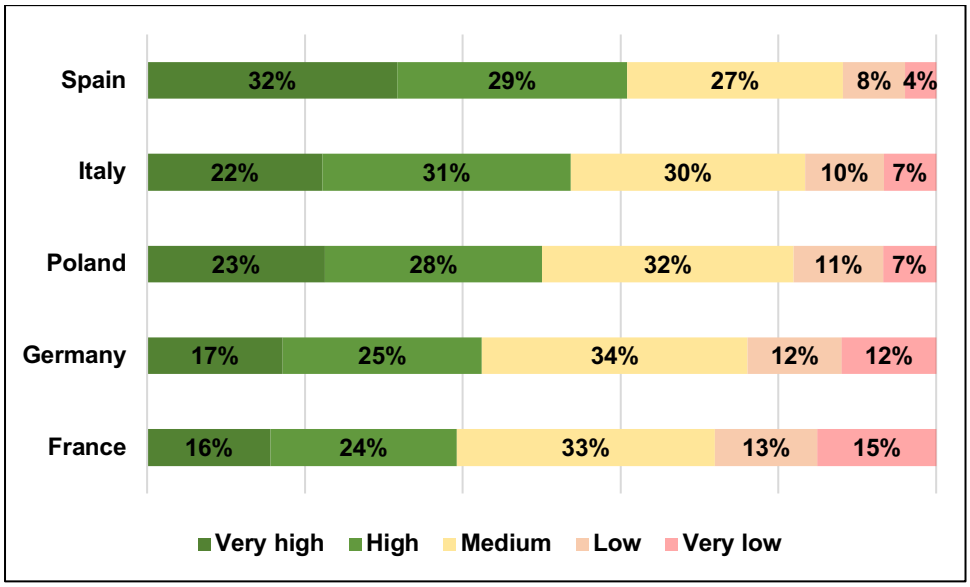

Figure 44: Perceived quality of information obtainable by scanning a QR-code associated with a garment (by country)

Concerning the perception quality of the QR-code as system, Figure 45 reported results at aggregated level, taking into account all respondents involved in the survey. As can be seen in Figure 45, about 80% of respondents perceives the QR-code as a system which is *highly/moderately* reliable, safe to use, characterized by an adequate speed and easily accessible to obtain additional purchase information (53% *very high* and *high*; 31% *medium*). Only the 16% of respondents perceives low the quality of information provided by this technology.

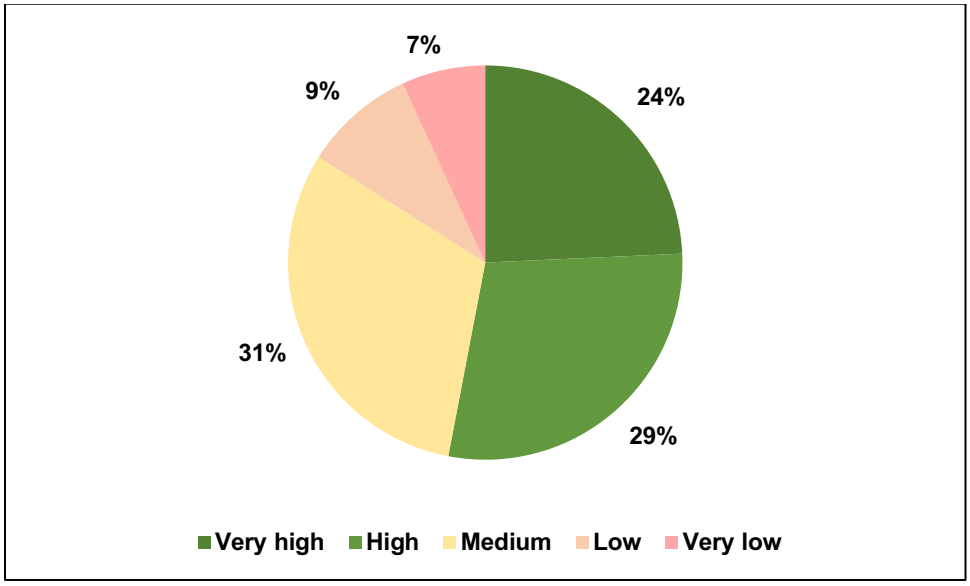

Figure 45: Perceived quality of a QR-code associated with a garment (total)

Figure 46 displays the perceived quality of a QR-code as system associated with a garment by country. As already previously emerged, Spain, Italy and Poland reported the highest number of respondents that perceives the QR-code as a system of quality (more than 50% of corresponding respondents expressed this consideration). Instead, respondents in Germany and France perceive the quality of this

system *moderately/less* reliable, safe to use, quick and accessible to obtain additional purchase information

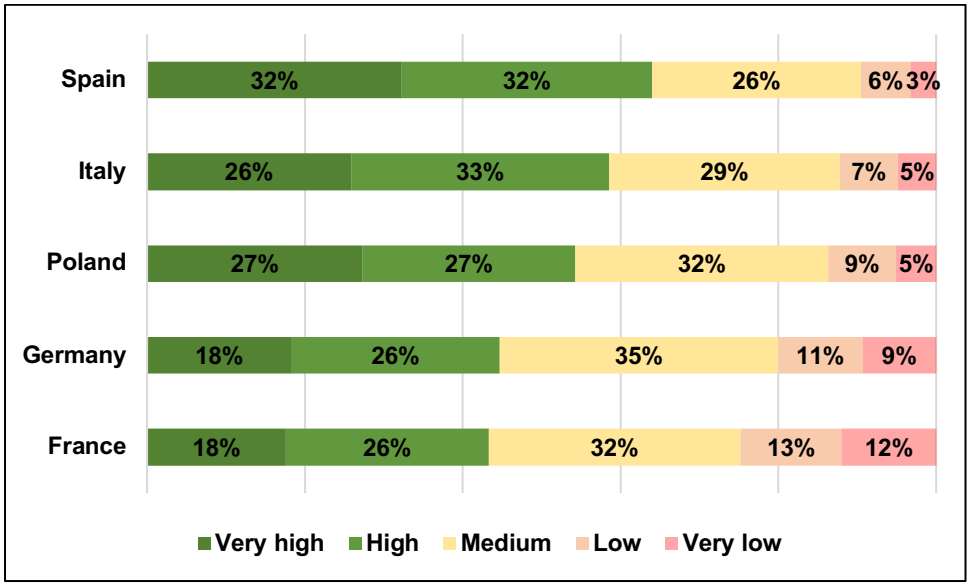

Figure 46: Perceived Quality of a QR-code associated with a garment (by country)

4.1.2 Facilitating Conditions

Furthermore, but not less important, the context conditions may also affect the successful interaction with a new technology by a potential user (as the presence or absence of proper facilitating conditions, both at a technical level and at a skills/knowledge level that may affect the widespread of that specific technology)[94]. Facilitating conditions, in the QR-code context, for example, may be represented by having all resources necessary to properly scan this system, by having all knowledge to understand and to properly use it, by having proper technologies to interact with it (e.g., a camera phone equipped with the correct reader application can scan the image of a QR code) and, in case of emerging difficulties, the presence of an external help (e.g., other family members, friends, etc.).

From the questionnaire it emerges, at aggregated level, that more than 80% of respondents believes to have all resources to properly scan a QR-code associated with a garment, as reported in Figure 47 (59% *very high* and *high*; 25% *medium*). It is a reasonable result since this kind of technology has been introduced more than 20 years ago and nowadays it is common having access to a mobile equipped with the correct QR-code reader application[9596]. Furthermore, the number of contexts for which nowadays is foreseen the interaction of this type of information system is considerably increased (e.g., restaurants/bar to read menu, to verify access credentials, to access wi-fi networks and so on). To complete the evaluation of obtained results, only about 17% of respondents highlights to not have all resources to properly use a QR-code associated with a garment as can be seen below.

[94] Viswanath Venkatesh, Michael G. Morris, Gordon B. Davis and Fred D. Davis (2003) User Acceptance of Information Technology: Toward a Unified View, MIS Quarterly, Vol. 27, No. 3 (Sep., 2003), pp. 425-478 Published by: Management Information Systems Research Center, University of MinnesotaStable
[95] Demir, S., Kaynak, R., Demir, K.A. (2015). Usage level and future intent of use of quick response (QR) codes for mobile marketing among college students in Turkey. Procedia-Social and Behavioral Sciences 181, 405-413
[96] Shin, D., Jung, J., Chang, B. (2012). The psychology behind QR codes: User experience perspective. Computers in Human Behaviour 28, 1417-1426

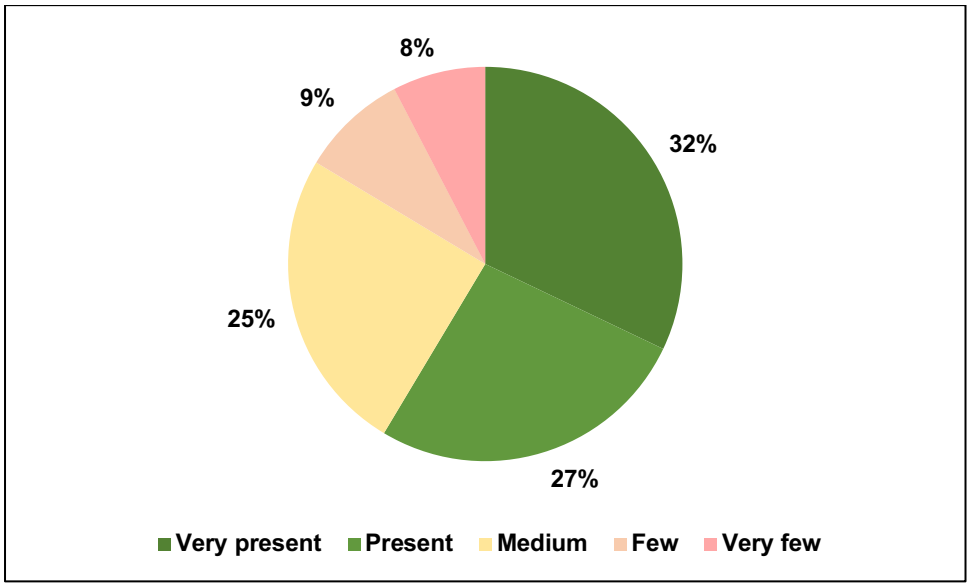

Figure 47: Facilitating conditions that support the use of QR-code perceived by respondents (total)

Taking into account results related to the presence of proper conditions to facilitate the usage of a QR-code associated with a garment by country, as reported in Figure 48, it emerges that Spain and Italy reported the highest number of respondents that highly believes of having all needed resources to correctly interact with this technology (all knowledge to understand and to properly use it, proper technologies to interact with it and, in case of emerging difficulties, the presence of other family members and/or friends able to support them) (more than 60% of corresponding respondents considered). Regarding the other three countries, about 50% of respondents expressed to have all needed resources.

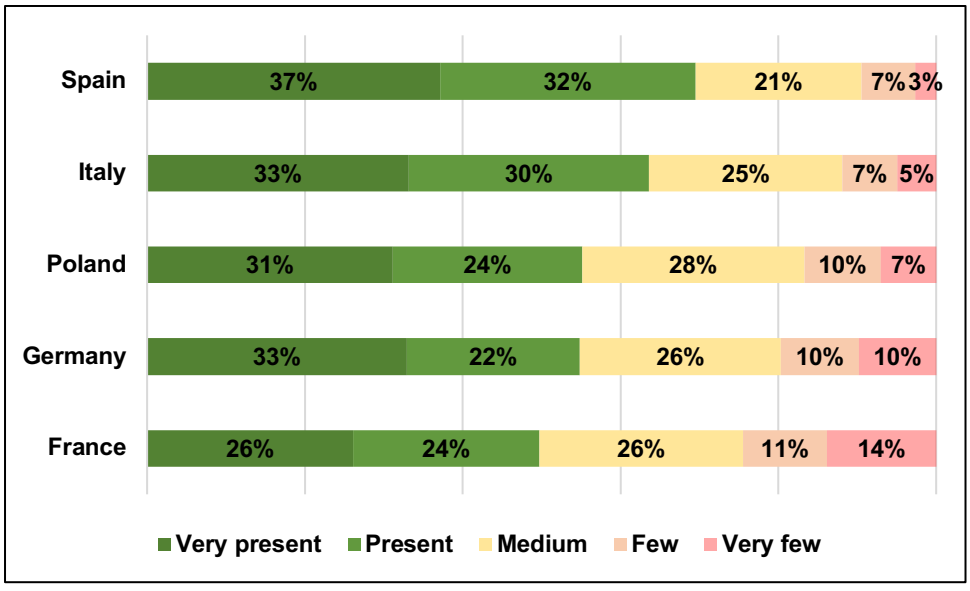

Figure 48: Facilitating conditions that support the use of QR-code perceived by respondents (by country)

4.1.3 Users' characteristics: habit and novelty seeking

Additional important drivers are also those related to users' characteristics: their habit in the usage of technology or that specific technology (in this case, the habit to scan a QR-code)[97] and their propensity to seek novelty/to be open towards innovation in order to foster circular behaviours and more circular value chains[9899100].

Habit has been defined as "the extent to which people tend to perform behaviours automatically because of learning"[101]. In this case, the automatism in the scanning of a QR-code in the daily life to achieve various kind of desiderata (e.g., to access the menu of a restaurant/bar; to obtain additional information about a product in a shop; to verify login credentials/or to authenticate online accounts (e.g. WhatsApp Web, other); to send and/or receive payment information; to access Wi-Fi networks; to download an application or audio/video and finally, to access contact information such as phone number(s), email address(es)) has been investigated.

At aggregated level, as reported in Figure 49, it appears that there is a homogenous distribution in reference to the habit in the scan of QR-code during daily routines among respondents in the five countries sampled. Indeed, respondents can be ascribed to one of the five "user categories" (each one corresponds to about an average value of 20% of the entire sample considered): "**very frequent user**" (22%, more than once a week); "**Frequent user**" (18%, once a week); "**Sporadic user**" (21%, once to three times a month); "**Very sporadic user**" (22%, less than once a month) and "**No use**" (18%, never/very rarely).

[97] Viswanath Venkatesh, James Y. L. Thong and Xin Xu (2012) Consumer Acceptance and Use of Information Technology: Extending the Unified Theoryof Acceptance and Use of Technology MIS Quarterly, Vol. 36, No. 1 (March 2012), pp. 157-178 Published by: Management Information Systems Research Center, University of Minnesota

[98] Ritu Agarwal, Jayesh Prasad, (1998) A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology. Information Systems Research 9(2):204-215

[99] Borhan, M. N., Ibrahim, A. N. H., & Miskeen, M. A. A. (2019). Extending the theory of planned behaviour to predict the intention to take the new high-speed rail for intercity travel in Libya: Assessment of the influence of novelty seeking, trust and external influence. Transportation Research Part A: Policy and Practice, 130, 373-384.

[100] Rogers, EM. Diffusion of innovations. 5. New York: Free Press; 2003.

[101] Viswanath Venkatesh, James Y. L. Thong and Xin Xu (2012) Consumer Acceptance and Use of Information Technology: Extending the Unified Theoryof Acceptance and Use of Technology MIS Quarterly, Vol. 36, No. 1 (March 2012), pp. 157-178 Published by: Management Information Systems Research Center, University of Minnesota

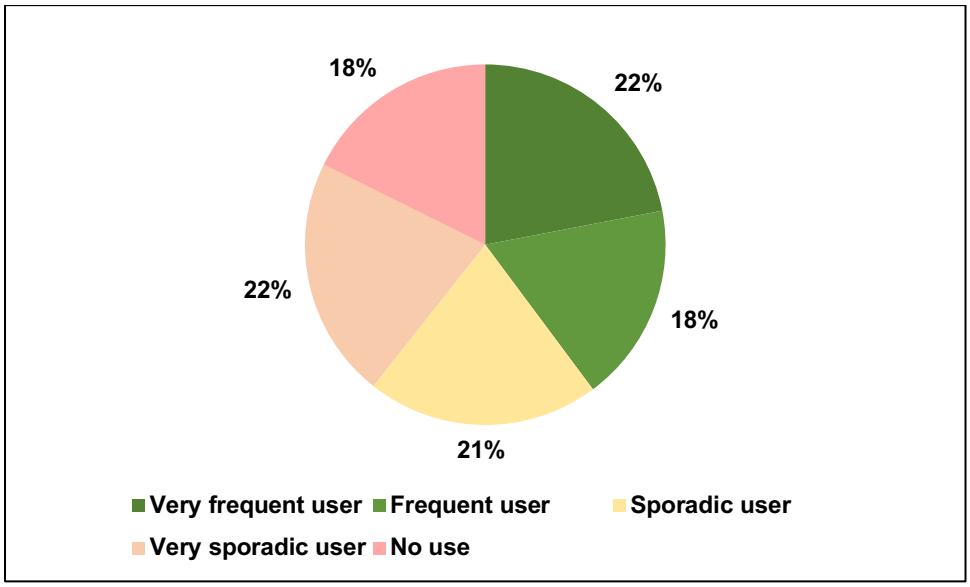

Figure 49: Type of QR-code user (total)

In figure 50 is reported the type of QR-code users by country. It can be seen that the homogeneity observed considering all respondents (Figure 49), here is less evident. Indeed, it may be noted two kinds of situations: considering Germany, France and Poland it may be noted that the majority of respondents can be ascribed in the users' categories of "*Sporadic user*", "*Very sporadic user*" and "*No use*"; whereas, for what concerns Spain and Italy it emerges an opposite scenario. In this case, about 50% of respondents may be identified as or "*Very frequent*" or "*Frequent*" users. Furthermore, for these lasts, it is also possible to highlight that about 30% of respondents belong to first category (respondents that scan a QR-code more than once a week). Overall, it emerges that respondents of Spain and Italy frequently use this information technology during their daily routines.

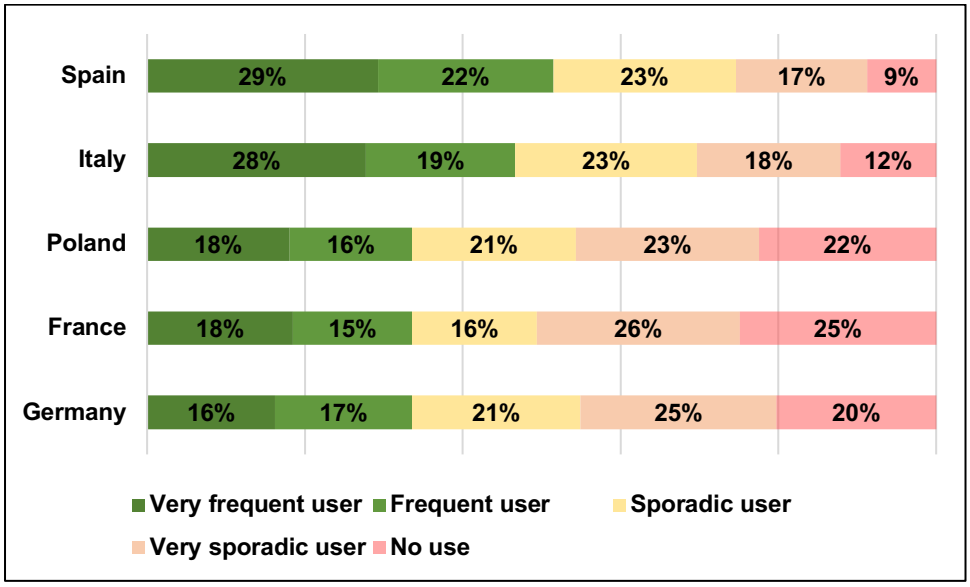

Figure 50: Type of QR-code user (by country)

In order to complete the evaluation of habit of respondents in the five countries in the scanning process of a QR-code, Figure 51 reports, at aggregate level, the results related to the various types of purposes for which respondents in five countries analysed scan a QR-code during their daily routines. As can be seen below, there are slight differences among an item and another one. Nevertheless, it emerges that the scanning operation of a QR-code is mainly addressed to one of following purposes (considering frequency from more than once a week to once to three times a month): "*to access the menu of a restaurant/bar*" (about 41%); "*To access additional information about a product in a shop*" (about 39%); "*to verify login credentials/authenticate online accounts (e.g., WhatsApp Web other)*" (about 38%) and "*To download an application*" (about 38%).

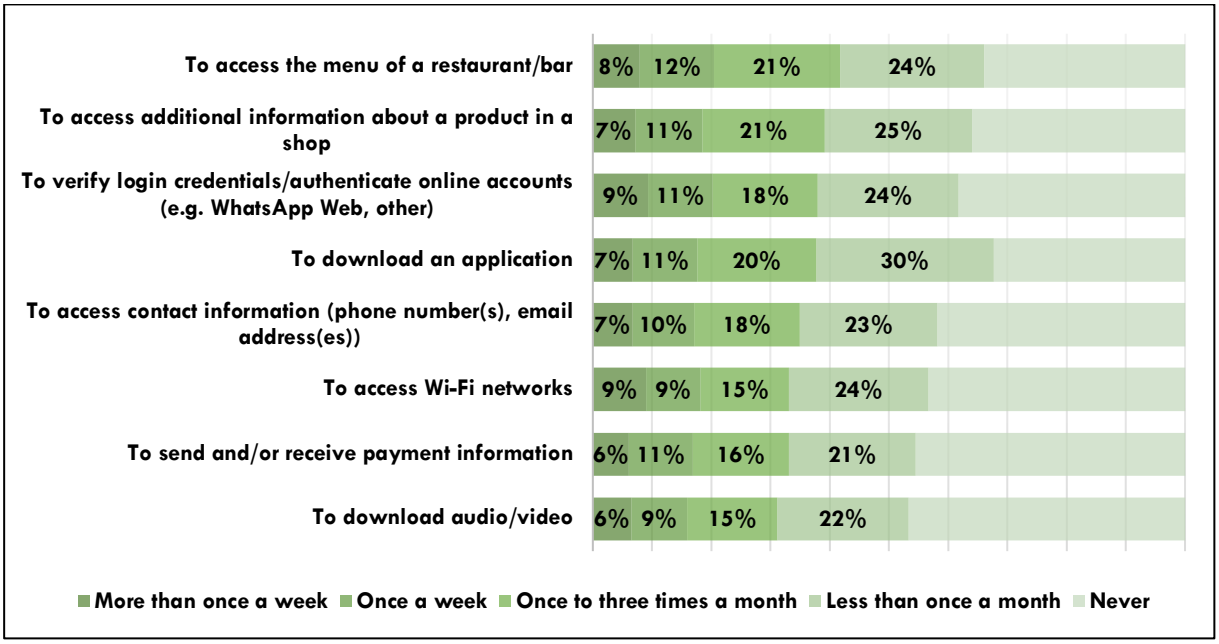

Figure 51: Habit to use QR-code (total)

Consumers with high propensity to seek novelty have a stronger intrinsic motivation to use technology-based products and seek new stimuli. Therefore, ***novelty seekers*** are often identified as those who dare to break traditional rules, take risks, and pursue novel experiences that are different from the routine of their daily lives[102][103]. For this reason, this survey addressed to also explore this propensity in order to investigate if consumers have a positive attitude towards the novelty and innovation, in order to support the development of future circular value chains based on traceability and strong interconnections between various actors.

From this study, as reported in Figure 52, it emerges that about 50% of respondents seeks *highly* novelty and expressed to always look for new ideas, to like trying new and unfamiliar experiences, to constantly change own activities and to like introducing novelties and changes in own daily routines. About 30% *moderately* seeks novelty and innovative experiences, whereas an overall percentage of 18% *rarely* look for new ones.

[102] Borhan, M. N., Ibrahim, A. N. H., & Miskeen, M. A. A. (2019). Extending the theory of planned behaviour to predict the intention to take the new high-speed rail for intercity travel in Libya: Assessment of the influence of novelty seeking, trust and external influence. Transportation Research Part A: Policy and Practice, 130, 373-384.
[103] Currie, R., 1997. A pleasure-tourism behaviors framework. Ann. Tour. Res. 24 (4), 884–89

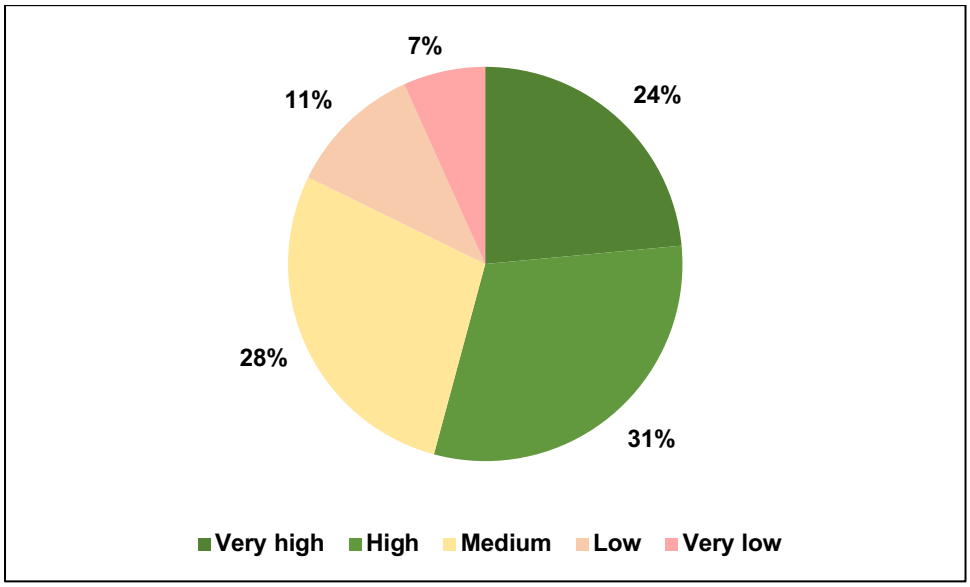

Figure 52: Novelty seeking by respondents (total)

In figure 53 is reported the novelty seeking by country. It can be seen that respondents from Spain, Poland and Italy *highly* seeks for new and innovative experiences (more than 50%). Instead, respondents in Germany and France *less* seeks this kind of experiences (less than 50%).

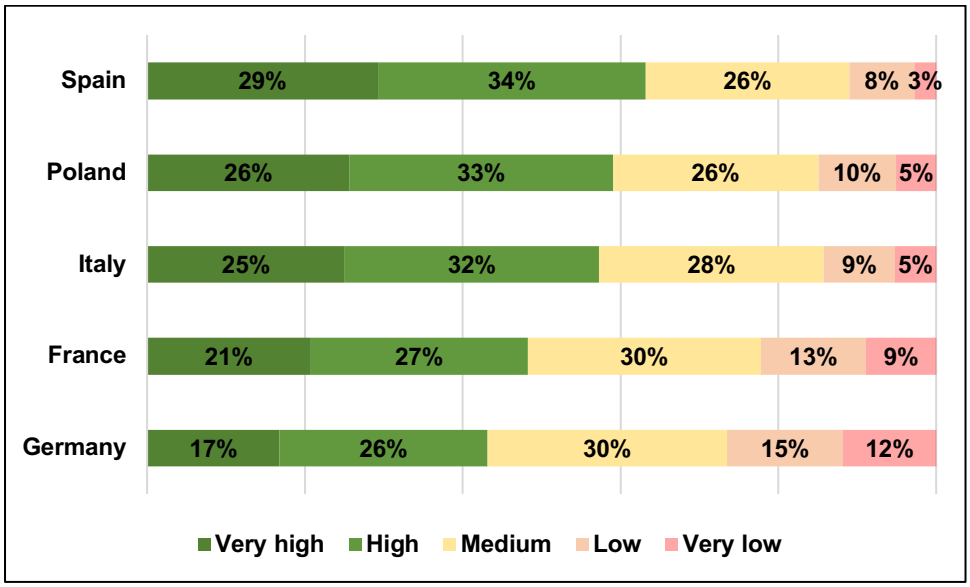

Figure 53: Novelty seeking by respondents (by country)

4.2 Intention to use the QR-code

As previously introduced, the second part of ***Innovation and QR-code*** section was addressed to assess the concrete intention to use the QR-code by consumers in order to support more aware purchasing behaviours and, at the same time, the circular transition of the textile value chain itself. In this survey both users' attitude towards this technology and their behaviour intention to concretely use it have been investigated. ***Attitude*** refers to "the user's overall feeling about performing the target behaviour"

[104], whereas ***behavioural intention*** refers to "the strength of a user's intention to undertake a particular behaviour" (in our case, the scanning process of a QR-code associated with a circular garment)[105]. If the new technology has been accepted and evaluated as a useful tool, consumers concretely will start to use it in their daily routines: if a QR-code is recognized as capable to provide relevant information in an easy way consumers will use it[106].

Coherently with results highlighted for drivers' part, at aggregated level, as reported in Figure 54, it emerges a positive attitude toward the possible use of a QR-code associated with a garment to obtain additional information on its circular story. About 80% of respondents consider highly/moderately the scanning of a QR-code for that purpose a good/reasonable/useful/funny/very satisfying/sensible idea (56%, *very high* and *high*; 27% *medium*). Only 17% of respondent expressed a *low* attitude towards the adoption of this behaviour.

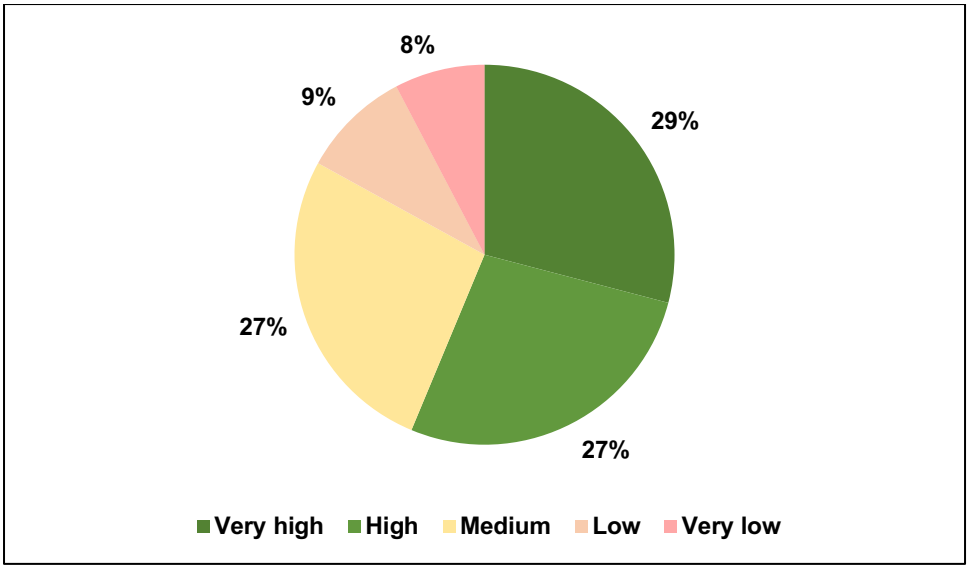

Figure 54: Attitude toward use of a QR-code associated with a garment (total)

Concerning the results on the attitude toward use of a QR-code associated with a garment by country, as can be seen in Figure 55, it emerges that respondents in all five countries have a *high* positive attitude toward the adoption of this behaviour: in Spain, Italy, Poland and Germany more than 50% of total number of respondents expressed this consideration; whereas in France, about 46% of the respondents agreed with this evaluation.

[104] Viswanath Venkatesh, James Y. L. Thong and Xin Xu (2012) Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology MIS Quarterly, Vol. 36, No. 1 (March 2012), pp. 157-178 Published by: Management Information Systems Research Center, University of Minnesota

[105] Y.G. Kim, E.Woo. Consumer acceptance of a quick response (QR) code for the food traceability system: Application of an extended technology acceptance model (TAM). Food Research International 85 (2016) 266–272

[106] Viswanath Venkatesh, James Y. L. Thong and Xin Xu (2012) Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology MIS Quarterly, Vol. 36, No. 1 (March 2012), pp. 157-178 Published by: Management Information Systems Research Center, University of Minnesota

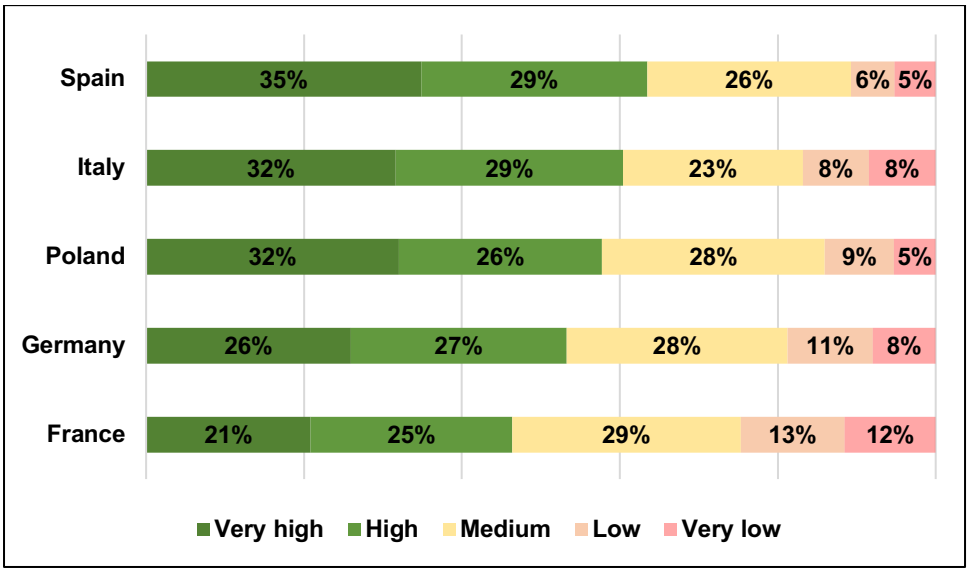

Figure 55: Attitude toward use of a QR-code associated with a garment (by country)

Analysing intention to use responses' part, it emerges, as reported in Figure 56, at aggregated level, among respondents in five countries, analysed in this study, a *high/moderate* intention to concretely use the QR-code in order to support more aware purchasing behaviours and, at the same time, the circular transition of the textile value chain itself. About 76% of total number of respondents expressed own will/intention to scan QR-codes associated with garments to support own purchase choices and the will to recommend this action also to other consumers (46%, *very high* and *high*; 30% *medium*). About a quarter of total number of respondents expressed a low intention to adopt this behaviour (16% very low).

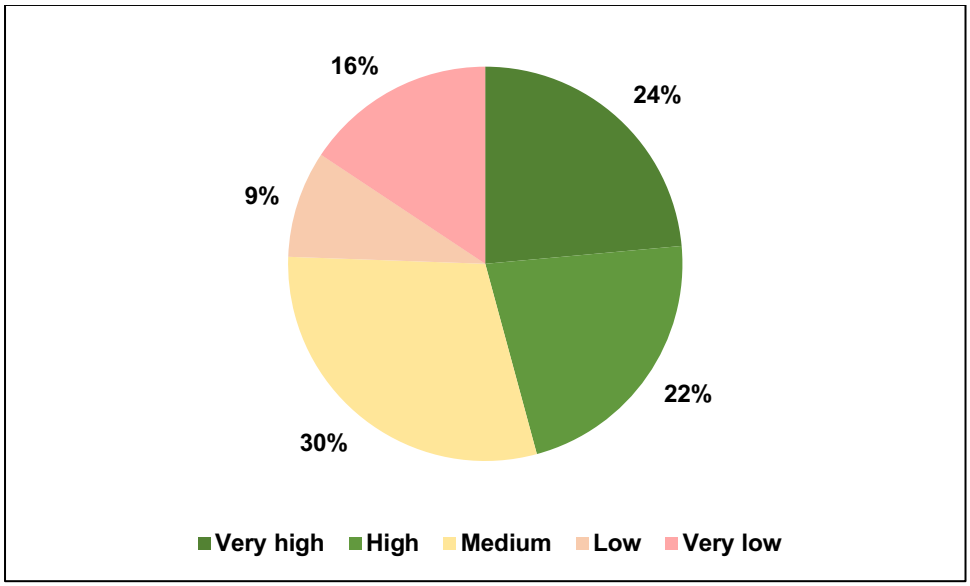

Figure 56: Intention to use a QR-code associated with a garment (total)

In figure 57 intention to use a QR-code associated with a garment by country is reported. It may be noted two kinds of situations: considering Germany and France it may be noted that the majority of respondents expressed a *minor* intention to adopt this behaviour (overall a percentage of about 60% expressed a *moderate/unfavourable* intention); whereas, for what concerns Spain, Italy and Poland, it

emerges an opposite scenario. In this case, more than about 50% of respondents expressed the will to scan a QR-code associated with garments during their own shopping activities and the will to recommend this to other consumers.

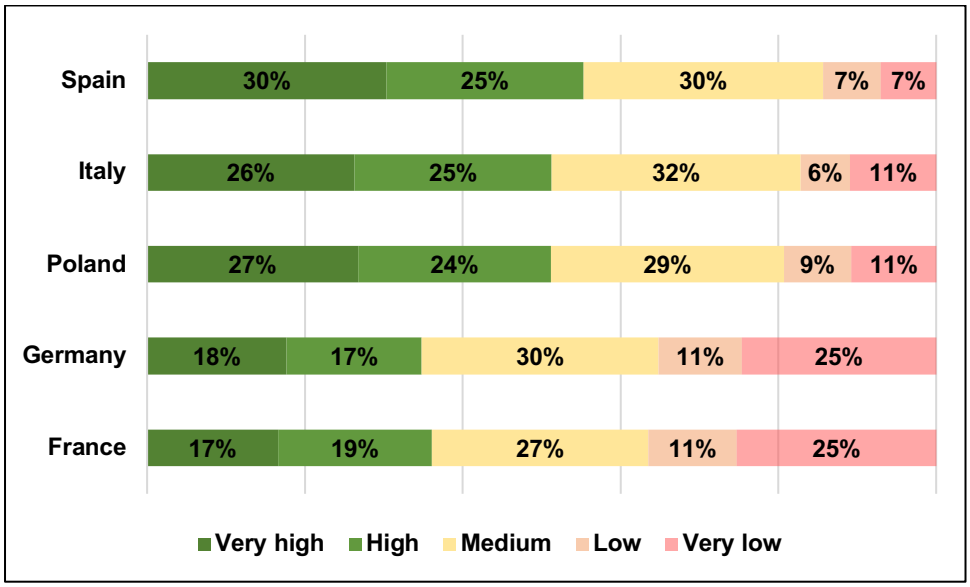

Figure 57: Intention to use a QR-code associated with a garment (by country)

4.3 Attitude toward blockchain technology

The final part of this section was aimed to explore the attitude toward blockchain by consumers. In particular, their **knowledge level** on this topic and their **trust toward this innovative technology and its benefits** for the future have been investigated. According to some authors, blockchain technology may be considered as a strong enabler of consumer trust for its immutability, decentralization, openness and anonymity. Thanks to this technology is possible to build trusted traceability systems[107].

Regarding the analysis of knowledge level on the blockchain technology among consumers in the five countries where this survey was carried out, this topic was explored in the questionnaire by means of four true/false sentences related to main characteristics of this technology (such as, its "immutable" and shared data structure, the fact that each element, once written, can be fully traced, the decentralization of information and the transparency of contents).

Survey's respondents, as reported in Figures 58, 59, 60, 61, 62 and 63 showing results both at overall level and at by country level, highlighted a limited knowledge of what blockchain technology is. Indeed, at aggregated level (Figure 58), only a small percentage of the total number of respondents correctly identified all four true/false sentences: 2%, whereas 52% expressed or not to know the topic or wrongly answered. Taking into account the knowledge level of respondents by country (Figures 59, 60, 61, 62 and 63) the situation is very similar to that observed at overall level: 1-2% of total number of respondents correctly identified all true/four sentences, whereas an average percentage value of about 52% expressed or not to know this topic or wrongly answered.

[107] Ferreira da Silva, C., & Moro, S. (2021). Blockchain technology as an enabler of consumer trust: A text mining literature analysis. Telematics and Informatics, 60, 101593.

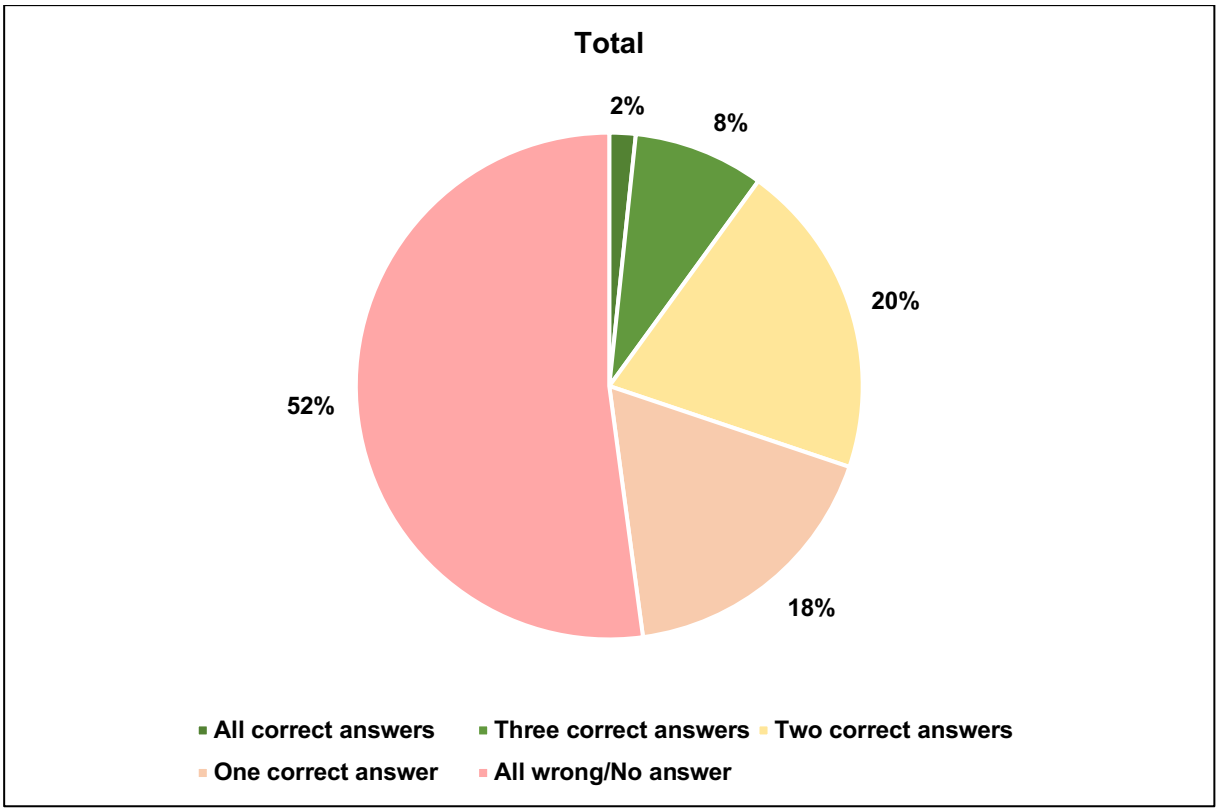

Figure 58: Knowledge of blockchain technology (total)

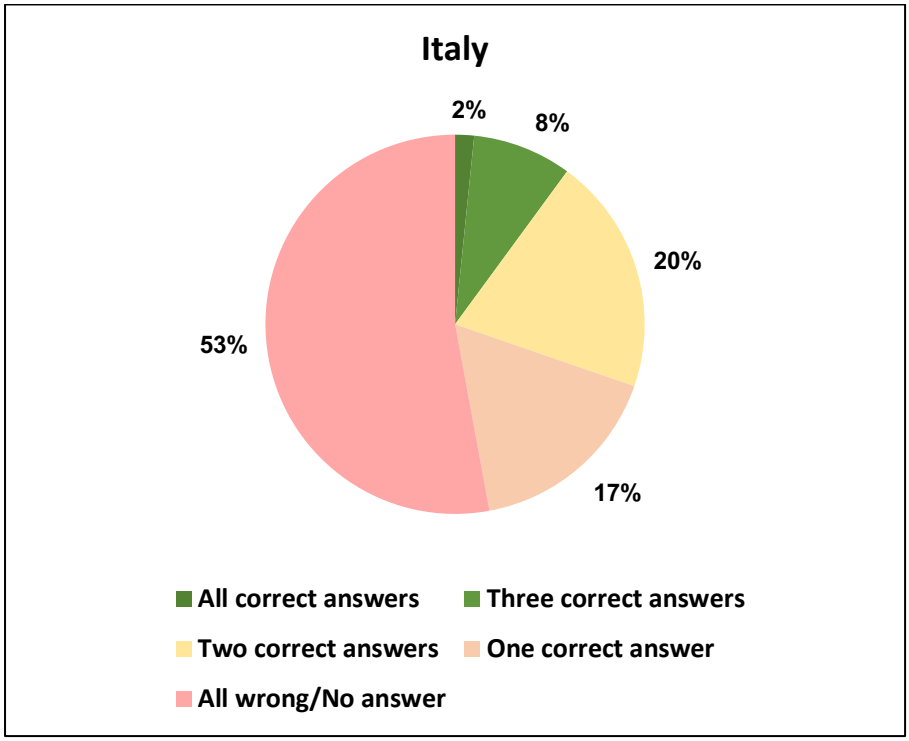

Figure 59: Knowledge of blockchain technology (Italy)

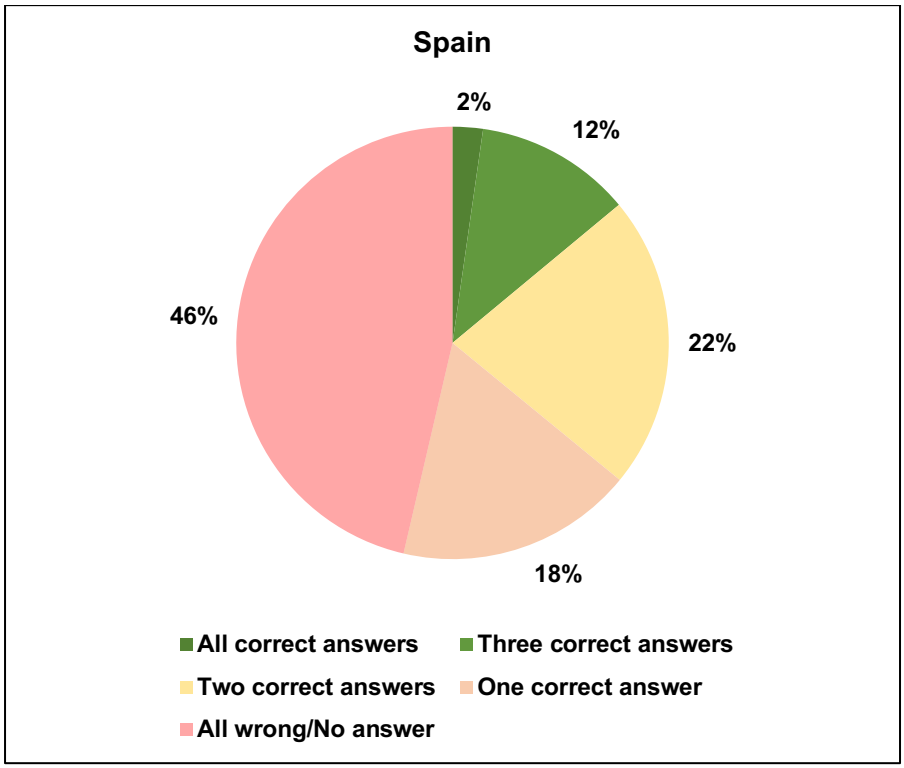

Figure 60: Knowledge of blockchain technology (Spain)

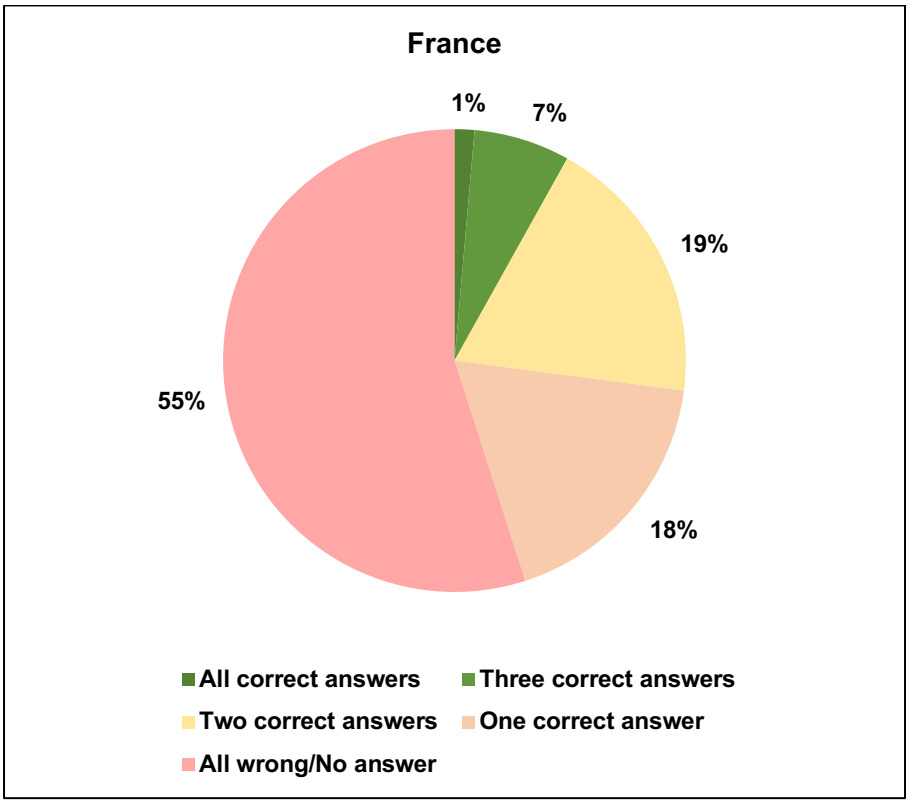

Figure 61: Knowledge of blockchain technology (France)

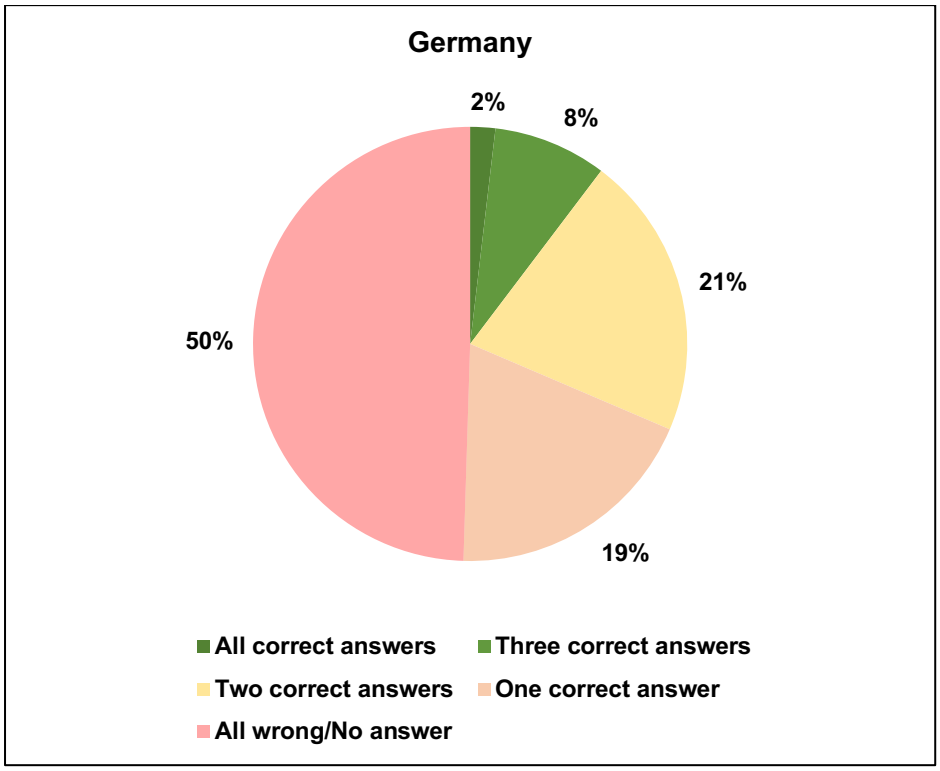

Figure 62: Knowledge of blockchain technology (Germany)

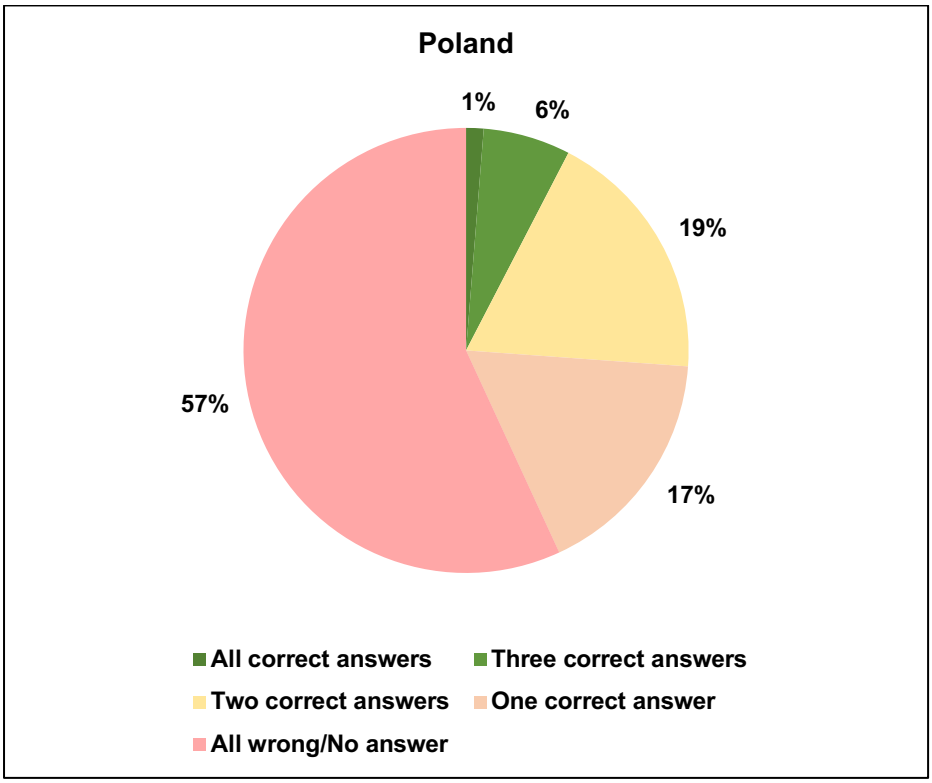

Figure 63: Knowledge of blockchain technology (Poland)

Trust is "a person's willingness to rely on a new technology or a person's will"[108]. Thus, trust ensures that users are empowered to make decisions in the face of uncertain evidence of reliability, and thus to take aware purchase decisions according to their own use intentions. Despite this field is still few explored, some authors agree that consumers want transparency and effective accountability when use information technology to understand sources and processes related to the entire value chain. The lack of reliable information, such as dishonest and deceptive practices, may lead to a failure to gain consumer trust, whereas the provision of credible information can greatly enhance consumer trust[109].

Taking into account the trust toward blockchain by all respondents of five countries analysed in this survey, as can be seen in Figure 64, at aggregated level, the majority of respondents expressed a *moderate* trust toward this new technology and its corresponding benefits (such as, making it possible to carry out securely and reliably transactions, to fully trace the supply chain of a product, to ensure transparent and responsible manufacturing supply chains, to enable reliable information, to enhance trust between producers and consumers, to support the development of new technologies as product passport) (47% of the total number of respondents agrees with this evaluation). This picture seems to be coherent with the previous output related to the knowledge level on blockchain technology by respondents involved in this survey: trust towards a new technology can be increased both by supporting the learning process of what it really/concretely is (its main characteristics and benefits) and starting to interact with the technology itself in daily routines to touch/live its real benefits.

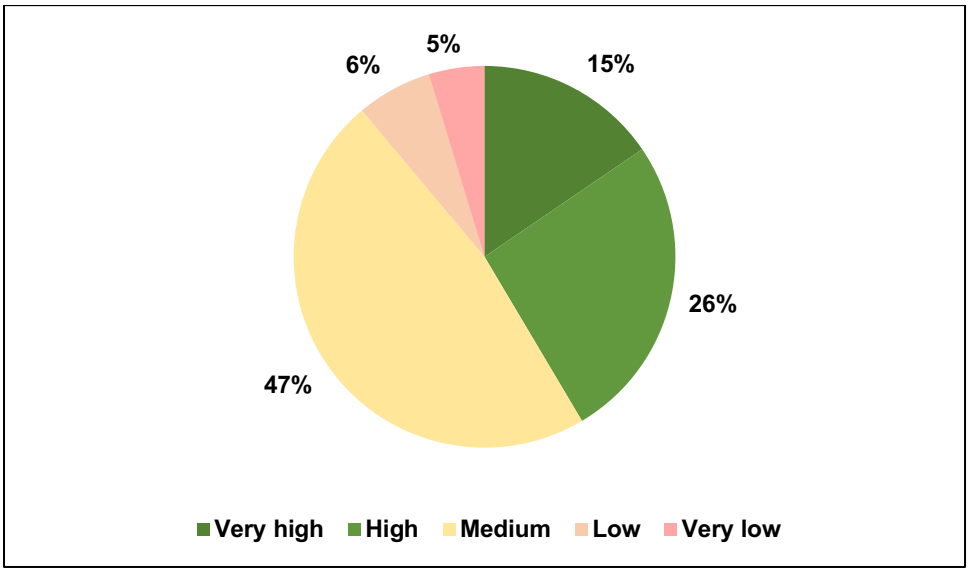

Figure 64: Trust toward blockchain technology (total)

In figure 65 is reported the trust toward blockchain technology by country. It can be seen, coherently with results obtained at aggregated level, that respondents in all five countries expressed a medium trust toward this technology. This highlights that there is the need to develop proper policies / regulations / action plans able to also support the development/growth of a more aware consumer toward the adoption of this kind of innovative technologies in order to really foster circular value

[108] Borhan, M. N., Ibrahim, A. N. H., & Miskeen, M. A. A. (2019). Extending the theory of planned behaviour to predict the intention to take the new high-speed rail for intercity travel in Libya: Assessment of the influence of novelty seeking, trust and external influence. Transportation Research Part A: Policy and Practice, 130, 373-384.
[109] Morgan, R.M.; Hunt, S.D. The commitment-trust theory of relationship marketing. J. Mark. 1994, 58, 20–38.

chains and circular behaviours. Only in Spain, as can be seen below, respondents expressed high trust toward blockchain for a percentage of about 50%, whereas in other four countries analysed, this percentage resulted to be minor.

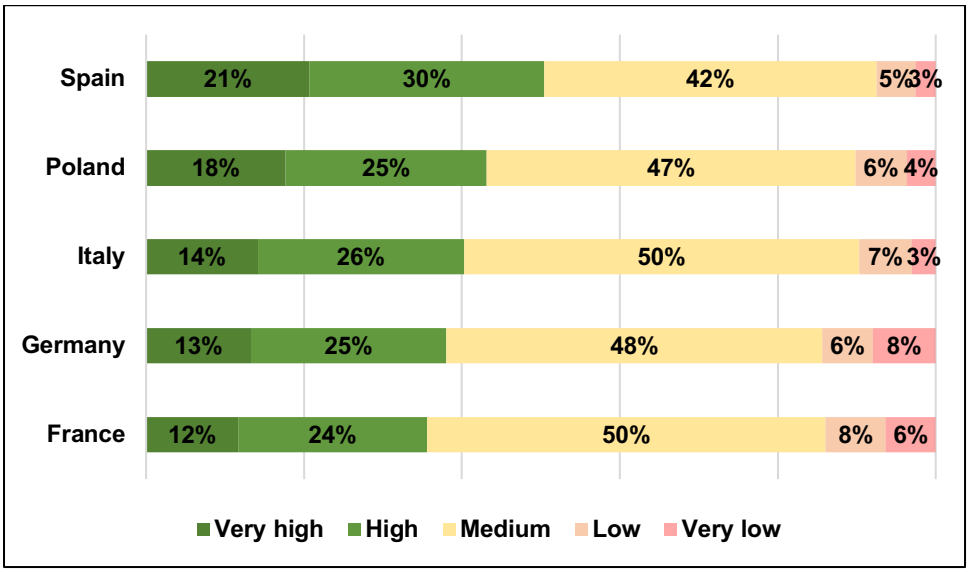

Figure 65: Trust toward blockchain technology (by country)

5 Conflicts and paradoxes in consumers' minds on circular fashion

In this section authors are going to dig deeper into consumers' minds, to explore how they deliberate decisions when personal and environmental objectives conflict with each other. Oftentimes, personal willingness to pursue ecological behaviours collides with the intimate intention to satisfy personal desires[110]. Specifically, when buying clothes or garments people are likely to take into account a wide set of aspects, as shown in the previous paragraphs (i.e., aesthetical, price, functionality, sustainability, recyclability, environmental footprint, fair trade and so forth). When the alternatives are diverse and each of them reflects one aspect that consumers care about (e.g., sustainability vs aesthetics, sustainability vs functionality), those aspects turn into trade-offs[111], which can eventually backfire on people's capacity to stick with their sustainability commitment regarding clothes.

In the following paragraphs, there will run over the process through which conflicts take place in consumer's mind, whether people have a natural propensity to get excitement by resolving those tensions and how many types of different conflicts they can deal with - respectively: experiencing tensions, types of tensions and paradox mindset[112].

5.1 Perceived tensions

Consumers have been asked whether they feel conflictual ideas and opinions about a set of seven questions, where each question depicts a frequent yet fairly different scenario. By this set of questions, authors investigated how often (on a scale ranging from "*never*" to "*very often/always*") people experience conflicting goals, ideas, or inquiries while shopping for clothes. For instance, authors wondered whether they have even experienced thoughts like: "*I am looking for a garment that is functional but also manufactured sustainably*" or "*I wonder whether to buy a new cheap pair of shoes, aware of the risk of having to change it soon or buy a more expensive pair that should last much longer*". Overall, the majority of the interviewees have experienced such feelings at least "sometimes" (Figure 66).

[110] Barbarossa, C., & Pastore, A. (2015). Why environmentally conscious consumers do not purchase green products: A cognitive mapping approach. Qualitative Market Research: An International Journal.

[111] Hyun, J., Lee, K., & Kim-Vick, J. (2021). Consumer responses to trade-offs in eco-friendly clothing: The moderating effects of fashion leadership and regulatory focus. Journal of Retailing and Consumer Services, 59, 102365.

[112] Miron-Spektor, E., Ingram, A., Keller, J., Smith, W. K., & Lewis, M. W. (2018). Microfoundations of organizational paradox: The problem is how we think about the problem. Academy of Management Journal, 61(1), 26-45.

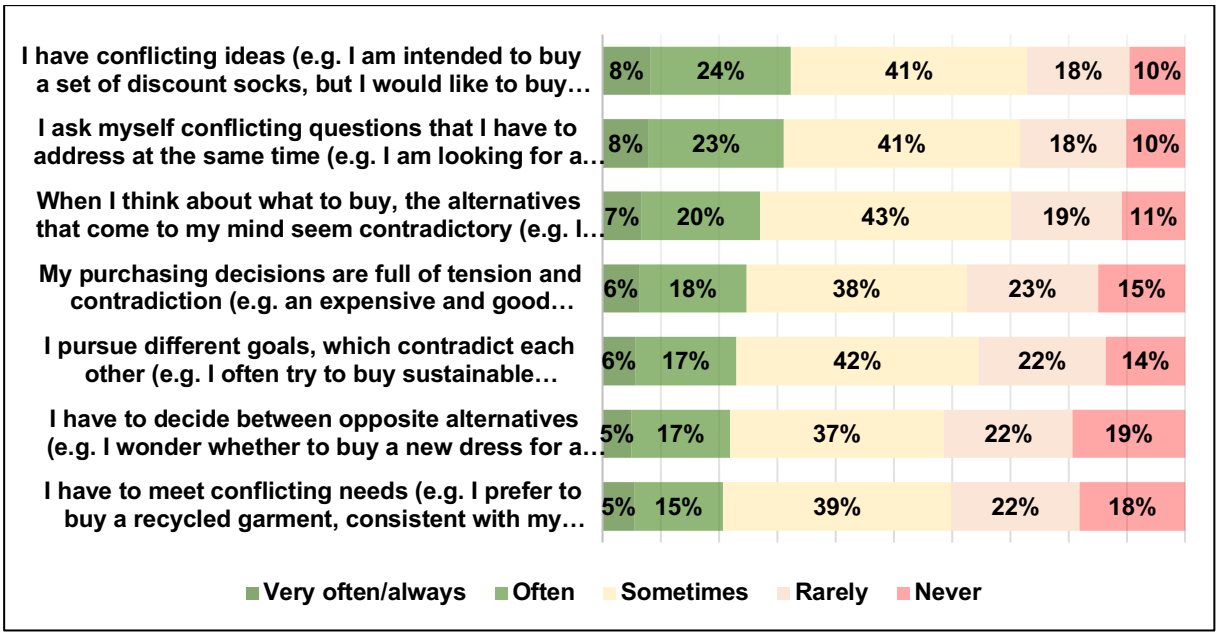

Figure 66: The broad set of scenarios where people can experience tensions while shopping for clothes

Analysing the answers country by country, in figure 67, can be noticed that no substantial differences emerge depending on the geographical area. Italy is the country with the highest percentage of people experiencing those tensions "*sometimes*" (43.6%), while France is the country with the highest percentage of people (40.1%) who have "*never*" or "*rarely*" experienced such tensions. On the other side of the spectrum, Spain stands as the country showing the highest percentage of people experiencing those tensions "often" or "very often/always" (31.8%). Figure 68 shows the situation more in detail, by displaying percentages of the seven different scenarios country by country. As can be seen, the phenomenon is spread uniformly, without any particular difference by geographical areas.

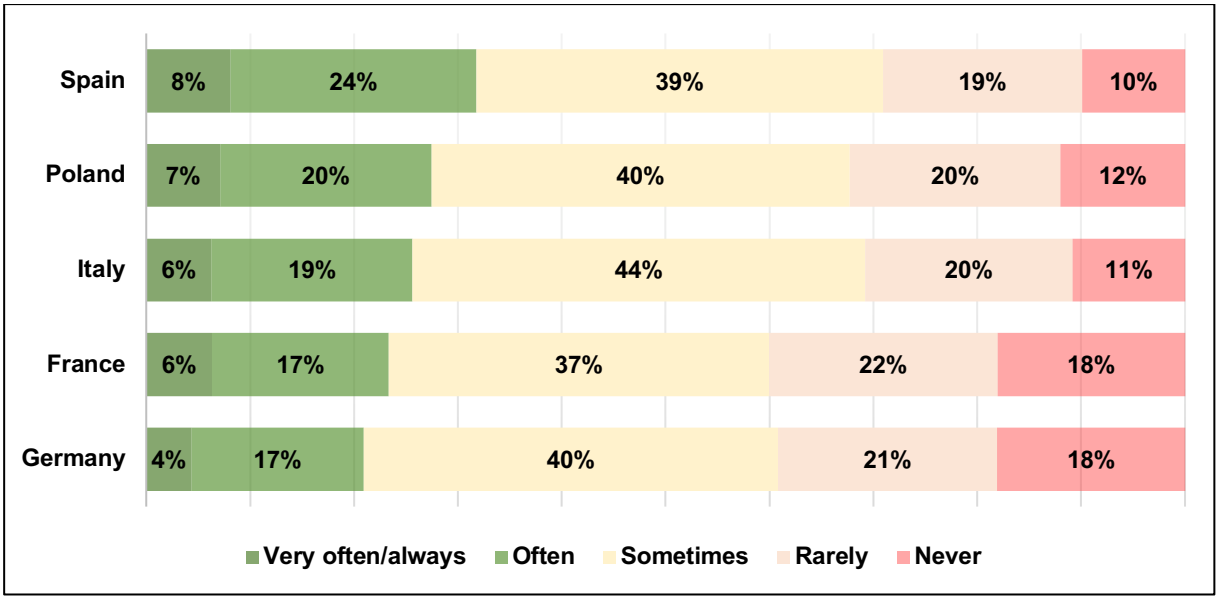

Figure 67: Experiencing tensions (country level)

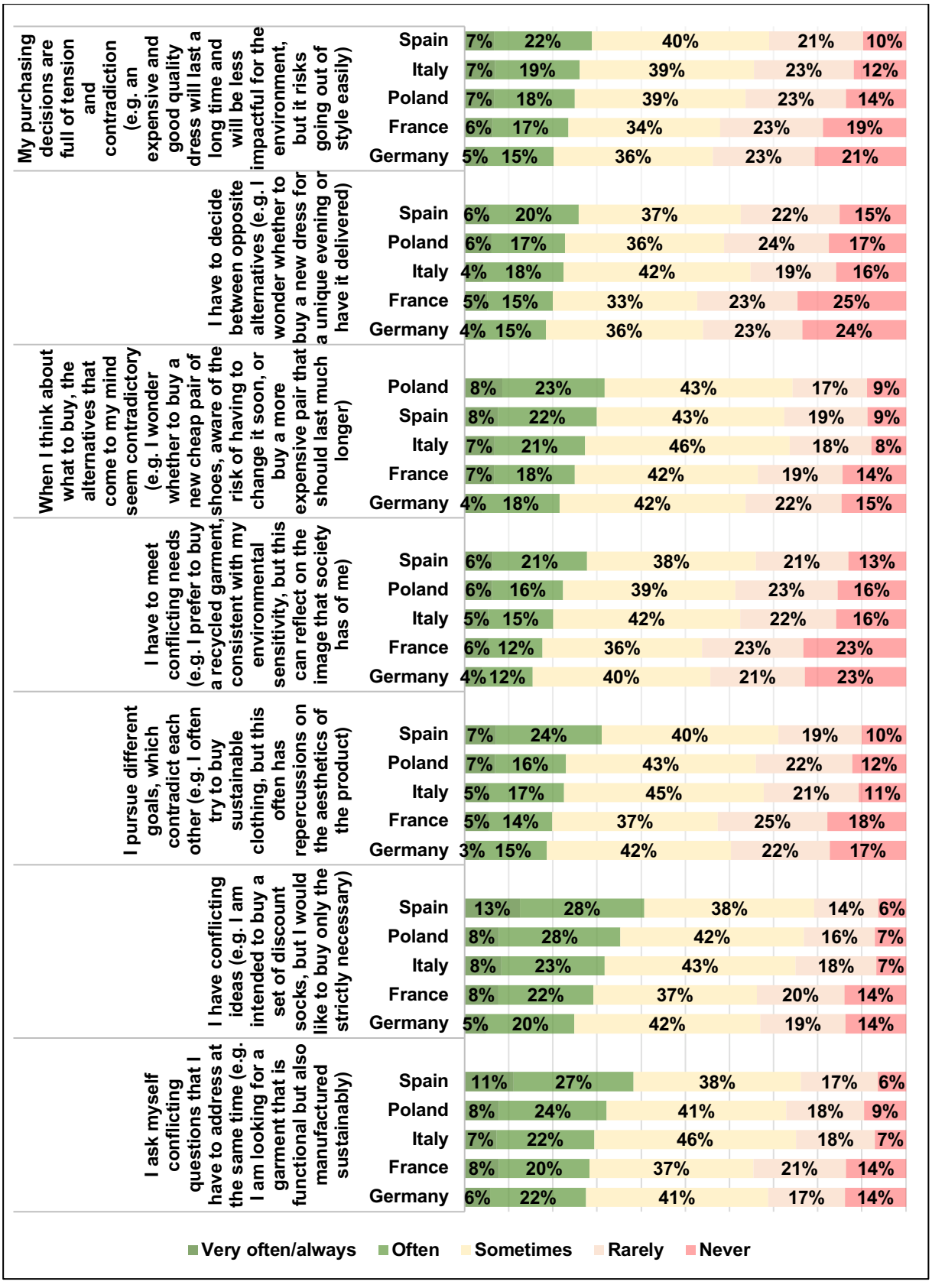

Figure 68: Different scenarios of experiencing tensions while shopping clothes (country level)

5.3 Paradox mindset

According to recent literature[113], experiencing tensions can be either a cause of distress or excitement. It depends on the natural predisposition of people to resolve conflicting and contradictory issues or, on the other hand, to avoid them. Therefore, authors decided to ask participants to what extent they agreed with the following situations: "feel comfortable balancing conflicting needs at the same time", "feel satisfied when I manage to pursue contradictory goals" or "get excited about finding solutions to conflicting needs" and other scenarios. Answers varied from "*totally disagree*" to "*totally agree*".

Echoing the previous paragraph about experiencing tensions, no wonder that Spain, stands out for its remarkable propensity to "agree" and "totally agree" (64.6%) with a feeling of satisfaction, fulfilment and excitement regarding contradictory goals while shopping for clothes (i.e., paradox mindset). Instead, all the other countries barely reach 50% of agreement on the same questions (Figure 69).

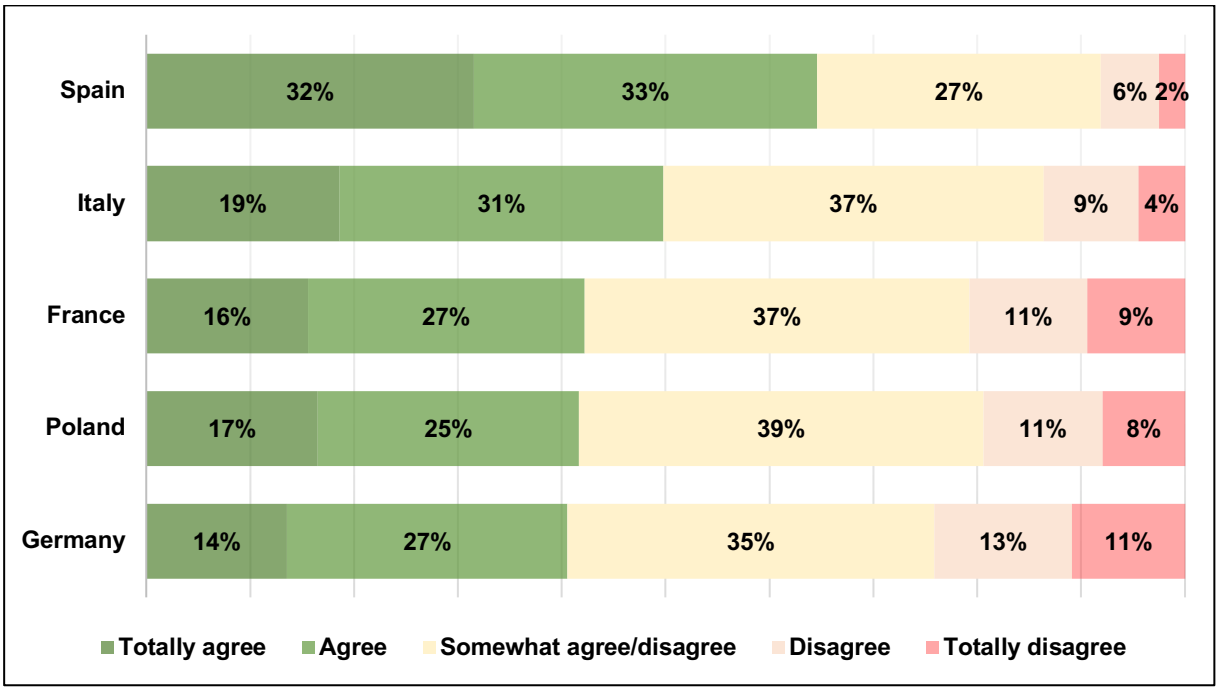

Figure 69: Overall differences in paradox mindset, country by country

5.4 Types of tensions

Although people may have conflicting thoughts when thinking about purchasing clothing, such tensions, however, can originate from different domains (i.e., conflictual beliefs, times and social

[113] Yin, J. (2021). Effects of the paradox mindset on work engagement: The mediating role of seeking challenges and individual unlearning. Current Psychology, 1-11.

dynamics)[114]. Therefore, in this report authors refer to those diverse domains as *performing*, *learning* and *belonging* tensions[115]. In in the next paragraph a deeper analysis will be conducted.

At first in this section, the survey wanted to explore the different areas of the human mindset in which conflicts take place. To understand this, participants were asked to indicate their level of agreement (ranging from "*totally disagree*" to "*totally agree*") with the following statement: "*When I go shopping, or looking for clothes and accessories, I feel capable of. . .*" followed by different circumstances and examples, namely *". . . respect my moral tenet but be flexible at the same time (e.g. as a rule I buy garments produced according to ethical and environmental standards but at the same time if I find a dress that I particularly like, I buy it even if it does not provide information on sustainability)*".

Data show that people, as long as they get more familiar with conflictual situations that can occur throughout their daily life, the average level of agreement to paradoxical situations increases (Figure 70). Indeed, barely 15% of the respondents totally disagreed or disagreed with the statements described in the survey, compared to more the 50% of them who agreed and totally agreed with the same statements – by comparing figure 70 with figure 67, differences are noteworthy.

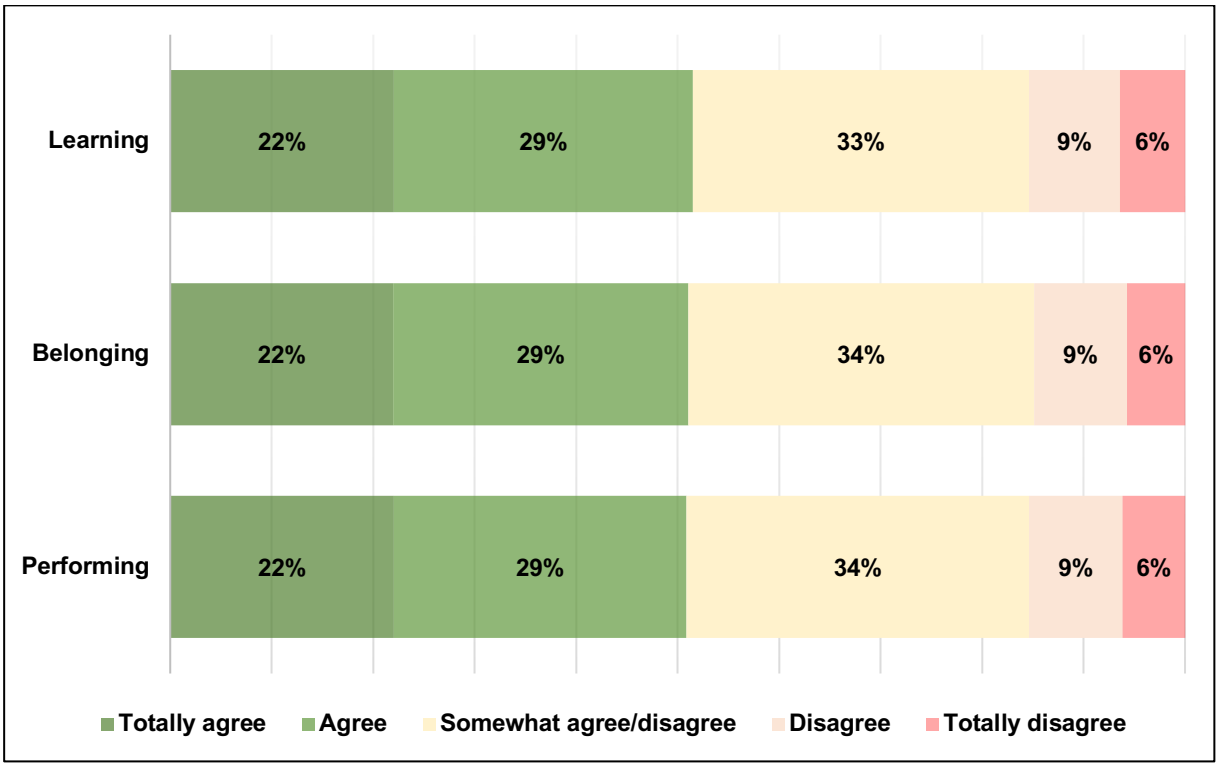

Figure 70: Types of tensions (total)

[114] Westenholz, A. (1993). Paradoxical thinking and change in the frames of reference. Organization studies, 14(1), 37-5

[115] Smith, W. K., & Lewis, M. W. (2011). Toward a theory of paradox: A dynamic equilibrium model of organizing. Academy of management Review, 36(2), 381-403.

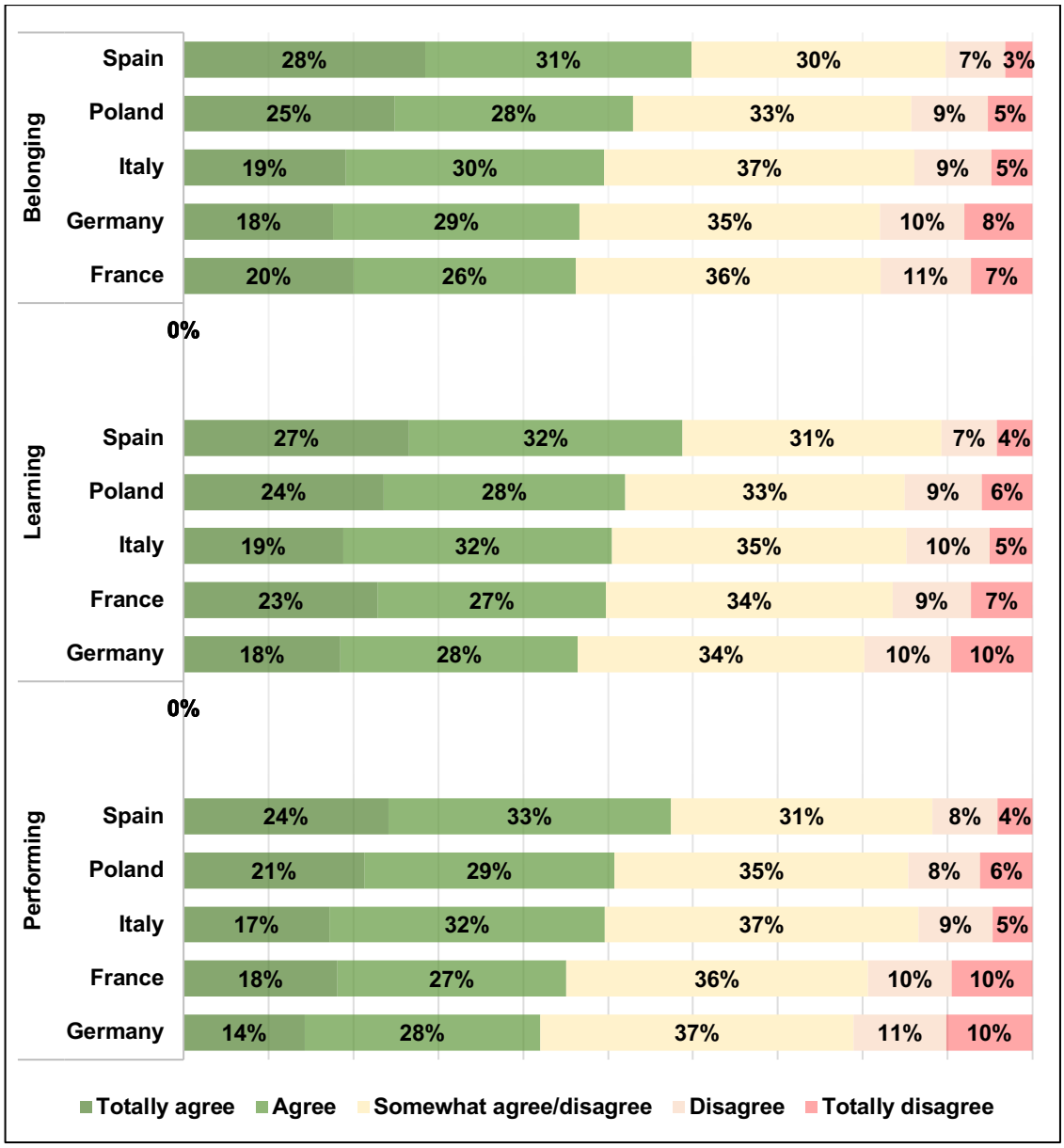

Figure 71: Differences among countries and types of tensions

5.4.1 Performing tensions

According to the literature, performing tensions can be described as those tensions that come from inner conflicts, between intimate needs, values and wishes. These conflicts emerge in situations when people question their moral tenet. For instance: *"as a rule I buy garments produced according to ethical and environmental standards but at the same time if I find a dress that I particularly like, I buy it even if it does not provide information on sustainability"*, or *"I learned to look carefully at the label, paying attention to the composition of the garment and environmental certifications*", or even *"take back vintage clothing from my relatives to satisfy the desire to wear different clothes and not give in to the temptation of fast fashion if I need something urgently"*.

Remarkably, Germany stands out as the country with the higher percentage in terms of "totally disagree" and "disagree" with the when asking "being original on habits" while shopping for clothes (27.7%). Spain instead is the country that scores the highest percentage of agreement ("agree" and "totally agree") concerning the same question (54.4%). Italy, France and Poland follow a similar trend (Figure 72).

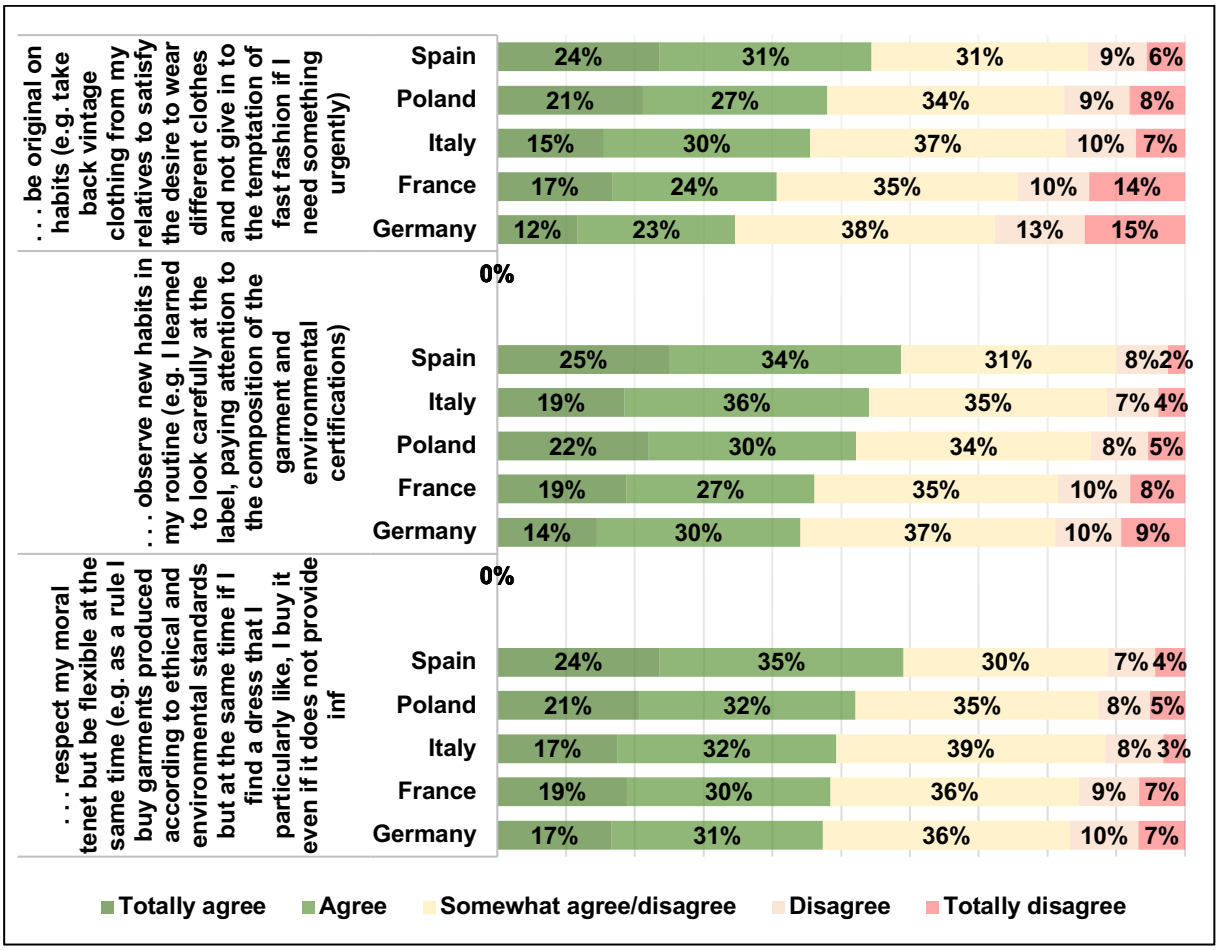

Figure 72: Set of performing tensions (country by country)

5.4.2 Learning tensions

Learning tensions are described as those tensions that come over time, in situations when people question their old habits with new insights. Here are some examples of learning tensions while shopping for clothes: "*I repair or have worn clothes repaired instead of replacing or throwing them away*", or "*I learned to donate, exchange or resell the clothing I no longer wear*", or even "*when I go to stores to shop, take advantage of the commute to run other errands such as returning discarded garments at collection points or looking for second-hand markets".*

When asked to respondents if they *find new solutions respecting their philosophy of life*, the majority of them "agree" and "totally agree" homogeneously among countries (from 50.5% - Germany, to 58.9% - Spain). By contrast, percentages vary more when people are asked whether they "agree" or

"totally agree" with *exploring new ways of doing while practicing the usual ones* (from 43.3% - Germany, to 59.2% - Spain). Germany and France are the two countries where disagreement is the higher, yet Spain is the one with the lower level of disagreement. Italy and Poland follow a similar trend (figure 73).

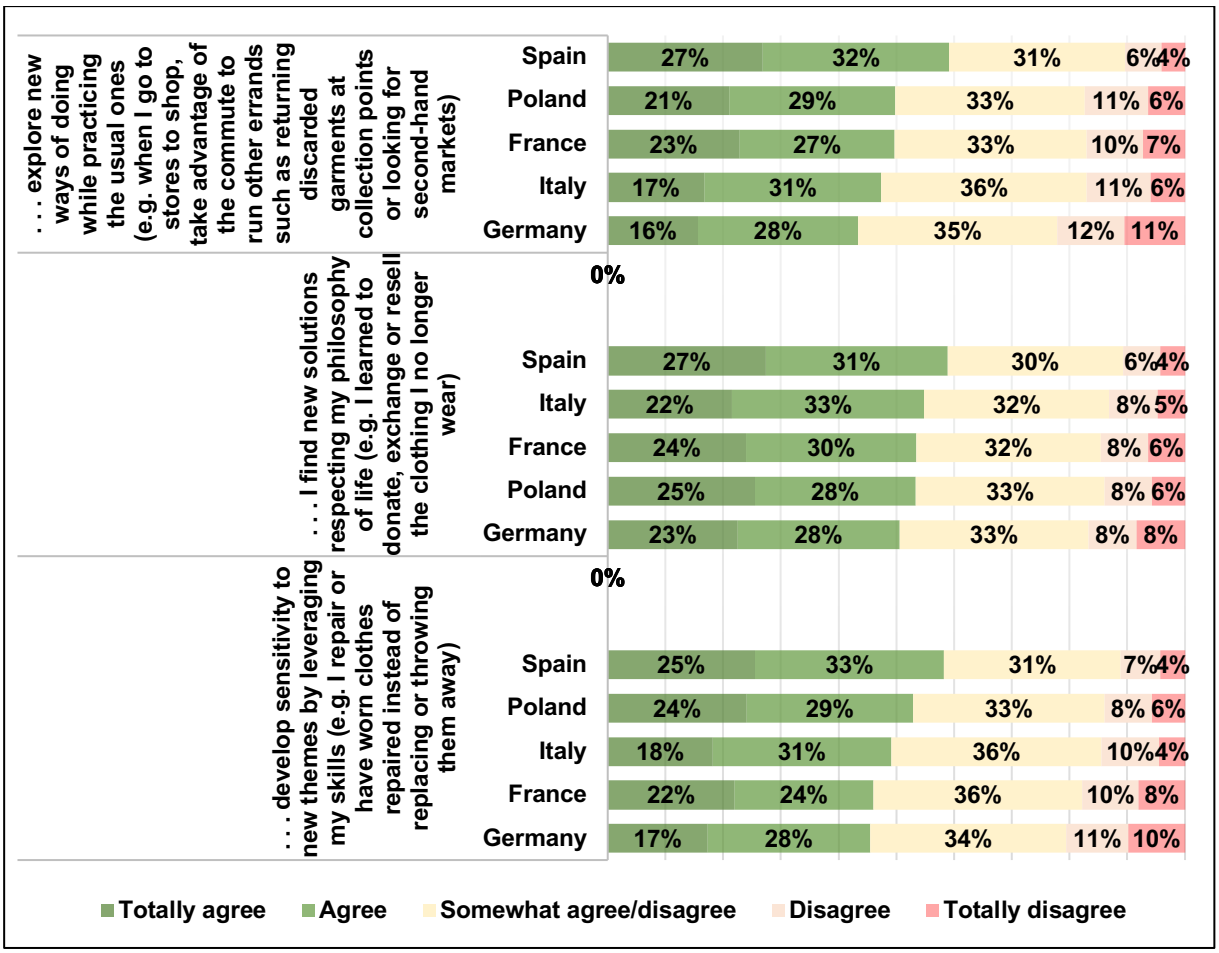

Figure 73: Set of learning tensions (country by country)

5.4.3 Belonging tensions

Belonging tensions are described as those tensions that spark when people question their perspective with this of their group of references.

"when I discard a dress, I choose to deliver it to designated collection centers for donation or recycling", or *"when I look for new clothes, I prefer those not made in countries that employ cheap labour"*, or even *"I prefer to buy clothing in small shops, giving support to small artisans, or from fair trade, such as 'made in prison' ".*

There are fairly differences between the responses. However, this time France overpowers Germany in disagreement share: when asked respondents if they *satisfy their need for fulfillment and contribute to the well-being of others*, 21.8% of French disagrees with such statement, while 20.1% of Germans do the same. Analogously, France recorded the lowest percentage of agreement (39.4%), even lower than Germany (42.2%). Spain, instead, outperformed all the other countries, especially when *focusing*

on their own needs while addressing the needs of the others (only 9.2% disagree, while even 62.9% agree). Italy and Poland fluctuate similarly (figure 74).

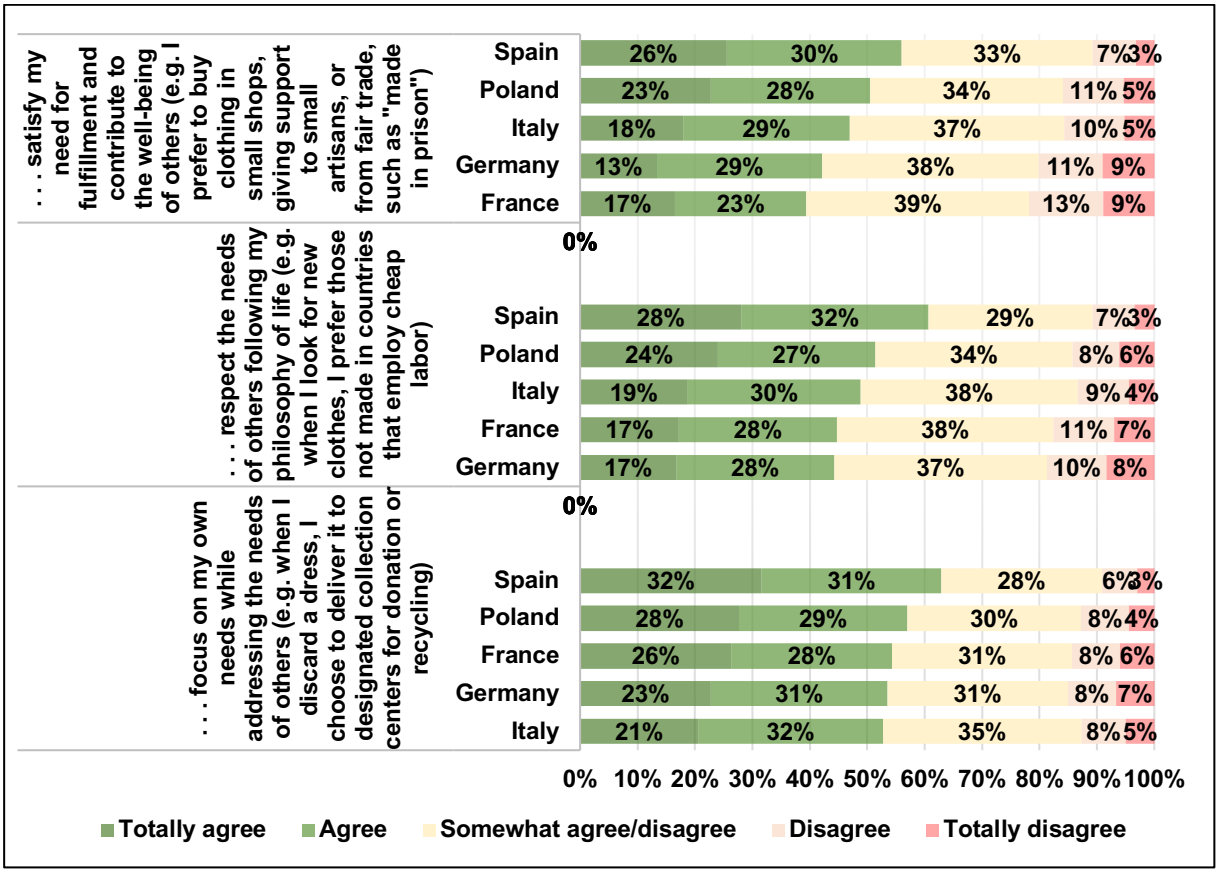

Figure 74: Set of belonging tensions (country by country)

6 Exploring relations among variables

Once consumers' behaviours have been outlined, defining their extent and frequency, it is pivotal to explore relations to grasp correlations among variables and understand if pro-environmental and pro-technological behaviours depend on social factors, personal convictions, and demographical elements. Therefore, correlation and regression analysis were conducted, using Stata 14 software.

In the first place, the linear correlation method was used to investigate if there are interdependencies between different consumer behaviours throughout the clothing life cycle and between consumer behaviours and personal or socio-demographic factors. This method considers pairwise correlations between variables and consists in calculating and then interpreting the Pearson correlation coefficient, denoted as ***r***, which ranges between -1 and +1. The sign of the coefficient indicates the direction of the relationship (positive or negative), while the absolute value quantifies the degree of the relationship. The closer the absolute value gets to 1, the stronger is the interdependence between variables. Conversely, the closer it gets to 0, the more the variables can be considered linearly independent. The results of this analysis are reported in the correlation matrix (Figure 75): a square matrix having the 13 variables under study both on the rows and on the columns. The matrix is symmetric and the coefficients on the diagonal are 1. Moreover, each coefficient is associated with the relative p-value that explains the statistical significance level of the result: according to the thresholds set, values less than 0.01, 0.05 or 0.1 can be considered significant.

As can be seen in the matrix, **there is a strong and positive correlation between all the sustainable behaviours that can be implemented by consumers along the entire clothing life cycle** (purchase, consumption, use, repair and after-use). It means that, if an individual acts in a sustainable way in relation to a specific behaviour, it is very likely that she/he will behave the same in the other life cycle phases. In particular, purchase is always highly correlated with the other four behaviours ($0,5 < r < 0,6$), while consumption, repair and after-use are even more strongly correlated between them ($0,6 < r < 0,7$).

With regard to personal beliefs, it emerges that environmental awareness and perceived effectiveness are good predictors of sustainable purchase and sustainable use ($0,4 < r < 0,5$). Moreover, there is a deep interdependence between awareness and perceived effectiveness ($r = 0,7$), indicating that knowledgeable consumers having a better understanding of environmental and social problems related to the textile sector are also more aware about the effectiveness of their actions and, ultimately, it is probable that they will purchase circular clothing and use it sustainably.

Relevant correlations between behaviours and the socio-demographic variables were not detected, except for some remarks relating to gender and age. In fact – bearing in mind that the variable gender is a dichotomous variable coded 1 if the respondent is female and 2 if male – there is a negative correlation, albeit weak ($-0,11 < r < -0,13$), between gender and both beliefs and behaviours. Precisely, women are more likely to be aware and concerned about sustainability-related issues, perceive their ability to contribute to positive change and act in a sustainable way, specifically during the use phase (i.e., paying attention to clothing care instructions and trying to reduce washing, drying and ironing). In addition, age is negatively correlated to sustainable consumption ($r = -0,26$) and positively to sustainable use ($r = 0,22$): this means that young people are keener to use new consumption models such as renting, sharing, and second-hand, while elderly are likely to behave sustainably during the use phase.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Env. awareness	1.0000												
	0.0000												
2. PCE	0.7066	1.0000											
	0.0000	0.0000											
3. Purchase	0.4206	0.4707	1.0000										
	0.0000	0.0000	0.0000										
4. Consumption	0.1307	0.1548	0.5527	1.0000									
	0.0000	0.0000	0.0000	0.0000									
5. Use	0.4408	0.4709	0.5317	0.2023	1.0000								
	0.0000	0.0000	0.0000	0.0000	0.0000								
6. Repair	0.2100	0.2261	0.5237	0.6176	0.3616	1.0000							
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000							
7. After use	0.2238	0.2414	0.5497	0.6807	0.3508	0.6775	1.0000						
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
8. Gender	-0.1122	-0.1284	-0.0496	-0.0455	-0.1216	-0.0470	-0.0583	1.0000					
	0.0000	0.0000	0.0004	0.0011	0.0000	0.0008	0.0000	0.0000					
9. Town size	0.0483	0.0278	0.0843	0.0897	0.0537	0.0797	0.0609	0.0415	1.0000				
	0.0005	0.0463	0.0000	0.0000	0.0001	0.0000	0.0000	0.0030	0.0000				
10. Family members	0.0113	0.0315	0.0884	0.1751	-0.0208	0.1703	0.1596	-0.0581	-0.0094	1.0000			
	0.4191	0.0243	0.0000	0.0000	0.1372	0.0000	0.0000	0.0000	0.5034	0.0000			
11. Income class	-0.0034	-0.0247	0.0798	0.1161	-0.0014	0.0861	0.0929	0.0532	0.0948	0.0966	1.0000		
	0.8063	0.0774	0.0000	0.0000	0.9193	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000		
12. Education	0.1279	0.0903	0.0586	0.0135	0.1074	0.0664	0.0547	-0.0074	0.1863	0.0164	0.1600	1.0000	
	0.0000	0.0000	0.0000	0.3353	0.0000	0.0000	0.0001	0.5954	0.0000	0.2408	0.0000	0.0000	
13. Age	0.1157	0.1371	0.0597	-0.2581	0.2196	-0.1365	-0.1571	0.0096	-0.0738	-0.2315	-0.1228	-0.0821	1.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4913	0.0000	0.0000	0.0000	0.0000	0.0000

Figure 75: Correlation matrix (consumer behaviours and personal/social/demographic factors)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958352.

To deepen the outcomes emerging from the correlation analysis, a study of the causal relationships was developed by using the linear regression method, considering one set of variables as outcome and the other set as predictor variables. A multivariate multiple regression was used since it is a technique that estimates a single regression model with more than one outcome variable – namely purchase, consumption, use, repair and after-use – and with more than one predictor variable. Fourteen independent variables (or predictors) were considered to explain consumer behaviours and – retracing the classification elaborated in the previous analysis – they can be divided in two groups: personal factors (e.g., environmental concern and attitude towards sustainability-related information on clothing) and socio-demographic characteristics (e.g., age, gender, income and nationality).

Considering the five univariate models individually – reported in Figure 76 on the five column representing consumer behaviours – each one is statistically significant because the p-value is equal to 0. Moreover, looking at R^2, data show that the fourteen predictor variables explain 42%, 24%, 37%, 23% and 25% of the variance in the dependent variables purchase, consumption, use, repair and after-use, respectively.

Coefficients reported in figure 76 are the values for predicting the dependent variables from the fourteen independent variables. The parameter estimates show the relationship between the independent variables and the dependent variables, namely the amount of increase/decrease in purchase, consumption, use, repair and after-use that would be predicted by a 1 unit increase in the predictors. However, not alle the coefficients are statistically significant: asterisks associated with coefficients (*, **, ***) indicate their p-value, that is their statistical significance (at $p<0.10$, $p<0.05$ and $p<0.01$).

Starting from personal beliefs, environmental awareness and perceived effectiveness are good predictors for two over five sustainable behaviours. For every unit increase in environmental awareness, a 0.08- and 0.12-unit increase is predicted in sustainable purchase and sustainable use respectively, while for every unit increase in PCE, a 0.15- and 0.16-unit increase is predicted in purchase and use once again. This evidence deepens the results emerged in the correlation analysis, where a high interdependence between personal convictions (awareness and perceived effectiveness) and this kind of behaviours (purchasing and use) was detected, although it was not possible to determine the causality of the relationship.

Secondly, with regards to personal attitude towards information on clothing, having a high trust in eco-labels (i.e., third-party certified environmental information) increases the probability to behave sustainably in all the clothing life cycle phases (coefficients are equal to 0.29, 0.24, 0.17, 0.23 and 0.16 in purchase, consumption, use, repair and after-use respectively). In addition, a high perceived reliability due to the availability of information disclosed by companies can rise the likelihood to buy circular clothing, as well as use and dispose of it in a sustainable way, although coefficients are slightly lower (0.09, 0.10, 0.15, 0.14 and 0.13) compared to those linked to trust in eco-labels.

Socio-demographical factors show different outcomes as some variables report a stronger causal relationship with behaviours than others. Since gender is a dichotomous variable (coded 1=female, 2=male), behaviour related to the use phase (i.e., clothing caring and washing) is predicted to be more sustainable for females than for males (with a 0.10-unit change). A similar result – namely a weak interdependence between female gender and sustainable use – was also found in the correlation analysis too. Otherwise, for every additional family member, a 0.06-unit increase is predicted in repair behaviour. Repairing is also strongly affected by nationality as Mediterranean countries are keener to

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this practice (coefficient associated with Spain is +0.24 compared to Germany and the one related to Italy is +0.21). Remarkably, the parameter estimate between Polish consumers (compared to German ones) and consumption behaviour is equal to 0.33, meaning that rental and swapping clothing practices, as well as second-hand purchasing, are considerably more probable in Poland. Lastly, the income class has a little positive influence on these new models of consumption too (coefficient is equal to 0.05).

	Purchase	Consumption	Use	Repair	After use
Environ. awareness	0.0798983***	-0.0120096	0.1234515***	0.036799*	0.02821**
PCE	0.1486656***	-0.0081066	0.1640259***	0.0086201	0.0153757
Info availability	0.092203***	0.1047305***	0.1509026***	0.1443088***	0.131657***
Trust in eco-claims	0.0519698***	0.0943507***	0.0143841	0.0770451***	0.0915642***
Trust in eco-labels	0.2861652***	0.238666***	0.168506***	0.2333157***	0.1615114***
Gender	0.021243	-0.0320486	-0.1002108***	-0.0190577	-0.0276564
Age	0.0026247***	-0.0144256***	0.009949***	-0.0067274***	-0.0064948***
Education	-0.0034697	-0.02697***	0.0358151***	0.0053484	0.0007069
Family members	0.0180586***	0.0470474***	-0.0178698**	0.0645277***	0.0440505***
Income class	0.0344303***	0.0482902***	0.0027441	0.0347481***	0.0271725***
Spain compared to Germany	0.0439804*	0.1156707***	0.0014772	0.2435848***	-0.0032315
France compared to Germany	-0.0040856	0.1338339***	-0.0270267	0.1257154***	0.0236006
Italy compared to Germany	0.0954743***	0.0920383**	0.0811235***	0.2121698***	0.0487185**
Poland compared to Germany	0.0802096***	0.3288424***	-0.0446728	0.1219171***	0.0187661
R^2	0.4239	0.2436	0.3731	0.2348	0.2544
P	0.000	0.000	0.000	0.000	0.000
, **, * statistical significance at p < 0.10, p<0.05 and p<0.01*					

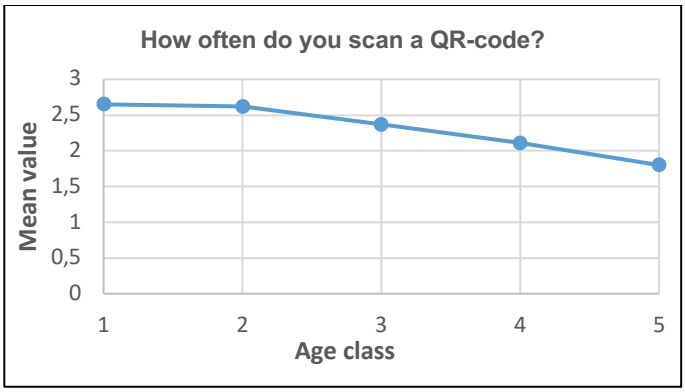
Figure 76: Multivariate multiple regression for the valuation of the relationship between consumer behaviours and personal/social/demographic factors

With regards consumers' propensity to scan a QR-Code to obtain information on a circular garment, an interesting in-depth it is exploring if age variable affects or not the adoption of this behaviour. For this aim, five main groups have been identified (Table 2).

Table 2: Age classes

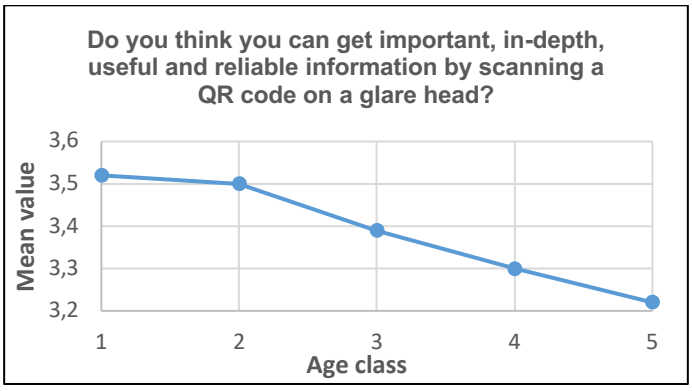
Age class		Poland		Germany		France		Spain		Italy		Total	
Group 1	18-24	105	10,24%	109	10,71%	128	12,65%	107	10,53%	107	10,16%	556	10,80%
Group 2	25-34	205	20,00%	194	19,06%	181	17,89%	169	16,63%	169	16,05%	918	17,84%
Group 3	35-44	232	22,63%	176	17,29%	192	18,97%	226	22,24%	208	19,75%	1034	20,10%
Group 4	45-54	182	17,76%	213	20,92%	207	20,45%	231	22,74%	250	23,74%	1083	21,05%
Group 5	55-70	301	29,37%	326	32,02%	304	30,04%	283	27,85%	319	30,29%	1533	29,80%

For each group the mean value of provided answers in reference to their *Habit* (Figure 75), *Perceived Information Quality* (Figure 76), *Perceived System Quality* (Figure 77), *Perceived Usefulness* (Figure 78), *Facilitating Conditions* (Figure 79), *Perceived Ease of Use* (Figure 80) in relation to scan a QR-code associated with a garment has been calculated.



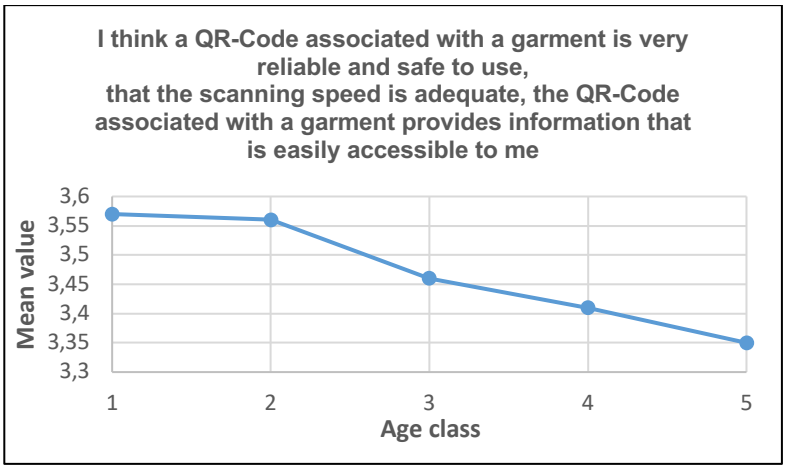
Age Group	Mean of responses
1	2,65
2	2,62
3	2,37
4	2,11
5	1,8

Figure 75: Age classes' mean value in relation to Habit to scan a QR-code



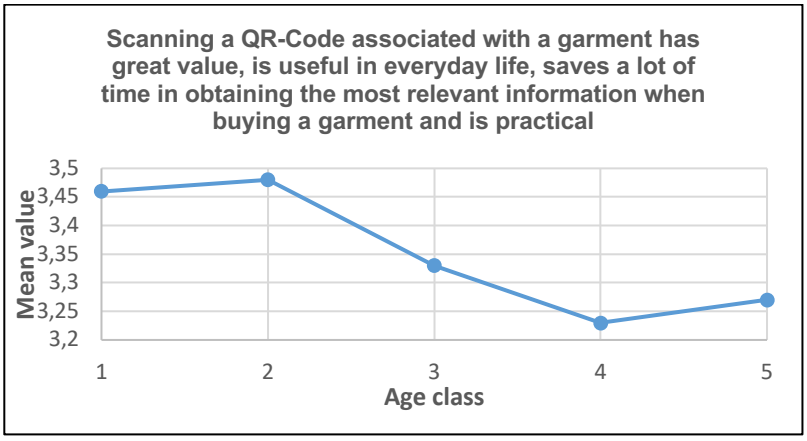
Age Group	Mean of responses
1	3,52
2	3,5
3	3,39
4	3,3
5	3,22

Figure 76: Age classes' mean value in relation to Perceived quality of information obtainable by scanning a QR-code associated with a garment



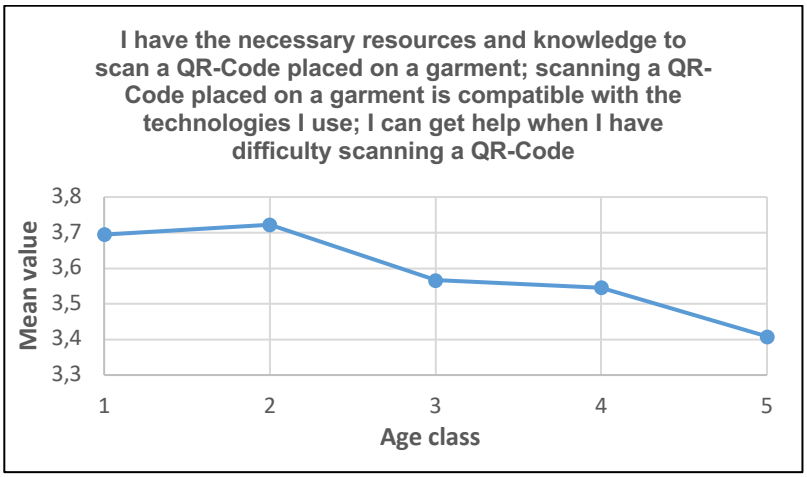
Age Group	Mean of responses
1	3,57
2	3,56
3	3,46
4	3,41
5	3,35

Figure 77: Age classes' mean value in relation to quality of a QR-code associated with a garment



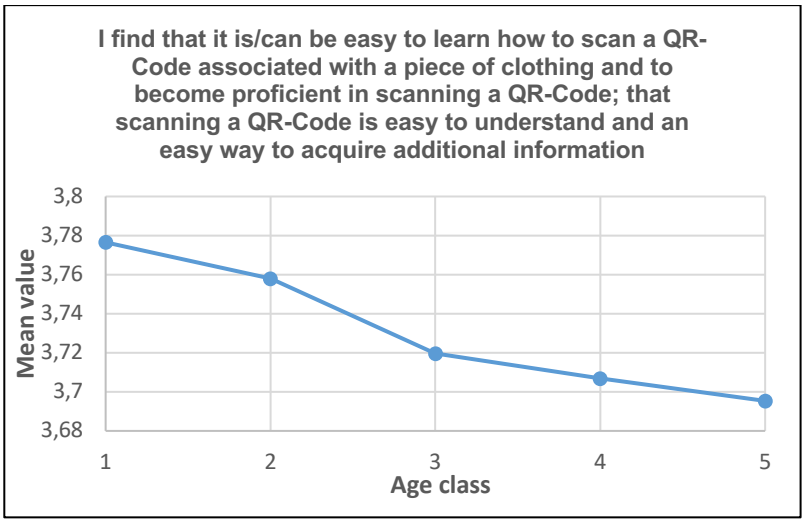
Age Group	Mean of responses
1	3,46
2	3,48
3	3,33
4	3,23
5	3,27

Figure 78: Age classes' mean value in relation to Perceived usefulness of a QR-code associated with a garment



Age Group	Mean of responses
1	3,69514388
2	3,72222222
3	3,56648936
4	3,54570637
5	3,40851272

Figure 79: Age classes' mean value in relation to Facilitating conditions that support the use of QR-code



Age Group	Mean of responses
1	3,77652878
2	3,7578976
3	3,71953578
4	3,70683287
5	3,69536856

Figure 80: Age classes' mean value in relation to Perceived ease of use of a QR-code associated with a garment

For what concern all investigated aspects, it emerges that youngest respondents are more confident that having additional available information will help them to make better purchasing and consumption choices than elder respondents. Overall, younger people are more prone to believe to have the resources and the necessary knowledge to scan a QR code and that it represents a good way to gather additional information on what they are buying.

Analysing the first aspect investigated (*Habit*, see Figure 75), the average responses for all groups highlights that most respondents use the QR code just once per month or use it a maximum of three times a month if not less, so very rarely. Nevertheless, the means scores are decreasing per age group and Group 5 reports the lowest mean meaning that probably they are less familiar with the QR code technology or with technology in general. This fact is somehow supported by what can be derived from Figure 79 (*Facilitating conditions*). In the graph, it appears clear that the means for the issues "I have the necessary resources and knowledge to scan a QR-Code placed on a garment; scanning a QR-Code placed on a garment is compatible with the technologies I use; I can get help when I have difficulty scanning a QR-Code" decrease as age increase even though differences between groups are minimal. Similar supporting results are given by the means of responses to the investigation on whether surveyed people find that it is/can be easy to learn how to scan a QR-Code associated with a piece of clothing and to become proficient in scanning a QR-Code and that scanning a QR-Code is easy to understand and an easy way to acquire additional information. Although differences between the means are very little (*Perceived Ease of Use*, see Figure 80) and many responses revolve around the middle score (3), they are again decreasing with age (a significant difference emerged between Group 1 and Group 2 and the remaining three groups – see Figure 76, *Perceived Information Quality*).

Finally, the belief that a QR-Code associated with a garment is very reliable and safe to use, that the scanning speed is adequate, that the QR-Code associated with a garment provides information that is easily accessible to consumers has been investigated and it also reports not clear results (Figure 77, *Perceived System Quality*). But again, the most interesting thing is that the importance of accessible information decreases as the age of respondents increases. This fact may be due to the different familiarity of the different age groups with QR code and their use to discover the products'

characteristics. Figure 78, *Perceived Usefulness*, showing the mean of responses to the issue of whether scanning a QR-Code associated with a garment has great value for the respondent, is useful in everyday life, saves time in obtaining the most relevant information when buying a garment, and is practical seems to confirm what already pointed out above. The lowest means are for older groups, particularly for respondents which are between 45 and 54 years old.

7 The experimental study: circular fashion, blockchain technology and perceived value

7.1 Context

Over the last decade, the burgeoning concept of the circular economy has been spreading far and wide worldwide. People are getting more familiar with its tenets (*Reuse, Reduce, Recycle*) as long as even more firms offer circular economy amenities: in-store recycling service, repairing services, garment made up with recycled materials, second-hand items and several other ecological options. Due to the combination of industry's CO_2 emissions and the massive amount of clothing waste strewn around the world, fashion industry stand accused for being among the most polluting industries on the planet[116]. Fashion industry, hence, is getting seriously involved with the circular economy, striving to stand at the forefront of sustainability to make it business greener and more responsible -circular fashion.

Circular fashion embodies fashion corporation that integrate circular economy tenets in their business models. Hence, it aims to improve the ecological integrity and social justice of fashion goods and the fashion sector. It looks at the full process of garment production, including who makes it and how long a product lasts before it ends up in a landfill. As a matter of facts, circular fashion corporations are implementing ecolabels, to certify their environmental footprint over their operations, in-store take-back initiatives, to allow people to return their old garments and get a discount, and even second-hand shops, to reduce the amount of clothing waste strewn. Although these initiatives have raised consumer's interest and a fair commitment, some hesitations keep on fastening them. One of the major causes of scepticism is greenwashing [117]. It is defined as people's little perception of green commitment authenticity proclaimed by corporation, specifically when there is lack of data (or independent certifiers) behind such disclosure. As a result, people do not trust corporation green commitment.

The urge to provide consumers reliable sources of information can be pleased by the blockchain technology. A blockchain is a growing list of documents, known as blocks, that are cryptographically linked together. Data in one block cannot be changed retrospectively without affecting the data in all succeeding blocks. This encrypting mechanism makes data in block chain technology extremely secure. Therefore, blockchain technology can be really helpful to people to provide them reliable information, because. The resulting benefits justified blockchain technology's success in several area, such as cryptocurrencies, smart contracts, financial services, and supply chain. By encrypting supply chain data with blockchain technology is a fruitful field of implementation, especially for circular fashion industry: it may contribute to overcome the spectrum of greenwashing, by providing ever seen extremely reliable and accurate information to consumers.

Those premises elicited the urge of an empirical experiment, to measure whether -and to what extent- blockchain technology can affect consumers' perception of value of circular fashion industry.

[116] https://www.theecoexperts.co.uk/blog/top-7-most-polluting-industries
[117] Testa, F., Boiral, O., & Iraldo, F. (2018). Internalization of environmental practices and institutional complexity: can stakeholders pressures encourage greenwashing?. *Journal of Business Ethics*, *147*(2), 287-307.

7.2 Experimental design

7.2.1 Circular fashion

When circular economy tenets and textile sector blend it, circular fashion takes shape. It refers to the practice of continuously recycling clothes and garments in order to re-enter the economy as much as possible -rather than ending up as garbage- to reduce the amount of clothing waste strewn all over the planet. It stands in stark contrast with the traditional, linear fashion industry paradigm, in which raw materials are harvested, produced into commercial items, and then bought, worn, and eventually discarded by customers. It results in an annual economic loss of nearly $500 billion, and severe detrimental socio ecological consequences[118].

According to a 2017 Ellen MacArthur Foundation report, "A New Textiles Economy"[119], circular fashion can unfold as follows: phasing out substances of concern and microfiber release; transforming the way clothes are designed, sold, and used to break free from their increasingly disposable nature; radically improving recycling by transforming clothing design, collection, and reprocessing; and making effective use of resources and moving to renewable input.

Pushing these the circular fashion principles to the limit, it is reasonable to assert that the most environmentally friendly fabrics in fashion are those who one already owns. As a result, new business models focus on the resale, revival, and recirculation of worn, second-hand, or antique apparel to recycle existing garments. Buying used or antique clothes helps to reduce the amount of new clothing that is created, discarded, and eventually ends up in landfills. For instance, *Worn Ware* program by Patagonia invites customers to send in their used Patagonia clothing in return for store credit. The clothing is repaired and resold on the Worn Wear website (that makes the item unique). Recently, Patagonia Worn Wear added a line of hand-sewn clothing called *ReCrafted*, made from returned items the company considers beyond repair. Used or antique clothes market is getting bigger, not only because of the proliferation of such firms' initiatives, by also due to peer-to-peer exchange.

However, this new, circular way of conceiving fashion industry is not immune from controversies. Indeed, companies who support such initiatives face increasing scrutiny and criticism – blamed for greenwashing. Greenwashing consists on lack of trust in green commitment proclaimed by corporation by consumers, specifically when there is lack of data (or independent certifiers) behind such disclosure. As a result, each effort to address ecological and socioeconomic challenges exacerbates the problem. From that issue stems up the urge, for circular fashion, to demonstrate the authenticity and reliability of such environmental commitment. For instance, providing information about clothing provenance may help people trust them more. In order to secure this information in the most reliable way, blockchain technology appears to be a useful tool.

[118] "In Copenhagen, Gearing up for a Circular Fashion System". The Business of Fashion. 2017-05-11. Retrieved 2018-10-30.

[119] Ellen MacArthur Foundation, A new textiles economy: Redesigning fashion's future, (2017, http://www.ellenmacarthurfoundation.org/publications).

7.2.2 Blockchain technology

The blockchain technology is a growing list of records (blocks) cryptographically linked each other. A cryptographic mechanism, called timestamp, and transaction data are all included in each block. The timestamp validates that the transaction data existed when the block was published. Since each block contains information about the one before it, they form a chain of blocks. Data in one block cannot be changed retrospectively without affecting the data in all succeeding blocks. This encrypting mechanism makes data in block chain technology particularly protected.

Blockchain benefits make it benefit a growing number of domains, like cryptocurrencies, smart contracts, financial services, and supply chain. Among them, supply chain is the most promising area for goods industry. First area to be powered by blockchain technology was food supply. In 2018, for instance when Walmart and IBM were conducting a study to utilize a blockchain-backed system for lettuce and spinach supply chain monitoring: all nodes of the blockchain were governed by Walmart and were hosted on the IBM cloud[120]. In similar fashion, further corporations employed QR codes and cloud computing to digitize food supply chain data to increase traceability of food by farmers and consumers. Drawing on this early implementation in the food industry, fashion sector cam steer toward a similar direction.

Circular fashion can implement blockchain technology, through QR codes and cloud computing, to make supply chain digitized to trace provenance of each single garment (through a unique ID) by sellers and customers. By attaching unique IDs to clothes and maintaining records connected with transactions that cannot be falsified or altered, blockchain could be used to detect counterfeits, can prove items' real environmental footprint and even provide information about their previous owner (in case of second-hand/remanufactured garments). However, it blockchain technology effectiveness on physical produces, like clothes, can be augmented with in combination with technologies that offer a solid link between physical items and blockchain systems, such as QR codes. Here is why.

Because of reduced manufacture, raw material procurement, and transport, buying second-hand items reduces carbon footprint and CO_2 emissions significantly when compared to the entire product life cycle, according to scientific studies. However, the proportional carbon footprint of manufacturing, procuring raw materials, and the supply chain is frequently unknown. By attaching a printed ID on each item, it is possible to apply scientific methodologies to determine it environmental footprint and ensure this information with blockchain technology. But there is something more.

Clothing provenance, also, can be a particular interesting aspect to be disclosed. Circular economy programs in fashion industry relying on second-hand/remanufactured garments could be potentially improved by providing information about the item provenance. Providing information through blockchain can also increase the perception on meaningfulness and uniqueness of the used/remanufacture product which, in turn, increases its perceived value.

[120] Corkery, Michael; Popper, Nathaniel (24 September 2018). "From Farm to Blockchain: Walmart Tracks Its Lettuce". The New York Times. Archived from the original on 5 December 2018. Retrieved 5 December 2018.

7.2.3 Perceived value: meaningfulness and uniqueness

Second-hand clothes, in spite of a new cloths, have a symbolic meaning. Purchasing second-hand garments reduces the carbon footprint because it reduces manufacture, raw material procurement, and transport. Needless to say, it also reduces waste because used clothes were supposed to be thrown away. Therefore, buying second-hand clothes represent a signal that people send to their peers to show off their ecological commitment. In a similar fashion, remanufactured garments have a high intrinsic value given by the strive of the previous owner to restyle it for further uses or purposes. These aspects can provide an extra nuance in meaning to clothes for consumers, who can rate either second-hand or remanufacture garment more meaningful.

Also, second-hand and remanufactured clothes, in spite of a new cloths, have a story to tell. They both come from a previous owner. Someone who has dressed it up in the past and collected memories and experiences with it. Someone, in short, who has attached an intimate bond with it. For instance, people would value more a basketball jersey whether Michael Jordan has put it on. Yet people consider items like that as memorabilia. As a consequence, they probably will not wear it as casual. Instead, by trading second-hand items through blockchain, it is possible to get piece of information about the previous owns, as long as he/she wants to disclose it. Eventually, knowing the history of the used/remanufactured product can make is one of a kind. Authors refer to this aspect as a “provenance” effect. Therefore, information provided by blockchain technology can unleash this uniqueness value to cloth for consumers.

According to the reasons above, authors employed an experimental study to better explore the potentiality of block chain technology in circular fashion industry.

7.3 Methods

7.3.1 Vignettes

According to those premises, authors laid down the three main aspects (i.e., factors) to be examined, i.e., circular fashion strategy (factor 1), provenance information (factor 2) and blockchain technology (factor 3), over purchase intention through two emotional means, namely uniqueness and meaningfulness. To catch the effect of each single factor, two similar short vignettes each have been composed (i.e., level A vs level B). Technically, authors composed a factorial experiment with 3 factors and 2 levels each factor. See the scheme below:

Factor 1: circular fashion strategy **Level A: second-hand garment**	**Factor 1: circular fashion strategy** **Level B: remanufactured garment**
Designed to keep you warm in the unexpected cold, this scarf is woven from premium cashmere and is ***second hand.***	*Designed to keep you warm in the unexpected cold, this scarf* ***comes from the reuse of fabrics of a high-quality cashmere coat.***
Factor 2: provenance information **Level A: information about the previous owner**	**Factor 2: provenance information** **Level B: no information about the previous owner**
The ***garment belonged to Maria****, a researcher who treats rare diseases. He wore it on special*	//

occasions, such as fundraising events for research.	
Factor 3: blockchain technology **Level A: blockchain encrypted information**	**Factor 3: blockchain technology** **Level B: no blockchain encrypted information**
*This information is collected voluntarily and protected through **an encrypted digital ledger (blockchain).***	//

Each combination is provided with the same image of a scarf. See below.

By combining this 2 x 2 x 2 vignettes, 8 different scenarios have been obtained. Each respondent would visualize only 1 out of the 8 scenarios and be asked to rate on a 1 to 5 scale his/her level of agreement on statements regarding the *uniqueness*, *meaningfulness* and *purchase intention* about what he/she has seen. See Appendix B – The Experiment. Each responded is randomly assigned to one scenario. Yet in such a proportional way that each treatment was assigned to a similar number of respondents (table 3).

Table 3: In green, the number of respondents each scenario

Scenarios	Freq.	Percent	Cum.
1	633	12.36	12.36
2	633	12.36	24.71
3	638	12.45	37.17
4	637	12.43	49.6
5	646	12.61	62.21
6	641	12.51	74.72
7	648	12.65	87.37
8	647	12.63	100

According to the previous paragraphs, the aim was to measure how much the perception of *uniqueness*, *meaningfulness* and *purchase intention* vary depending on the 8 different scenarios. Therefore, the experiment was administered to a sample of 5,123 respondents across the five countries that have been partnered up in the project: Italy, France, Germany, Poland and Spain (table 4). For a more detailed description of the sample, including socio demographic characteristics, see Table 1 (p.14).

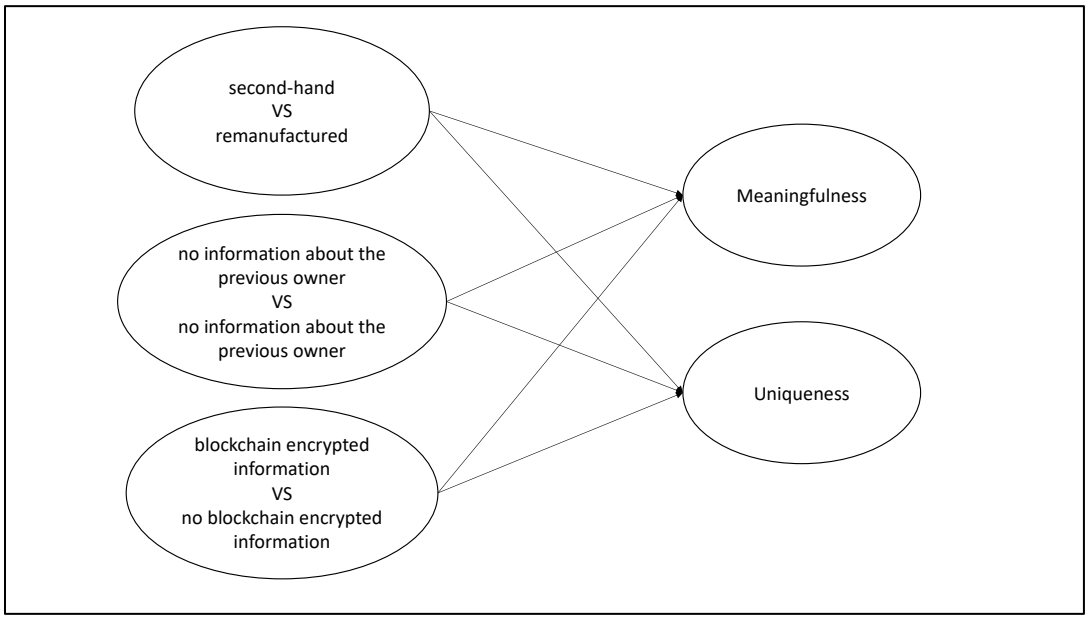
Table 4: Number of respondents each subset, country by country

country	1	2	3	4	5	6	7	8	Total
Germany	123	128	127	124	130	126	130	129	1,017
Spain	127	127	127	128	124	128	128	127	1,016
France	128	124	126	126	125	124	132	127	1,012
Italy	127	127	130	131	140	134	129	135	1,053
Poland	128	127	128	128	127	129	129	129	1,025
Total	**633**	**633**	**638**	**637**	**646**	**641**	**648**	**647**	**5,123**

Before analysing the results, authors run a manipulation check, to understand to want extent people remembered the scenario they were assigned to and confirm the reliability of their responses. Respondents reliably recognized and distinguished second-hand garment from remanufacturing garment (Pearson chi2= 958.3343; probability = 0.000). Similarly, respondents recognized and distinguished stimulus containing stimuli containing "provenance" information (Pearson chi2 = 2.1e+03, probability = 0.000), and ultimately a representative percentage of distinguished when information were provided by blockchain against when they were not (Pearson chi2= 617.8062, probability = 0.000).

7.4 Results

Authors relied on the analysis of variance (ANOVA) to examine differences within group (where each group is a single scenario) with differences between groups (different scenarios) by using STATA 16 software. By comparing the three different experimental conditions with their control conditions, namely second-hand (vs remanufactured), provenance information (vs no provenance information), and blockchain encryption (vs no blockchain encryption) over meaningfulness and uniqueness, data show interesting outcomes. See image below.



Starting from second-hand (vs remanufactured) condition over meaningfulness, ANOVA revealed a significant mean difference between the two conditions ($F = 12.66$, $p<.01$), supporting the difference in meaningfulness perception between the two circular fashion scenarios, i.e., second-hand garment vs remanufactured garment (figure 81). Similar significant difference in means between the conditions were detected by ANOVA over uniqueness ($F = 70.37$, $p<.01$). See figure 82. According to the results, people attributed a fairly higher level of meaningfulness and uniqueness to the remanufactured item than the second-hand item. However, no matter the type of circular fashion item, people regarded more unique those items then meaningful (figure 83).

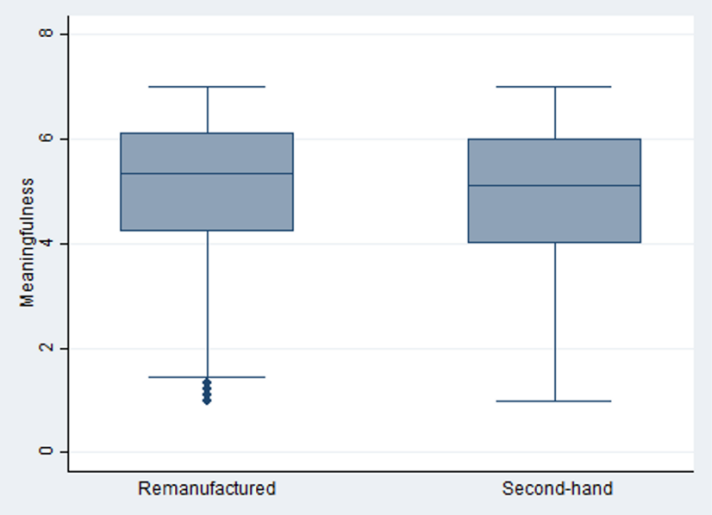


Figure 81: Difference in meaningfulness between second-hand scarf and remanufactured scarf

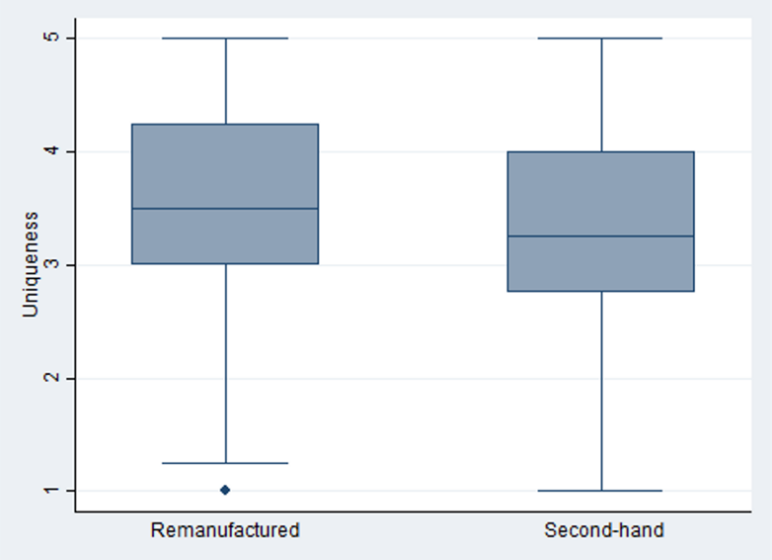


Figure 82: Difference in uniqueness between second-hand scarf and remanufactured scarf

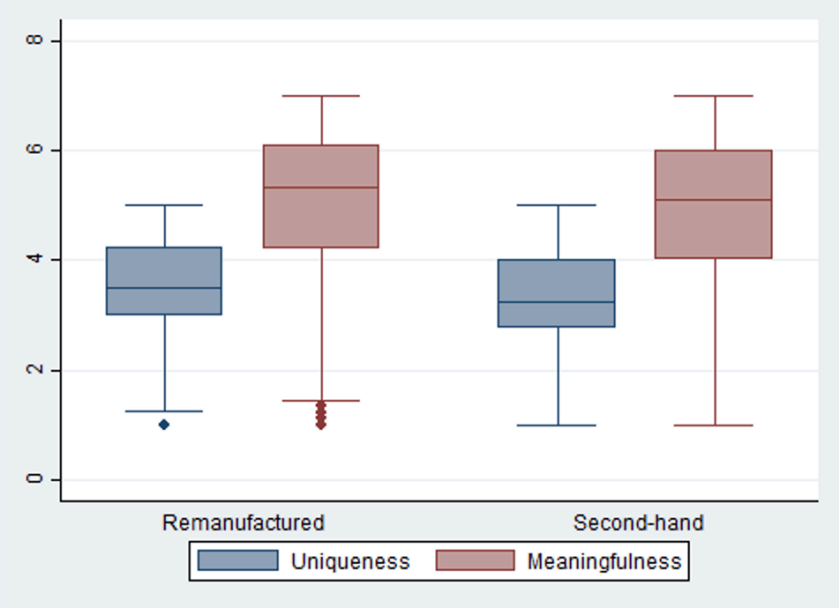


Figure 83: Comparing uniqueness and meaningfulness between second-hand scarf and remanufactured scarf

Further, the impact of providing information about the previous owner of the garment has been analysed, namely provenance information (vs no provenance information). ANOVA revealed a not statistically significant difference between the two conditions ($F = 0.18$, $p>.01$), demonstrating that the difference in meaningfulness perception between the two provenance scenarios, i.e., providing information about the previous owner "Maria" and her activity vs not providing any information is not perceived by respondents (figure 84).

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958352.

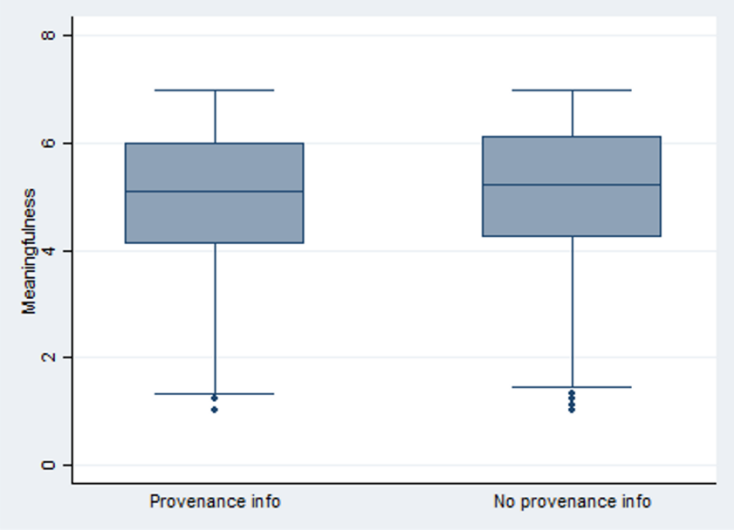


Figure 84: Difference in meaningfulness between provenance information and no information about the previous owner

Instead, ANOVA detected a statistically significant difference between the conditions were detected over uniqueness (F = 18.02, p<.01), figure 85. Results showed that people attribute higher level of uniqueness to the scarf with no information about the previous owner.

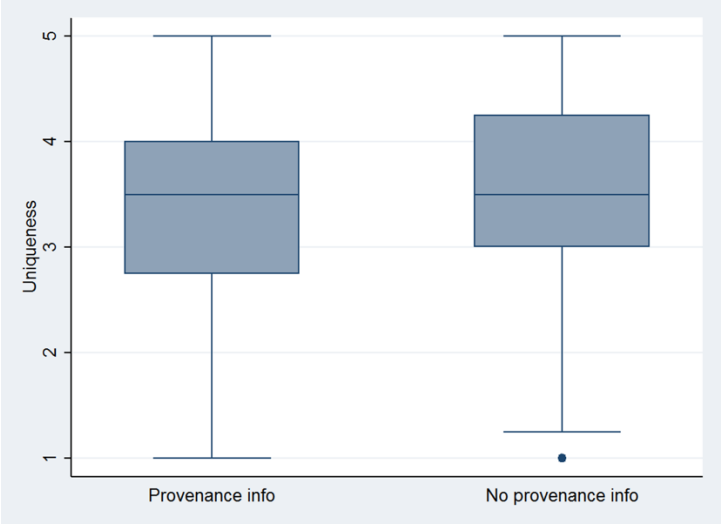


Figure 85: Difference in uniqueness between provenance information and no information about the previous owner

Then, the effect of securing such information with blockchain encryption (vs no blockchain encryption) has been examined. ANOVA revealed no statistically significant difference between the two conditions in meaningfulness (F = 0.00, p>.01), see figure 86, either in uniqueness, (F = 1.21, p>.01), see figure 87.

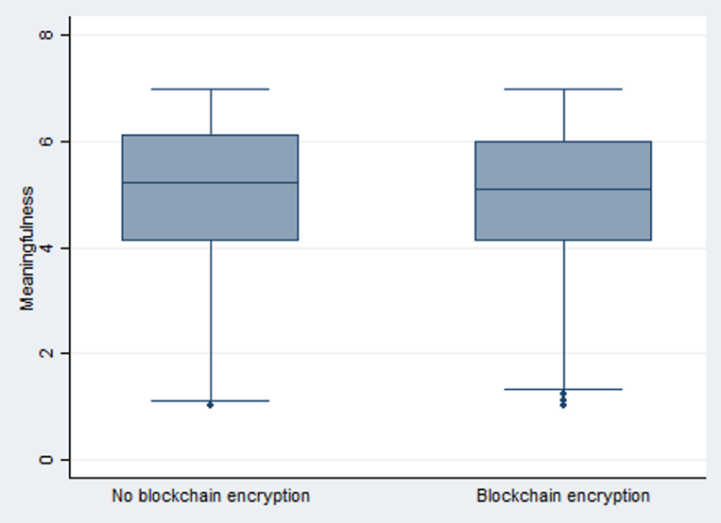


Figure 86: Difference in meaningfulness between no blockchain encryption and blockchain encryption about the product information

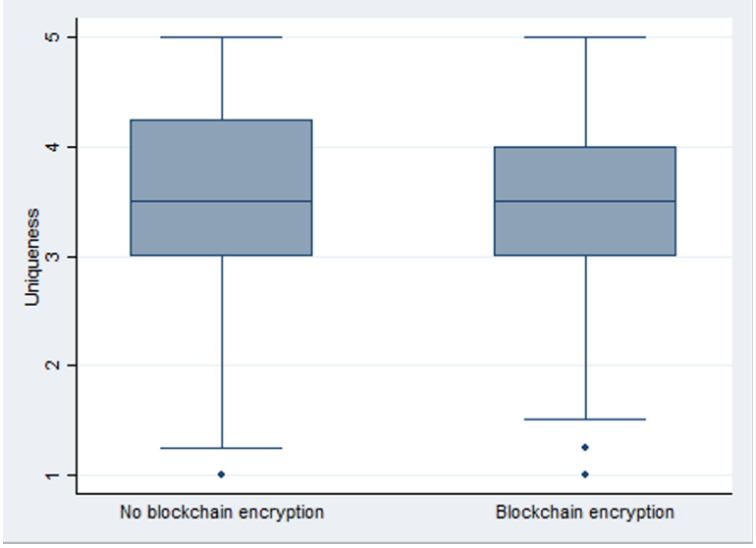


Figure 87: Difference in uniqueness between no blockchain encryption and blockchain encryption about the product information

Ultimately, the impact over these three experimental conditions (vs control conditions) over purchase intention has been analysed. Authors wanted to measure the impact that those conditions exert over the final decision of consumption and, additionally, whether interactions among them occur. To do so, authors ran a three-way ANOVA. Purchase intention is statistically significant under second-hand ($F = 49.78$, $p<.01$) and provenance ($F = 8.52$, $p<.01$) conditions, yet it is not significant under blockchain encryption technology ($F = 0,54$, $p>.01$). Neither all the possible interaction combinations turned out to be statistically significant (table 5).

Table 5: Three-way ANOVA over purchase intention

Number Of Obs = 5,123				**R-Squared = 0.0122**	
Root Mse = 1.15674				**Adj R-Squared = 0.0108**	
Source	Partial Ss	Df	Ms	F	Prob>F
Model	84.477677	7	12.06824	9.02	0.0000
Second-Hand	**66.614215**	**1**	**66.61421**	**49.78**	**0.0000**
Provenance	**11.402752**	**1**	**11.40275**	**8.52**	**0.0035**
Sec-Hand#Prov	**1.5054607**	**1**	**1.50546**	**1.13**	**0.2889**
Blockchain	**.72584984**	**1**	**.725849**	**0.54**	**0.4614**
Sec-Han#Block	**1.6547964**	**1**	**1.65479**	**1.24**	**0.2662**
Prov#Block	**.5233396**	**1**	**.52333**	**0.39**	**0.5317**
Sec-Han#Prov#Block	**1.9694106**	**1**	**1.96941**	**1.47**	**0.2251**
Residual	6844.1481	5,115	1.33805		
Total	6928.6257	5,122	1.35271		

In order to understand the extent of the impact of the experimental conditions (no matter the difference between experimental and control group, which have been analysed earlier) over the behavioural outcome through the emotional reaction, authors employed a regression analysis (table 6). Data show that provenance has a statistically significance effect over purchase intention (p<.01) and the effect is pretty weak (coef. = .1706), although it is negative. Conversely, second-hand and blockchain are not statistically significant (p>.01). However, the biggest and statistically significant effect (p>.01) over purchase intention is attributed to meaningfulness and uniqueness. Specifically, uniqueness exerts the major impact over purchase intention (coef. = .5714). See image below.

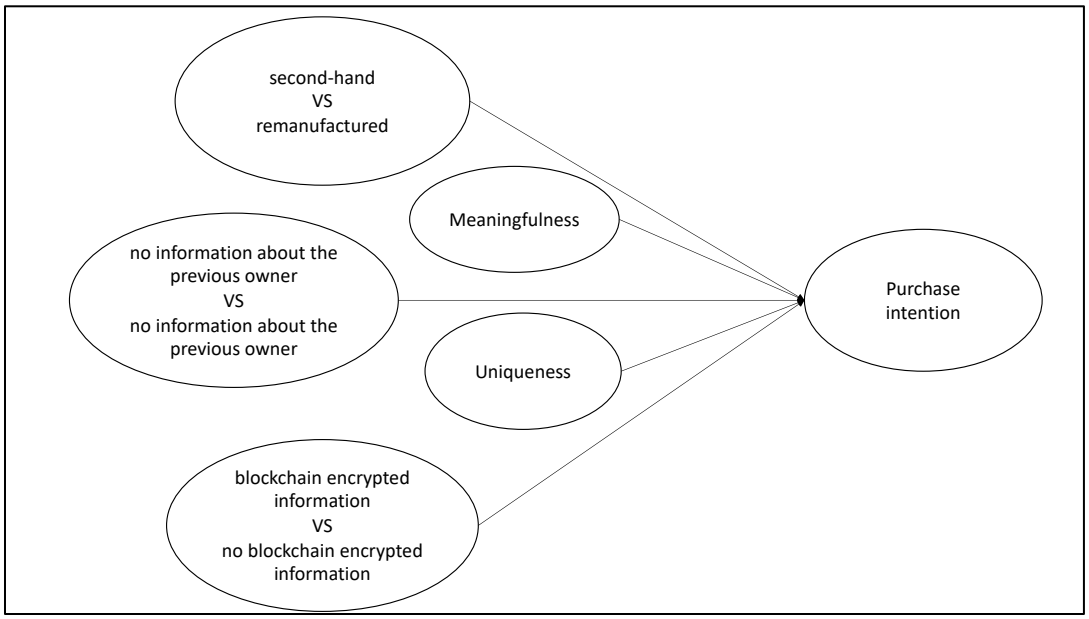


Table 6: Regression analysis

Number of obs = 5,123						
F(5, 5117) = 1078.92						
Prob > F = 0.0000						
R-squared = 0.5132						
Adj R-squared = 0.5127						
Root MSE = .81188						
PI	**Coef.**	**Std. Err.**	**t**	**P>|t|**	**[95% Conf. Interval]**	
Meaningfulness	.240163	.0100257	23.95	0.000	.2205084	.2598175
Uniqueness	.571397	.0127737	44.73	0.000	.5463551	.5964389
Second-hand	-.0541629	.0228458	-2.37	0.018	-.0989504	-.0093753
Provenance	-.1706578	.0227377	-7.51	0.000	-.2152334	-.1260823
Blockchain	-.0043302	.0226898	-0.19	0.849	-.0488118	.0401514
_cons	3.389562	.0226284	149.79	0.000	3.345201	3.433924

7.5 Behavioural implications

According to data, it is reasonable to imply that consumers are particularly interested in circular fashion. When provenance information is provided, though, it reduces the perceived uniqueness of the garment. Uniqueness and meaningfulness, though, accounts for most of the purchase intention either second-hand or remanufactured garments (namely, a scarf, in the experimental scenario) can be realistically explained through the role of uniqueness, yet when provenance information are displayed.

In other words, people attribute attached a keen sense of uniqueness to circular fashion garments, which reflects in high senso of meaningfulness and -particularly- uniqueness. However, this provenance information discourages consumers' intention to purchase such garment.

Blockchain information does not covers a pivotal role over people's consumption decision, yet. This result can be explained by the fact that this burgeoning technology is still at its embryonic stage, especially in fashion industry, where blockchain is still new yet close to be implemented.

7.6 Conclusions

According to this analysis, circular fashion is a valuable asset for corporations, since consumers attributed high level of uniqueness and fairly level of meaningfulness to products. This emotional attachment, in turn, impacts purchase intention. But the effect is somehow controverse. Indeed, information about the product's previous owner can play a detrimental role on the final purchasing decision. However, providing this information by blockchain technology does not help overcome this obstacle. Lack of knowledge about this technology can by the reason lying beneath such experimental results. Nonetheless, given the consensus blockchain technology is gaining in further markets, e.g., cryptocurrencies, digital contracts and food (just to name a few), it can be a valuable tool to be explored more in depth in the near future.

8 Conclusions

This study has explored the consumers' role in the circular transformation of the textile and clothing industry, by investigating both their behaviours relating to circular fashion textile and their attitude towards/interaction capability with certain typologies of technologies, in particular towards QR-codes and the blockchain technology.

The results of consumers' questionnaire along with those related to the carried-out choice experiment have been analysed in order to get useful information to complete the whole picture related to consumers that could be indirectly interact with the TRICK platform in the next future and directly support, by means of their purchase choices, the circular transition of textile value chain.

Main findings are synthesized below, considering all main sections of this report and to follow, a set of major implications from a policy-making point of view is reported.

As regards results related to **Circular Fashion behaviours** adopted by European consumers, it emerges an interesting picture on circular and sustainable purchasing and consumption predisposition: a new consumer path has begun, but it needs to be further supported.

Taking into account the sustainable awareness and involvement's section, it appears at aggregated level that the majority of respondents (about 75%) is aware on the environmental and social negative impacts related to textile and clothing sector along with all main implications linked to current linear model of fashion production and consumption. European consumers also recognize the importance of the adoption of certain sustainable behaviours in order to influence sustainability-related problems in fashion industry (such as, the importance of disposing of end-of-life clothing properly, of extending product life by choosing long-lasting clothes or by giving a new function to those that are no longer used, of buying clothing made from recycled materials) (more than 70% of total involved respondents). Nevertheless, renting is still considered the most useless behaviour to tackle environmental issues. Despite this high level of awareness in sustainable issues, European consumers state that economic factors along with products features (like quality of materials and durability) deeply affect their purchase and consumption decisions related to clothes (at aggregated level about 54%). Results in the five countries are enough homogenous and highlight that there is the necessity to furtherly enhance the competitivity of sustainable cloths in next future (both by means of the development of specific policies/strategies and by "building" a market effectively capable to properly valorise this kind of products and to make these lasts more competitive).

As regards purchasing and consumption intentions, at aggregated level, it appears that respondents in the five countries are all influenced when purchase a new garment by quality of the product itself (e.g., preference of clothes with natural fibres and/or of highest quality or lost-lasting clothes, etc.), but also by some environmental factors (e.g., the absence of packaging or fabrics produced through low environmental impact methods, such as the organic cotton) (more than 60% of the total number agreed with this evaluation). These results confirmed those obtained in sustainable awareness and involvement's section. The purchase of clothes made with recycled materials is still few explored by respondents (about 33% of total respondents), even if they are starting to recognize the additional value of the use of recycled materials in the production of a new garment. Indeed, about 54% of respondents expressed the willing to pay a little more for a similar garment in comparison to one realized with virgin fibres (an average value of about 9 euros more). Nevertheless, about the 39% of

respondents expressed their willingness to pay much less (from € 20 to € 39) than the cost of a sweatshirt made with virgin fibres and the 7% of consumers would pay the same. This result confirms the necessity to furtherly enhance the economic competitivity of and the trust towards cloths made with recycled fibres in next future.

Regarding sustainable fashion consumption tendencies, these lasts are largely still few adopted among European consumers: about 30% of total number of respondents, at aggregated level, expressed to adapt/modify old clothes, buy modern second-hand or clothes made with reused materials and exchange clothes with other people. A remarkable reduction is registered for buying original vintage clothing and renting clothes (at aggregated level, about 15% of total respondents). This last result is coherent with that emerged by sustainable awareness and involvement's section (the useless perception of renting clothes to face negative impacts of linear model of fashion production and consumption).

Final part of this section explored motivations/barriers that may influence the purchase/usage of three different kinds of sustainable and circular clothes by consumers: as sustainable produced garments made from natural or recycled fibres and/or characterized by a low environmental impact; second-hand garments and rented garments. As regards ***sustainably produced clothes***, at aggregated level, more than 50% of total respondents expressed that the wearing of this kind of clothes make it feel better and is aligned with own personal identity (personal drivers prevail in respect with epistemic and social drivers). Nevertheless, the price continues to be perceived as the main barrier to furtherly increase this sustainable behaviour (financial risk strongly prevails in comparison to other ones investigated, e.g., aesthetic, functional and sanitary risks). Focusing on ***second-hand clothing***, about 50% of consumers, at aggregated level, agreed that wearing/usage second-hand garments generates positive and accomplishing feelings and the perception to have done something worthwhile. Second-hand clothes and their corresponding value are recognized as unique (exactly as in sustainable clothes, personal drivers prevail, following by epistemic drivers and, finally, by social ones). Among potential barriers analysed in this study it emerges a balanced picture: about 40% of respondents, at aggregated level, expressed to perceive the price, the not reflection of the latest fashions and unhygienic aspects as possible barriers for a more robust adoption of this sustainable behaviour by European consumers. At the same time, a similar percentage expressed a neutral position (economic and aesthetic risks are more perceived than sanitary and functional ones). If financial barriers for sustainably produced clothes are more important compared to second-hand clothing (49% and 41% respectively), people are much more concerned about hygienic and cleaning conditions of second-hand clothing (37% compared to 25% for sustainable clothes). Finally, analysing responses on ***renting clothing*** behaviour, at aggregated level, about 50% of respondents agreed that renting of clothes allows to wear expensive clothes at low cost, to save space in the closet and to wear the most suitable cloth for the purpose of a specific event (functional drivers prevail). At aggregated level, unhygienic aspects and feeling to waste money are perceived as possible barriers to further increase the widespread of this sustainable behaviour (about 40% of respondents) (sanitary and financial risks are equally important). It is possible to observe that these perceived obstacles may be therefore faced with proper communication actions / awareness and information traceability strategies at different levels in order to better contribute to the consumer growth and to concretely nourish its main role in the circular transition of textile value chain.

Results in the five countries are enough homogenous, even if some useful insights emerged. Poland highlighted the major number of consumers that frequently purchases second-hand clothing. The

majority of respondents from Germany and France has never rent clothes (64% and 60% of respondents) and never bought vintage pieces (47% and 43%).

For what concerns use behaviour's section, it emerges a positive representation of European consumers. They take high care on purchased clothes, fostering their durability by means of the adoption of proper washing habits, avoiding dryers and ironing when it is not required and paying great attention to the indications on garments' labels (more than about 60% of respondents, at aggregated level, frequently adopted this type of attention). Furthermore, repair/mend of clothing is becoming a frequent habit for about 35-40% of consumers involved in this study (at aggregated level). Results in the five countries are enough homogenous.

About after-use behaviour's part, respondents highlight to have adopted a sustainable and responsible post-use management approach of own clothes. From this study only about 18% percentage of consumers involved, at aggregated level, prefer to throw these away, whereas about 50% of total expressed to favour more sustainable and circular solutions (such as to take these lasts to shops/collection centres where fabrics may be collected for recycling or to donate these to thrift stores or to take charity). The respondents also highlighted a low attitude towards obtaining an economic advantage by selling clothes to thrift stores or swapping them (9% for "*Very often/always"* and 16% for "*Often")*. In general, practices such as the creative recycling (turning clothes into canvas, bags etc.), donation and taking clothes to collection centres/shops are the options most selected by all the countries. Countries having a greater aptitude for donation are Italy and Spain (more than half of positive answers), while those with more aptitude for taking clothes at collection centres/shops are Germany, France and Spain (more than half of positive answers). The countries reusing the oldest clothes for other purposes are Poland (51%), Italy (45%) and Spain (45%). These results are coherent with those emerged in before sections.

Considering trust in information's section, from the study it emerges that about half of respondents at aggregated level feels more reassured if a piece of clothing offers additional information. Availability of easily accessible information can help consumers to be more confident towards apparel products even if they don't check it. Southern countries, namely Spain and Italy, feel more reassured by the availability of further information on clothing (more than 50%). On the contrary, France and Germany present a more sceptical population, reporting a lower share of positive answers (33-34%). Poland places itself in a mid-level but closer to Spain and Italy (about 53%). In reference to environmental claims about 39-44% of total respondents declares to trust/moderately trust them. Trust increases by 10% when the information is third-party certified reaching (for example, by means of eco-label scheme).

Analysing the main relations among investigated circular and fashion behaviours' variables, these results fully reinforce previous insights. Indeed, it emerges a strong and positive correlation between all the sustainable behaviours that can be implemented by consumers along the entire clothing life cycle (purchase, consumption, use, repair and after-use). It means that, if an individual acts in a sustainable way in relation to a specific behaviour, it is very likely that she/he will behave the same in the other life cycle phases. With regard to personal beliefs, it emerges that environmental awareness and perceived effectiveness are good predictors of sustainable purchase and sustainable use. With regards to personal attitude towards information on clothing, having a high trust in eco-labels (i.e., third-party certified environmental information) increases the probability to behave sustainably in all the clothing life cycle phases. In addition, a high perceived reliability due to the availability of information disclosed by companies can rise the likelihood to buy circular clothing, as well as use and

dispose of it in a sustainable way. Finally, other interesting highlights are that young people are keener to use new consumption models such as renting, sharing, and second-hand, while elderly are likely to behave sustainably during the use phase; repairing is strongly affected by nationality as Mediterranean countries are keener to this practice; and rental and swapping clothing practices, as well as second-hand purchasing, are considerably more probable in Poland.

Concerning behaviours and beliefs to **QR-code and blockchain technologies**, the main emerged findings highlight that both technologies may really contribute to foster the circular transition of fashion sector if these lasts will be properly exploited.

As regards drivers that may influence the scanning action of a QR-code associated with a garment by consumers to support their purchase decisions, it emerges a positive predisposition among European consumers. The majority of respondents, considered at aggregate level, perceives this system useful to obtain relevant purchase information, as well as an information technology capable to save much time during their shopping and also practical to use (about 77% of total respondents). Furthermore, more than 80% of respondents perceives as highly/moderately ease to use this information technology and the scanning an operation highly/moderately ease to learn and to understand. In reference to perception quality of information obtainable, about 80% of respondents perceives the obtainable information highly/on average relevant, in-depth, useful and reliable. A similar percentage of respondents also perceives the QR-code as a system which is highly/moderately reliable, safe to use, characterized by an adequate speed and easily accessible to obtain additional purchase information as well as to have all resources to correctly interact with this technology.
Additional important drivers are also those related to users' characteristics: their habit in the usage of technology or that specific technology (in this case, the habit to scan a QR-code) and their propensity to seek novelty/to be open towards innovation. Regarding novelty seeking results, it emerges, at aggregated level, that about 80% of respondents highly/moderately seeks novelty. Regarding the habit to scan a QR-code during daily routines, it emerged, at aggregated level, that about 60% of European citizens scans a QR-code at least from one to three times a month (in particular, 40% of respondents, at aggregated level, state to use QR-code to access additional information about a product in a shop with a frequency from more than once a week to once to three times a month). This highlights that there is a "fertile ground" potentially exploitable to support the development of real innovative and circular textile value chains in next future. Spain, Italy and Poland, from this study, emerge as the European countries with the better predisposition to use QR-code to foster circular transition of fashion production and consumption model.

About the individual intention to use a QR-code associated with a garment to obtain additional information on its circular performance, the data highlight that about 80% of respondents, at aggregated level, positively considers the scanning process of a QR-code for supporting own purchase choices and at same time expresses own will to adopt this behaviour in the next future. Again, Spain, Italy and Poland represent the European countries with the higher individual intention to use a QR-code associated with a garment, coherently with previous section.

Another relevant result, emerged in this study in reference to QR-code technology, it is the high confidence level towards this technology by younger respondents (under 35 years). Generally younger people are more prone to believe to have all resources and necessary knowledge to scan a QR code and that it represents a good way to gather additional information on what they are buying. The youngest respondents are more confident that having additional available information will help them to make better purchasing and consumption choices than elder respondents.

The final part of survey was aimed to explore the attitude toward **blockchain** by consumers. In particular, their knowledge level on this topic and their trust toward this innovative technology were investigated. Regarding the analysis of knowledge level on the blockchain technology, this topic was explored in the questionnaire by means of four true/false items related to main characteristics of this technology. Survey's respondents at aggregated level highlighted a limited knowledge of what blockchain technology is: only a small percentage of the total number of respondents correctly identified all four true/false sentences (2%), whereas 52% expressed or not to know this topic or wrongly answered (Spain highlighted the better result, 14%). Taking into account the trust toward blockchain, at aggregated level, the majority of respondents expressed a moderate trust toward this new technology and its corresponding benefits. This picture seems to be coherent with the previous output related to the knowledge level on what this technology is. Trust towards a new technology needs to be supported by the learning process of what it really/concretely is (its main characteristics and benefits) and by providing, at the same time, the opportunity to interact with the technology itself in daily routines to touch/live its real benefits. This final highlight that there is the need to develop and to nourish proper strategies / policies / regulations / action plans, at different levels, capable to help the growth of a more aware consumer open toward the adoption of innovative technologies in order to really support the fostering of circular value chains and circular behaviours. The result on novelty seeking, previously debated, highlights that there is a huge potential that may be exploited in order to reduce this knowledge gap and to improve trust toward blockchain technology of consumers in next years.

Taking into account the **conflicts and paradoxes in consumers' minds on circular fashion**'s part, it emerges at aggregated level that European consumers have experienced conflictual feelings at least "sometimes" (about 40% of total respondents) during their circular and sustainable clothing purchasing (e.g., sustainability vs aesthetics, sustainability vs functionality). Spain consumers resulted to be the European consumers characterized with the highest level of satisfaction, fulfilment and excitement regarding the resolution of contradictory goals while shopping for clothes (more than 60%), whereas other countries' consumers barely reach 50%.

The ending part of this study, based on the carrying out of a **choice experiment** to investigate cause-effect connections between different informative stimuli and the direction and the intensity of circular behaviours, highlights that circular fashion is a valuable asset for corporations, since consumers attribute high level of uniqueness and fairly level of meaningfulness to circular fashion products. However, obtained results in reference to provide this circular information by blockchain technology are coherent with previous ones: blockchain may be a valuable tool to be more explored in the near feature, but nowadays it is still few known by European consumers.

In reference to consumers, **TRICK platform and related services** may effectively contribute to overcome the identified barriers in near future. Indeed:

- TRICK platform addresses to foster collaboration, communication and cooperation among all main actors in textile value chain (included consumers) towards circular economy;
- TRICK platform and block-chain based traceability addresses to provide a strong informative base to face green-washing in textile and to effectively demonstrate the positive impacts related to circularity;
- TRICK platform addresses to increase consumers' engagement in the adoption of circular fashion behaviours, by providing the right information for a better use and disposal and by collecting all their feedbacks.

However, a more active role of consumers in the transition towards a circular fashion textile value chain needs to be furtherly fostered also by **policy makers**. These lasts, indeed, should implement following actions in near future:

- Supporting the development of a well-functioning internal market for secondary raw materials by both an economic and quality point of view (this need is also emerged in the New Circular Economy Action Plan). The goal is to make more competitive recycled fibers;
- Supporting the development of standard certifications capable to increase the trust of consumers towards sustainable clothes and to face the green-washing in textile. In reference to this point, TRICK project may provide useful informative basis (Eco-labels should be furtherly improved);
- Supporting the adoption of renting clothes and of other new circular business models thanks to proper incentives addressed towards textile industry, but also towards consumers view (this need to shift in textile towards product-as-service models has been also highlighted in the New Circular Economy Action Plan).

Appendix A – The Questionnaire

D1. Which is your position regarding the following statements?

Please select a score on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree)

	1 - Strongly disagree	2	3	4	5 - Strongly agree
I am aware of the social issues present in the clothing sector (e.g. child exploitation, harsh, dangerous and socially unacceptable working conditions in the factory, unfair wages, etc.)					
I am aware of the environmental issues present in the clothing sector (e.g. environmental impact generated during the production, distribution and disposal of clothing)					
I know that the clothing sector operates following a linear model: it uses large amounts of resources to produce garments which, after a short period of use, are sent to landfills or burned.					
I am aware that a large amount of textile waste generated every year is not recycled					
I know that fast fashion (the so-called fast and cheap fashion) is a consumption model that has a great impact on the environment					
I believe that the use of recycled fibers can reduce the environmental impact of the clothing sector					

D2. Which is your position regarding the following statements?

Please indicate a score on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree)

	1 - Strongly disagree	2	3	4	5 - Strongly agree
It is important, as an individual consumer, to reduce the purchase of clothes to protect the environment					

Since everyone can have an impact on environmental problems, buying clothes made from recycled materials can really make a difference					
It is worth recycling / donating clothing at appropriate collection centers					
Giving a new function to clothes I no longer use (for example by making rags or creating new objects) makes me feel that I am helping to reduce the consumption of resources					
It is good for the environment to prefer renting to buying clothes that I would wear only once or occasionally					
Buying clothes and accessories that do not deteriorate / last a long time has a positive effect on the environment					

D3. Which characteristics do you take into consideration when you choose an item of clothing?

Indicate the three characteristics that you consider most important among those listed, from the most important to the third most important

Aesthetics	
To be cool	
Quality of materials	
Durability	
Price	
Use of recycled fibers	
Environmental impact of the entire life cycle (CO_2 emissions, water consumption, etc.)	
Local production	
Company ethical behavior (e.g. fair and decent working conditions)	

1.

D4. Thinking about your clothing purchasing decisions, indicate how often you perform the following behaviors using a scale from 1 (I never adopt that behavior) to 5 (I always adopt it / whenever I have the possibility)

	Never	Rarely	Some time	Often	Always / as often as possible
I choose clothes of the highest quality available and long lasting					
I buy garments indicating that they have been made with little use of water					
I prefer clothes made with fibers produced through low environmental impact methods (e.g. organic cotton)					
I buy clothes made with recycled materials					
I prefer clothes with natural fibers (e.g. linen, cotton, wool, silk)					
I choose garments having a low environmental impact during production (e.g. clothing with eco-friendly labels)					
I buy locally produced (national) clothing					
I choose garments with labels that demonstrate the ethical behavior of the manufacturer (e.g. “sweatshop-free” or similar)					
I avoid buying garments made in countries with unfair working conditions or exploitation					
I select fabrics that require cold washing temperature, shorter drying time or no ironing					
I buy clothes without wrapping / packaging					
I buy clothes in sustainable wrapping/packaging (e.g. reusable, recyclable, recycled or biodegradable)					

D5. Considering a sweatshirt made with (new) virgin fibers worth € 40, how much would you be willing to pay to buy the same sweatshirt made with recycled fibers?

D6. Thinking about your purchase and consumption methods in relation to clothing, indicate how often you perform the following behaviors using a scale from 1 (never adopts that behavior) to 5 (always adopts it / as often as possible)

	Never	Rarely	Some time	Often	Always / as often as possible
I buy clothes made with reused materials					
When I'm tired of my old clothes I modify / adapt them (or have them modified / adapted) to create new ones					
I happen to rent clothes instead of buying them					
I happen to exchange my clothes with other people					
I buy modern second hand clothing					
I buy original vintage clothing (dating back to the period 1920-1980)					

D7. How much do you agree with the following statements?

Express a score from 1 to 5 where 1 means "Strongly disagree" and 5 "Strongly agree"

(to clarify) :

- ***Garments produced in a sustainable way :*** *garments made with natural or recycled fibers and / or garments that have a low environmental impact during the production and distribution phases*

- ***Second-hand garments :*** *second-hand garments or redesigned garments created from unstructured garments / materials*

- ***Garments rented :*** *garments rented for a short period of time in the store or through an online platform*

	1 - Strongly disagree	2	3	4	5 - Strongly agree
Wearing **sustainably produced clothes** would make me feel better					
Wearing **secondhand clothes** would make me feel like I've done something worthwhile					
Wearing **rented clothes** would make me feel good and happy					
Wearing **sustainably produced garments** would allow me to express my identity					
Wearing **secondhand clothes** would make me feel accomplished					
Wearing **rented clothes** would allow me to express my identity					
My loved ones would like me to buy **sustainably produced garments**					
My loved ones would like me to buy **second-hand clothes**					
My loved ones would like me to use **rented clothes**					
People close to me usually buy **sustainably produced clothes**					
People close to me usually buy **second-hand clothes**					
People close to me usually buy **rented clothes**					
Sustainably **produced clothes** have new characteristics and uniqueness, differentiating themselves from traditional clothing					

Second hand clothes are unique garments					
Rented clothes would allow me to stand out					
Using **rented clothes** would allow me to wear clothes that match fast-changing trends					
Using **rented clothes** would allow me to wear clothes suitable for the purpose of the event or for the specific occasion when participating in it					
Using **rented clothes** would save me space in the closet by reducing the number of unnecessary clothes					
Using **rented clothes** would allow me to wear expensive clothes at a low cost					

D8. How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
Sustainably produced clothes are likely to be expensive as they are not mass-produced					
Some **second-hand clothes** are likely to be expensive as they are rare					
Renting clothes for a short time, without actually owning them, seems like a waste of money					
Sustainably produced clothes are likely not a durable product					
Second-hand clothes aren't likely to last long					
Sustainably produced clothes are likely to be damaged or discolored when washed					
Second-hand clothes are likely to be damaged or discolored when washed					
Sustainably **produced clothes** may not reflect the latest trends					

Second hand clothes may not reflect the latest fashions					
Sustainably produced clothes are unlikely to be unclean / hygienic					
Second-hand clothes are unlikely to be unclean / hygienic					
Rented clothes are unlikely to be clean/hygienic					

D9. Thinking about how you use your clothing, indicate how often you perform the following behaviors using a scale from 1 (never adopts that behavior) to 5 (always adopts it / whenever possible)

	Never	Rarely	Some time	Often	Always / as often as possible
I try to reduce the number of washes of clothes					
I wash clothes at low temperatures					
I wash clothes with a mild and / or natural detergent					
I pay attention to the indications on garments' labels that show how to wash and take care of different fabrics					
I avoid using the dryer and / or ironing clothing whenever possible					

D10. Thinking about how you repair your clothing, indicate how often you perform the following behaviors using a scale from 1 (never adopts that behavior) to 5 (always adopts it / whenever possible)

	Never	Rarely	Some time	Often	Always / as often as possible
I repair / mend my clothing by myself					
I help family and/or friends to repair/mend their clothes					

I ask my family and / or friends to help me repair / mend clothing when I am unable to do it myself					
I go to a seamstress or the shop where I bought the clothes when I can't fix them myself					

D11. Thinking about when you discard (stop using, stop using, give away) your clothing, indicate how often you perform the following behaviors using a scale from 1 (never adopts that behavior) to 5 (adopts it always / as often as possible)

	Never	Rarely	Some time	Often	Always / as often as possible
When I get tired of my clothes or when my clothes are damaged ...					
I donate them to thrift stores or to charity					
I sell them to thrift stores or swap them for other clothes					
I hand them down to family members/relatives					
I reuse them for other purposes (e.g. cleaning rags) or turn them into something new (e.g. canvas bag)					
I modify / customize or repair them					
I throw them away					
I take them to shops / collection centers where fabrics are collected for recycling					

D12. Regarding accessing further information, for example via a link / QR code on a web page, please indicate how much do you agree with the following statements

Express a score from 1 to 5, where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
I feel safer when I see that an item of clothing offers additional information, even if I don't look for it					

Knowing that more information about an item of clothing is *possibly* easily accessible makes me less concerned about its quality					
Having more easily accessible information about an item of clothing gives me more confidence, whether I check it or not					
Statements about more information about an item of clothing, make me feel more comfortable					

D13. How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

*Companies tend to express their commitment to social / environmental causes through self-declarations. **The self -declaration** (eg. "Produced with recycled materials") is a voluntary message (not mandatory) not certified by any other body than by the Company itself.*

	1 - Strongly disagree	2	3	4	5 - Strongly agree
The environmental self-declarations on clothing guarantee a sincere commitment to protecting the environment					
Most of what environmental self-claims on clothing communicate is reliable					
Environmental self-declarations on clothing certify truthful information					

D14. How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

Continuing to talk about how companies communicate information about products, eco-labels (or eco-labels) are an official symbol (not a simple self-declaration of the company but a declaration verified by a certification body) that informs that a product has been designed to do less harm to the environment than similar products.

	1 - Strongly disagree	2	3	4	5 - Strongly agree
Eco-labeled clothing meets environmental quality standards					

Eco-labels inform consumers about the low environmental impact of clothing					
Eco-labels on clothing are credible					
Eco-labels are a reliable source of information on the quality and environmental performance of clothing					
I have a more favorable opinion of clothing that has an eco-label					
My attitude towards clothing is more positive when it has an eco-label					
Eco-labels influence my shopping habits					
The presence of ecological labels that certify the sustainability of the packaging of an item of clothing inspires me with confidence also in the item contained					

Q15. Indicate how often it is usual to scan a QR-code for the following purposes

	Never	Less than once a month	Once or three times a month	Once a week	Several times a week
To access the menu of a restaurant / bar					
To access additional information about a product in a shop					
To verify login credentials / authenticate online accounts (eg. WhatsApp Web, other)					
To send and / or receive payment information					
To access Wi-Fi networks					
To download an application					
To access contact information (telephone number(s), e-mail address(es))					
To download audio / video					

D16. How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
In my opinion, I can obtain important information on a garment by scanning a QR-code associated with it					
I think I can get in-depth information about a garment by scanning a QR-code associated with it					
I think I can get a lot of information useful for my decisions to buy a garment, by scanning a QR-Code associated with a garment					
I think I can get reliable information by scanning a QR-Code associated with a piece of clothing					

D17. How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
I think that a QR-Code associated with a garment is very reliable					
I think a QR-Code associated with a garment is safe to use					
I think the scanning speed of a QR-Code associated with a garment is adequate					
I think the QR-Code associated with a garment provides information that is easily accessible to me					

D18. How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
For me, scanning a QR-Code associated with a garment is of great value					
I find that scanning a QR-Code associated with a garment is useful in everyday life					
I find that scanning a QR-Code associated with a garment saves me a lot of time in getting the most relevant information for me when buying a garment					
For me, scanning a QR-Code associated with a garment is practical					

D19. How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
I have the necessary resources to scan a QR-Code on a garment					
I have the knowledge to scan a QR-Code on a piece of clothing					
Scanning a QR-Code on a garment is compatible with the technologies I use					
I can get help from others when I have difficulty scanning a QR-Code on a garment					

D20. In order to obtain relevant information for the purchase phase of a garment, how much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
I I find that it is/can be easy to learn how to scan a QR-Code associated with a garment					
I find it easy to become proficient in scanning a QR-Code associated with a garment					
Scanning a QR-Code associated with a garment is easy to understand					
I find that using a QR-Code associated with a garment is an easy way to acquire additional information					

D21. For each pair of opposite attributes, indicate the score from 1 to 7 that best reflects your views on scanning a QR-code associated with a garment

We remind you that 1 expresses maximum preference for the "negative" attribute and 7 expresses maximum preference for the "positive" attribute, while 4 describes an "intermediate" evaluation.

	1	2	3	4	5	6	7	
A bad idea								A good idea
Senseless								Solid
Pointless								Useful
Boring								Funny
Unsatisfactory								Very satisfactory

Unreasonable								Reasonable

D22. How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
I plan to scan the QR-Codes associated with the garments to support my purchase decisions					
I think I will scan the QR-Codes associated with the garments to support my purchasing choices					
I intend to recommend to others (relatives, friends, colleagues) to scan the QR-Codes associated with the garments to support their purchase decisions					

D23. How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
I am always looking for new ideas and experiences					
When I get bored, I like to try new, unfamiliar experiences					
I like to constantly change my activities					
I like to introduce novelties and changes in my daily routine					

D24. Taking into consideration the Blockchain technology *, please indicate if the following statements are true (V) or false (F)

** **Blockchain** : "Technology based on a chain of blocks that record and manage accounting operations accessible only to users of each node, to ensure traceability."*

	V.	F.	I do not know
The Blockchain is a shared and "immutable" data structure	x		
Each element, once written in the Blockchain, is traceable in every part, but its exact origin cannot be traced		x	

The Blockchain is based on the decentralization of information	x		
The content of the Blockchain is not transparent and visible to everyone and is not easily consulted and verified		x	

D25. Please indicate how much you agree with the following statements about the Blockchain

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree". The intermediate value 3 means "Neither agree / disagree - I don't know".

	1 - Strongly disagree	2	3	4	5 - Strongly agree
Blockchain technology makes it possible to carry out transactions securely and reliably					
Blockchain technology makes it possible to fully trace the supply chain of a product (e.g. a garment, etc.)					
Blockchain technology ensures transparent and responsible manufacturing supply chains					
Blockchain technology enables reliable information to be obtained					
Blockchain technology enhances trust between producers and consumers					
Blockchain technology can support the development of new technologies (e.g. product passports, etc.)					

D26. When you are faced with a choice (eg when you shop, use clothing), do you experience tensions between personal needs and environmental objectives?

	Never	Rarely	Some time	Often	All time
I ask myself divergent questions that I have to address at the same time (e.g. I am looking for a garment that is functional but also produced in a sustainable way)					
I can think of conflicting ideas (e.g. I am tempted to buy a set of socks on offer but I would like to buy only the strictly necessary)					
I pursue different goals, which contradict each other (e.g. I often try to buy sustainable clothing, but this often has repercussions on the aesthetics of the product)					

I have to meet conflicting needs (e.g. I prefer to buy a recycled garment, consistent with my environmental sensitivity, but this can reflect on the image that society has of me)					
When I think about what to buy, the alternatives that come to my mind seem contradictory (e.g. I wonder whether to buy a new cheap pair of shoes, aware of the risk of having to change it soon, or buy a more expensive pair that should last much longer.)					
I have to decide between opposite alternatives (e.g. I wonder whether to buy a new dress for a unique evening or let me borrow it)					
My purchasing decisions are full of tension and contradiction (e.g. an expensive and good quality dress will last a long time and be less impactful for the environment, but it risks going out of style easily)					

D27. When you experience tensions in front of a choice (eg when choosing, using clothing), what is your reaction?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
When I consider contrasting perspectives, I gain greater awareness of a specific theme.					
I feel comfortable balancing conflicting needs at the same time.					
Accepting contradictions is essential for my fulfillment.					
The tension between different opinions stimulates me					
I am satisfied when I manage to pursue contradictory goals					
I often get excited about finding solutions to conflicting needs					
I feel comfortable reflecting on contradicting issues.					
I feel relieved when I realize that two opposites can both come true.					

D28. “When I shop, or use clothes and accessories, I feel capable of. . . "

	1 - Strongly disagree	2	3	4	5 - Strongly agree
. . . respect my morals but be flexible at the same time (e.g. as a rule I buy garments produced according to ethical and environmental standards but at the same time if I find a dress that I particularly like, I buy it even if it does not provide information on sustainability)					
. . . observe new habits in my routine (e.g. I learned to look carefully at the label, paying attention to the composition of the garment and environmental certifications)					
. . . be original in habits (e.g. take back vintage clothing from my relatives to satisfy the desire to wear different clothes and not give in to the temptation of fast-fashion if I need something urgently)					
. . . develop sensitivity to new themes by leveraging my skills (e.g. I repair or have worn clothing repaired instead of replacing or throwing it away)					
. . . I find new solutions respecting my philosophy of life (e.g. I learned to donate, exchange or resell the clothing I no longer wear)					
. . . explore new ways of doing while practicing the usual ones (e.g. when I go to stores to shop, take advantage of the commute to run other errands such as returning discarded garments at collection points or looking for second-hand markets)					
. . . focus on my own needs while addressing the needs of others (e.g. when I discard a dress, I choose to deliver it to designated collection centers for donation or recycling)					
. . . respect the needs of others following my philosophy of life (e.g. when I look for new clothes, I prefer those not made in countries that employ cheap labor)					
. . . satisfy my need for fulfillment and contribute to the well-being of others (eg I prefer to buy clothing in small shops, giving support to small artisans, or from fair trade, such as "made in prison")					

Appendix B – The Experiment

Note: divide the respondents into 8 homogeneous groups, each one will display a single scenario

EQUAL INTRODUCTION FOR ALL:

We ask you to look at the image and read the product information provided by an online site.

SCENARIO 1 Reuse / No-provenance / Blockchain

Designed to keep you warm in the unexpected cold, this scarf is woven from premium cashmere and is **second hand.**
By scanning the QR code, you can get additional information about the product features.

This information is collected voluntarily and protected through **an encrypted digital ledger** (blockchain).

SCENARIO 2 A- Reuse / Provenance / Blockchain

Designed to keep you warm in the unexpected cold, this scarf is woven from premium cashmere and is **second hand.**
By scanning the QR code, you can get additional information about the product features.

The **head belonged to Maria**, a researcher to treat rare diseases. He wore it on special occasions such as, for example, fundraising evenings for research.
This information is collected voluntarily and protected through **an encrypted digital ledger** (blockchain).

SCENARIO 3 A-Reuse / No-provenance / No-traced info

Designed to keep you warm in the unexpected cold, this scarf is woven from premium cashmere and is **second hand.**
By scanning the QR code, you can get additional information about the product features.

SCENARIO 4 A-Reuse / Provenance / No-traced info

Designed to keep you warm in the unexpected cold, this scarf is woven from premium cashmere and is **second hand.**
By scanning the QR code, you can get additional information about the product features.

The **head belonged to Maria**, a researcher to treat rare diseases. He wore it on special occasions such as, for example, fundraising evenings for research.

SCENARIO 5 B- Remanufacturing / No-provenance / Blockchain

Designed to keep you warm in the unexpected cold, this scarf **comes from the reuse of fabrics of a high quality cashmere coat.**
By scanning the QR code, you can get additional information about the product features.

This information is collected voluntarily and protected through **an encrypted digital ledger** (blockchain).

SCENARIO 6 B- Remanufacturing / Provenance / Blockchain

Designed to keep you warm in the unexpected cold, this scarf **comes from the reuse of fabrics of a high quality cashmere coat.**
By scanning the QR code, you can get additional information about the product features.

The **head belonged to Maria**, a researcher to treat rare diseases. He wore it on special occasions such as, for example, fundraising evenings for research.

This information is collected voluntarily and protected through **an encrypted digital ledger** (blockchain).

SCENARIO 7 B- Remanufacturing / No-provenance / No-traced into

Designed to keep you warm in the unexpected cold, this scarf **comes from the reuse of fabrics of a high quality cashmere coat.**
By scanning the QR code, you can get additional information about the product features.

SCENARIO 8 B- Remanufacturing / Provenance / No-traced info

Designed to keep you warm in the unexpected cold, this scarf **comes from the reuse of fabrics of a high quality cashmere coat.**
By scanning the QR code, you can get additional information about the product features.

The **head belonged to Maria**, a researcher to treat rare diseases. He wore it on special occasions such as research fundraising evenings.

QUESTIONS COMMON TO ALL RESPONDENTS

D.29 Regarding the image you have seen and the information you have read, indicate the correct answer:

	Yup	No	I do not know
The scarf you saw is second hand			
The scarf she saw was made from reusing old fabrics			
The head previously belonged to Maria			
Information is collected and protected using encrypted digital technology (blockchain).			

-

Q.30 How much do you agree with the following statements about the product?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
I perceive this product as absolutely unique					
This product is one of a kind					
This product is truly special					
The product in question is exceptional					

D31. For each pair of attributes, select the attribute that best describes how you perceive the product

Indicate a score from 1 to 7, where 1 expresses maximum preference for the "negative" attribute and 7 expresses maximum preference for the "positive" attribute, while 4 describes an "intermediate" evaluation.

	1	2	3	4	5	6	7	
Ugly								Handsome
Not recommendable								Recommendable
Not Preferable								Preferable
Unpleasant								Pleasant
Insignificant								Significant
Unsatisfactory								Rewarding
Useless								Useful
Not ecological								Ecological

Unethical								Ethical

D.32 How much do you agree with the following statements?

Express a score from 1 to 5 Where 1 means "Strongly disagree" and 5 "Strongly agree"

	1 - Strongly disagree	2	3	4	5 - Strongly agree
I am inclined to purchase this product					
If I were to buy a scarf, I would consider purchasing this model					
Based on the information provided, I consider purchasing the product					
I would consider purchasing this product					
I am willing to purchase the product					