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Towards sustainability: The Impact of Environmental Sustainability of Consumer Goods in the Italian Packaging Sector

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Abstract

Sustainable development is the path of the present and the economic and productive future. The pandemic has transformed the purchasing habits of goods, especially food products, its packaging and consequently the packaging sector as a whole is directly involved. Together with this remarkable transformation, sustainability represents another challenge of equal impact. Two surveys carried out by Nomisma Observatory in 2019 and 2020 targeting 1,000 and 1,008 consumers respectively on consumer packaged goods together with some direct qualitative interviews with packaging companies helped understand how consumer sensitization to issues of sustainability can change the packaging products, the materials used and the production methods and technologies. Manufacturing and packaging companies are facing a difficult challenge to better communicate the issue of sustainability through their products and the challenge of their clients in finding adequate margins to accelerate change in a market of consumers who are in part sensitive to sustainable development but not so willing to change their consumer spending behaviour. This study examines the possible obstacles in the value chain starting from the companies that produce packaging machinery, which must be able to process new materials, up to the production companies which in turn use such machinery for packaging their product to be offered to the final consumer. It is a team game that must involve government, industry, retailers and consumers. Enabling technologies, properly used, may provide a solution to this difficult balance in the future.

Keywords: Covid-19; sustainability; packaging; consumers; automatic machines; productive reorganization; Industry 4.0; internet of things; territory; supply chain; flow of knowledge; innovation; Italy

Introduction

Over time the sensitivity and commitments of Italians to the issue of sustainability is growing leading them to a more sustainable lifestyle. In 2019, 34 million Italians were interested in the topic of sustainability and almost one in three Italians knows the subject well, with an increase of 10% compared to the previous year (LifeGate, 2019). Despite the pandemic, Italian sales in large-scale distribution, including ecommerce, increased by 5% of which eGrocery by 134% (Nomisma, 2021). The turnover of Food Delivery has reached 706 million euros and according to estimates in 2021, 82% of Italians will use Food Delivery and Take Away services (Osservatorio PoliMi, 2020 and The World after Lockdown Nomisma Observatory,

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2021). The health emergency, unlike what was expected, did not generate greater environmental awareness despite partly sensitive consumers to sustainable development.

The originality of this work is twofold. On the one hand, it uses an original database created through surveys administered for two years by Nomisma⁵ in 2019 and 2020 to a representative sample of the population of 1,000 consumers for a total of 2,008 consumers. Nomisma is one of the most prestigious independent companies that engages in economic research and consulting activities for companies, associations, and public administrations at the national and international level based in Italy. On the other hand, based on consumers' indications on sustainable packaging, it analyses the possible obstacles in the value chain starting from the companies that produce packaging machinery, which must be able to process new materials, up to the production companies which in turn use such machinery for packaging (and sometimes for producing the good) their product to be offered to the final consumer. Rarely has a research jointly analysed these aspects of the production and sales chain.

This study furthermore aims to understand why and how consumers do or do not incorporate sustainability issues into their purchasing behaviour; and how major packaging and manufacturing companies are organizing themselves to face the challenges to modify their packaging machines to package with new and more sustainable materials. Finally, this paper furthermore helps find out if enabling technologies may provide a way out to this difficulty balance in the future.

Literature Review

Assessing the economic consequences of sustainable consumption and production practices aimed at reducing negative environmental externalities is crucial for policy making, especially if we consider the increasing interest of the recent EU policy packages in this field (Circular Economy package; European Green Deal and Recovery Fund to support sustainable transition). Since the seminal contribution by Porter and Van der Linde (1995) and Jaffe and Palmer (1997), the economic literature highlights that environmental regulation is not necessarily detrimental for firms' performance; on the contrary, well-design policies may induce Environmental Innovation (EI) practices that can generate long term positive effect on firm performances and competitiveness – a theory often known as Porter hypothesis. This idea has been verified empirically by a broad strand of empirical literature, which generally agrees that the economic return of sustainable consumption and production practices – the old question: “does it pay to be green?” – is highly context and sector specific, and cannot be generalised (For a review see Barbieri et al., 2016).

A consolidated result in the literature, as shown by the early contribution by Telle (2006), is that the real question is understanding when (i.e. under which context), or for whom it can pay to go green. In fact, the academic literature has found both positive (Cheng et al. 2014; Manello, 2017; Costantini and Mazzanti, 2012), null (Peneder et al. 2017; Rubashkina et al., 2015; Elsayed and Paton 2005; Amores-Salvadó et al. 2014) and negative effect (Greenstone et al., 2012; Rexhäuser and Rammer, 2013) of different green practices on firm competitiveness. An attempt to summarise and synthesise this literature has been made by the meta-analysis by Horváthová (2010), which finds that 55% of studies find a positive effect of green practices on firms' outcomes, 30% no effect and 15% negative effect. A standard



economic explanation for the positive effects comes from the idea that firms start to adopt green practices when facing resource depletion. These practices generally translate into new business strategies – like access to new markets, or cost reductions driven by increased resource efficiency –, which, eventually, are later associated to higher economic returns (Hart and Dowell 2011; Ambec et al. 2008, Porter and Kramer 2006). However, studies show that this mechanism is not homogeneous across sectors (Soltmann et al. 2015) and tend to vanish in energy-intensive ones (Riillo, 2017). Finally, Marin (2014) and Marin and Lotti (2017) show that productivity returns of green practices are smaller than the ones related to non-green ones, because environmental innovation tend to crowd out non-environmental innovations, which may be more profitable. While many empirical studies have focused on the economic effects of environmental innovation, there is still little empirical evidence on the impact of circular economy practices on the performance of firms and economic systems – a topic more in line with this study. However, there is much need to study this new topic because, while Environmental Innovation (EI) and Circular Economy (CE) are closely related, such that achieving CE without EI is unlikely, not all EI are related to CE. For instance, circular economy practices differ from standard EI, because CE do not only require technological changes, but also service innovations and novel organisational set-ups (de Jesus et al. 2018). Given these premises, there are at least two open lines of research which deserve further investigation. Firstly, a recent strand of literature analysis the development and adoption of circular economy practices by considering several aspects like: the contextual factors in which a firm operates; the technical-scientific aspects that may facilitate a transition to the CE (for instance, digital technologies); the acquisition of “circular” product, processes and business models (Centobelli et al., 2020). Secondly, little is known about the economic impact of circular economy practices at firm level. In addition to the above-mentioned complexity, which still deserves further investigation, little is known on the economic returns of CE-related technologies. If, on the one hand, the aim of sustainable and circular economy practices is not to boost company profits, on the other hand, given the costs involved in introducing these practices, and the difficulty, at times, of communicating them to consumers, it is clear that understanding the economic return of CE becomes crucial to their future development. On this issue, the recent study by Horbach and Rammer, (2020) found – exploiting the 2014 edition of the German Community Innovation survey – that firms which introduced CE innovations have higher sales and employment growth (particularly in lower-median quantiles of the growth distribution), and have higher financial standing (particularly for high-growth firms in the upper quantile). Similarly, Ghisetti and Rennings (2014), by dividing CE-innovation in its sub-categories, found that input-reducing innovation activities (either energy or materials) has led to short-term profit gains which may eventually lead to a reduced price per product that may increase its demand. For the other categories of CE-innovation, such as energy- substitution in favour of renewables, the results are less clear, and may depend on who is producing the renewable energy and its costs for the firm. Flachenecker and Kornejew (2019), by exploiting the Community Innovation Survey (2008), found that competitiveness return are correlated to innovation for the reduction of material use, but only for firms that received public financial support for these practices.

Overall, the scant literature in this field highlights that a CE transition require costly changes for the firms, not only in physical capital investments, but also in intangibles innovation-related activities and in organizational changes. However, this literature has generally focussed on the whole manufacturing sector, often neglecting sector-specificity, and did not consider

how CE innovations are received by consumers, a far from simple process in which some of the value created can be lost. In this paper, focusing on a key sector of Italian industry that has undergone – and is undergoing – profound transformations during the pandemic, we will try to answer these last questions.

Methodology

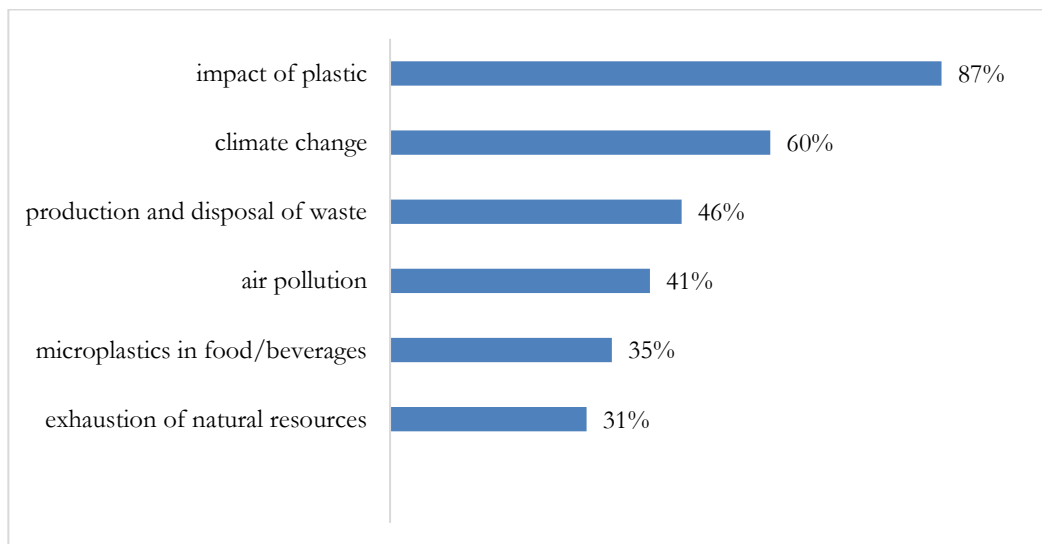
This research analyzes the data and the surveys of two years of activity carried out by the Nomisma Observatory in 2019 and 2020 interpreted in the light of some direct qualitative interviews with major packaging companies to help understand how awareness of consumer sustainability issues can change the packaging of products, the materials used, and the production methods and technologies. The two surveys targeted 1,000 and 1,008 consumers aged 18-65 respectively on consumer packaging goods. Both surveys were carried out by the Nomisma Observatory.

Results

The consumers point of view

In 2019, the environment was a priority for 27% of Italians, and this share remained unchanged in 2020. In the year of the pandemic, work and employment became an important priority for 70% of the interviewees, as did health (66%), environment and climate change (38%) and sustainable development (19%) lagged slightly behind. The impact of plastic is the environmental issue that worries Italians the most (87%) followed by climate change (60%) and the production and disposal of waste (46%), only 31% of the interviewees are worried about the exhaustion of natural resources (Figure 1).

Figure 1. Top Environmental Issues that worries Italian consumers

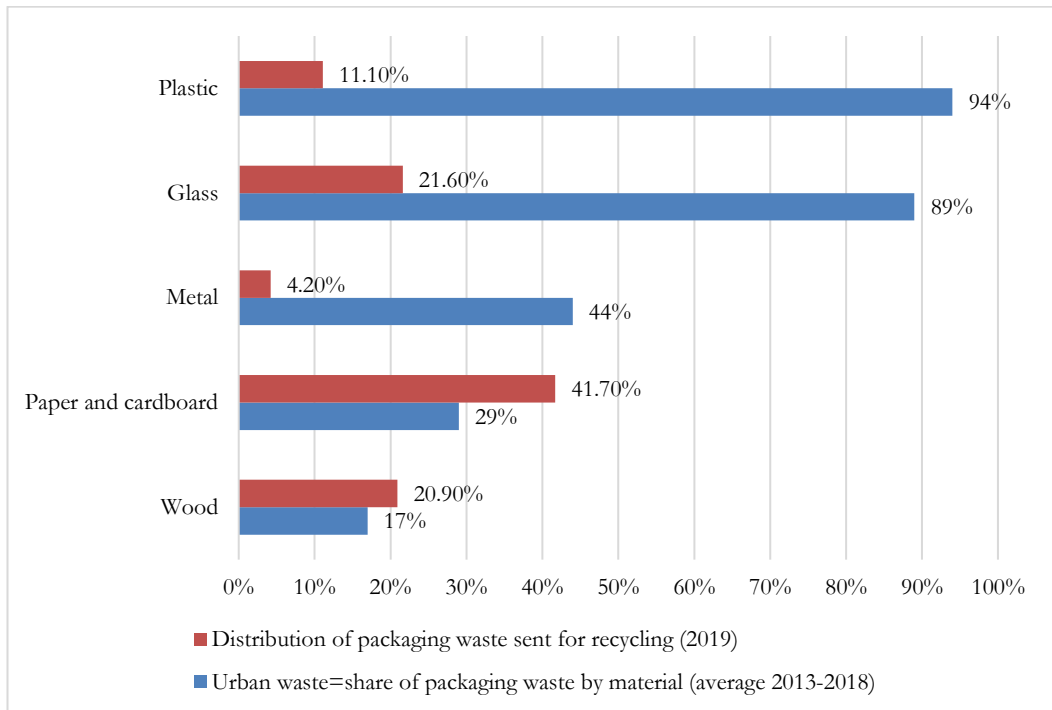


Source: Personal elaboration based on the Large Consumption Packaging Observatory, Nomisma, 2021



Figure 2 compares the share of municipal waste of a given type of material coming from packaging with the percentage share of the same material with respect to all recycled materials. Ninety four percent of plastic waste and 89% of glass waste are attributable to packaging and only 11% of the former and 21.6% of the latter are sent for recycling. On the other hand, paper, of which less than a third (29%) comes from packaging covers the largest share of all recycled materials (41.7%). In other words, the most important materials used for packaging are also those that are most difficult to recycle.

Figure 2. Waste Pre-Covid-19

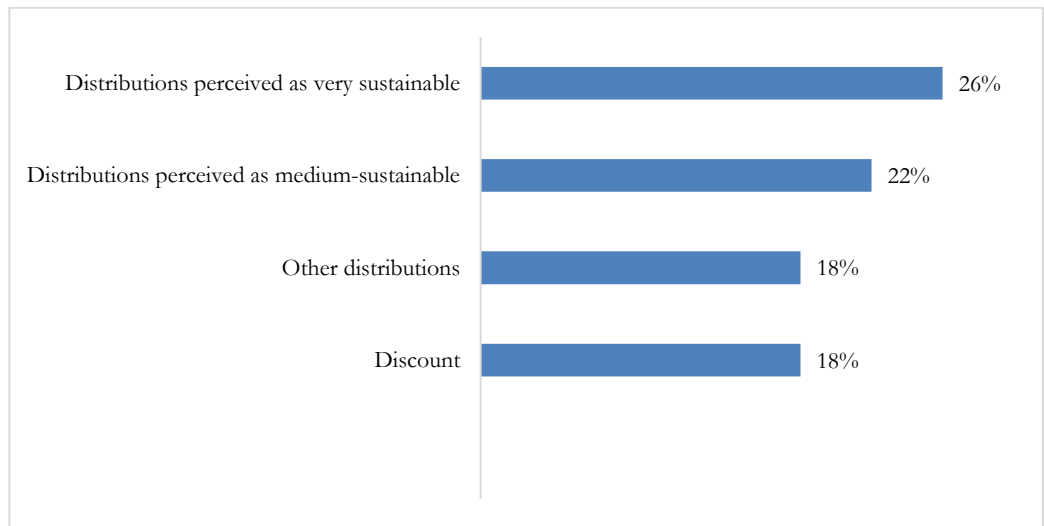


Source: Personal elaboration based on the Large Consumption Packaging Observatory, Nomisma, 2021-CONAI, Green Economy Report, 2019

An interesting result showed that twenty-eight percent of Italians are convinced that the best way to tackle environmental problems is to change their consumption habits and show a high propensity to adopt sustainable purchasing behaviors compared to their reference large-scale distribution. In 1952, John Kenneth Galbraith wrote in his book about the *American Capitalism*. A theory of political modification of markets, *the Countervailing Power*. According to the American economist, once a monopoly is created, a balancing power can be created on the part of the buyers that in some way limits or inhibits the potential abuse of the seller's dominant position. In the book, this counter-power was identified in large-scale distributions that could somehow calm the high prices imposed by the oligopolists. In more recent times, this idea has turned into the competition between store loyalty and brand loyalty. If the former is more powerful this can impose significant price reductions on branded products, as the consumer will still go to the sales store even in the absence of such products. If the brand loyalty is stronger, it will be the large distribution that will have to give margins to the branded

product, whose absence on shelves could lead consumers to abandon the store. This is a tug-of-war that has lasted for over half a century and that large-scale distribution forced when it began producing competing products under its own brand. Rereading Figure 3 in the light of these theories, we can observe how the message of "sustainability" can reach the consumer directly through the individual product or indirectly through the large-scale distribution that actively undertakes measures to improve environmental sustainability, through a selection of products, also based on their degree of sustainability, or by directly activating environmental support initiatives. Twenty-six percent of Italian consumers show a high propensity to adopt sustainable purchasing behaviors towards large-scale distributions perceived as highly sustainable, while 22% turn to distributions perceived as sustainable on average. This is an important percentage but not yet as high as one might expect. Adopting actions aimed at environmental sustainability with commitment and constancy entails a certain appeal on the customer but it is not yet a phenomenon widely perceived by customers who, in the majority of cases, still orient their choices based on the price of the products.

Figure 3. Sustainable Consumer Behaviour



Source: Personal elaboration based on the Large Consumption Packaging Observatory, Nomisma, 2021

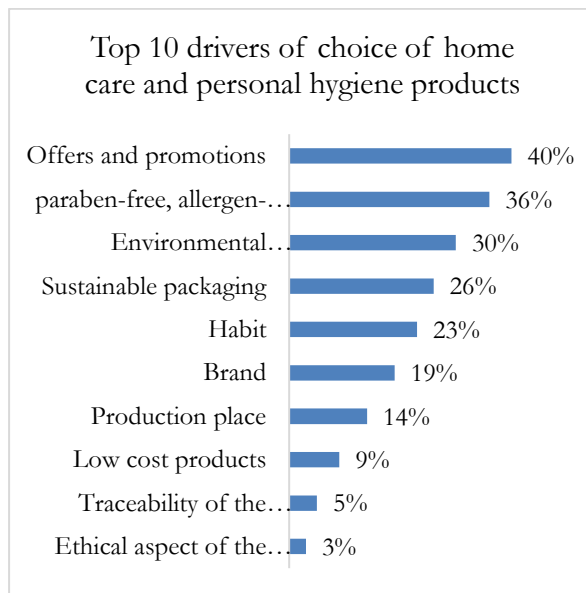
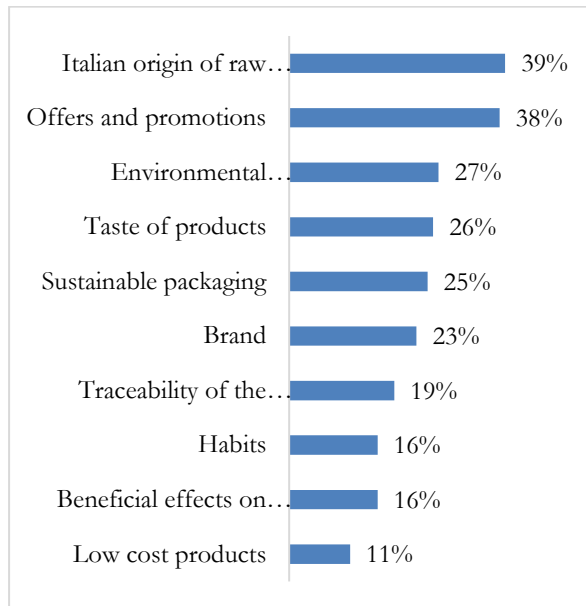
The next group of figures highlights the crucial trade-off between environmentalist sentiment and economic rationality aimed at saving money. In other words, many consumers are very prepared to engage in environmentally friendly purchasing behaviors as long as this choice does not affect their wallet and that the technical properties of the material being replaced remain unchanged. In short, a choice at no cost.

Looking at the top ten drivers of consumer choice for food products (Figure 4), offers and promotions are almost in first place (38%) paired with the Italian origin of raw materials. The environmental sustainability of the product (27%) and the sustainability of the packaging (25%) are in third and fifth place but with a much lower percentage of choice than that shown in regards to offers and promotions. The economic question comes before the environmental one. This predisposition is even more evident in home and personal care products where offers and promotions stand out in first place (40%) while the environmental sustainability of the product and sustainable packaging arrive respectively at 30% and 26%. The figure is even



more compelling considering that Italian consumers are prodigal consumers, who are attentive to the quality of the products, willing to pay a premium for the quality or brand of the products, which is why hard discount stores in Italy have been less successful than in Germany and France. On the other hand, Italian consumers have showed less willingness to reorganize their purchasing habits in favor of the environment.

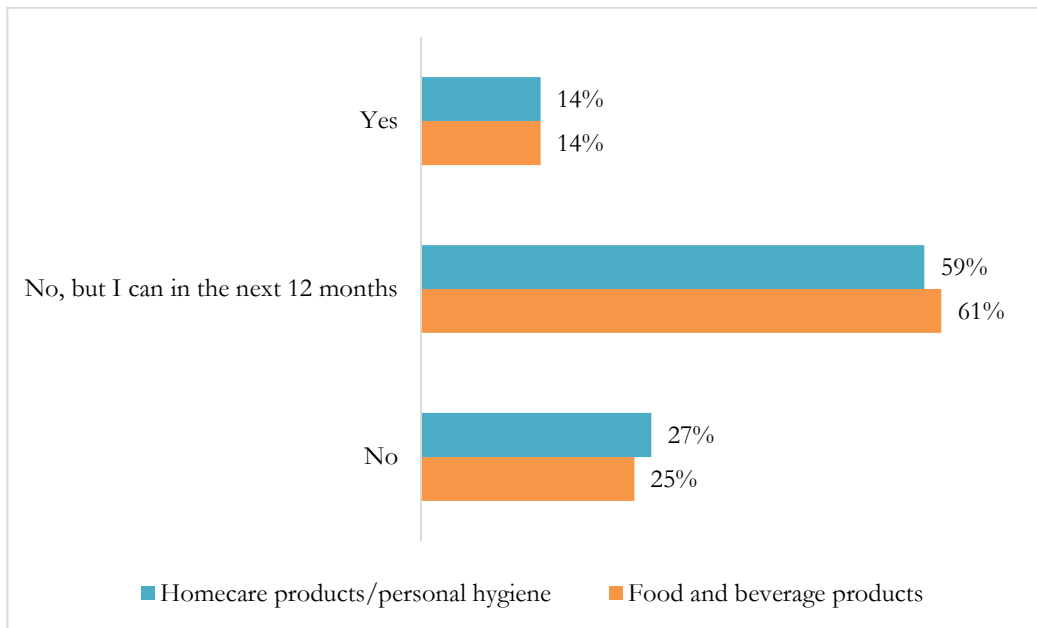
Figure 4. Top 10 drivers of choice of Food and Beverage products



Source: Personal elaboration based on the Large Consumption Packaging Observatory, Nomisma, 2021

Survey results also showed that for most consumers (66%), the main function of packaging is to be attributed to the preservation of the product, and for 60% is to protect the organoleptic characteristics of the product. Unfortunately, the new materials that replace the old ones are certainly completely biodegradable but often have lower conservation and protection of the organoleptic characteristics. New packaging methods could see the length of storage reduced that is, bringing the expiration date of the product closer. Others for example could protect the product to a lesser extent than the more resistant old materials. Only almost half of the consumers said that it must help define the sustainability of the product (47%). If we reread these figures, it emerges that the consumer is mainly attracted by economic offers, wants an unaltered price and that the technical characteristics of the goods remain unchanged. In real behavior, the sanction is less evident although sensitive, 14% of consumers have stopped buying certain products as they did not come in sustainable packaging (Figure 5), but Italian consumers have not proved too willing to pay a higher price to have a sustainable packaging. This hypothesis is confirmed by the following figures where consumers were asked directly how much they were willing to pay for a more sustainable product.

Figure 5. Share of consumers who stopped buying products due to lack of sustainable packaging



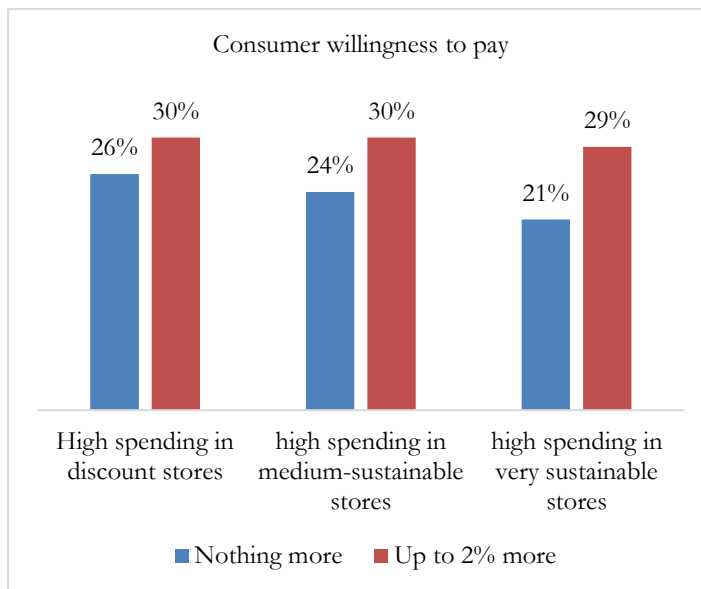
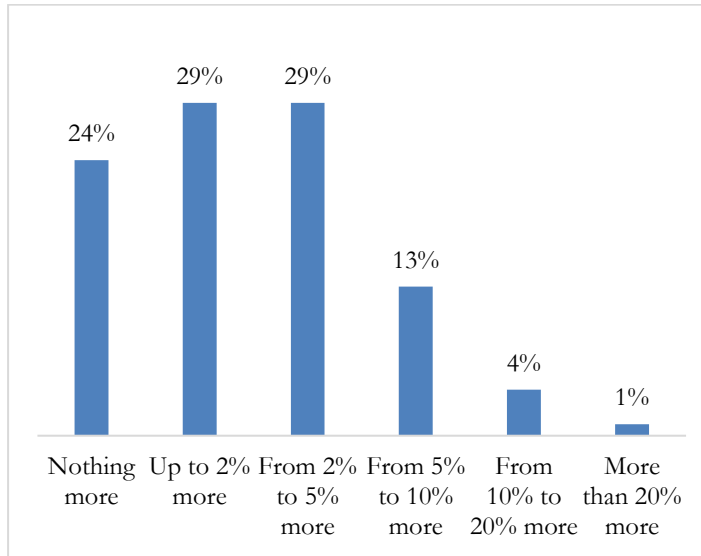
Source: Personal elaboration based on the Large Consumption Packaging Observatory, Nomisma, 2021

The result of the elaborations is absolutely significant. Over half of the sample declared a zero to almost zero willingness to pay more: 24% are unwilling to pay any surcharge and 29% a surcharge no higher than 2%. If we include a surcharge of no more than 5%, we reach 82% of consumers. The remaining 13% accepts a surcharge in the range between 5 to 10%. Very often the additional costs to obtain a sustainable product or sustainable packaging are much higher than 10%, and companies that undertake the path of sustainability and sustainable packaging are unable to include the higher costs of production (including that of research and development) in the final prices of the products. Consequently, only companies that have high



margins can afford to take the path of sustainability of products and their packaging. Furthermore, as emerges from Figure 6, is the type of store, (whether it is with a low or high propensity towards the environment), that does not affect the consumer's willingness to pay a surcharge for environmental products. That the price remains unchanged, despite the product being sustainable, is not the only request of a majority of consumers, but they require that any new material (for example completely biodegradable materials) that replaces the old, more polluting material, has roughly the same technical characteristics as the previous one.

Figure 6. Are consumers willing to pay more?



Source: Personal elaboration based on the Large Consumption Packaging Observatory, Nomisma, 2021

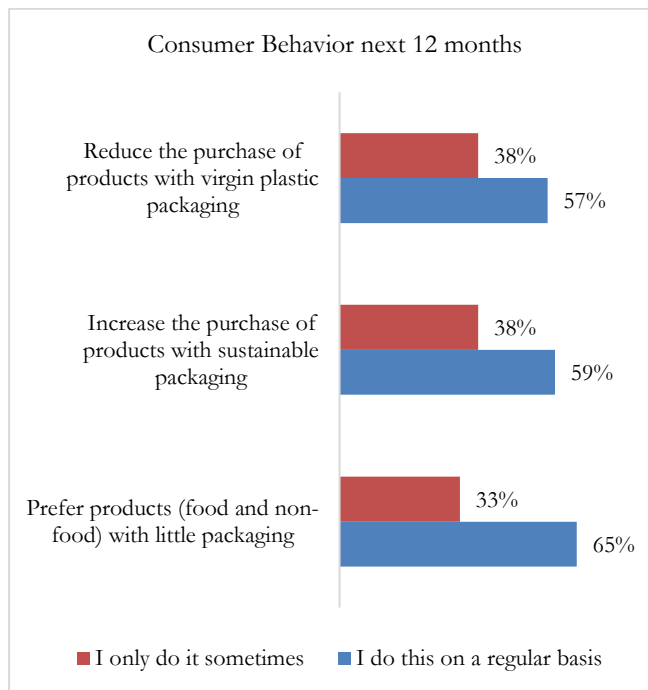
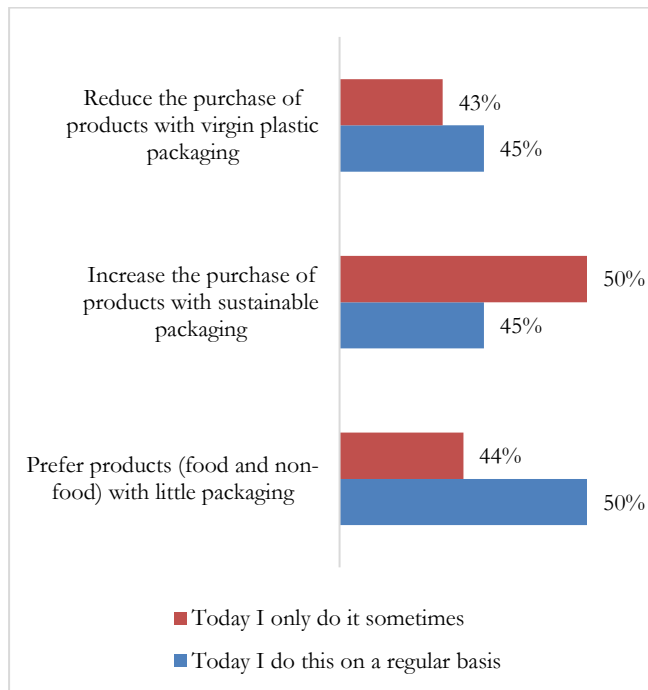
This represents a difficult challenge for packaging companies as they must find new materials that have the same, or superior protection and storage characteristics compared to substitutes and must not cost more. If this squaring of the circle is not possible, it is up to the seller to reduce any margins to offer a technologically more advanced product and packaging at the same price. Where the margins are already narrow or nil, this path is impossible to follow.

Survey results also recorded the decisive characteristics consumers look for when choosing the food products they buy (including beverage products). For 55% of consumers, no over-packaging was key. This is a situation that is connected to the length and articulation of the logistics chain. The shorter the logistics chain, the more the product can be “loosely” packaged. The longer and more complex the logistics chain is, the more the product must be packed in multiple containers to protect its integrity, both against possible blows or thermal shocks. In addition, overpackaging is also directly related to the value of the product that is shipped or presented. For many valuable items, packaging is an integrated part of the product's value. The other responses that fluctuate with values around 40% showed consumers' attention to packaging sustainability (products with recyclable materials, materials from renewable sources, materials with reduced CO2 emissions, biodegradable materials). An interesting recorded fact is that only 7% of consumers never look at packaging materials, which is a sign of the growing attention of consumers towards packaging.

Packaging could be an information vehicle and also an important means of communication. In the past, the main communicative function of packaging was to capture the consumer's attention, perhaps with evocative images that had an impact on the subject's latent function (Merton R.K., 1968). In more recent times, labels, both for regulatory needs and for a greater sensitivity of the consumer, have predominantly assumed the information dimension, becoming the major vehicle for information on products, in particular food, and home and person hygiene products. In fact, 75% of consumers read product labels, while 12% look at the manufacturer's website. Obtaining information on the product online such as on consumer social web pages is still not very widespread (only 8% of Italian consumers). Most consumers (64%) say they generally have the information they need but would like to have more. Certainly the companies that have undertaken the solution of having a QR-code in the label, allow the consumer today to trace the entire path of the food product, from the initial to the final processing stages. However, Italian consumers are still not very predisposed to the use of these technological potentials compared to the digital generation, which however do not yet represent the predominant range of consumers of food and home care products.

Observing the behaviors aimed at the attention of consumers towards the environment, comparing the current and future commitment, it is noted that almost half of consumers regularly reduce the purchase of products packaged with plastic packaging, with an improvement expected for the next year (from 45% to 57%). The same share of responses is represented for the purchase of products with sustainable packaging which, however, boasts an outlook almost close to 60%. The greatest commitment is lavished towards a purchase preference for products with little packaging (50%) as this has already emerged at first place in the main decisive characteristics that the packaging of a product must have, i.e., to be without overpackaging.



Figure 7. Consumer Behavior Today

Source: Personal elaboration based on the Large Consumption Packaging Observatory, Nomisma, 2021

Possibilities and obstacles for the production system

There are two other issues complicating the adaptation process. Packaging companies used to specialize in producing one or two machines on the production line. The buyer, who was the company that sold the final product, that could be pharmaceutical, food and beverage, or any other product, bought machinery of different brands according to the different stages of composition and packaging of the product. For about a decade, the general trend among larger packaging companies has been to sell, not the single machine but the entire production line (made up of many machines that work in line). An option that has become increasingly tied up with the advent of Internet of Things (IoT) and industry 4.0. Since the machines have to communicate with each other via a huge flow of data according to the different external and internal situations, they need a common language and a common software capable of processing this data. This makes it more complicated to insert machines of different productions in the same line. All this brings enormous advantages, but makes it much more complicated to make changes to adapt the packaging to the environmental demands claimed by consumers. It is no longer a question of adapting a single machine but of adapting the entire production line with increasing costs and technical complexity. Secondly, the sector is burdened by the fallout of the Emission Trading System of the European Union designed to reduce greenhouse gas emissions in an economically efficient way, directed towards energy-intensive industrial sectors, including oil refineries, steel mills and production of metals, aluminium, cement, lime, glass, ceramics, wood pulp, paper, cardboard, acids and large-scale organic chemicals, all materials used by the packaging sector to package the different products. This system develops competitive asymmetries, favouring production in non-EU countries not burdened by this tax. For this reason, in 2030, the CBAM (Carbon Border Adjustment Mechanism) will also extend to the downstream, also affecting derivatives and semi-finished products of raw materials (for example all semi-finished products made of iron, steel and aluminium). Being able to provide a “green” answer to consumers' needs does not only involve the final part of the packaging but also the construction of the machinery itself, creating a truly complex trade-off between international competitiveness and environmental protection.

Discussion and conclusions

In conclusion, since consumers are not willing to pay a higher price for ecological products and at the same time demand the same technical qualities of conservation of materials, this poses two types of problems from two different points of view. First, the challenge faced by packaging machine manufacturers who have to make machinery capable of processing new materials, many of which often cannot be treated with existing machinery. These manufacturers sometimes have to redesign or build an entirely new machine, with significant investment in research and development. Which raises the question of whether the contracting machinery companies are willing to pay for this additional cost. Secondly, the purchase of these new packaging machines has a cost for the client companies that have to pack and sell the final product, which is added to the cost of the new materials, often more expensive as they are less widespread on a large scale. If consumers, through their purchasing behaviours, do not recognize the impact and the consequence of this process, the final companies can use them only on high-margin goods, leaving the price almost unchanged, while on low-margin goods they would not have economic significance. This “trap” can block,



or significantly slow down, the transition towards a more sustainable development of consumer goods.

Overall, this contribution enriches existing literature by highlighting that consumer behaviour can seriously limit the transition towards a circular economy paradigm. In particular, the packaging sector shows an evident mismatch between consumer preferences and technical possibilities of firms, with marked knowledge asymmetries among the actors involved. In other words, the lack of technological awareness among consumers may threaten to create a biased technical change towards financially unsustainable needs, which put at risk the possible beneficial effects of circular economy practices found in previous literature (e.g. Horbach and Rammer, 2020). As a consequence, the answer to the old question: “for whom it pays to be green” (Telle, 2006), really depends on consumer behaviour and education, which is an issue beyond the control of firms, and which we believe is a new result in the literature. Therefore, state aid, such as tax incentives for companies that adopt new materials, would be necessary to unblock this impasse, and to stimulate sellers to use sustainable materials where the classic market mechanisms would not push companies in this direction.

The study composed in such a way, offers clear indications on what is the market trend and the communication levers, strengthening the orientation for the strategic positioning of companies in the market. If companies are following different development trajectories from those that have emerged, it is good that they reorient their strategies. For example, knowing that acting on the lever of price versus sustainable quality would not obtain the desired results, companies can act on the communication side. Through corporate social responsibility campaigns, they can communicate the commitment that the company is instilling in the innovation of packaging materials for greater respect for the environment, justifying a very small increase in the price of the product in the face of much higher costs of investment by the company. With regard to future developments, this work can be deepened through a cluster analysis that highlights the behaviour of consumers with regard to their propensity for sustainability or consumption behaviour according to the age group, gender, disposable income or propensity towards sustainability, for example, investigating the propensity to pay with respect to generations or interest groups.

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