

Good for Good. Designing Packaging in the Era of Deliveries

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Abstract

Packaging is one of the classical field for the design activities where both functional, technological and communication features are faced. Design has considered packaging as a field where mainly experiment and develop the consumption engagement and attraction. In fact, the most part of the Design effort has been focused on new shapes, new aesthetics values, new uses: in sum on the product innovation. This paper reports a didactic experience where packaging has been using to training a “systemic planet-centric” approach, merging the following aspects:

- from social point of view, the phenomenon of self-production and consciousness consumption;
- from technological point of view, the improvement of new manufacturing;
- from economic point of view, the phenomenon of open-sourcing and the sharing-economy;
- from environmental point of view, the phenomenon of the zero-impact, zero-waste and zero-resources.

Keywords

Packaging design
Environmental design
Systemic design
Era of deliveries

The Era of Deliveries

Containment is a very ancient human need. Starting from the Neolithic period (10,000 BC), man began to combine hunting and food gathering activities with the development of agriculture. Agriculture required artifacts for protection, food preservation, movement, and later, in support of mercantile activities. Many of these artifacts, often made with artisanal techniques and with local materials, have remained unchanged for many centuries. We also know how, in the second half of the nineteenth century, due to the effect of the Industrial Revolution, the modern packaging born, immediately becoming also a driver for market promotion thanks to its fundamental role in making possible increasingly large productions and increasingly distant transportations. The real radical evolution of packaging dates back to the second postwar period and in particular to the 50s, when the massive use of polymers and cardboard-based products began to spread for disposable packaging and, starting from Europe and the USA, when mass production, distribution and consumption models were introduced (supermarkets, malls, self-service sales, global markets, correspondence selling, and, today, e-commerce).

Traditionally, packaging design has had a subordinate role with respect to product design and production systems design; however, its impact on supply chain costs and performances can be devastating. Only in the past few years its strategic role has been recognized both in theory and in practice (Azzi et al., 2012). Nowadays, the critical impact of the packaging from economic and environmental point of view, is recognized both from companies, who need to reduce the environmental cost — also for the use of energy and resources — and from governments and civil societies who pays the negative effects, in particular for the management of the waste stream that the disposable packaging system generates (Barbero & Pereno, 2020). It is possible to state that packaging industry has become one of the most crucial sectors in the value chain as well as the flow of goods is strongly characterizing our contemporary society. In fact, the exponential growth of the e-purchases — also due the pandemic constraints — has put “distribution” on the top of the priority of any business. As consequences, packaging is become an important part of the product and service value, both from the economic, environmental, productive and also cultural point of view. In this scenario, Design for packaging has to completely reframe its goals, using a systemic approach and a sustainable perspective facing the entire production, distribution, consumption and dismissing process. The urgent to act towards a different solution, has dramatically grow during worldwide COVID-19 pandemic when an important percentage of the population, in different part of the world, turning a lot of life activities in online mode with a strong effect on transportations patterns (Beck & Hensher, 2020; De Vos, 2020; Grida et al., 2020; Loske, 2020; Mogaji, 2020). Specifically, the pandemic has had a significant impact on the way we shop, with a clear movement towards e-commerce. Just to mention few examples, Instacart, a popular grocery delivery service in the United States, experienced a 500% growth in April 2020 (Petrova, 2020). May 2020 saw a 78% increase in online shopping compared to May 2019 (Samet, 2020). With the pandemic shifting sales online and consumers flush with

stimulus checks, Amazon in April 2021 reported \$108.5 billion in sales in the first three months of the year. It also posted \$8.1 billion in profit, an increase of 220% from the same period in the previous year. The high volume of orders during the pandemic has let Amazon operate more efficiently. It has run its warehouses closer to full capacity, and delivery drivers have made more stops on their routes, with less time driving between customers. The number of items Amazon sold grew 44%, but the cost to fulfil those orders was up only 31% (Weise, 2021). After a such extraordinary global event, it is particularly clear that the e-commerce explosion has today significant implications for the worldwide distribution sector and its footprint on environment (Figliozzi, 2020).

Context and Methods of Experimentation

Although, packaging as design topic for a didactic activity is not a new issue, taking in consideration the new scenario, it has been decided to choose it for the Advanced Design Studio led by the authors, provided in the a.y. 2020-2021 at the Master level. A class of around sixty students, from more than ten different countries in the world, working in a blended mode, has been involved in a design activity focus on the new future of packaging in the “era of deliveries”.

Methodologically, a hybrid design approach has been proposed merging different tools, each of them related to one emerging cultural and technological phenomenon (Rawsthorn, 2014; Thackara, 2015; Gold, 2007):

- using tools of future studies, the phenomenon of self-production and consciousness consumption has been faced touching in particular the social aspects;
- using tools of service design, the phenomenon of digital and open manufacturing has been faced touching particular the technological aspects;
- using tools of design for social innovation, the phenomenon of open-sourcing and the sharing-economy has been faced touching the organizational aspects (Thackara, 2015);
- using tools of design for sustainability, the phenomenon of the zero-impact, zero-waste and zero-resources has been faced touching the environmental impact.

The students, working in teams, have developed a three-steps design paths where: the first has been focused to recognize the “room to act”; the second has been focused to propose a possible innovation; the third one has been focused on the validation of the design proposal reframing the entire supply-chain and testing a prototype in a real contest considering also the local impact.

Finally, the several design proposals, grouped according to the sectors of consumption to which it is intended — food delivery and distribution, medical products, plants and fresh products, clothes — have been compared and related, each with the other, to simulate the impact in the whole packaging system. Due the pandemic constrains the didactic activities have been developed in blended mode and each team involved students who worked in different part of the world and therefore with a different “social environment” where they had to face the proposed innovation.



Fig. 1

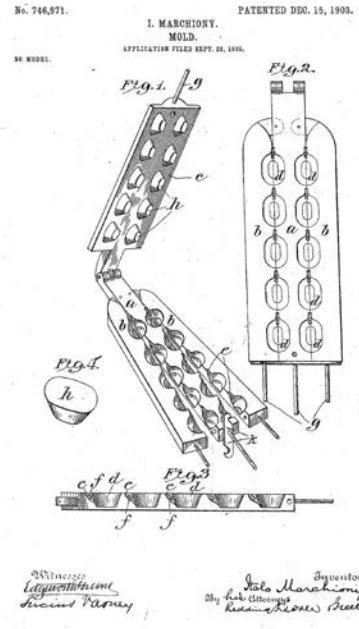


Fig. 2



Fig. 3

Fig. 1
Italo Marchioni, Ice Cream Cone, an example of edible packaging, Ben & Jerry's Homemade Inc., 1896. Source: MoMA.

Fig. 2
Italo Marchiony (Marchioni), Moulding apparatuses used in the manufacture of ice cream cups – United States Patent Office patent n°746971, December 15, 1903. Source: United States Patent and Trademark Office.

Fig. 3
Fortunato Depero, Campari Soda, an example of naked packaging, Davide Campari-Milano, 1932.

Fig. 4
Alessandro Stabile and
Martinelli Venezia, Chair
1:1. An example of flat
packaging, concept, 2020.

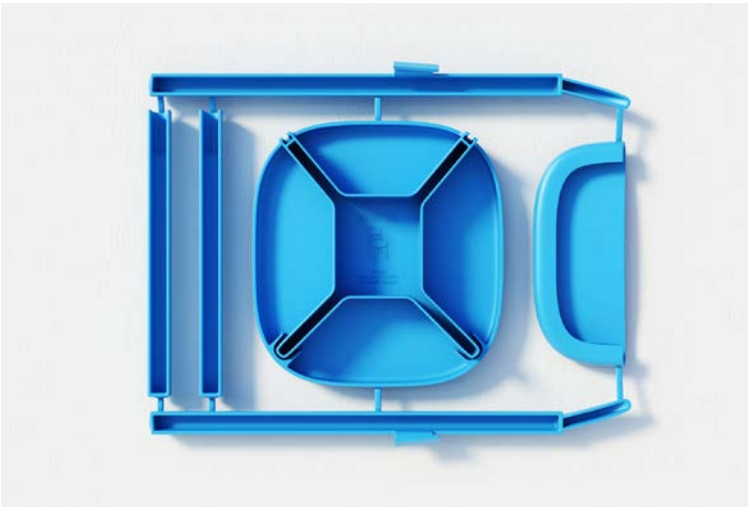


Fig. 4a



Fig. 4b



Fig. 4c

From the didactic perspective, the engagement and the effort of the students, despite the blended mode of interaction, has been positive. Each design proposal has been prototyped and tested within a real context and the students had the possibility to improve the capability to independently involve a wider network of stakeholder than the one typically encountered in the academic context. In this way they lived the design experience with more involvement, despite the physical distance. From the culture perspective, the design critical skill improved facing with a wider question rather the typical product-centred or people centred approaches (Di Lucchio & Giambattista, 2017). In fact, the future of packaging, which has been verified from different features, may be reasonably considered one of the issues towards which a planet-centred design must focus on.

Discussion and Open Themes

The first clear observation concerning contemporary packaging is that the global ecological footprint of disposable items is a fundamental problem. In a nutshell, we can say that nowadays we have gone from consumption models that encouraged refilling (returnable empty containers) to models that favor single use (disposable) packaging (since it became increasingly cheaper and lighter). One of the major criticalities of modern plastic packaging lies in the very nature of plastic which is a material characterized by strong resistance and durability, but this characteristic is not consistent with pack solutions which foresee limited use over time. This is no more a sustainable behaviour, overall if we use oil-based plastics that are long-life materials to manufacture packaging parts. We are obliged to reduce the quantities of packaging and of eco-critical materials, to re-think the lifecycles of packaging, working on reusability and enhancing, as final chance, recycling. So what should we do as designer? Of course we need to deepen all the systemic aspects concerning packaging and all the chains of goods. A good idea for example should be to use organic materials (fibers, leaves, peels), and processing natural and local materials as less as possible. This strategy can overall be suitable if we adopt organic scraps of other productions (agriculture for example) or at least if we use fast-growing organic materials which require few use of water. When it is not possible to use organic materials as we find in nature, we could use them to develop biodegradable materials as organic pulps and bio-plastics made of corn, cereals, different kind of organic starches and fibers. Here the main issues affect the economic sustainability, so the containment of production costs. It would also be necessary to regulate the origin and characteristics of the raw materials we use, to avoid going to affect even more the phenomenon of deforestation. Furthermore, considering the rather high transport costs of biomasses (as in general they are voluminous and heavy when they are rich of water), local procurement should be favoured to reduce the transports impact. A more advanced field of research affects the possibility to use edible materials for food short distance packagings, so in order to use the packaging itself as food for humans or animals and so to shorten as much as possible the lifecycle of the packaging and never let it be an eco-critical debris. Another possible way to innovate in packaging

material design regards the choice to use only one material, and to avoid as much as possible printed labels or varnishings or printing processes that have a strong environmental impact.

From the didactic experimentations we made, it is possible to identify an alternative strategy to returnable/refilling packaging. A good design opportunity could also be to provide for single-use packaging a long-lasting “second life”. A good historical example are the flour sacks that were in use in US during the great economic depression of 1940s. At that time the sacks to deliver flour were made in white natural cotton. The motto of the Depression Era was “making do” while making sure nothing was wasted and everything was re-used or recycled. This sparked families, and women in particular, to get incredibly creative with how they handled meals, goods, and rationed water and utilities. Almost every woman had the sufficient skills to sew and to make dresses and they began to use cotton flour sacks to make them. This trend quickly caught on, it became a sort of fashion trend and so a cultural value of this specific period, and so the flour companies supported this behavior by beginning to print colored patterns on their bags, also investing in strong advertising campaigns and they also printed instruction leaflets to give to the women methods, sewing models and suggestion to tailor clothes parts and dresses, but also dolls for children, tablecloths, towels, pillows, kitchen aprons, and so on. This design approach could be repurposed today or in the near future.

Another important technical aspect concerning the general functionality and the sustainability of shipped goods is about the volume saving. A flat box is cheaper to deliver, it has a generally lighter footprint and it is easier to manage during all the lifecycle (also during the recycling phases). With growing concerns about freight transport emissions, so it has become imperative to find ways to reduce package dimensions or to improve packaging fill rate that increases vehicle utilisation efficiency (Ahmad et al., 2022). So the purpose of new design efforts in this direction is to identify and evaluate interventions aimed to improve space utilisation at various levels of packaging in freight transport operations.

Conclusions

As described in the introduction, the methodological objective of this didactic-design experimentation was aimed at understanding the results of a shift of attention from the product/service innovation, that is strictly linked to technological, morphological and usable aspects, to the process innovation, that brings into play the systems/contexts in which the production and consumption cycle is determined.

This shift of attention from product innovation to process innovation is the result of a progressive loss of centrality of product design, in particular in the design research, in favour of the complexity in which the products are involved both in the production, consumption and disposable phase.

Due to a deep change of scenario, in recent decades Design as a discipline and practice, feeding itself more and more on multi-disciplinary contaminations, has shifted its attention from the morphological and technological aspects of an object (both material or



Fig. 5



Fig. 6

Fig. 5
Yod Corporation, Loong Glin Orchard. An example of organic packaging, GI Agricultural Products, 2012.

Fig. 6
Flour sack with decorative patterns. An example of reusable packaging, USA, 1940s.

Fig. 7
John Habraken, WOBO bottle. An example of reusable packaging, Glasfabriek Leerdam for Heineken, 1963.



Fig. 7

immaterial) to questions related to the interaction in between object and man (Human-Centred Design), in between object and environment (Design for Sustainability), in between object and object (Design for Interaction), in between object and society (Design for Social Innovation), to arrive to completely exclude the object from the innovation process (Design of Services).

From a methodological point of view, this expansion of the factors has determinate what we can consider the updated version of process innovation which is namely recognized as Systemic Design (Peruccio et al., 2019). A design practice focused on complexity and plurality where the design result is a direct consequence of open flows of exchanges and knowledge and where time is the key that determines, increases, reconfigures the project itself or at least its capacity for innovation.

Systemic Design provides tools to understand and apply a complex vision to the design process, by recognizing that: the outputs of one process must be considered as potential inputs for another process, in an open system capable of self-generation; that relations are the constituent elements of the system and not just a result of it; that according to a biological metaphor systems are such if they respond to the principle of “autopoiesis” and therefore that any intervention on the system cannot and must not be contrary to it; that the system is contextual and situated and therefore not abstract and even the singular user is part of the system her/his is no longer at the centre of it.

Based on these methodological premises, didactically the risks of an experimentation based precisely on Systemic Design can be connected to the impossibility to evaluate the validity of innovation over the simple meta-design stage.

It has been widely described how packaging, taken as a field of didactic investigation and experimentation, allowed to address all the aspects of complexity on which Systemic Design focuses.

At the end of the experimentation carried out, however, an attempt was made to qualitatively measure whether and how the students were able to evaluate the validity of the innovation.

The answer was positively found when the physical dimension of the design activity (in this case the packaging) has been used to measure the systemic dimension. In fact, if the design of a material product offers the possibility of testing it at least in use and disposal and simulating its production and eventual recycling, in the case of packaging, that is strongly connected with another object (the one it contains) and with different processes (production, distribution, storage, consumption), the complex system of relations it determines can help to equally validated the system.

With this purpose, the didactic experimentation has involved 3 levels of prototyping useful for validating the level of innovation proposed. A “dirty prototyping” phase has allowed students to focus on the usability, sustainability and technological smartness aspects of the object. A “rapid prototyping” phase has allowed to identify the more suitable production processes. A last phase of “service prototyping”, during which the previously prototyped packaging has been used in a real context by various process stakeholders, has allowed students to measure the degree of systemic innovation. Exactly this last prototyping phase, with a higher degree of failure than the previous ones, was the most didactically decisive with respect to the objective to develop the

student's capability to evaluate the Systemic Innovation and therefore to positively apply a Systemic Design approach.

Certainly, in the practice of Systemic Design, and therefore of process innovation, the question of how to teach and therefore evaluate the time factor remains open. But from the experience made, it emerged the need not to exclude in the didactic context of Design Systems the role of the physical artefacts as valid tools to measure the process innovation.

Of course, in order to have more valuable conclusions, this experience has to be replicated and for this reason also a specific critical evaluation grid has been developed to compare the here obtained results with the ones from other and new didactic experiences facing the same topic from a systemic-perspective.

A packaging decision is a complex process involving different actors to consider, many functions to serve, different requirements to satisfy and conditions to pay attention to. Hence, a packaging decision requires a holistic approach that provides means to manage these complexities (Hellström & Saghir, 2007).

Design culture, if it really will understand this condition of complexity of future challenges connected to packaging, has the strategic role to provide answers to continuously growing demand of innovation: main drivers of these trends are certainly globalization and increasing distances between point of production and point of consumption, environmental crisis, changes in social behaviours, demographics and lifestyles, improvements in hygiene standards, adoption of new materials, development of new distribution services.

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