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Design for sustainability in future scenarios in the self-service food packaging sector

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ABSTRACT

The increase in the reciprocal demand of the packaging and food industries currently promotes a volume of waste that is disproportionate to an efficient management in terms of environmental, socio-ethical, economical and political sustainability. In this context, this research proposes the development of a methodology to define strategies that provide parameters for decisions guided by Design for Sustainability. It is anchored in the principle that the discontinuity of the current patterns of production and consumption is essential to achieve transformations with more promising results. This precept was related to Future Studies and in its premise to establish parameters that configure changes of perspective, as well as a deep awareness of the implications that involve the making of decisions. In this field of research, the recognition and adaptation of the Future Workshop method and the creation of Scenarios were highlighted. In this juncture, the scenarios obtained evidenced the aid they can provide for the elaboration of strategies that better lead to a preferable future. In order to seek a verification of this finding, an experiment was developed resulting in a system-packaging concept complementing the applicability of the proposed methodological structure.

Keywords: design for sustainability, packaging, food, self-service, future studies, scenarios.

Introduction

The volume of waste generation produced by productive sectors and contemporary society is in broad terms disproportionate to the capacity of management and assimilation of the social, economic and environmental adverse impacts that it has been causing.

As a strategy to change this framework, industries around the world have considered eco-efficiency as a path (Bhamra and Lofthouse, 2007). However, it is noted that opportunities for this can arise at any stage of a product's life cycle and that this fact alone does not lead to sustainability, since improving in relative terms (impact value) can still mean an overall increase in the impact of an activity thus creating unacceptable or irreversible damages (Braungart and McDonough, 2013).

For a shift in focus from this discussion, the Design for Sustainability (DfS) precepts propose a rethinking of this process through the dimension of eco-efficient systems innovation associated with equity and social cohesion. In this way, it aims at achieving a discontinuity of current patterns of production and consumption, considered essential for achieving transformations with more promising results. It refers to a perspective of radical change, in which the transition to sustainability, besides being diversified, considers a great process of social, cultural and technological innovation. It also involves value judgments and the criteria that interpret the idea of well-being, that is, a profound change in the culture so far dominant (Manzini and Vezzoli, 2005).

This precept may be related to Future Studies insofar as it establishes parameters so that, in practice, changes of perspective can be made. Hence, the concept of Prospective emphasizes the principle of human will in influencing the future in order to favor the desirable and with the awareness of the implicit hypotheses on which the decision-making is based.

Considering these contexts – of Design for Sustainability and of Future Studies – this research sought to explore two sectors of important representativeness: the packaging industry and the food industry configured by reciprocal demands and interpreted in the supermarket environment as a place of great concentration of both (packaging and food). In this sense, and with an emphasis on the

importance of changes that provide greater sustainability in the current patterns of production and consumption, the following questioning reflected the fundamental problem analyzed: How to define strategies that provide parameters for decisions oriented to Design for Sustainability in the self-service food-packaging sector?

This question delimited objectives that were anchored on the assumption that Future Studies, through the construction of Scenarios, could receive a greater recognition from the sphere of Design, configuring contributions to both theory and practice, both in business or academic environment. It was also considered that the creation of Future Scenarios could be an efficient tool in helping to delimit strategies to Design for Sustainability. In this way, it would influence the decision-making process in the scope of the discontinuity of production and consumption patterns that do not reflect a desired eco-effectiveness (environmental, socio-ethical, economic and political).

Thus, a methodological structure was organized with the adoption of action research, in terms of technical procedures, due to its close relationship with Future Studies. In this field of research, the precepts of Prospective provided the recognition of the Future Workshop method with elaboration of Scenarios as a way to unveil the definition of strategies according to the problem of this research.

For that, an adaptation of the Future Workshop method was proposed, applying it in undergraduate Courses of Design in Brazil and Portugal, due to the opportunity of academic exchange. The proposed methodology considered important factors of its theoretical foundation such as, among others, the importance of creativity as a path to innovation and its close relationship with scenario planning, and the importance of narrative in the sense of order and meaning of events and through imagination. In this sense, the application of the tool called "Postcard from the Future" in workshops was considered of great potential to reach the main objective proposed.

The information collected was interpreted taking into account, basically, two criteria: (1) The categorization of future images in Continuation – generally 'continued economic growth'; Collapse – usually a variety of different reasons such as environmental overload and/or resource exhaustion, economic instability, moral degeneration, etc.; Disciplined Society – in which society in the future is seen as organized in global or other values; and Transformational Society – usually a 'high technology' or a 'high spirit' variety that sees the end of current forms and the emergence of new beliefs, behavior, organization, etc. (Dator, 1998) and (2) The approaches of Probable Scenarios (Predictive); Possible Scenarios (Explorative); and Preferable Scenarios (Normative) according to Börjeson *et al.* (2006) and shown schematically in Figure 1.

With this background, three future scenarios were obtained – as a synthesis of the contents produced in the workshops – characterized as "alternative futures" (according to Dator's theory, 1998). These scenarios have highlighted the help they can provide for the development of strategies that better target a preferable future.

In order to seek a verification of this finding, an experiment was developed (a term used in the sense of "put into practice, execute, try, undertake") based on one of the scenarios, generating an effective strategy for the future, but at the present time.

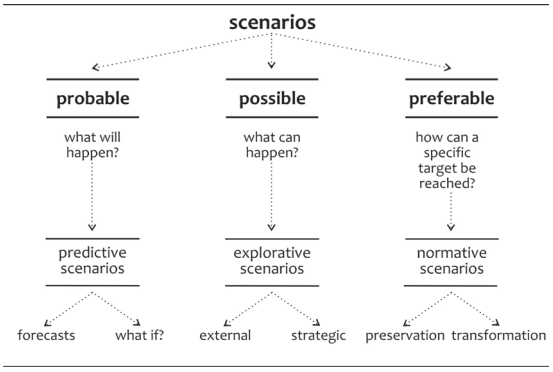

Figure 1. Types and categories of scenarios.

Source: The authors based on the theory of Börjeson *et al.* (2006).

In general terms the process allowed the identification and verification of a methodological structure that enabled the identification of strategies in the sector and segment here discussed, by means of Future Scenarios, as well as associated with the Design for Sustainability precepts.

Context of the research

The Design for Sustainability (DfS) approaches shifted the discussions proposed by earlier movements – such as Green Design and Ecodesign – toward a more radical paradigm shift from the current production and consumption system. However, the DfS can still be considered a new field, filled of immense challenges in order to reach a more robust and consolidated scope, independent of the market segment in which it can act.

In the specific case of this research, it is considered that DfS can effectively contribute in the discussions on two productive sectors of great importance: food and self-service food packaging.

The Brazilian food and beverage industry, for example, exports to more than 100 markets and is the largest national employer industry (Costa *et al.*, 2010).

The configuration of the current packaging industry, in turn, received a great impetus and reformulation with the emergence of supermarkets, when a rethinking of sale methods and consumption through "self-service" took place. This system, in which the consumer alone gets the products intended to purchase, contributes to the current global packaging market of around US$ 800 billion, with annual growth forecasts of 4% by 2018 (Smithers Pira, 2013). Of this amount, in terms of segmentation, the largest share of production, or 70%, goes to the food and beverage industry (Ernest & Young Global Limited, 2013).

However, at the same time as this production is aimed at supplying a demand, it contributes to the significant increase in the average composition of residues that currently reaches disproportional volumes compared to the capacity of management and environmental assimilation (Cossu and Masi, 2013; Dias, 2002; Jayaraman *et al.*, 2003; Menegat and Almeida, 2004; Stewart, 2010; Waldman, 2012). This fact is associated with the concentration of the

population in urban areas, driven by industrialization, and which was not accompanied by an effective capacity to manage infrastructure and services, implying serious social problems of public health and urban waste generation.

In Brazil, these reached 78.6 million tons in 2014, an increase of 2.9% compared to the previous year, which is higher than the population growth rate in the country during the same period, which was 0.9%. Of this amount, only 58% had a planned destination, such as recycling or landfills, which means that about 80,000 tons per day were discarded inappropriately (ABRELPE, 2014). It should also be noted that 32% of this volume corresponds to dry solid waste, that is, those mainly made up of packaging (Brasil, 2012).

In this context, it was observed in scientific articles – peer-reviewed in periodicals indexed in the online portals Science Direct and CAPES, for the last ten years, and in relation to the terms "packaging disposal"; "Sustainable packaging"; and "packaging waste" – a relevant common issue: identification and/or planning of measures to reduce the environmental impact of packaging waste through programs or regulations involving recycling or recovery of waste, but with the goal of ensuring the market operation within the current paradigm (Arena and Gregorio, 2014; Bovea and Powell, 2006; Cruz *et al.*, 2014; Dixon-Hardy and Curran, 2009; Ferreira *et al.*, 2014; Jaeger and Rogge, 2014; Wilkström *et al.*, 2014). Another relevant remarks is that there is a wide-ranging approach to the Life Cycle Assessment (LCA) tool (Arena and Gregorio, 2014; Ferreira *et al.*, 2014; Wilkström *et al.*, 2014; Varzinskas *et al.*, 2012; Verghese *et al.*, 2010; Bovea and Powell, 2006; Meneses *et al.*, 2012), highlighting its importance both in the management of packaging waste and the content contained therein. The LCA is valued and discussed in the flow and source processes of materials; in estimating and comparing environmental impacts including carbon footprint or global warming potential; the possibility of further analysis of financial costs and benefits; treatment options for final disposal (i.e. incineration, recycling, reuse); possibilities of use of energy generated by residues disposal treatment; among others. However, in most of the approaches, difficulties in adapting the legislation to the market reality have been encountered, hindering economic and logistical issues. Besides these, other issues also stand out, to a greater or lesser degree in each case, such as demography associated with cultural and ethical implications (Cruz *et al.*, 2014).

These approaches highlight an important gap for the Design for Sustainability discussions when it is mainly observed that the proposals in the field in question do not consider paradigm shifts more radically than the current production and consumption system. As this is one of the principles that can contribute, according to Manzini and Vezzoli (2008), to a discontinuity that reflects a broader concept of sustainability. Thus, it was observed a complementarity with the thinking of Manzini (2008), when he states that the basic lines of political and social economy still direct the system in the opposite direction to that of sustainability.

In line with this precept, and looking for ways in this research work, one can also highlight the concept of Prospective in that it consists of a science of practice for a change of perspective. It stresses the principle that the human will is capable of influencing the future in a way that favors the desirable, and through pre-active (prepare for foreseeable changes) and proactive attitudes (acting to bring about desired changes) (Godet and Durance, 2011).

In most prospective studies, the construction of Scenarios often plays a prominent role in contributing to discussions around the future. They purposely support strategic delimitation. On the other hand, they propose to capture the wealth and the range of possibilities, stimulating the decision makers to consider changes that they would otherwise ignore (Selin *et al.*, 2015).

According to Alänge and Lundqvist (2014), exploring Scenarios can also be one of the stages of the proposal to develop sustainable business in innovative and early stages, relatively unrestricted by organizational or other requirements, genuinely predisposed to new configurations.

However, the integration of Design and Future Studies, involving the creation of Scenarios, is a relatively recent phenomenon and defended by individuals and organizations in a wide variety of perspectives (Kelliher and Byrne, 2015; Selin *et al.*, 2015).

The research of Lu *et al.* (2016) puts this question in evidence. These authors elaborated an intense systematic review of scientific articles on what they called "broad foresight", which involves the terminologies: "futures studies", "futures research", "forecasting", "la prospective", and "antecipation", the most commonly found terms in this field. Thus, they used an integrated methodology of analysis through 785 articles published in the ISI – Web of Science (WOS) between 1977 and 2015. In general terms, among all the information and findings that result for this thesis is the fact that although several studies refer to the construction of methodologies and/or the development of tools that can be adapted in a multidisciplinary way, there was no identification of specific research in the area of Design, or in the area of packaging. As for food, the few references observed are focused on agriculture, planting systems and land use. In this amount, which encompasses several parts of the world, it is also observed that there are no Brazilian publications.

It is thus revealed that the study context here proposed is still devoid of further scientific investigation. This way, the commitment and engagement to modify this framework is justified, specially considering the two main aspects of the research: the one of the Design for Sustainability – in the dimensions of the eco-efficient innovation systems associated to the one of the equity and social cohesion – and the one of the Future Studies, anchored in Prospective and with Scenario planning, both directed to self-service food packaging (supermarkets).

Proposed methodology

Supported by an intense theoretical foundation, it was possible to establish that, in terms of methodological procedures, this research was inserted in the field of Future Studies, in the concept of Prospective, based on the Future Workshop method based on the development of Scenarios. It is important to emphasize that these were the delimiting precepts, but they were not followed in an orthodox manner in relation to the researched contents of each author

specifically in each subject. In this way, a planning was elaborated, which was characterized by an adaptation of the researched approaches, relating and integrating them mainly to the environment of the academy (with students from undergraduate Design Courses) as direct participants in the process of discussion.

Therefore, the objectives, the assumptions and the theoretical basis developed have provided the following criteria in terms of technical procedures:

(1) The overall objective: to demonstrate how the construction of Future Scenarios can contribute to the definition of Design for Sustainability strategies in the self-service food-packaging sector;

(2) Analysis unit: Brazilian sector of food-packaging in self-service, in the supermarket environment;

(3) To address the issue of the proposed innovation dimension, the following perspectives were highlighted:

(3.1) The premise that systems innovation can be seen as a strategic innovation and potentially a "win-win" solution: gains for producers/suppliers, users and the environment. The company can revise its traditional way of using resources in relation to profit and welfare standards, in order to find new market niches, compete and generate value and social quality, while decreasing (directly or indirectly) the consumption of resources (Vezzoli, 2010).

(3.2) Manzini's (n.d.) proposal for "new production and consumption scenarios corresponding to new lifestyles" as a level at which designers can play an exceptional but limited role in the collection, interpretation, reconsideration and stimulation of socially productive ideas. In this case, new quality criteria in production, distribution and consumption overlap with the application of new technologies or productive opportunities. Such qualities must be environmentally sustainable, socially acceptable, and culturally attractive at the same time. In practice, the problem is to set a trend opposite to the one currently dominant, such as shifting from an 'increasingly simplified product' to a trend in which the product requires greater consumer awareness and active participation.

(3.3) The perspective that in order to obtain a sustainable scenario there should be a discontinuity of the current model of production and consumption, which reaches all dimensions of the system: the physical dimensions, that is, the matter and energy flows; economic (relations among social actors); ethic; aesthetic and cultural (the value criteria and the appraisal of quality that socially legitimize the system) (Manzini and Vezzoli, 2005).

(3.4) The complementarities of Manzini and Vezzoli's (2005) theories on "discontinuity and transition" and the two temporal horizons proposed by the World Business Council for Sustainable Development (2010) called "Turbulent Years" from 2010 to 2020 and "Time of Transformation" from 2020 to 2050.

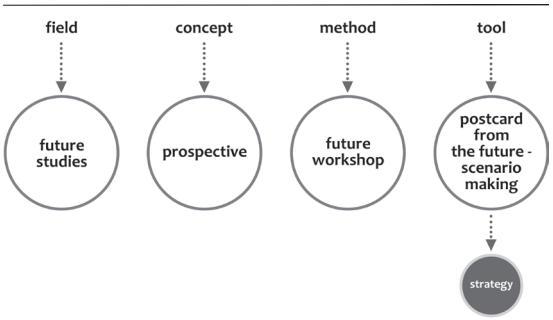

Figure 2. Delimitation of proposed methodology.

(3.5) The categories of Sustainability and Ethics and Health and Well-being according to FIESP and ITAL (2010). These categories allow the delimitation of performance in some specific product proposals, such as fresh, natural, organic, nutritious, for diets, functional, fresh-cut, vegan, fair-trade, carbon footprint products with concern with animal welfare, and with ethical behavior of companies.2

In the sequence, the compatibility of being able to treat this demand by means of Future Studies inserted in the concept of Prospective was verified, based on the Future Workshop method and using Scenarios by means of the tool called "Postcard from the future" (Figure 2).

Workshop "discontinuity"

Anchored on the phases suggested by Jungk (Apel, 2004) in the Future Workshop method (Preparation, Critique, Fantasy and Implementation) in association with the Generating, Integrating and Consistency steps for scenario studies (suggested by Börjeson *et al.*, 2006), a specific model of workshop was planned to be applied in classes of undergraduate Design Courses.

Thus, the context of the sites and the specific ways in which the workshops took place were analyzed. In this sense, some factors of the theoretical foundation were re-examined at this moment, such as:

- The importance of creativity as a path to innovation and its close relationship with scenario planning (Börjeson *et al.*, 2006; Candy, 2010; Dator, 1998; Finland Futures Research Center, 2014; Marcial and Grumbach, 2008; Selin *et al.*, 2015; Schwartz, 2004; Vidal, 2006);
- Candy's (2010) proposition of "Experiential Scenario" as a way to stimulate the involvement of people and seeking to make a complex subject more welcoming, initiating the discussion of assumptions about the future in an informal way;
- The language of stories that according to Schwartz (2004) have a psychological impact that is lacking in graphics and equations, giving order and meaning to events – a crucial aspect in understanding future possibilities. This statement is reinforced by Selin *et al.* (2015) when they emphasize the importance of

Table 1. Phases of the workshop "Discontinuity".

	Phase	Procedure	Instrumentation
1	Preparation	- Criteria catalogue - Elaboration of the planning - Place definition and organization - Context information of the participants	- List based on bibliographic review - Form containing time, activity, content and didactic resource - Attendance e-mail - Dialogued exposition
2	Critique	- Concepts presentation - Topic delimitation - Exemplifications - Initial debate	- Dialogued exposition - Multimedia projector and computer with sound box
3	Fantasy or generating	- Elaboration of propositions for future scenarios	- Postcard from the future - Brainstorming - Debate
4	Implementation or integrating	- Integration of parts into the totalities - Identification of probable, possible and preferable scenarios (according to Börjeson *et al.*, 2006) - Identification of continuation, collapsed, disciplined society and transformational society proposals (according to Dator, 1998)	- Global comparative table - Specific comparative tables
5	Consistency	- Validation of information consistency	- Crossing of collected data
6	Synthesis	- Elaboration of potential scenarios	- Descriptive text

narrative and how it can involve the imagination with plausible futures;

- The basic principle proposed for the Future Workshop's Fantasy Phase, which consists of trying to elaborate an utopia to draw an exaggerated picture of future possibilities, exploiting creativity as much as possible and seeking to differentiate itself from the solutions to usual problems.

Taking this contextualization under consideration, the use of the tool called "Postcard from the Future" was established. This was inspired by the research section called "Prognostics", with emphasis on the proposal "France in the Year 2000" (The Open Public Domain, n.d.) and the homonym project "Postcard from the Future" (Graves and Madoc-Jones, n.d.). These were complemented by the analysis of the S3C proposal – Smart Consumer, Smart Customer, Smart Citizen (n.d.) called "Postcard from the Future Workshop Method".

Thus, in this project, the "Postcard from the Future", was characterized by a tool adapted for both the context under study and the logistics conditions. It enabled the creation of an informal environment in the discussion of the subject as well as the exploration of creativity and innovation through narratives and drawings.

Once this tool was established, Table 1 was defined consisting of the structuring of the phases of the workshop with their respective procedures and instrumentations.

Experiencing future scenarios

The workshops were held between June 2015 and May 2016, in four institutions in Brazil and seven in Portugal, with 233 participants and an average of 21 students each. For the practical part, these students were organized into teams with an average of 4.6 participants each, making 51 teams. The average age of participants was 22 years.

Regarding the application of the workshop, it was possible to verify that the first part – *Critique Phase* – was efficient in capturing the attention of the students who, independently of the institution, participated actively in the initial debate, thus facilitating the insertion in the proposed theme. It was assumed that the approaches undertaken relate to a current topic in the discussions of society in general terms and this fact benefited the capture of interest.

Following the debate, the *Fantasy or Generating Phase* began. The students, organized into teams, elaborated postcards in an enlarged format. The recipient should be between the years 2035 and 2050. The stipulation of this specific period in time is anchored in Dator's (1998, p. 15) approaches when it points out that the term "future" is vague when a clear demarcation is not established. According to this author, in general, future studies are prepared for next 20-50 years or for the next 20-30. This is also the suggestion of Finland Futures Research Centre (2014). Based on the delimitations and established criteria, the process took place in a way that all felt free to explore the theme bias their preference and/or which called their attention the most. The teams were oriented so that the best individual skills were considered in order to make it easier to carry out the drawing on the front and writing the text on the back of the card in order to make the most of the time available between discussion and execution itself.

After the application of the workshops and the respective development of the postcards, these were organized and interpreted to obtain a synthesis configuration of Future Scenarios. The *Implementation or Integrating Phase* was started by drawing up a Table 2[1] for a comparative

[1] It is worth mentioning that the number of pages of this Table 2 makes it impossible to insert it in this publication. All this information is available in Albach (2017).

analysis. In this, the contents of all the postcards generated were distributed according to four characteristics considered central in the topic under discussion: "food", "packaging", "supermarket (system of supplying/buying)", and "another change of behavior". To do this, initially each row and column of the refferred table was colored specifically to identify hypotheses that could be related to Probable Scenarios (Predictive), Possible Scenarios (Explorative); and Preferable Scenarios (Normative).

Facing these identifications, a compilation of ideas was established that enabled the establishment of a third Table. This provided the recognition of only one hypothesis for Probable Scenario; one hundred and four of Possible Scenarios and thirty-nine Preferable Scenarios. A key factor was that all the hypotheses of Preferential Scenarios were also considered as Possible Scenarios, a fact that generated a delimitation of the number of them to be considered for the continuity of this stage of analysis. Thus, these thirty-nine overlapping hypotheses, both Possible and Preferable Scenarios, were organized in a new Comparative Table (Albach, 2017) in order to allow the creation of the first future scenario.

Keeping the same structure of the columns of the referred Table 2 (Albach, 2017), the contents were analyzed again, but now distinguished by a subtitle with different colors that identified information that was repeated and/or complemented in different proposals. Thus, it was possible to establish important connections, according to the *Consistency Phase* proposition and consequently the conduction to the *Synthesis Phase* through the creation of the characteristics of Scenario 1. It is important to note that for this and the other two potential scenarios identified, specific names were assigned. These are anchored in the premise of Schwartz (2004) that considers them a reference factor of great value, which helps to think about a wide spectrum of meanings. These names should represent the essence of the contextualized history and become a way of short and facilitate communication when it comes to, for example, planning meetings for discussion around the (appointed) scenarios or instigating the construction of the best questions in the challenge of future actions. In this context, Scenario 1 was named "Harvest" and its characteristics contemplate the following narrative:

> *The HARVEST SCENARIO is characterized by the supply of bulk products by supermarkets, with specific optimized equipment, which also help to avoid waste – the consumer buys only what is needed. The packages consist of cloth bags and reusable glass jars. These belong to the consumers themselves who take an active role in their purchases, in the sense that with their packaging, they take the food to their homes and these remain packaged during their consumption. Other specific packages are distinguished by being edible and/or biodegradable. Priority is also given to the supply of organic[2], natural[3] and small local producers. In addition to promoting the growth and development of local production, this measure aims at minimizing transport costs (compared to products produced in distant locations) and at the same time reducing the 'ecological footprint'. People value their own or community gardens, mainly in the production of vegetables and fruits, and they are also concerned with treating the land with products considered ecologically correct. There is an important association between eating habits and health. In this sense, a highlight is for the reduction of consumption of meats and refined sugar. In addition to the concern with food quality, people prioritize to dine at home. Housing structure allows the recycling of waste generated and the small amount that is discarded has a set destination. In this scenario, the awareness that individual actions reflect throughout society is a prime issue of the new generations.*

For the creation of the other scenarios, the Table 2 on Albach (2017) was again observed, however, highlighting other hypotheses orientations. These were listed as more "radical" and distinguished by their involvement with technologies that can be considered to some extent as fictional, approaching the denominations "Transformational Society" and "Collapse" according to Dator (1998). This analysis was done jointly in view of the fact that several of the hypotheses overlap when considering these aspects. In this way, a fifth Table (Albach, 2017) was elaborated through which proposals that were repeated and/or complemented were identified. These gave rise to two other scenarios, called "Space" and "Downfall", and constituted by the following narratives:

> *In the SPACE SCENARIO, although a small portion of the food still being grown on top of the buildings, providing some green space in the middle of the city, most are obtained through equipment. People have chips inside the body whose reading by specific machines can indicate which foods need to be consumed or which food is most suitable individually. These foods are obtained through 3D printers that in addition to these, also prints the packaging, thus reducing costs and avoiding wasted materials. These packages can be recycled and converted into new raw material. Other equipment are fresh food machines. In these, the seeds receive a light equivalent to solar, organic fertilizers, water and other nutrients necessary for the germination. After plant growth there is harvesting and packaging. In this case, the packaging is made with the residues of the machine itself. Another form of food is supported by extraterrestrials, which due to the pollution of the planet have brought a new technology consisting of a chemical element used in packaging. Its discarding in nature generates the birth of fruit trees that have a very large vitamin complex. This disposal can be carried out in supermarkets. These have their own food productions that are still not possible to obtain via 3D printer or fresh food machine. This way, they manage a system of planting, in the form*

[2] Produced without antibiotics, without growth hormones, without pesticides and synthetic fertilizers, non-irradiated and not genetically modified.
[3] With the elimination of artificial preservatives, colorings, sweeteners or flavorings, without chemical additives, without hydrogenated fats, minimally processed and non-irradiated.

of a large vegetable garden, in which people can also contribute and be rewarded with discount coupons. This provides self-sustaining production, reducing transportation costs and motivating healthy eating. This system proves viable for the supermarket, for the people and for their health. On the other hand, technological advances allow unwanted waste to be sent to an incinerator that breaks the hitherto known laws of physics producing a micro black hole that disappears along with deposited material in seconds. The displacements are carried out by solar powered vehicles. The digital universe is intensifying more and more, many people work from home and most of the needs are met through the internet including virtual money.

In the DOWNFALL SCENARIO the sky is dark, the garbage is still in the air, and it seems there is no progress. Excess packaging has become the most serious environmental problem. People avoid walking on the streets, but when necessary they wear a kind of transparent dome on their heads because the air is unbreathable. This domecomes in several sizes, is customizable and allows floatation for dislocation, also having the possibility of remote control. Pharmaceutical industries have developed capsules or sachets as staple diet in order to meet demand because of unprecedented population growth and because the land is saturated with fertilizers and chemicals. However, a small part of the population, formed by millionaires, is living in neighborhoods located in a kind of glass bubble where pollution is unknown. On the other hand, among the poorest people there are individuals who live on the "plastic islands" after rising water levels. Among these, there are frequent hospital admissions due to viruses, infections and newfound diseases. There is a drastic decrease in average life expectancy. The planet Mars is being prepared to receive the inhabitants of Earth safely – other places have been affected by radiation. A moment of delight can be obtained by means of the 6D machine, which allows to have several sensations in a single space. In it, it´s possible to travel to the past to know all the wonders that have been destroyed by pollution and environmental disasters.

Considering the configuration of the Harvest, Space and Downfall Scenarios, which sought to represent a synthetic representation of the various hypotheses raised in the workshops, one could arrive at what Dator (1998) called "alternative futures". These considering the future images that inhabit the mind of the people, and thus observing how these can lead to specific actions or inactions in the present and consequently creating aspects in the future. In this observation and with the premise that these scenarios can contribute to the process of elaboration of strategies that better lead to a preferable future in the field of research to which they refer, the development of a theoretical-practical experiment was started. In this, the Harvest Scenario was selected for a more detailed analysis, because it is closer to the fundamentals of this research and, therefore, allied to a "preferable future".

Experiment

In methodological terms for the experiment, the design stages called Preparation, Generation, Evaluation and Realization were considered based on Löbach (2001). In this way, a research of exploratory character was developed and through bibliographical revision around the observation of a specific type of supermarket. This is highlighted by the proposition of solutions closer to changes in behavior and/or a displacement of the conventional system of production and consumption. In this sense, it explores the commercialization of products in bulk and shows a more active participation of consumers, especially in relation to packaging – as recommended by the Harvest Scenario. These supermarkets were researched separately and later a comparative analysis was elaborated. The survey comprised digital media sources, such as the websites made available by the companies themselves: official websites, Facebook pages, Blogs, institutional videos and articles from press releases such as magazines and newspapers online. The survey also included four on-site visits in the city of Curitiba, Brazil, four in Lisbon and three in the city of Porto, Portugal. In total, twenty-six small and medium-sized supermarkets, which have between 100 m^2 and 400 m^2, are available and have approximately 1000 to 8000 items. They are located in nine different countries: one in Germany; one in Austria; five in Brazil; five in Spain; two in England; two in Italy; eight in Portugal; one in Switzerland; and one in the United States. The opening of most of these took place between the years of 2000 and 2015.

Among the main common characteristics that these establishments distinguish as their philosophy or mission can be highlighted:

(1) Reduce the volume of packaging waste;
(2) Reduce food waste ("buy only what you need" concept);
(3) Promote local and seasonal purchases (concept "ZeroKm");
(4) Promote responsible purchasing with sustainable consumption;
(5) Promote healthy eating;
(6) Promote sustainable health and life.

All stores offer bulk products. They emphasize that they have returned to a model that is half forgotten, but in a new format, which is very valid for new habits and the new social reality. They exalt that there is more quality, and at a fair price when not more than enough is purchased, thus avoiding wastes. It is also associated with the reduction of packaging and the consequent reduction of waste.

These products include: cereals (e.g. brown rice, wheat, rye, oats, barley, quinoa, maize, millet), vegetables (e.g. beans, chickpeas, lentils, peas, lupins) (e.g. sunflower seed, flaxseed, almond, sesame, peanut, pumpkin seed, pistachio, chestnut), pasta, spices, sauces, olives, salts, sugars, olive oils, jellies, pastries, breads, dairy products, eggs, fresh vegetables and fruits. Juices, wines and craft beers can be found in bulk or already bottled. Most also have bulk organic cleaners such as soaps and detergents (for the home, clothes and dishes). For fresh produce, establishments

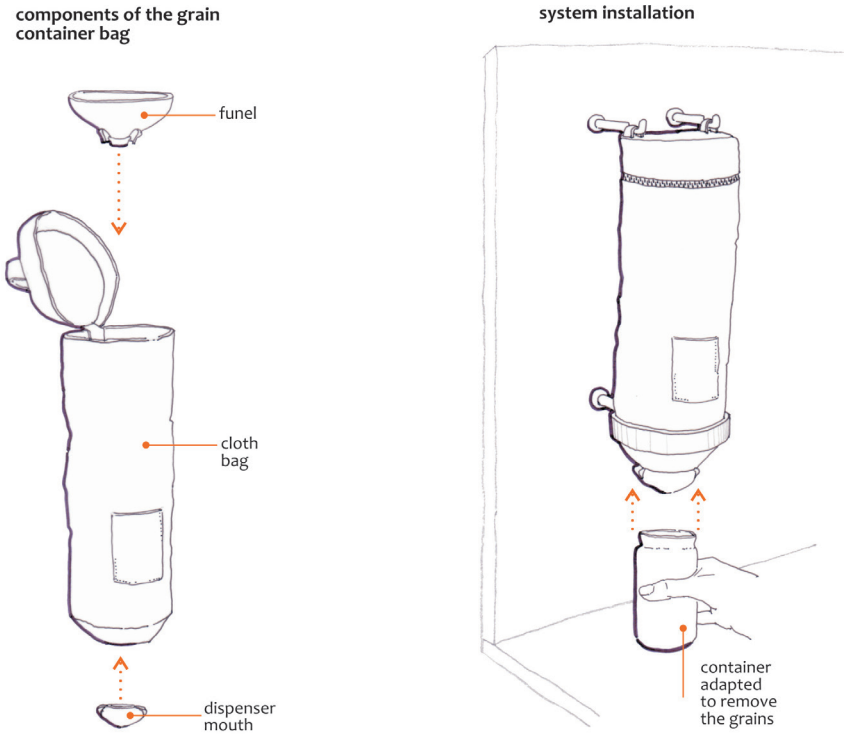

Figure 3. Concept of packaging-system product.

are concerned with seasonality, valuing the product of the season according to the seasons. The main advantages, as they highlight, are the cost and nutritional benefits.

With regard to the act of buying itself, customers are invited to bring their own reusable containers such as bags, bottles, jars, etc. These are weighed before placing the product to be purchased, discounting the value of the final weight with content. In this way, the predominant system is self-service.

Regarding the physical configuration of the establishments, there is a distinct concern with layout and furniture. There is no excessive advertising billboard or brand exploitation and product information is usually on the shelves or counters themselves. The general idea is to create a cozy space in which the customer can make a quiet, conscious purchase. Also avoiding strident ambient music.

Most of the initiatives come from private individuals, making it possible to walk away from the big business deals in terms of market lobbying and taxation. Individually, in pairs, or a group of up to five people, they decide to open their own business because they are already included in the discussions about sustainability, concern for the environment, in the field of nutrition and/or some special issue that led them to seek a change of life.

One of the stores is highlighted due to the proposal to create a cooperative in which customers are invited to work for a few hours (e.g. replacing products, cleaning, cooking, etc.) in exchange for a discount on their purchases. The idea has been a success, with a number of adhesions above expectations and with the possibility of applying discounts higher than those planned at the beginning of the proposal.

Five of the establishments expand the activity of the physical store to online stores associated with delivery service. In one of the shops, this is even done by bicycles.

The profile of the owners of the sites surveyedis, for the most part, made up of young people who attach great importance to the internet. Most institutional websites are well crafted, with high quality images and lots of information available. Besides this, they make use of other digital media like Facebook, YouTube, Instagram and Blogs. In these media, one can find, in addition to the whole range of products offered, the history and properties, how to use, curiosities, therapeutic characteristics, culinary recipes and cooking tips. Among other complementary information there are explanations on organic farming, composting, global warming, or the planet's environmental problems. In these Medias, events realized by the establishments are also disclosed, and this is a factor common to all. Examples include workshops on cooking and essential oils, tasting sessions, movie sessions or happy hour with local artists.

In specifying the profile of the target audience, the surveyed sites, for the most part, highlight those concerned with environmental issues, who want to reduce waste and who base their diet on healthy habits.

It was possible to conclude with this referred research of supermarkets, driven by the concepts of the Harvest Scenario, that there is in the consumer market a movement for change of the current form of production and consumption in the system of self-service that involves food packaging. The similar profile raised among the researched establishments may indicate an expanding trend, which involves concepts in the area of sustainability such as social responsibility, human rights, environmental and ethical issues rather than just projects (but also) for financial gain. Most establishments are relatively recent experiments that still require more uptime to obtain more conclusive analysis results. However, it has been identified that these represent a place for the performance of the designers. One of

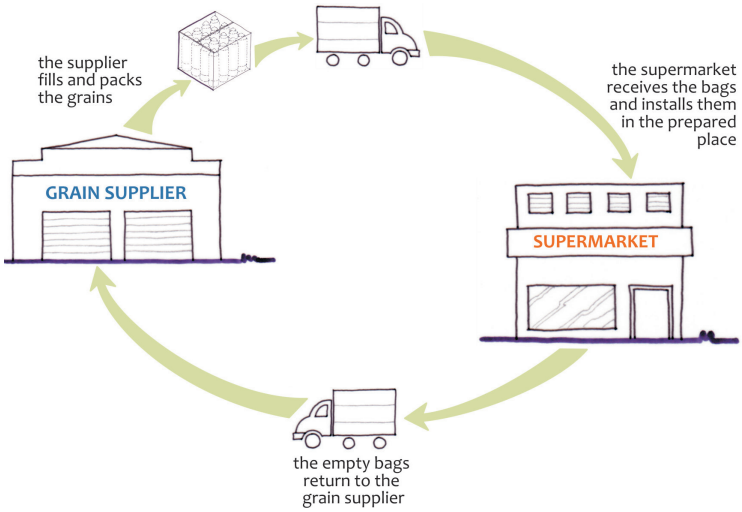

Figure 4. Closed supply cycle.

the ways, in addition to theoretical analysis, is through the making of contributions in opportunities, as, for example, product design. These may offer new ways of exposing the goods; ergonomic and functional bulk dispensers or tools that facilitate self-service.

In this sense, and for the continuity of the experiment proposed here, the form of supply and acquisition of products in grains and in bulk was selected for the detailed analysis. Based on the design stages involving, among others, an in-depth analysis of the problems identified in the acquisition of bulk products, analysis of similar direct and indirect products, associated to the process of generation and evaluation of alternatives, a resulting concept was obtained. This is characterized by a packaging-system that provides greater ease to the user to draw on grain and bulk products, in the same way that provides a dosing autonomy of the quantity one wants to acquire. It consists of a funnel and dispenser mouth, coupled in a cloth bag in which the grains are inserted by the supplier, reducing the direct manipulation by the supermarket and consequently improving the hygiene as well as the handling by the consumer (Figure 3). This packaging-system is characterized by a new reading regarding the conventional meaning of packaging and proposes a closed supply cycle (Figure 4) involving the point of sale and the supplier associated with the active participation of the consumers.

Final considerations

Packaging as configured today is an element that represents an intricate dichotomy: on the one hand, it plays an important role in the food industry. Be it in relation to functions such as protection, containment, transportation, information (to name a few) or as developers of a sector that moves billions of dollars, generates jobs, promotes research, or develops materials and processes, etc. On the other hand, it also characterizes a highly polluter, waste generator sector with inadequate discards, promoting adverse impacts and a disproportionate capacity for assimilation, management and administration.

The self-service sector in turn, and specifically the supermarkets, here highlighted, are a scenario of great concentration of both food and packaging, characterizing an environment conducive to discussion and propositions of strategies that reflect in more effective results for both sectors in terms of assumptions of greater sustainability.

Thus, a challenging and important perspective for the field of Design is created, in the glimpse of more assertive interpretations and, consequently, more suitable solutions for an eco-effectiveness. This research, within the Design for Sustainability assumptions, among other directions, singles out the need of discontinuing current production and consumption patterns, rethinking behaviors and reviewing actions in all dimensions, as advocated by sustainable development.

These principles were associated with Future Studies by its essence of considering changes of perspective, especially in decision-making processes. In this way, the Future Workshop method was aligned with some adaptations and the use of the "Postcard from the Future" tool for the context of the creation of Future Scenarios.

Through the selection of one of the scenarios obtained – Harvest Scenario – it was possible to propose a new packaging concept, which modifies the currently conventional form of packaging, transportation and commercialization of grain and bulk products. This was called a packaging-system intended to reduce the amount of packaging and the steps of handling the grains. At the same time, it aimed to promote hygiene and purchase by the point of sale and by the consumer. This, in turn, shifts from the condition of passive user (traditional consumer) to the profile of partially passive user (self-service) and of a user who brings resources and abilities (new services) – according to Manzini and Vezzoli (2005) in relation to the evolution of the user role regarding discussions of the necessary changes in society for greater sustainability. To this matter, the connection between the company (in this case the supermarket) and its suppliers is associated in terms of practices involving planning in environmental management (Alves and Nascimento, 2014).

It should be noted that this specific profile of the supermarket to which the proposal refers has already the characteristic of supplying bulk products. If the traditional supermarket environment and those that do not offer bulk products were considered, the reduction of packaging that is part of the distribution system would be even more significant and would add even more instigation to changes.

In order to expand the detail of this packaging-system concept, there would still be a need for new tests and adjustments. Besides these, analyzes of the logistics involving the transport and the form of supply and refueling in the B2B relation; analysis of materials and processes; and a Life Cycle Assessment would also be important in order to assist in the recognition of adverse impacts. However, these questions did not fit the scope of this research. This experiment prioritized the completion of methodological steps followed by the search of an answer to the research problem under analysis. This was contemplated in order to demonstrate how the definition of strategies that provide parameters for decisions oriented to Design for Sustainability and through Future Scenarios can occur.

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