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ABSTRACT

All the societies are living an intense changing phase due to economic and cultural crisis. That is opening the way for disruptive innovations that are causing distress in the traditional models in several human spheres. The result is an undeniable need for all societies to new and innovative approaches able to manage and meet the economic, social and environmental challenges of today with a look into the future. The awareness of the complexities, interdependencies and interconnections of the challenges faced by these fields, together with the technologies and tools to better understand those systems, have brought to implement our traditional methodology, the systemic design, into the well-known innovation design processes. This type of approach tries to add market value and increase environmental and social acceptance by starting from enhancing the assets of the context where the innovation takes.

This paper goes through the explanation of the theory and the practical methodology adopted for the presentation of two different experiences. The first one is focused on the didactic area and shows the path and the achievements of the Systemic Design innovation methodology, used to design concepts of social innovation in defined districts in the town of Turin. The second one is an experience with a local company. Thanks our collaboration, was able to design an innovative type of product and to redefine part of his product process in order to be released in the market very soon.

Keywords: design innovation, systemic design.

1 INTRODUCTION

The design role inside the company and the society is radically changing in recent years. If the design has become an essential asset in any product or service delivered in the market, other indicators suggest an increasingly importance of the role of design as a strategic tool in the vast landscape of innovation, as suggest Tim Brown (Cicoria & Swawn. 2013). In fact if the innovation is a multifunctional force that must continually refine his form method and his meaning to be able to reply to new outcome issues (Tamborrini. 2014), the multidisciplinary nature of design fit in a natural way into the need to manage in a proper manner these issues. In addition, we are witnessing in every social and market field context, a speed and unpredictability that have dealt a blow to the old systems and established "modus operandi". The result is a growing complexity and a lack of predictability that affect industries, corporate and institutions that every day are looking to the right way to navigate into this fog (Josiasen & Rosted. 2014). This is precondition why nowadays there are

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SYSTEMIC INNOVATION DESIGN METHODOLOGY: THE COMPARISON OF TWO CASES STUDIES

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more attention into the research for tools to handle the increasingly complex contexts and of apparent chaos that is opening up to the "golden age of design" (Walker, 2014). On this line the research team of the Department of Architecture and Design is moving to study, to map and to re-defining and experiment methodologies capable of responding to the new meanings and to the emerging needs for those who create innovation in order to progress and prosper (enterprise) and for those who need it to improve their quality of life (the user/subject) in a sustainable way.

This paper present two real case studies in different contexts of design innovation, where we tested our methodology. The first, Turin Social Innovation, was born from an academic experience within the innovation master course of the Politecnico di Torino. In this project, the students were challenged in the creation of social and environmental innovations within specific areas of the city Turin. The final intention was to improve the reference area starting from the analysis of the issues, possibilities and resources offer by the same. The second experience, Tell + write, instead was a partnership born with the promotional pens manufacturer Stilolinea rooted in the industrial area of Turin. As a leader in the market due to his strong creative talent and a broad knowledge of the technological know-how, it takes on a strategic design initiative, with our research department team, in order to innovate their products to respond to the their critical market situation.

2 THE SYSTEMIC APPROACH: CONTEXT INNOVATION AND DESIGN.

Today every firm, company, institution or individual have to interface with the high degree of complexity of society and economy coupled with the unpredictability of the future challenges. The global growth markets, new technologies opportunities and emerging cultures are rewriting a system where the old paradigms seem didn't work anymore in the contemporary context. The opening up of new possibilities in terms of product and service are breaking the boundaries in every field of the knowable human with astonishing speed, forcing everyone to view itself in a global view. The result is a world where local's actions influence the global scale and vice versa. Willingly or sore organizations and society have to face to an international reality, that may seem distant and elusive, but which manifests the consequences in the local context, positive or negative they are. For this reason the need for new solutions and new actors, able to handle this radical change of vision, is strictly necessary (Brand & Rocchi. 2011). Moreover, thanks to the multiple possibilities to experiment new ideas, offer by the new technologies, is needed to be capable of designing optimal solutions that will create value / benefits at many levels. To this point, the best design practices, could play a strategic role driving the modern society in a better quality of life of the human condition (Guenther. 2012). By starting acting in the local context, with the tools provided by the global world, is possible to unlock the intrinsic value of it and subvert the problems into opportunities.

The principal needs for innovation and updating pursued by the organization are strictly connected and bounded with the industrial and cultural richness coming from the territory. So what we are experimenting is to involve this aspect in the early stage of the design innovation process. In this way we should to define new solutions (products, services, processes and models) able to meet, in a better way of today, the social, economic and environmental needs of a community (European Commission. 2012). In other words, our aim is to build

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sustainable innovation solutions: socially equitable, economically viable and environmentally sound for the context where the innovation took place.

This greatly complicates the design process, but as suggesting by J.Gharajedaghi (2004), we see the world as increasingly more complex and chaotic because we use inadequate concepts to explain it. Consequently is necessary to look at the innovation process with new eyes, not only from new knowledge to new product / service, but also with holistic "eye" to see the "big picture". Defined and verified in different design field as a way to create innovation by the research group, our "eye" is the systemic approach.

The basic idea behind this approach is to consider the system as starting point in the innovation process. The system is considered as a set of two or more elements where the behavior of each element has an effect on the behavior of the whole, and where the behavior of the elements and their effects, on the whole, are interdependent (Ackoff. 1981). That gives complex problems characterized by non-linearity, ambiguity and uncertainty (Glouberman & Zimmerman. 2002). So this approach provides prominence on designing the relationships between people, activities and contextual features to enhance knowledge about the system where it is acting and to help and manage his features. We experienced that the design of these relationships is one of the crucial point of real and successful innovation (Mortati. 2013) decreasing the possibility to design stand-alone and unsuccessful outcomes. Indeed using this method is possible create the "identity" of the topic expressed by the features, the behaviors and the relations of the system where it is involved. However, at the same time is possible to create a "culture" of the considered topic with the interaction between his identity and the particular operational context where is acting. (Gaiardo & Tamborrini. 2013).

3 METHODOLOGY

When it comes the necessity to innovate "something" theory and practices are different things that have to work together. The theory is setting the culture of innovation while the practice has to set up the tool able to answer to the challenges come out from the first. Wherefore starting from the recognition and the study of the various broad innovation theories and design methods were the first step of our research. On account of this, we embrace the innovation definition, as that the practice of creating a new viable value/benefits proposition, follow the studies of Larry Keely (2013) and Roberto Verganti (2009). In this definition, the aim of the innovation is focusing on delivering new, viable and concrete sustainable result activities with a tangible value/benefit for all the actors involved. Equally the design methodology adopted to guide the stage of product/service design innovation, derives from the Systemic Design approach used and taught in design courses at the Architecture and Design Department (Bistagnino. 2009).

Even though the systemic innovation is not amenable to simple recipes or toolkits, for his complexity and his multi-faceted process, this does not mean that it can not be driven by awareness to achieve the best possible result. That is the scope of the systemic innovation process. Starting from the analysis of the complex interactions relationship between different actors (individuals, society, enterprise, culture, territory, etc.) and the related cultural, economic and community area or territory the aim is to unlocking and exploit the innate value

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of the context as a starting point. Nowadays more than ever the new information and communication technologies and in particular, the ability to gather, analyse and disseminate large swaths of data and connect large number of people over broad areas have also enabled a greater understanding complex systems. There is now a range of tools for mapping and better understanding systems that can give useful insight to lead to innovation of those systems (OECD. 2014). This approach is a strategic way to face the design innovation activity defined as the process of all essentials steps that lead to the innovations involving generally all the internal source of knowledge generation and learning and the organizational structure and processes of the people/organization committed in the process (Filippetti A. 2011).

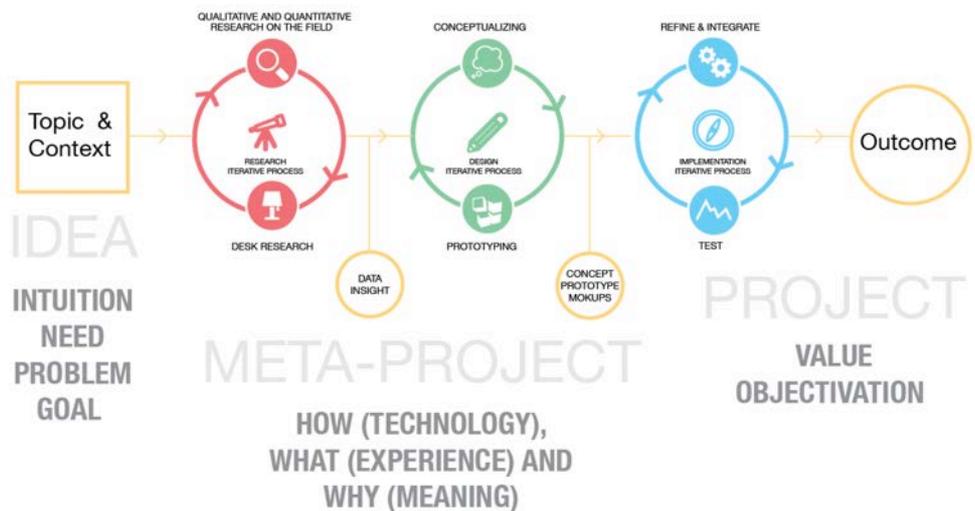


Figure 1 –Design process schema

3.1 DESIGN PROCESS

The design process come out, described in general view in the picture (fig. 1), go through in all the stage of the innovation design process. The preliminary step is the definition of the goal's project with the description of the topic and context action boundaries. The set up of these boundaries derives from what we would like to achieve drive from an intuition, an idea or an issue to solve.

The meta-design phase, or rather the design expectations that will provide indications without the specific solutions to implement the project (Germak & Celaschi. 2008), start and end with two iterative processes: the research and the design step. In this phase, the assignment of the designer is to answer why he is adopting a solution, what is the solution and how the solution adopted will work.

The research step begins with the exploration and collection of broad and tangential information in order to examine the vast array of issues, features and relationship surrounding the topic. The analysis of this overall picture drives into a deep understand of the topic outlining the real role of all the actors involved within their scope, their development and their relations in their operational context. The amounts of data generate the design analysis/data documentation.

This output is the fundamental under layer leading into the second stage of design where it starts the iterative process of design. At this step, the designer

have to develop guidelines and propose solutions in according to the research step, described before.

The result of this stage as to be, by and large, a functional prototype or mockups of the concept outcomes. The intent of this outcome is to communicate and explain how the concept works and how it answers to the goal's project. The last phase is the implementation of the concept, with his development and the launch test phase where is it still possible correct the role before to deliver the project over.

4 RESULTS

4.1 TURIN SOCIAL INNOVATION

The teaching experience has allowed us to test our methodology in a social innovation project. The aim of the course was to deliver a project at the prototype/mockup stage that would introduce a social innovation, rather new ideas (products, services and models) that simultaneously meet social needs and create new social relationships and collaborations (Mulgan. 2010). In other words, innovations that are both good for society and enhance society's capacity to act within certain quarters of the city of Turin. This type of request required a careful contextual analysis to bring out cultural, social, historical, geographical and economic territorial characteristics, in order to identify the critical situation and the potential of intervention. The challenge was to determine and take advantage of the resources of the territory and enhance it using them. The study of the field of intervention has driven the iterative phase of idea generation that has resulted in 14 concepts and prototypes. The chapter 4.1.3 present the most significant outcomes.

4.1.1 *Research phase*

In the research phase it was, necessary to identify and analysis every possible feature of the neighbourhood. So each student groups took a deep qualitative and quantitative analysis of the cultural, social and economic situation. That also concerned the recognition of all the actors involved in the territory (people, companies, organizations etc.). The tool used for this phase ranged from interviews, empathy exploration, qualitative and quantitative data analysis, contextual map, case history and value network maps. These generate a book report of the neighbourhood taken into account.

4.1.2 *Design phase*

The second step of the research was to propose design concepts able to introduce a social improvement in their neighborhoods. It is then passed from the resulting data, of the previous step, into the formalization of guidelines for enhance one territorial aspect, to mitigate or solve a problem or to implement a project on the territory can bring a benefit. The systemic methodology in this case led the students in formulating design concepts with a general perspective on cause and effect with elements that can support their choices.

4.1.3 *Projects*

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Figure 3 Design process schema

Furthermore, Aurora got one of the biggest open food markets in Europe. Therefore, the aim of the project was to enhance cultural diversity using food as a communication tool to reverse a problem into an opportunity, through games, workshops, themed dinners and workshops. The project aspires to enhance the interaction of people from a different culture into an everyday topic. The project used the pictograms of food (fig.3) as a communication tool to overcome language difficulties and standardize the interaction between the people involved. The communication was studied to fit in heterogeneous media.

All right. Racconigi³.

The whole project aims to place a market through innovative management and a re-organization in terms of space and facilities to exploit and re-evaluate the deviation of one of the longest markets in the city (almost 2 km). Through the education and communication, it attempts to enhance the value of waste (fruit and vegetables still good but not aesthetically marketable) in support of the socially disadvantaged. The project also introduces new methods of waste disposal inedible, such as cardboard and wood, for proper disposal in favour of discounts on cleaning and rent for the hawker area and an automatic management of allocations of the market areas free (fig.4).



³ Student project contributors: De Brito, H., Calvo, A., Eguluz, N. and Fondacaro, A.

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Figure 4 All right overview

Piantala (pack it in) Crocetta district ⁴.

The Crocetta district is one of the most elegant in the city. However, being in the most central part of the city suffers from a lack of public green areas and chronic air pollution because it is crossed by major street arteries of urban mobility. The project, therefore, aims to introduce in the neighborhood more "green" and to communicate and empower the residents on the problems of air pollution situation. Through the use of particular plant species (lichens) "Piantala" intends to monitor air quality with natural indicators installed in selected areas of the urban space (fig.5). The recognition of garden shops, associations, the "Earth and the man" museum, the GAM the modern art gallery and a FabLab has made possible to set up a collaboration to act in two different ways. First of all, to build and distribute a "green kit" of plant, able to mitigate the pollution of outdoor and indoor air. Secondly to make aware people about the real situation and to propose actions of active citizen, as a "green founding" where it is possible contribute and choose where and which plants to plant in the area.



Figure 5 Lichens overview

Village Sports. Cenisia Cit Turin⁵.

The Sports Village project aims to aggregate all the associations and sports facilities under a single entity able to offer new services economically and physically more accessible (with less expenditure of time and in a simplified way). The district Cenisia and Cit Turin is in fact permeated by sports structures (public and private) and their aggregation could be a real and high driving force for the economy of the district, especially for the commercial side. Through some partnership, the user could enrol into this association and with his smart card and, for instance, he could book sports lessons on the fly on the web-app.

⁴ Student project contributors: Di Ruscio, C., Gerometta, A., Lievano, J. and Malagon, C.

⁵ Student project contributors: Balliari, S., Costamagna, S., Costantini, M. and Turina, F.

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Check the availability of the sports facilities in real time. Access to other services like the use of locker rooms and shower and medical support in case of need and so on.

4.2 TELL + WRITE

The experience with the company Stilolinen was born to respond to the current crisis that is going on the enterprise. The company, as it mentioned before, is a promotional pens producer, with an annual production of about 80 million pieces since two decades. The crisis that is going through is due to several causes. The expanded market competition opened by the global market and the static and saturated industry sector that nowadays produces only disposable gadgets with few spots of formal innovation, have forced the company to find new ways to respond adequately to these threats. The establishment of the collaboration with our department is one of their answers. Through the interaction of researchers, selected students, and R&D's company employee the intention of Stilolinea was to innovate his product at the company communication. The reports quite narrow and continuous with the CEO have been of paramount importance to maximize the period of analysis and design with the wording of the ten concepts in about five months. All this has led to the development of ten concept prototypes of innovative promotional pens. These concepts have been designed follow the approach of our methodology, with an accurate analysis of their final goals and through the definition of guidelines, verified with the creation of prototypes with the rapid prototyping technology. The results led the company to engineering a new pen model (Bella!) and to present it, after few months, in an event/show to the shareholders. The final launch on the pen will be in 2015 and the cooperation with the company is still active, with the extension of the research in other strategic areas.

4.2.1 Research phase

In the first phase was implemented a contextual benchmarking study focusing on three main aspects. The first-level was dedicated to the components and the process of production, assembly and logistics of the products Stilolinea. The careful study carried out both to theoretical and practical level was improved with company visits. The second-level was applied to the material with a careful analysis of the materials used by the company and the potential uses. (for instance 1050 iProctect antibacterial pen and eco and vegetal material). The third level of the research was focused to understand the market of promotional/gadget market. That has undertaken an analysis of the needs and

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reasons for use/purchase of a promotional pen, his life cycle and the involvement/experience of the product with customers.

4.2.2 *Design phase*

In the second phase of the project of design concept we divided three major areas of intervention in: Ergonomics and Use, Materials and Components, and New Technologies and Experience. This step was necessary to simplify and better manage the iterative design process and to optimize the results of the analysis phase. In that case, the methodology helps us to set up different design strategies following the relationship of this operational context. In fact by and large, all projects have responded optimally to the company's premises with a range of projects able to design new component, involving accurate and right materials and with a formal extension of the product's life cycle. The results outcome was innovative not only terms of style but especially to the level of meaning about the use, the communication and the interaction of the users with a promotional pen. Tell + Write pens are innovative because they are transferring the message through their shapes, their functional characteristics and new production strategies without introducing new assets in the company, but just reuse them in other ways.

4.2.3 *Projects*

Hair Holder Pen (hair holder pen) ⁶

This idea was developed after a careful analysis of the ergonomic use / interaction of the pen for a particular target: the women. Starting from an improper pen's use such as to hold the hair, the aim of the concept was to extend the life of the promotional object giving it a second function. The result is a pen that draws attention even when used as a hair holder (fig.6). The pen body was review to be slender and linear shaped for an ease hair introduction. The project studied an ergonomic pen to look and to be physically predisposed to write and hair holder at the same time. The result is a pen with a shape transition from a square section, in the upper part, to a circular section towards its grip. The length unusual designed specifically to be used as the holder's hair.

⁶ Student project contributors: Juvenal, G., Khorramian, K. and Sorrentino, M.

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Figure 6 Hair Holder pen

Kit-O⁷

The project is planned according to the design by elements rules. The analysis of this project was focused on materials and components in order to extend the life and the pragmatic use of the pens, with a sustainable perspective. The solution is based on a unique base where it is possible to connect freely functional and aesthetic fitting. With an easy and flexible assemble and disassemble, able to create many different product models. Besides Kit-O allows to produce different pen models from a single production line. A grip, metallic or magnetic ring, a key-ring, a led for lightning are only some of the adding. The project carries on also a study on the possibility of the user to shape up a customized pen through the 3D pen software from the company website.



Figure 7 Kit-O pen

SI! ZERO⁸

The project intended to explore new and innovative ways to use the promotional pen with a marketing and a communication view. The concept focus on the

⁷ Student project contributors: Molina, V., Rispoli, V. and Stante, A.

⁸ Student project contributors: Collignan, L. and D'Urzo, M.

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spreading of new technologies in the classical pens. S!zero gives the opportunity to design different communication and engaging strategies concealing in its triangular section a technological soul: an NFC tag. This system enables a high potential and benefit related to the merchandising and interactive strategies with customers.



Figure 8 S!Zero pen

4.2.1 Implementation phase

After the concept and design phase presented in the exhibition Tell+Write (2013), the company re-elaborate all the concept, engineering a new pen called Bella. This pen was holding formal inspiration from the concept, and it has been engineered taking some design points of the outcome of the projects presented before. The pen resulted, gave a geometric and multifaceted look, making it always seem different, depending on the viewpoint. Plus, thanks to his shape and his components is possible to personalize it in many ways. A simple slender and bright design also introduces a double use. In the top pen's diamond, it is possible to insert a special tip to use with touch-screen devices. During the official presentation "Discover Bellezza" the company present the first prototype to the retailers and ask them some feedback before to going into the production of the first series.



Figure 9 Bella! prototype

5 FUTURE DEVELOPMENTS

These two experiences have led us to experiment our methodology in two different cases of innovation. The first one, in an academic environment where starting from the territory the aim was to enhance the value in order to introduce a social valuable innovation. The second one, in a company environment, where starting from the know-how and production asset we were challenged to looking for a formal and innovative concept in a market sector characterized by stagnation and crisis of ideas.

The good results accomplished took us to deepening the methodological experience in the social innovation with the research of new types of tools to increase the efficiency in the analysis of the context and the relationship in the new innovation course focusing on the food theme. Besides we started to tackle the field of Innovation data-driven with a Telco partner collaboration. With regard to the Stilolinea company, thanks to the excellent results obtained and the satisfaction of the company, the collaboration has resulted in another project whose goal is to investigate new ways able to innovate the experience, communication and channel of the company's products..

6 CONCLUSION

The use of the same methodology in different fields has produced significant results in both cases mentioned above. The aim of our research is to expanding the theoretical study of innovation driven by design and consequently looking deeply to the role of design in this field. The research effort go throughout the implementation and the experimentation of the systemic design approach in the innovation field with the study of a set of tools and methodology able to help to turn into tangible results the prerogatives and the objectives stated in the theory. We are confident that through the iteration of this case study presented in this paper, our research team will validate and communicate even more the importance of the role of design in the vast world of innovation as a strategic guidance and as a tool for positive change according to the nature of what we consider the aim of design, well defined by Klaus Krippendorff (1989), as the process of giving meaning and purpose of what we do.

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