


Experimenting in Industrial Product Design. The Case: "Art, Design and Business Project for New Young Talents - Young Culture as a Motor for a New Business Economy in Tuscany"

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Abstract

The design of mass-produced products is a design process aimed at the masses, which describes approaches and phenomena in strong transformation. The production techniques, the semantic value of the products, the concept of mass production and the similarities between these factors explain new production and design balances following the latest technological and cultural transformations within contemporary society and the market. The paper discusses and investigates the theme of industrial design aimed at the masses, reporting relevant case studies and experimental tests.

Keywords: additive manufacturing, production design, mass customisation, industrial design, industry 4.0

1. Introduction

For years now we have been living in a transformative moment as regards the design process in the definition of the industrial product. We are faced with a dichotomy in which there is, on the one hand, a reactionary aversion to the new techniques of industrial production and, on the other hand, a sterile adoption of the techniques of mass production that we can now consider traditional.

This ambiguity becomes even more evident when we talk about industrial products and we realize that we are moving further and further away from the concepts of "form" as a synthesis of a design thought aimed at the aesthetic-emotional component as well as the functional one. Probably the same complexity that describes our contemporaneity limits and constrains the attempts to express under industrial productions objects in series, able to transmit emotions, sensations and values. The diffusion of new production methods such as Additive Manufacturing has disrupted the process of industrial production to the point of breaking the "sound of reality" (Frateili, 1989) to invest in the refinement of advanced and self-managed techniques even in unconventional industrial sectors.

The concern underlying this phenomenon is defined by the indeterminacy that some products might describe within the increasingly complex system of connections between goods, consumption, and consumers. Thus, the design of industrial products for mass production still turns out to be tied to forces that hinder or slow explicit formal innovation in material and immaterial.

It seems clear that defining the design of industrial products for mass production is a difficult task. It is useful in the first place to identify the product design starting from the analysis of the elements that affect the design activity and, in fact, compose the complexity [...] in the study of the relationship between design activity, industry, market and society.

Defining industrial design today means moving from "traditional" techniques and practices to more advanced modes of both design and production, in which digital transformation becomes a design tool

and at the same time describes new opportunities for industries. Here, then, is the very attitude of "industrial design" together with the attention to the use of materials in innovation processes, to preserve the absolute and abstract value of the idea as a project of the work, but especially that semantic ambiguity of the term "design" as a reflection of the encounter between industrial culture and design culture.

Therefore, it becomes critical to describe experiences where practical experimentation guided by industrial design research, is beneficial for industry-related projects. Through this experimentation, appropriate artifacts are developed to generate a new body of knowledge. The results developed through practice identify all stages of a design process to inform others of the requirements to best demonstrate design theories in practical outcomes (Kuys, 2014).

The type of experimentation described next is called: "ART, DESIGN AND BUSINESS PROJECT FOR NEW YOUNG TALENTS - YOUNG CULTURE AS A MOTOR FOR A NEW BUSINESS ECONOMY IN TUSCANY". The discussion of this case of applied research for the experimentation of industrial products, aims to contextualize and investigate how the current period of social, digital and sustainable transformation is affecting designing processes, opening new opportunities for product design and development. In fact the complexity of launching a new product or product system on the market defines a long and articulated series of phases, which increase exponentially in relation to the size of the target market taken as reference. Aware that there is an increasing need to identify solutions to more complex challenges (Manzini, 2015) in addition to being a warning for effective design, it often becomes a reductive and immobilizing system in which to design.

Considering the design process as an empirical formula and therefore determined a priori turns out to be a limiting approach both for designers, who risk applying the same practices to each new project in a redundant way, and for the end users of the product or system produced, who risk being infected by an education in forms and functions that is strongly demagogic and therefore one-sided. The design process is not a codified procedure but is composed of a series of practices and best practices that must therefore be designed continuously.

The complexity of the industrial production system is not only to be found in an intrinsic way in the internal phases of a production chain, but also in the external ones which are strongly influenced by the transversal perception that people have in relation to the production itself. It is evident that any industrial production addressed to the masses, and therefore addressed to individuals, is highly complex and imbued with factors of social, cultural and biological influence. These considerations cannot be considered as additional and external parts of the production process because when we are dealing with perception, biological predispositions and cultural issues are inextricable (Falcinelli, 2014).

So here is that the genesis of any product or series of products does not become a mere formal solution, but a deep generative synthesis that collaborates in an active way with many interlocutors, so as to define precise assumptions of responsibility by the designers towards society and people who will then use these design solutions within the real world and especially within economic and cultural relationships in continuous transformation.

2. Customising Industrial Products as Emotional Distillates

As a result of this social, cultural and market complexity, industries seeking greater customization of complex products through engineering-to-order, we are then faced with methods to streamline the product development process. Customization of industrial products has been introduced and developed through digital configure-to-order (CTO) platforms, where any product is produced through a priori configured models. Then there is the engineer-to-order (ETO) approach, which includes people in the early stages of the engineering process, during product design, and thus allows for a higher level of customization (Levandowski et al. 2015). This second process succeeds in maximizing quality and quantity of production although it is not yet widespread in the Italian industrial fabric.

The "New Industrial Design" referred to in Domus No. 807 of 1998 was described as the synthesis of the overwhelming changes taking place in the relationship between design and industrial fabric with the increasing awareness that industry was now engulfing with its maximum expansion also all those processes and micro-processors of industrial production that until then were not yet standardized and

reproducible within industrial production chains. Therefore, if the factory and the whole production chain is now immanent to society, society too, with its criticalities and evolutions, is now a permeating element of the whole "industrial production territory". Once the boundaries have been broken down, the industrial coincides with the non-industrial, thus freeing the whole entrepreneurial culture from the rhetoric of the factory to place it side by side with a new, more open vision that takes on social responsibilities and new forms of "social economies" capable of and, above all, interested in the production of products.

We are getting closer and closer to the definition expressed by Thomas Maldonado of the International Council of Societies of Industrial Design (ICSID): industrial design is a creative action whose objective is to determine the formal values of objects produced by industry. These formal qualities include the external characteristics of products, but above all those structural and functional relationships that transform the product as a system into a coherent whole from the point of view of the manufacturer and the buyer. Industrial design makes it necessary to cover all aspects of the human environment conditioned and directed to industrial production (Maldonado, 1961).

It seems evident that therefore the introduction of industrial automation processes is today of fundamental importance but at the same time a condition to be controlled and monitored. If automation in product design is used to eliminate non-creative work through the implementation of knowledge-based engineering as a means to effectively acquire information by storing rules, relationships and facts (Amadori et al., 2012), then the emotional component turns out to be an even more decisive and characterizing factor in serial productions. Moreover considering the new idea of "open manufacturing" and therefore enabled and enabling with respect to digital design and production technologies we are faced with a new idea of production, in which there is a huge amount of individual products that are perfectly adapted to people. The definition of this new paradigm of mass individualization, could suggest more and more a structured and mutual design with respect to Additive Manufacturing techniques, but with an even more preponderant emotional and characterizing component proper to the design culture.

3. A new Silver Factory as a Transmutation of the 'Viral' Concept

The concept of industrial mass production introduces a new meaning to the concept of "viral production." The pandemic simply accelerated certain manufacturing processes through the use of digital technologies. During an unforeseen circumstance, such as the COVID-19 pandemic, product delivery relied on available digital technologies (Agostino D, Arnaboldi M, 2020).

There are a whole series of characteristics that an effective and therefore "viral" industrial production seems to inherit directly from the COVID-19 pandemic, such as the effectiveness to give answers to rapidly changing situations by making the best use of the various actors that can contribute to achieve an optimal result. In this new meaning a design of "viral products" is constantly changing and therefore a single solution generates others that will be increasingly defined by their ability to diverge, spread and collaborate with each other. Significant is the case of the New York-based collective MSCHF, which purchased an original Andy Warhol pen stroke for \$20,000 and then sold it to a lucky buyer for only \$250. The Andy Warhol artwork is sold for a very small price along with 999 other high-quality copies created by the collective. The reproductions, generated serially, have reached such levels of accuracy that it is no longer possible to recognize the work.

For the project, christened "Museum of Forgeries" by the collective, MSCHF members purchased an authentic 1954 Warhol pen drawing. The work is titled "Fairies" and the collective used not only digital and automation technologies, but also a robotic arm to recreate the American artist's exact strokes. All this before using heat, light and humidity to artificially age the paper.

Having mixed the 999 fakes with the one original, MSCHF artists now claim they can no longer identify Warhol's work. People can purchase one of the copies, titled "Possibly Real Copy of Fairies by Andy Warhol" for \$250. Among these, therefore, would also hide the original design worth 20 thousand dollars. If all the pieces of this incredible project are sold, the New York-based collective will earn more than 12 times what the original design paid.

The group believes that anyone who buys the original Warhol will probably not realize it. It is interesting to understand how this example is a clear indication of how through industrial design in

series there is a contamination of other sectors ranging from the design of new business models halfway between the digital world and the real world, to the creation of equipment for the production and distribution of products.

We are faced with a true "democratization" of a work, or rather the serial and industrial representation of a design synthesis. Lukas Bentel, Chief Creative Director of MSCHF, explained, as reported by CNN, that the project was born to make the work of the master of Pop Art accessible to all. In fact, according to Bentel, the project isn't just destroying the value of a work of art, but creating an entirely new one

that will become the common property of all 1,000 buyers. "Buying a Warhol work is something unrealistic for most people.

This way we are democratizing it, allowing everyone to have what could be a Warhol." The irreverence of MSCHF's project becomes an object of study even more when we think about the impact that this operation has had on people by immediately entering the trends of 2021 as a "mass-produced viral product" (Lorimer, B. 2021).

The shamelessness of this project increases precisely in the exponential resonance that the communication of the project has described in contemporary society.

4. R&S Poliart

The relationship between art design and serial production in this moment of pandemic has led us to carry out a design research of experimental character in which some companies in the Tuscan industrial area have combined artistic research with the typical design culture through operational phases similar to serial development, with the aim of creating a product that combines these areas but is free from the perspective of the "unique piece" and the problems related to human intervention for the final finishing processes. With the team, we focused on these aspects and drew up a series of proposals, from which one was then selected in consultation with the company.

The research began with a design phase for a surface with certain aesthetic and functional characteristics, bringing together the artistic and industrial dimensions.

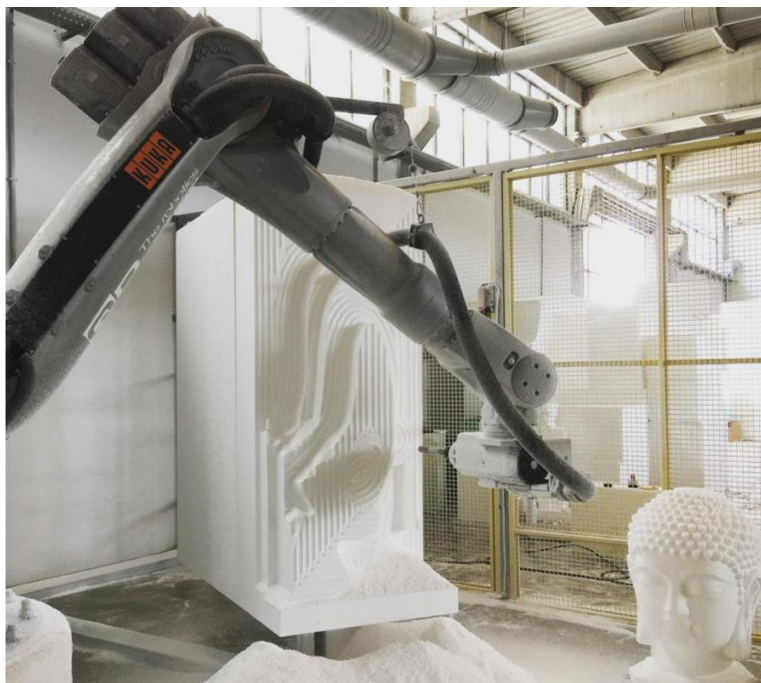


Figure 1. ©Margherita Villani for Young Talent Poliart 2021

Always the way on the dialectic between unique piece and reproducibility, based on the conception of the error of the machine as its "signature". The next stage involved the design and prototyping of the packaging and all the digital apparatus it contained, an integral and significant part as it was

synchronic and necessary for the project to function, be made available to the public and sold. The innovative approach to be highlighted in this project is the direct communication between designers, machines and end users in a collection of objects that combines aesthetic research with the more industrial aspect linked to serial development.

Development methods and techniques that the company already possesses have been used, enhancing the possibilities of realisation by broadening the formal range and offering new perspectives by exploiting technical limits as added value.

The project called "Lace" is presented as a series of pictorial and non-pictorial visions in continuous growth and transformation that emerge from an instinctive dimension. The series of works that are articulated through heterogeneous supports intends to address, through the subject of lace synthesized and concentrated in a modular gesture that is repeated, the eternal dialectic that is triggered in us between being and appearing. At times the painted lace enters into a relationship and almost dissimulates with the real one, stretched and grafted onto surfaces and more.

This element, sinuous and deliberately decorative, wants to be a tool to generate a moment of reflection on the superficial, constructed and decidedly over-articulated images we give of ourselves to the world, as we represent ourselves.

In continuous expansion, like a stain, a "virus", it seeks and slowly occupies all the space, repeating itself. Starting from the red thread that follows all my work: that of creating a relationship between seriality, randomness and pictorial gesture, to open a reflection on the theme of reproducibility, we often speak (as I define it) of a "failed reproducibility", because, alongside a construction that refers to the idea of reiteration, of serial possibility, there is an "interruption", the action is "missed", after a first glance we realise that each element, even if similar, maintains its own uniqueness.



Figure 2. ©Margherita Villani for Young Talent Poliart 2021

The strength of this proposal lies in the fact that the object to be made by the machine takes into account the fact that the latter maintains a certain marginality of approximation and defects which, in this case, is part of the concept of the work, going to produce an artefact that deliberately intends to "absorb" these defects (usually considered as such and eliminated). Here, the latter become a fundamental element, in the vision in which they are conceived as the basic element on which the sense of modularity and reproducibility rests.

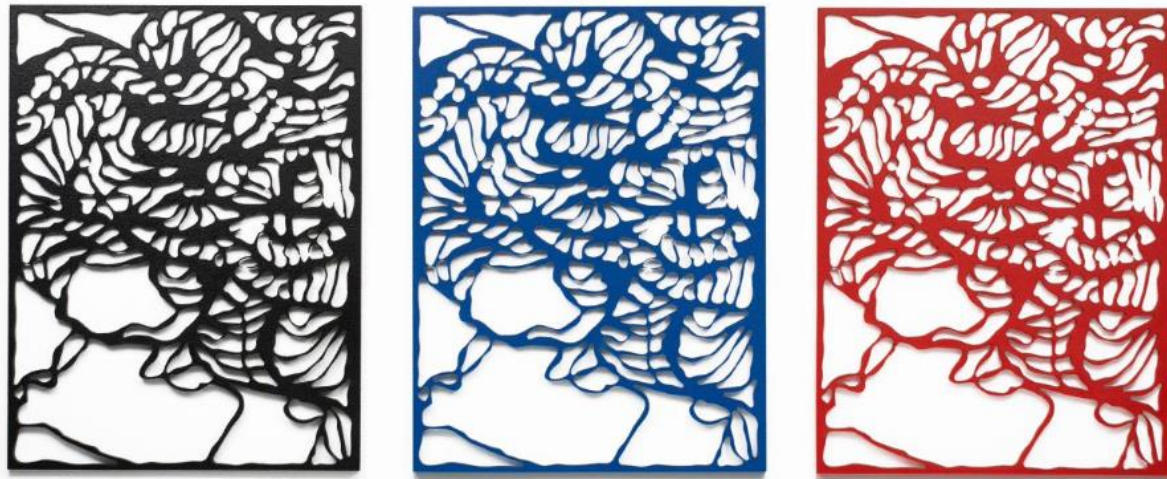


Figure 3. Paolo Puppato for Young Talent Poliart 2021

The choice of this "dirty" design is intended to emphasise how errors are the "signature of the machine" that become important within the work. It doesn't matter if the machine reproduces the models faithfully and extensively, they are simply the starting point which will change slightly every time a margin of error and impossibility of further detail "deviates" or limits the print. The gap that is created between reproducibility and reproduction is the final object. Micro changes that do not involve the use of the human hand, but which become part of a potentially infinite serial cycle.

The piece, produced and released, is black lacquered and mass printed according to demand. All the small defects that may emerge in the process are internalised and accepted as they represent the true trace of the machine work and seriality. The module is conceived to become a piece of wall furniture, unique or modular (by placing several copies side by side in the desired quantity); a vertical element (with a designable base) that can serve as a spacer or space separator; placed horizontally with the addition of legs and the covering of a plexiglass can be used as a table or side table.

This example of applied research describes an example of design applied to products made using mass production techniques, without the action of the designer being limited in any way by the defects in the series, but instead there is a communicative capacity between man and machine to such an extent that they empathise with production defects or examples of unique customisation for end users. There is therefore a clear mutual relationship between all the factors involved in a mass production driven by a design culture that acts as a vector, catalyst and intermediary between different areas of knowledge, between different tools and above all between different relationships.

5. Conclusions and Perspectives

When we are confronted with the industrial production of mass-produced products, multiple factors come into play and consequently complicated relationships between them. Resilience to economic and technological forces (Stevens, 2019) that in recent years have seen as active subjects both the productive industrial fabrics and the same design approaches fossilized on the problems of users and not on their solutions and emotions (Verganti, 2018).

If the limits in the world of industrial production aimed at the masses are overcome, there will no longer be a sterile conflict between the world of the arts, production and design itself. The overcoming of these limits will be tangible in both design approaches and mass production techniques. The concept of industrial production also recurs constantly in Argan:

Design decisively challenged the concept that industrial production is necessarily repetitive or quantitative [...] but above all [aimed] to clearly separate qualitative production, with a creative and progressive character and therefore with a precise educational and social purpose, from purely quantitative production, with a speculative character (Argan cited in Grassi & Pansera, 1986, p. 23)

The same industrial production that today can choose to change design, production but also business processes in relation to this new union between quality design, with a strong emotional and exponential component, and the use of advanced production technologies. We can deal with the great uncertainty about the future dictated by an ever-accelerating technological advancement through lively experimentation, in which direct experiences of new products can produce the knowledge needed to bring out content and meaning.

The experimentation proposed in this case indicates a new vision of digital technologies, no longer understood only as the custodians of quantities of information, but also as a valid integrated tool in close relationship with the design culture. In exploring this new horizon we can identify different practices ranging from Industrial Design to Advanced Design. The latter are located in the front-end of what we can define as the design-driven innovation, and therefore need a constant theoretical reflection, rooted in practice, to create their own tools and paths to follow, to give original forms to the future (Celi et al., 2010).

The spin-offs of these design approaches are tangible in the fabric of Italian companies that have always been characterized by the depth and complexity of the production chain. The model described operating on a small scale but with a high level of difficulty, offers new opportunities on a larger scale and in contexts characterized by different levels of difficulty. Today we are aware that the shift from traditional district forms based on incremental innovation to the new district forms characterized by radical innovation can largely be read as a paradigm shift (Carlei et al., 2008). Experiments in this new paradigm shift can activate paths and good practices, capable of reading the new opportunities also for the manufacturing system. The types of hybrid experimentation such as those illustrated can therefore generate and influence both research paths and, at the same time, the development of new business models.

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