Springer Series in Design and Innovation 37

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Multidisciplinary Aspects of Design

Objects, Processes, Experiences and Narratives

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ISSN 2661-8184 ISSN 2661-8192 (electronic)
Springer Series in Design and Innovation
ISBN 978-3-031-49810-7 ISBN 978-3-031-49811-4 (eBook)
https://doi.org/10.1007/978-3-031-49811-4

This work was supported by Centro Studi e Archivio della Comunicazione, Università di Palermo and Politecnico di Milano.

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Introduction

This book is the result of a long research process. The work started in 2020 with an exhibition held in Parma (*Design! Oggetti processi esperienze*, CSAC Università degli Studi di Parma), and a book of the same title, edited by F. Zanella (with essays by G. Bosoni, E. Di Stefano, G.L. Iannilli, G. Matteucci and R. Trocchianesi) and published in 2023 (Electa Milano) centered on the role of archives as memory repositories and agents for contemporary design. This first period of reflection was followed by an international conference: *Design! O.P.E.N.* (https://www.designopen.it) held in Parma on May 5–6, 2022. The present volume contains most of the papers presented at the conference.

Starting from the first volume (*Design! Oggetti processi esperienze*), the research was always characterized by a multidisciplinary approach, which became even more multidisciplinary at the international conference held in 2022.

In fact, the conference was organized by a network of scholars from the world of design, philosophy and history of art, whose aim was to intertwine several types of knowledge. Consequently, multidisciplinarity is also the main feature of this second volume whose objective is to reflect, in an integrated manner, on the different dimensions of design, using competencies from the field of design and from that of humanities.

The aim of this project is to create a repertoire of opportunities of exchange and of relation among the culture of designers and the applied marketability of humanists in the project and in the innovation processes, in particular those design processes characterized by an important social and cultural impact.

In this context of exploration and experimentation in the territory of bordering subjects, stands the interpretative model in Fig. 1. It represents the potentialities in the interdisciplinary relations which verify the logics and dynamics in the "behavior" of a designer dealing with some project variables. On the vertical axis, humanities and techniques can be found, and on horizontal one, research and project.

Where these variables intersect, there can be four types of intervention:

- The intersection of techniques and research generates technological experimentation considering techniques and technology fields in continuous and fast evolution.
- Where research and humanities intersect, we are in the field of a historical/social/philosophical approach in which the analytical and critical dimensions of the research itself are developed.
- Between humanities and project, we are in the area on which our project focuses: here the meta-project approach becomes the synthetic expression of the relation among the two poles.
- Finally, between project and technique, we are in the area where the executive component of the project itself emerges.

There have already been significant studies which have stressed the importance of humanities for design and have shown that design can be a stimulus for humanities; this

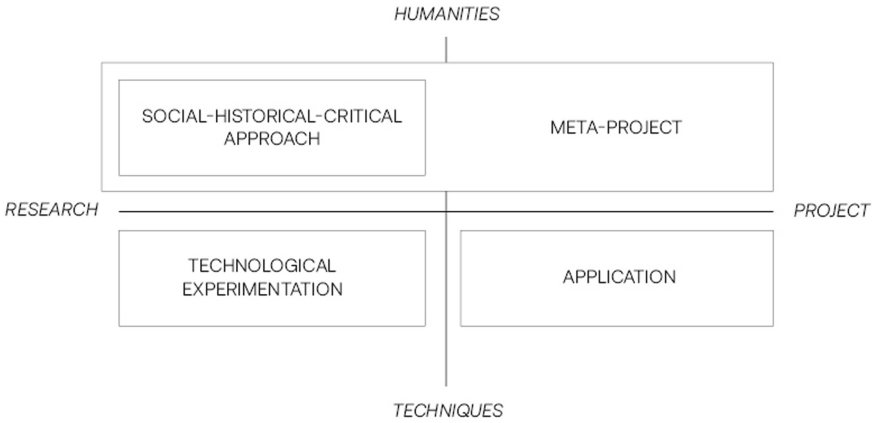

Fig. 1. Potential synergies between design and humanities [1]

is why the conference *Design! O.P.E.N.* intended to be an opportunity for research and debate with the objective of continuing this fundamental line of work.

Some crucial issues which interdisciplinary research must tackle are:

- The research of "new problems for design", that is, the collective need, as a scientific community, to find new directions toward which work must be periodically re-oriented, and this can be done only through a process of joint reflection.
- Research investigating the "meanings" that the product can have for design.
- Research that investigating the "value" that the design product shows.

As far as meanings are concerned, design and humanities integrated research can challenge, in a theoretically sounder way, "sustainability" by enhancing those concepts that are on the boundary between ethics and esthetics. Today, design cannot afford to dismiss ethical reflection, and, in this direction, humanistic culture can help to reinterpret the reflection on the mere functionality, in the more philosophically complex terms of the concept of "suitability for the purpose".

With regards to the analysis of the value generated by the action of design, it may be interesting to speak of "technology of value", which only humanistic investigation can help to process and fill with tools useful to produce not only ex-post critical knowledge, but first and foremost, oriented toward experimentation and to showing new corridors for contemporary design [1].

The volume follows the paths of reflection which structured the conference *Design! O.P.E.N.*, focusing on current themes and issues that are still at the center of the multidisciplinary debate on design, investigated through four keywords: objects, processes, experiences and narratives, which correspond to the book chapters.

The first chapter focuses on object-oriented design, enhancing its functional narrative and experiential values. In fact, objects, beyond their value in use, bear symbolic, anthropological, political and social meanings and worldviews. This section also develops a theoretical reflection on the esthetic categories used to interpret the design object

in relation to the classic dichotomy useful-beautiful, to the category of game, to artistic values and the relation between ethics and esthetics.

The second chapter is on the designer's self-reflective moment which is focused on the analysis and on the definition of processes in various contexts, spanning innovation, social engagement, reflection on emergencies or forecasting. This section investigates how designers develop and test their models, both at production, implementation and research levels. The areas of investigation are those addressing innovation, social engagement and pursuing a reflection on emergencies or forecasting. The section is intended as an arena for discussion on topics revolving around both the different moments in the history of design and the contemporary condition. The contributions collected in the Processes Section reflect the current condition of the disciplinary debate, which is strongly characterized by a profound transformation of design processes due to the comparison with scientific research methods, with a prevailing interest for methodologies and contemporary priorities as the environmental one, or to the dematerialization of processes.

The third chapter focuses on as a theoretical and practical strategy aimed at facilitating and fostering experiential interactions among people, between people and objects or environments. This section aims at investigating the foundations and the implications of a specifically experiential turn in design from various perspectives and in various disciplines. Due to the multifaceted nature of this turn, both theoretical and practice-based research are testified by contributors.

Finally, the last chapter is on narrative. The narrative vocation of design represents a crucial key of interpretation in contemporary cultural expressions such as making history, representing through different media, archiving and exhibiting. This section explores narratives in three different "dimensions": narrative as a scenario (envisioning new contexts, behaviors, uses, spaces); narrative as a tool (creating new ways to trigger innovation); and narrative as a process (framing new methodologies to face complex issues).

Each chapter reflects the results of the conference held in Parma and is constituted by the analysis of concrete case studies and theoretical and methodological proposals aimed at highlighting the "multiverse" character of design. It is organized in the thematic subsection defined for the conference program, just to emphasize the prevailing interpretative trajectories.

A special thanks to the institutions that have funded the conference and the present publication (The Department of Humanities, Social Sciences and Cultural Industries and CSAC, University of Parma; the Department of Philosophy and Communication Studies, University of Bologna; the Department of Humanities, University of Palermo; the Department of Design, Politecnico di Milano; and the Department of Engineering Enzo Ferrari, University of Modena and Reggio Emilia) and all those who, in different ways, have contributed to reach this result (particularly Alice Biancardi and Marta Elisa Cecchi, and also: Okuniev Avhustyn; Katia Botta; Gabriela Del Rosario Abate; Giorgia Ferri; Salvatore Martino; Serena Massimo; Diego Valle; and Laura Xhaja).

Without their help, it wouldn't have been possible to make this event and this volume happen. We hope that this book will become a useful tool of reflection on the theoretical and methodological aspects between humanities and design.

The scientific committee and book editors:

Giampiero Bosoni, Elisabetta Di Stefano, Gioia Laura Iannilli, Giovanni Matteucci, Rita Messori, Raffaella Trocchianesi and Francesca Zanella.

Reference

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PROCESSES. Design Methodological Processes

Air as a Design Tool: Raw Material, Infra-material Space, and Transformative Matter

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Abstract. The paper highlights some issues in relation to air and how it is used in different forms of project planning. Air, a protagonist to be explored in the multitude of possibilities it offers to design, is initially analysed as a primary element by determining its role within the strategic processes activated by nature. Secondly, defining it as a material having its own entities and specific autonomy capable of expanding and enriching contemporary design possibilities.

The goal is to define possibilities, potentialities and characteristics of air by investigating it through the use of three specific lenses: air as raw material; air as infra-material space –material among materials–; air as transformative matter –air that gives form–.

The methodology used presupposes a specific literature review and a critical analysis of case studies, in order to be able to cluster them into thematic areas useful for interpretive reconstruction.

From these premises, the interactions with air-related design are investigated through sensory perceptions. The path, steeped in suggestions, lays foundations for defining role and possibilities of air within design culture through the relationship between case studies, objectives, and the identified areas of intervention.

Keywords: Material Studies · Air as Process Trigger · Air as Expressive Medium

1 Introduction

1.1 The Expansion of Senses in the Air

Air is the medium through which the sensory perceptions, belonging to human being, take the form of smell, hearing, taste, touch, and sight. Five senses are the tools through which humans get in touch and establish relationships with the environment. These connections are of varied nature and frequently have to do with designed spaces. Often these connections are shown in human-designed spaces.

The frames in which sensory perceptions manifest themselves, fascinating and unequivocal, are multiple. Interesting is Nikola Bašić's "Sea Organ" project located in Zadar, Croatia, from 2005, in which Bašić involved composer Ivan Stamać in the

© The Author(s) 2024
F. Zanella et al. (Eds.): Design! OPEN 2022, SSDI 37, pp. 315–324, 2024.
https://doi.org/10.1007/978-3-031-49811-4_30

project to harness the waves of the sea to make a real sea organ. The organ's thirty-five pipes, with a width of seventy meters, are inserted into the staircase so as to resonate to the crashing of the waves at the front, in this way "the water pushes columns of air through openings facing the sea and the sound escapes from a row of holes arranged along the pavement, reproducing the harmonies typical of the local musical tradition of klapa choirs" [1].

If Bašić evokes listening, as a privileged sensory perception, Herb Ritts works with observation. Herb Ritts' photographic projects, developed for the Versace advertising campaign, use air and light as tools in the photography project entitled "Versace Dress Back View, El Mirage 1990". Air is used for its inherent expressive power, dense with sociological and semiotic references, to give form to matter [2]. The air gives shape to the fabric, inflating it, making a context and background for the models. Drawing the eye to move on is one of the fundamental elements of artistic forms that find in the air an expressive mediums of the storytelling.

Air is also a bearer of information and content, as well as an ambassador of meanings and memories. Therefore, content can also manifest itself through the sense of smell, which is densely stimulated by the scents emanating from restaurants, inns and bistros. The case of the Swedish pastry shop Sluka, which had to move its laboratory to the peri-urban area of the city because of complaints from neighbours about the constant and continuous spread of scents in the air, is well known [3].

Contemporary life is characterised by a tendency towards deodorisation that attempts to establish a monosensory and odorless civilization shaped by oculocentrism. Against this trend, authors studied by Jonas Rosenbrück –Friedrich Hölderlin, Friedrich Nietzsche, and Francis Ponge– show that, in fact, humans have never been deodorized and that the unique logic of the creation of the sense of smell contains significant philosophical, aesthetic, and cultural potential [4] that uses the air as a vector through which to expand and promote itself.

1.2 The Breath and Air

Breathing is the most natural act that exists, the most automatic and spontaneous. Breathing is the first physiological act necessary for human survival, and perhaps for this very reason it is also the most undervalued.

Breathing can be distinguished into two macro categories: internal breathing and external breathing. Internal breathing is characterized by the exchange of oxygen and carbon dioxide between tissues and arterial blood; external breathing is based on the same mechanism but the gases exchange takes place between atmospheric air and alveolar air, and between alveolar air and pulmonary capillaries.

Air is composed of 76% nitrogen (N2) and 22% oxygen (O2), the remaining 2% is composed of other gases including argon and carbon dioxide (CO2), and any change, even the smallest, within this delicate balance is able to produce significant changes.

For example, the variation in the concentration of aqueous vapour (H2O), within the air, causes humidity levels to increase or decrease and the consequent tarnishing of transparent surfaces.

Diller Scofidio + Renfro (DS + R) works on this aspect in particular, focusing on the act of visualizing the invisible. In 2020, the DS + R studio, commissioned by Fondazione

Prada, realizes "Exhaustion" [5]. This is a visual essay with which the pandemic crisis of 2020 is made tangible. Exhaustion quantifies and spatializes the intersection between a delicate environmental condition and the complexity of scientific research, using breath –and its visual-auditory manifestations– in the form of fogging.

Addressing a shift in scale, it is possible to see how changes in the concentrations of other gases, found in air, such as nitrous oxide (N2O) and methane (CH4) have led over time, to an aggravation of the greenhouse effect on the Planet [6].

The purpose of the chemical-physical analysis of air and its implication on the Earth is functional to understanding the complexity of air and its use in the project.

Aiming to outline a parallelism between breathing and air, multiple analogies are highlighted, from the perpetual movement of human's inhaling-exhaling translatable into flating-inflating in the project, to the immateriality of both processes.

Tobias Becker's 2016 "Breathing Skins Project" is an attempt to transfer the human breathing method to a building facade. The experimental facade project is inspired by nature and organic skins. Adapting to climate change, it increases user comfort and the connection of interior spaces with their natural surroundings and raises awareness of preserving a functioning ecosystem [7].

Functioning similarly to the external respiration of humans, 140 pneumatic muscles have been placed on each square meter of the facade that function as air channels that inflate and deflate in relation to the hygrometric needs of the interior room.

The pneumatic muscles engineered by Becker behave like the pores of the skin during the process of external breathing, peculiar to human beings.

The paper aims to investigate air, as a design material, using three different modes of analysis. From spatial scale to material scale, from process scale to transformative scale.

2 Perspective of the Project

The overview on the possibilities, research and project-related, of air [8] highlights the relevance of its role and allows us to explore its sustainable uses.

The purpose of the exploration is the historical-critical reconstruction of case studies in order to identify clusters with which to define the role of air and sketch future project limits and possibilities.

Project analysis with air combines methodological innovation and thinking, social, environmental, and economic sustainability with design possibilities.

Design is thus identified as the discipline able to qualifying products on the aesthetic-formal level, but more importantly as a tool able to enhancing the air as an activator of processes of redefining spaces and products on different scales.

Air, meaning in its material status, able to giving shape to objects and spaces, was one of the central themes of Bruno Munari's 1969 performance entitled "Far Vedere l'Aria".

During the performance, Munari, thanks to the use of an instruction leaflet, invited the inhabitants to climb the tower of Como Cathedral and build shapes with sheets of paper that, when dropped into the void, would reveal its essence, or rather the consistency of air [9].

The concept is enhanced by the narrative of the exhibition "Munari. Air – Earth" of 2017 realized by Palazzo Pretorio's Foundation in Cittadella, Padova, in which air is not defined as absence or emptiness, as in Yves Klein's "The Leap", but is etheric substance, part of the sky, and cosy space.

In fact, the two elements that polarize the pool of experiments are air and earth. The first is light, space, and lightness, the latter is gravity and matter where everyday life and industrial design happens.

Giving value to the invisible, to that which has no physical consistency and which does not meet the contingent need of a society principally aimed at satisfying the sense of sight, is well illustrated by Antoine de Saint-Exupéry when he wrote "what is essential is invisible to the eyes" [10].

References above give to the contribution a double function. On the one side they allow understanding the articulated and diversified design culture related to air and its role, and on the other side they equip the observer interpretive lenses.

2.1 Interpretive Lenses

The research adopts three lenses, three filters with which to observe and systematize the selected case studies. The three lenses differ from each other in the adopted project languages and scalar paradigms.

The lenses are air as raw material, air as infra-material space –matter among materials–, air as transformative matter –air gives form–.

Air as Raw-Material. With reference to the workshop led by Bruno Munari "Far Vedere L'aria", it is possible to claim that air is one of the cornerstones of architectural project because it is through it that the concept of living space can be conceived.

At the center of Gaston Bachelard's reflection, published in 2006 in "The Poetics of Space" [12], is the concept of space intended as the focus of daily life. This because air fills up dwellings in which the most intimate human acts take place.

In this overview, the concept is intertwined with Bruno Zevi's 1948 vision expressed in "Saper vedere l'architettura" [13] in relation to the idea that space is composed, as raw material, of air and therefore this can be the embedded value of architectural project.

Francisco and Manuel Aires Mateus, presenting their work "Voids", exhibited in 2010 at the Venice Architecture Biennale, writing: "Space is a void, a handful of air enclosed by matter that defines its limit. Its precision matches with the necessary existence of its surroundings, which gives it identity. Drawing spaces is drawing possibilities of life, materializing the limit" [14].

Aires Mateus' design process presupposes advancing in space definition by adding subtractions –advancing therefore, through material or conceptual eliminations–.

Tomas Saraceno in his works, particularly in "Poetic Cosmos of the Breath" [15] installation of 2007, conceives air as a subject with a double valence; on the one side it is material with which he co-designs, and on the other side it is raw material, that which allows his imagined spaces to materialize and manifest themselves in the world. When the sun rises, the air inside the installation heats up, lifting and elevating the iridescent foil in a reflective and refractive "cascade".

The irradiating surface of the foil glows in harmony with the natural environment of London's Gunpowder Park, directing and expanding reflections from the sky and weather changes.

The two case studies are expressions of a conscious use of air as an expressive tool capable of providing physical texture to air and evoking sensory perceptions.

The two works lead to a critical reflection with air as raw material of the space, interpreted as adding subtractions on the one side and as poetic scenarios on the other.

The two declinations converge in the relationship, triggered by the projects, between absence and mass [16].

This pair is made particularly evident in Saraceno's projects by the use of the dynamicity of the works in the environment, made possible through co-design with the users and the environment itself.

Aires Mateus, on the other hand, makes the void visible by proposing two types of models for each work produced. The first model transform the void into mass and the second one excavates the space around voids, making them stand out as full.

Air as Infra-material Space, Matter Among Materials. Gaetano Pesce's "Serie UP" [17], from 1968, is one of the earliest examples of products having their focus on the use of air as an infra-material. The product makes evident an integral design that domains as much the specificities of the material as its potential and possibilities.

The project recall at first the concept of amazement activated at the moment of extracting the product from its packaging. This because air, thanks to atmospheric pressure, returning into the polyurethane cells and caused the object to inflate and take on the designed shape.

Later, the project talks about technical and productive skill in knowing how to exploit the behaviour of air inside the shape of cold-formed flexible polyurethane. In this way we can define air as an infra-material.

Cassina & Busnelli's (C&B) 1972 product, "Le Bambole" [18] by Mario Bellini, tells of a design poetics not far away from Pesce's "Serie UP".

Le Bambole is a upholstered furniture without an internal structure in which vertical edges and elastic membranes define, with a fabric covering, the formal aspect. In fact they "are constructed of fabric, not covered in fabric" as Bellini's claims.

The result is made possible by the knowledge of the materials used: cold flexible polyurethane foam padding, polyester fiber lining.

So the air becomes part of the content of the upholstery; projected as other elements that make up the polyurethane. In this way air gain a declared "visible" function in allowing the formal modification of the seat and its adaptation to the human body.

The definition of infra-material is enriched because, if in the "Serie UP" the air was matter that appeared at the opening of the product and then stabilized in a given form, with "Le Bambole" the differentiated density of the polyurethane allows the sofa to adapt to the user.

Thus, the presence of air within the material allows for the continuous reconfiguration and adaptation of the product in relation to the user's behaviours.

More than 30 years later, in 2008, Matteo Borghi and Riccardo Blumer for Poliform, designed "BB" [19]. A seat, with a leather esoskeleton, injected with polyurethane foam which gives it its recognizable shape.

Unlike "Le Bambole" –differentiated density polyurethane–, the polyurethane foam used for "BB" is rigid; its low density is due to the low presence of air within the material, which, while providing a high level of structural rigidity, also imparts limited adaptation to the human body. The infra-material space occupied by air is variable but controllable.

Variations in amounts of air within the polyurethane result in its infinite configurations and application possibilities.

History of design that admits significant examples of products in which air is used as an infra-material is not exclusively authorial. Belonging to anonymous design [20], for example, are products such as Pluriball, in which small air bubbles are encased and retained within a double sheet of transparent polyethylene.

Another example are vacuum pouches for garments and foods which, constructed of polyamide and polyethylene –reusable polymeric materials–, interpret and use the absence of air.

In clothing, air determines volume; in food, it causes deterioration; in both cases, air as infra-material that is removed to obtain better logistics or storage.

Infra-materials is used to define the matter existing between the materials that constitute the projects.

Air, with this meaning, is the interstice projected that is placed in the space between the other materials of the product.

The role of air intended as infra-material changes in relation to the project goals of the product itself but its spatial location "within" and not "in form of" remains constant. In opposition to products and spaces where air directly shapes matter.

Air as Transformative Matter –Air Gives Form–. "Blow Chair", produced in 1968 by Zanotta and designed by Jonathan De Pas, Donato D'Urbino and Paolo Lomazzi, is one of the first furniture components to use air as structural element.

The transparent PVC is inflated by air, allowing it to assume the configuration projected by the designers. Air thus becomes the main material of the product, remaining invisible but constituting the very essence of the armchair.

Another way of using air while keeping it invisible is to give it the role of a trigger in the production process. A relevant example both in theory and in terms of the industry concerns air-moulding technology.

In 2000, Magis launched "Air Chair" [21], designed by Jasper Morris, inaugurating air-moulding technology.

This industrial technology makes it possible to create highly resistant yet superlightweight products made by polypropylene added with glass fiber. "Air Chair" will be followed by many other furniture items produced with this technology.

Air is not only used in the production of seats but also in other industrial sectors; Lino Dainese's Wearable Technology is an example of this.

The airbag for personal protection aims to identify new applications for D-air® technology. It is a protection system for the body that 'activates' only when necessary, covering the areas of the body considered most delicate and exposed to danger.

In 2018, the first prototype of "WorkAir" [22], an airbag waistcoat for protecting back and chest of workers at height, has been tested and certified as Personal Protective Equipment.

The product is equipped with a sensor capable of activating the pneumatic system integrated within it in 40 ms, starting from the moment of recognition of the accident and the consequent loss of stability of the user.

This product makes it possible to widen and define the last lens of investigation of the project with air: the air that gives form to the object, a form that is only defined at the moment of recognition of the dangerous situation.

In 1998, the designer Michael Kowitz, reasoning about the life-limiting situations of many people, presented "ParaSITE" [23]: inflatable shelters built for the homeless that have to be connected to the external outlets of a building's heating, ventilation and air-conditioning system.

The warm air coming out of the building inflates, and simultaneously heats, the double membrane structure. "ParaSITE" is a nomadic architecture, focused on the study of minimal spaces and with the intention to democratise design.

A further area of experimentation with the material air concerns architectural projects. Use of air in this context mainly concerns studies in the field of pneumatics and the first studies and prototypes date back to the late 1960s by Haus-Rucker-Co and Coop Himme(l)blau.

In both cases, it is a question of minimum, habitable and transformable living spaces which can adapt to the human body through the conscious use of the potential of air.

With their 1968 project "Yellow Heart" [24], Haus-Rucker-Co imagined an out-of-time environment, built of steel tubes to support the pneumatic PVC cell.

The interior space expands and shrinks at a rate controlled by a pressure valve. The aim is to guide the users in experiencing audio-visual impressions that lead to a way of relaxing out of ordinary time.

The soft pulsating movement of the cabin produces a general disaggregation of the user's perceptions, reminiscent of breathing movement.

"The Cloud" [25] by Coop Himme(l)blau was developed in 1968 as part of a research commission of the City of Vienna. The project aimed to expand existing living experiences by introducing mobile and changeable spaces.

The interior space is projected by imagining that visitors' heartbeats can be amplified and translated into optical and acoustic signals.

The aim is to establish a contact between the space and the people, with visitors altering within the 10 mt diameter, PVC-clad pneumatic environment.

At last, in 1972, Jonathan De Pas, Donato D'Urbino, Paolo Lomazzi (DDL) projected the pavilion of the BBB Bonacina company on the occasion of Eurodomus 4. The project consists of a "Self-supporting Pressostatic Dome" [26], a housing proposal for a temporary or nomadic architecture.

The project is the outcome of the group's pressostatic experimentation during the 1960s. Air inflates a series of cylindrical modules that make up the shape of the dome, so that the external and internal spaces can be communicated without the need for depressurisation rooms.

The narrative of air as transforming and informing matter was verified on case studies of different scales.

The dimensional variation made it possible to analyse at the same time the contexts and technologies used in projects.

But whatever scale is referred to, it is clear how air is mainly used to shape objects or architectural structures.

3 Conclusions

The contribution discusses the historical-critical reconstruction of space and product projects in relation to air, analysing and interpreting their goals.

The value of the air projects takes on different meanings and multiple derivations. Air is a material used to make the invisible visible, just think of the work "Poetic Cosmos of the Breath" by Tomas Saraceno or the visual experiments of Diller Scofidio + Renfro with "Exhaustion".

Fluidity, configurability and vividness are key characteristics of air that are highlighted in products such as Jasper Morris's "Air Chair" or Micheal Kowitz's "ParaSITE".

Some of these projects highlight another characteristic of air: reversibility.

When air informs and transforms the material, it enters into a reversible process, because while on the one side, inflating, allows for the visualisation of the projected form, on the other side its absence, deflation, returns it to its original state.

The role that air has played in history and design culture is primarily social and political, oriented towards a democratisation of design that has focused on environmental, social and economic sustainability at different factors of scale.

In fact, air can be an activator in processes of redefining spaces and products on different scales: from wearable products for the protection of workers at heights to seating, or upholstered furniture, or even the definition of pavilions for events and exhibitions. From experiments in visualising air to iridescent installations that change their shape as the weather changes.

The narration and clustering of the case studies brings out, with opportunities and potentialities given by the utilisation of the air material properties, also possible criticalities.

Through the use of contemporary tools and knowledge, one of the limits identified could be the consolidated air/plastic coupling, also considering the fact that plastic, in order to have the degree of elasticity and the mechanical performance found, must be virgin and not second-generation or recycled material.

It is therefore possible to argue that current materials research could identify in some bioplastics new horizons of meaning and project, as well as the prerequisite for a process of transformation of values, objectives and tools, being the promoter of innovation "through the introduction of elements endowed with ontological and not chronological novelty, new elements, therefore, or novel connections between existing elements" [27].

Air is therefore one of the centres on which design culture has gravitated and still gravitates, as are the sensorial perceptions that are amplified through it.

Always at the centre of many spectacularisation phenomena such as the "Museum of Dreamers" or the more recent "Baloon Museum" in Milan [28], air is as much the subject of works imagined to service the contemporary industry as of installations resulting from specific research.

Air is sometimes interpreted as a constructive and tangible element –such as a sculpture with an unexpected and monumental form– or as a metaphysical and suspended atmosphere.

Despite the uncritical spectacularisation of certain concepts, it is nevertheless well known how art can also be an anticipator of projectual directions. In Pelagius Palagi's

work [29] of 1827, Isaac Newton is depicted intuiting the phenomenon of light refraction through the observation of a child playing with soap bubbles. In this way an artistic expression –a poetic work showing a playful action– becomes a revelation of a revolutionary scientific discovery that opens up new design possibilities.

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