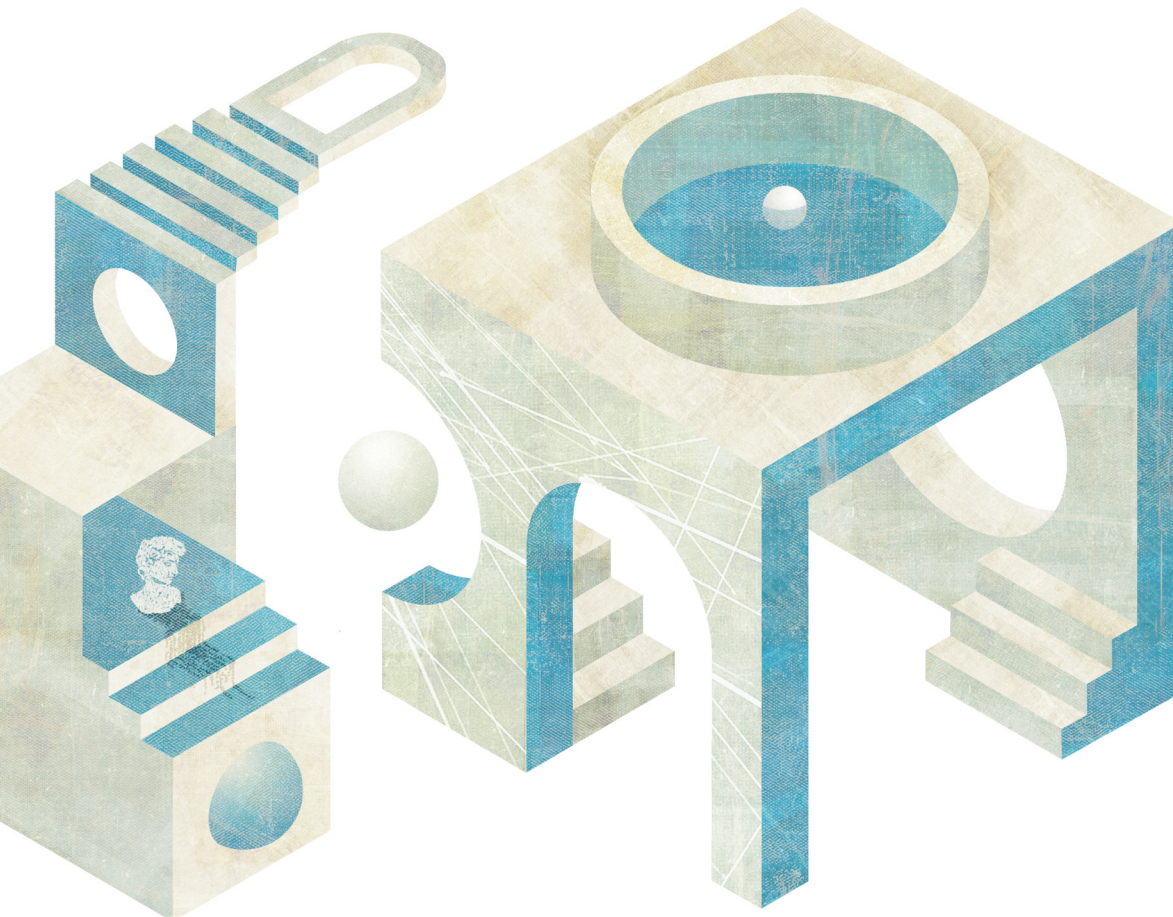
DESIGN CULTURE MATTERS

Embracing cultures and cross-cultures
through design perspective and matters

edited by Giampiero Bosoni, Marta Elisa Cecchi



D.I. FrancoAngeli
DESIGN INTERNATIONAL

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3. Materials and Society: Advancing the Material Culture of Design

Marinella Ferrara, Department of Design, Politecnico di Milano
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Abstract

This contribution focuses on the reconsideration of the relationship between society and the material culture of design. It includes the impact on environmental contexts, contemplating living and non-living elements as social bodies and where materials are an active part in continuous transformation. From this assumption, we want to indicate the material culture of design as an ally of the history of design, where society, environment, technology, and materials are integrated into the complex network between human beings and artefacts. The theoretical path is presented considering the approaches taken by the social sciences for a more in-depth analysis of society and material issues, as well as by studies on innovation. It integrates the history of materials in design, not only in socio-economic but also environmental contexts, which have permitted specific developments and where the materials are active elements in continuous transformation. Indeed, it is necessary to develop more contextual, and culturally situated epistemic beliefs to allow for multidisciplinary collaboration between design and other disciplines.

We will start our study with a brief review of material culture advancement in humanities and social studies. Then we will introduce the multidisciplinary approach focusing on the social, technical, and environmental network involving the 'use and development of materials with a focus on the Italian approach. Finally, we'll draw up conclusions and prospects, although our reflections are of a general nature.

Introduction

Material culture is the realm of things that human beings make and exchange or possess, being the pillar of our consumer culture. It is a subject of great interest in social sciences because these objects, also known as artifacts, provide information about our habits and our technological knowledge, both in the past and in the present days.

Research into material culture is a well-recognised field of study in the design sphere, although it does not yet have an exhaustive body of literature that clarify the complexity of the approach to materials and the different facets that this area of study should cover. We will indicate it as material design culture and will include social, technical, and environmental aspects.

The reason for the lack of adequate literature lies above all at the young age of design as a formalised and autonomous discipline, and in its foundation on a totally different practice compared to the traditional, artisanal ways of making objects, and constantly evolving following social and technical innovations.

In each temporal and geographic context, the influence of other disciplines on the material design field has been different. In the Italian academic context, material design research has integrated the skills of engineering of materials and industrial processes with which it has been sharing basic techno-scientific knowledge within the so-called polytechnic culture (Riccini, 1999, 2013), as well as in the companies "integrated process", attentive to the technical aspects of the product, and more generally to "a strategy that cannot separate the know-what from the specific know-how of the company" (Morello, 1984). In this scenario, the material design culture has been more influenced by design practices and by the relationship with companies and their needs, and less oriented towards a theoretical reflection on approaches to be adopted in design research.

This advancement towards a specific material design culture and methods was partly based on retracing theories and research practices from the history of design that have given to materials a leading role in the design process. Following this path, design material theories are still indebted to nineteenth-century approaches and the history of design framework which have isolated the study of design in the restricted of

its processes, divorcing design from the worlds 'outside' it, i.e., society (Dilnot, 2015).

In the last few decades, material design research has started to experiment with its own specific approaches, advancing from a position of a more passive approach towards consolidated materials and methods to being an active protagonist of a new material design culture (Ferrara and Ceppi, 2017). There are various motivations that move the research of material design today.

The first motivation is a renewed interest in crafts knowledge, that emerges in terms of the reappropriation of traditional technical processes bridging a gap between understanding and making, industrially mediated process and direct appropriation of technics, digital and physical, reflecting on the process of doing (Sennett, 2008; Schön, 1983). The understanding of material and techniques is extended through physical exploration, experimentation of processes, and manufacturing of models or materials.

The second motivation is the challenge that the climate crisis poses to design to counter human actions that negatively influence the living conditions and the planet. These include the extraction and fabrication of materials, the release of enormous concentrations of pollutants into the atmosphere, waste from industrial processes and consumption: all activities that have undergone a gradual and constant increase since the industrial revolution (Galimberti, 2016, p. 356).

Currently, with the beginning of the ecological transition (Manzini and Cullars, 1992), material design is called upon to face epochal challenges: to help limit and resolve the global climate crisis to which the negative consequences of industrialisation, and dependence on fossil fuels and mineral resources which have contributed. Challenges, such as circular products, green technologies, and sustainable consumption require a maximum understanding of the material fabrication, manufacturing, and their social impact. It is important to consider factors of consumption and use of products: real needs and value attribution processes, on which the design and the mediation have a deep role influencing the processes of signification, the ways in which the products are accepted, understood, and appreciated (Ferrara, 2022). Design is called to rethink its sensuous horizon (Manzini and Cullars, 1992). The History of design can give to this goal a significant contribution reconsidering the character of design-society relationships.

The contemporary relevance of the relation between society and materials. The cultural study paths

Today, an extensive understanding of the design-society relationship is crucial (Dilnot, 2015). The design research shall face a big change to give shape to a renewed material design culture, advancing a new framework on the base of the society-materials link as this dramatic moment requires.

In this paragraph, we follow the development taken by social sciences to open to new perspectives on material-society relationships. The rhizomatic sedimentation of post-structuralism and non-modernism theories of the second half of the last century has come to produce the base for a collective and active response in the design system nowadays, such as the design activism and the post-craft movement (Coles and Rossi, 2022; von Busch, 2022).

Since Aristotle's theory of hylomorphism – *hylo* (matter) and *morph* (shape) – where the shape and the active idea of it is given to the passive matter, philosophers and intellectuals have entrusted this postulate. A turning point has been given from the 60's by the disruptive position of French philosopher Gilbert Simondon that sees in his central postulate the process of ontogenesis in which form is ever emergent from matter rather than given in advance (Simondon, 2005). Therefore, by this perspective, form itself emerges as transitory equilibrium of the matter which is always in a flux of change and movement, with the consequence that this matter-flow can only be followed (Deleuze and Guattari, 1980).

With *Cultural Materialism* anthropologist Marvin Harris[1] (1979) identified the most significant forces behind the evolution of a practice known as material culture, technology, environmental conditions, and production development, naming them 'ethical and behavioral infra-

1. Marvin Harris investigated his entire life to build a scientific method to study cultural developments in different geographical areas. Following the 'ethical and behavioural infrastructure', Harris points the 'ethical and behavioural structure' with social relations; the 'ethical and behavioural superstructure' with the symbolic and ideological cognitive models shared in society such as arts, rituals, science, and religions; the 'emic and mental superstructure' that includes conscious or unconscious cognitions such as goals, categories, roles, values and philosophies. Structure and superstructures are considered regulatory mechanisms of the system. *Cultural Materialism: The Struggle for a Science of Culture* (1979) is considered his most important study.

structure' and considering them as the base of the cultural construction. From this perspective, environmental factors, materials, and artifacts assume an active role in social regulation and cultural development. In pursuance of Harris's theories, anthropologist Tim Ingold (2012) further stresses the concept of considering artifacts as organisms with characteristics of growth and transformation.

In the relationship between humankind and artifacts, a fundamental approach is the analysis of the interaction between materials and society, considering all human societies as material ones where artifacts are shaped by social actions within a given culture (Dant, 2005). In this scenario, design culture has an essential role in shaping material culture itself, embracing technical and humanistic cultures: deeply entangled with society and all that it concerns, not only production and processes but also human networks and cultural layers where materials are perceived as a founding element that expresses sustainability, intention, communication, meaning and empathetic.

Regarding this last focus, philosophers, anthropologists, and sociologists have investigated the design as a viral phenomenon (Colomina and Wigley, 2016), embedding design in systemic global issues such as environmental concerns, human and non-human exploitation, and wealth polarisation, considering non-human species and non-living elements as social actors of the material use and development in design action.

Thus, if earlier designers were interpreters of social needs in a broad sense, today, the trajectory towards co-design sees designers allied to social and material activism. *Cleaner technologies and materials* (Myers, 2012) are the focus of a new transdisciplinary engagement between design and other disciplines such as art, biology, chemistry, STEM, social sciences, and geopolitics, which has triggered what is now a common practice: design activism (Julier, 2013) as a possible response to the threat that production/consumption/waste is causing to our ecosystem and habitat.

In this scenario artifacts and all that they concern, including material experimentation, found a key role in the investigation of their agency in our habitat, everyday life, and actions (Diaz-Kommonen, 2004). From this perspective, they unfold various layers of interaction with abstract subjects such as context, politics, cultural development, and intersectionality (Biggs, 2002). On the artifact's abilities, mate-

rial properties are perceived by humans as qualities, through which we experience the sensual, visual, tactile, physical, and embodied ways in which social lives are lived.

In summary, there has been a substantial change in social studies where artifacts and materials are considered active agents of a cultural system instead of being just the result of it. Artifacts and their materials become a medium of cognitive contexts, conventions, and outcomes in the shared reality the designers and the users are immersed in, also shaping actions of everyone in late modern societies by supporting or preventing coordination between communities and organisational functions (Dadderio, 2011).

Towards a new material design culture

In the light of a sociological reflection, it appears very important to adopt a systemic vision on the relations among the social, technical, and environmental actors, networks and discourses involved in the application and use of materials and their development, instead of an exclusive focus on the design process. Design research should involve the integration of insights gained from exposure to different disciplinary perspectives, recognising the complex problematic nature of materiality in the modern era, concerning the production – consumption – waste cycle. Following our analysis, the centrality of social, technical, and environmental dimensions defines the value chain and the Social Life Cycle Assessment (S-LCA) of products and materials.

Following the success of the Life Cycle Assessment (LCA), S-LCA is a novel method "*to assess the social and sociological aspects of products, their actual and potential positive as well as negative impacts along the life cycle. This looks at the extraction and processing of raw materials, manufacturing, distribution, use, reuse, maintenance, recycling, and final disposal. S-LCA makes use of generic and site-specific data, can be quantitative, semi-quantitative or qualitative, and complements the environmental LCA and LCC. It can either be applied on its own or in combination with the other techniques*" (Traverso, Mankaa *et al.*, 2022).

Therefore, S-LCA does not replace LCA, but it might question it at its core (Birat, 2022).

In terms of design research, a good starting point to think about the integration of a similar approach expanding the analysis and the historical discourse on materials to their social life is the triad defined by the historian of architecture and design Dennis Doordan (2003). His framework is based on three main areas of the materials cycle: *fabrication, application*, and *appreciation*. However, his perspective seems partial to us for the purpose of adequately expanding the framework of design research and materials in the current context.

Doordan defines the *application* as a "familiar terrain for design historians" dealing with "transformation of materials into products", and "traces the role of designers in the product development process". As regards the relationship between the development process, technical and social dimension, we know that technical knowledge of materials plays a key role in the object. Design acts as a bridge between the world of production and that of consumption and use in social life: until a material has been designed and has become a product with a value of exchange, it has minimal cultural content (Sparke, 2013). Design has enormous power in the culture of technology and its communication, conferring value on materials with multiple meanings (Sparke, 2013). So, the design skills play an important role in terms of materials competition and "user reception". Moreover, the term of *appreciation*, does not mean only the consumption of the goods but also the willingness to appropriation by the recipient. The realisation made by the user who gives life to the work goes under the name of *aesthetics of the reception* advanced by the school of Constance and by Jauss (1972). Discourses on ecologies, ecosystems, their associated networks, and related cultures, tease out today's complexity of material design, where the designer ethical responsibility is more and more relevant. Although of great support for the advancement of the design research, Doordan's triad nevertheless remains limited exclusively in the relationship between technique and society, not considering the post-consumption phase, the non-human species, and the non-living elements.

To define a better understanding of our material culture and our relationship with artifacts, as a species we must encompass the entire gamut of organic life-forms along with the sunlight, moisture, air, and soil on which all life depends. Included in the category of the non-human are only those material objects and artifacts thanks to which some humans can assert their way of being in the world. If animals and

plants are included in this process of design research making at all, it is as either quasi-humans or pseudo-objects (Ingold, 2012).

As Ezio Manzini states (Manzini and Cullars, 1992), within this new horizon, the environmental problems we are living in can generate a new approach to design and can be the source of a vast series of cultural transformations and contemporary societal practices, including technology development and precisely, starting from inevitable discussions about society's values. Thus, design research has moved to the study and creation through practical experimentation of new materials to give answers to environmental problems.

We already have examples of design research on the material implication where the environmental concern is the core such as 'Ore stream', a study led by design studio Formafantasma questioning the electronic production processes in relationship with the ore's extraction, and the current state of e-waste management; or even 'Red Mud' by Studio ThusThat, where environmental transformations and alumina production waste are at the centre of the research. In Doordan's terms, we are in front of design research on the *fabrication* phase, where a broader systemic vision of the "actants" is included in the discourse (Latour and Callon, 1981).

Implications on History of Design research

A reflection on a new design historiography that includes the expansion of design history into more disciplinary histories, especially the history of materials, material design and materiality, should begin by considering the development of historical studies in the 80s during an overall process of change. Here, for the sake of brevity, we propose only a few points to be deepened on future occasions, referring to the Italian contribution, such us Vittorio Gregotti expanding the History of design towards new strands of study, and the theoretical framework proposed by Tomás Maldonado to understand design in the contemporaneity.

Vittorio Gregotti, editor of *Il disegno del prodotto industriale. Italia 1860-1980* (1982), had the merit of having brought to the attention of historical research certain key elements of the 'industrial' design as a professional practice in its continuous modification: among these are the relationship with technologies, materials, economic factors, the

tension toward innovation, and the formal control of objects and the environment. Another merit is that of having initiated the construction of an 'open' disciplinary historiography by identifying relevant design phenomena in its contemporaneity to be read historically. As a designer and actively engaged in the profession, he has been engaged to better understand the new questions and to be able to adequately respond by design. He stated: "The idea of design has now existed for more than a century: during all this time it has continued to broaden the front of the interests it invests, at the same time shifting the conceptual centre of the meaning of design itself" (Gregotti, 1964). And more: "The real possibility of using historical teaching therefore consists in becoming aware of the essence of the tradition in which we operate and, through it, of what we consider to be the directions of transformation; in the capacity therefore to criticise our intentions, to participate by adhering from within to that particular historical condition that is actuality" (Gregotti, 1965).

In 1983, Gregotti dedicated an issue of the magazine *Rassegna*, which he directed, to "The Materials of Design", with the contribution of Giampiero Bosoni and Manolo De Giorgi. At a time when the hyper-production of new materials was bringing about evident changes in industrial practices and products, the magazine traced an initial framework, on an international level, of historical research interested in the relationship between design culture and the history of materials, initiating a new strand of historical studies.

Another fundamental contribution is Maldonado's theory of design. According to Maldonado, the culture of design is expressed in a process of "social modelling" of form, the use of objects and technical systems (1991). For this reason, its study and analysis cannot be separated from a complex, systemic, dynamic, and temporal vision. Complex because it must be able to consider the set of "different factors" that design "coordinates" and "integrates". Systemic because it must consider the negotiation process with multiple actors with which each technique is "oriented" and "concretized" in the technical-design choices of an artifact. Dynamic and temporal because design is always strongly conditioned "by the way in which production and consumption of goods take place in a given society" (1991, p. 12). As Stefano Maffei stated (2010), in the design discipline with Tomás Maldonado the formal component "form" started to coexist with other fundamental aspects such as materials, manufac-

tures, artifacts production, social interaction, and other scientific and technical issues. Moreover, according to Maldonado, we can state that objects have agency, in the sense that they influence the things around them in relation to each other. They develop into the *population of wastes* which on its turn as well, develop into the *population of pollutants and man-made erosion factors* (Maldonado, 1970, p. 72).

The heritage of Gregotti and Maldonado – who both worked at the Politecnico di Milano – is the base of a multidisciplinary vision of design and what it concerns, however it opens to important questions, as Vanni Pasca (2004, p. 8) highlighted, such as the domination of technology among applied arts and design. He also stresses the importance of a multilinear history of design where the relationship between technology and aesthetics is essential. In fact, the theme of materials in the history of design is insufficiently explored and opens the way to new stimulating questions.

Another contribution to be reconsidered is Renato De Fusco's theory of the four-leaf clover (1985) based on "design, production, sales, and consumption" which extends the analysis towards the downstream base to be able to arrive at until the post-consumption phase of products.

Starting from these considerations, paying attention to the integration of society, environment, technology, and materials into the complex network between man and artefacts, it would be worth reconstructing "the Italian way to plastic materials" (Bosoni, 1983, 2006). An eventful and culturally connoted story would emerge that from the second half of the nineteenth century reaches the present day through the plastic materials evolution – since natural materials to synthetic and forward until the current new bio-based and compostable plastics – and their relationship with the changing society. The evolution of plastic materials intertwined with the stories of some of the major Italian companies of the golden years of Made in Italy. These last were committed to research unprecedented applications of synthetic materials, involving the social technological development of that time with the rise of figures such as the designers and the creative's working in the name of the union between art with the industrial world. As well as the scientific research and the political commitment of intellectuals and environmentalists towards the environmental issues in the time of the pervasive circulation of synthetic plastic materials and the new everyday use of them promoted to consumption by cultural mediation.

While some stages of this history have already been investigated, others are unknown and many of their aspects are still hidden. Particularly missing is a focus on a historical turning point, the 1970s with the first major oil crisis (1973), which brings to light the unsustainability of petrochemical plastics, and the Seveso disaster (1976) one of the worst in the history in which dioxin leaked from a factory and affected the population and the surrounding environment. Since these events, a new history of material design phase took place that must be investigated.

Concluding remarks

Historicizing the technological and material development in design discourses is an important identity pursuit that involves several aspects of the society and the environment in question, giving impetus to what defines the research in the material design culture nowadays. Science, technology, artifacts, and material design must be treated simultaneously as material and semiotic. 'Significant materiality' nowadays becomes an element to be recovered to restore value to objects (Ferrara, 2022). Also, reception and consumption are part of social and environmental development, where artifacts become a medium of cognitive contexts, conventions, and outcomes in the reality humankind is immersed in. Thus, design and its history cannot deal only with design and production processes but with the consequences of its work – social, and environmental impact and to do so it must open more and more to multidisciplinary work. De facto, it appears particularly important to consider a history of design that embraces an evolved approach to contemporary issues, connecting the relations among the social, technical, and environmental actors involved in materials 'use and development. The centrality of these aspects is fundamental within the design research processes, defining the value chain and the social life cycle assessment of products and materials.

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We live in an uncertain, changing, hard-to-focus era in which traditional design approaches and methods can no longer respond to today's challenges that surface in varying degrees and intensity. Moreover, we are developing a different perception of 'materiality' and the mediums employed. Hence in this 'liquid' and blurry landscape, the question emerges: What is the importance of understanding the value of design culture, more precisely, the "matters" through which this culture is manifested and expressed today? Moreover, how design culture aligns with the changed reality by responding "creatively" to today's emergencies?

The volume investigates a wide sphere of issues referring to an extended concept of "matter" – the word matter intended not only as materials as such but also of content and relationships – through design actions, approaches, processes, tools and methodologies employed in different areas and with different objectives, yet united by the desire to intercept the current shift, sometimes reinventing and sometimes evolving programmatically over time to embrace the changed framework.

The matter is thus interpreted in its range of potential declinations, bouncing from concept to object, material to immaterial, process to solution, and traditionally defined medium to a dynamic virtual tool.

This collection of essays is dedicated to all those who wish to explore the value and "matter" of design culture between past inheritance, present time and foreseeable future mutations through the deepening and inspiration of new and alternative tools, approaches and design methods.

FrancoAngeli
La passione per le conoscenze