

Springer Series in Design and Innovation 37

Francesca Zanella · Giampiero Bosoni ·
Elisabetta Di Stefano · Gioia Laura Iannilli ·
Giovanni Matteucci · Rita Messori ·
Raffaella Trocchianesi *Editors*

Multidisciplinary Aspects of Design

Objects, Processes, Experiences and
Narratives

OPEN ACCESS


 Springer

Editor-in-Chief

Francesca Tosi, *University of Florence, Florence, Italy*


Series Editors

Claudio Germak, *Politecnico di Torino, Turin, Italy*

Francesco Zurlo , *Politecnico di Milano, Milan, Italy*

Zhi Jinyi, *Southwest Jiaotong University, Chengdu, China*

Marilaine Pozzatti Amadori, *Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brazil*

Maurizio Caon , *University of Applied Sciences and Arts, Fribourg, Switzerland*

Springer Series in Design and Innovation (SSDI) publishes books on innovation and the latest developments in the fields of Product Design, Interior Design and Communication Design, with particular emphasis on technological and formal innovation, and on the application of digital technologies and new materials. The series explores all aspects of design, e.g. Human-Centered Design/User Experience, Service Design, and Design Thinking, which provide transversal and innovative approaches oriented on the involvement of people throughout the design development process. In addition, it covers emerging areas of research that may represent essential opportunities for economic and social development.

In fields ranging from the humanities to engineering and architecture, design is increasingly being recognized as a key means of bringing ideas to the market by transforming them into user-friendly and appealing products or services. Moreover, it provides a variety of methodologies, tools and techniques that can be used at different stages of the innovation process to enhance the value of new products and services.

The series' scope includes monographs, professional books, advanced textbooks, selected contributions from specialized conferences and workshops, and outstanding Ph.D. theses.

The volumes of the series are single-blind peer-reviewed.

Keywords: Product and System Innovation; Product design; Interior design; Communication Design; Human-Centered Design/User Experience; Service Design; Design Thinking; Digital Innovation; Innovation of Materials.

How to submit proposals

Proposals must include: title, keywords, presentation (max 10,000 characters), table of contents, chapter abstracts, editors'/authors' CV.

In case of proceedings, chairmen/editors are requested to submit the link to conference website (incl. relevant information such as committee members, topics, key dates, keynote speakers, information about the reviewing process, etc.), and approx. number of papers.


Proposals must be sent to: series editor Prof. Francesca Tosi (francesca.tosi@unifi.it) and/or publishing editor Mr. Pierpaolo Riva (pierpaolo.riva@springer.com).


Francesca Zanella · Giampiero Bosoni ·
Elisabetta Di Stefano · Gioia Laura Iannilli ·
Giovanni Matteucci · Rita Messori ·
Raffaella Trocchianesi
Editors


Multidisciplinary Aspects of Design

Objects, Processes, Experiences and Narratives

Editors

Francesca Zanella 
Department of Engineering “Enzo Ferrari”
University of Modena and Reggio Emilia
Modena, Italy

Giampiero Bosoni 
Department of Design
Politecnico di Milano
Milan, Italy

Elisabetta Di Stefano 
Department of Humanities
University of Palermo
Palermo, Italy

Gioia Laura Iannilli 
Department of Philosophy
and Communication Studies
University of Bologna
Bologna, Italy

Giovanni Matteucci 
Department of Philosophy
and Communication Studies
University of Bologna
Bologna, Italy

Rita Messori
Department of Humanities, Social Sciences
and Cultural Industries
University of Parma
Parma, Italy

Raffaella Trocchianesi 
Department of Design
Politecnico di Milano
Milan, Italy



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.

© The Editor(s) (if applicable) and The Author(s) 2024. This book is an open access publication.

Open Access This book is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this book are included in the book's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the book's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Paper in this product is recyclable.

Contents

OBJECTS

Beyond the Beauty-Utility Diatribe: Towards New Aesthetic Categories for the Eco-design	3
<i>Elisabetta Di Stefano</i>	

“The Useful-Beautiful Couplet”: On the Aesthetic Appraisal of Designed Objects	11
<i>Jane Forsey</i>	

Imaginative Object and Mimetic Object	21
<i>Andrea Mecacci</i>	

OBJECTS. Objects Between Anthropology and Material Culture

Seaweed Fabrics for Fashion Design. A Field Research Experience	31
<i>Paolo Franzo</i>	

Material Objects as Dispositive of Memory	41
<i>Toufic Haidamous</i>	

Objects Between Material Culture and Visual Culture	56
<i>Loredana La Fortuna</i>	

Puppets’ Tales. New Design Perspectives for a Multimedia Archive of a Humanity’s Intangible Heritage	65
<i>Vincenzo Maselli</i>	

Anonima Castelli. Objects, Design and Cultural Heritage	75
<i>Dario Scodeller</i>	

OBJECTS. Political and Social Value of Objects

Through the Mirror. Concept Maps to not Lose (One’s Way Between) Objects	87
<i>Silvia Berselli</i>	

For F☆ck's Sake. The Political Narrative of Sex Toys in the Communication of MySecretCase 103
Silvia Biasetton and Noemi Biasetton

Telephones in Italy, the Italtel Study-Case 116
Rosa Chiesa

Design and Self-reproduction: A Theoretical-Political Perspective 127
Alessio Fransoni

OBJECTS. Philosophy and Representation

Everyday Design: The Aesthetic Dimension of Alternative Use 139
Monika Favara-Kurkowski

Digital Objects' Aesthetic Features. Virtuality and Fluid Materiality in the Aesthetic Education 147
Lorenzo Manera

The Value System of Objects Through the Interpretation of Photographic Language 156
Paola Proverbio

Objects, Things, Hyperobjects. A Philosophical Gaze on Contemporary Design 165
Chiara Scarpitti

OBJECTS. Symbolic Value and Use Value

The Evolution of Yacht: From Status-Symbol to Values' Source 177
Giuditta Margherita Maria Ansaloni, Arianna Bionda, and Andrea Ratti

Liberating the Imprisoned Soul of Dorian Gray: Cultural Affordance as Design Tool to Rediscover Cultural Values 187
Andreas Sicklinger and Alireza Ajdari

The Extraordinary Everyday. The Post-Crafts in the Historical City 197
Viviana Trapani

PROCESSES

Archives and Processes 211
Francesca Zanella

25 Ways to Hammer a Nail. “Postrocian” Aesthetics and Everyday Life’s Poetics in Enzo Mari 225
Rita Messori

PROCESSES. Contemporary Strategies and Perspectives

Design Through Body Memory for the Regeneration of Urban Areas 235
Anna Anzani, Giulio Capitani, and Eugenio Guglielmi

Environmental Re-design of the Top San No Touch 2.0 Portable Toilet: The Contribution of the Bio-inspired Approach 244
Mariangela Francesca Balsamo

How to Use Strategic Design Process to Address Complex Challenges: A Practical Case of Application to Discuss Strategic Design Process’ Fundamental Traits 254
Gianluca Carella, Michele Melazzini, and Francesco Zurlo

Design for Emergencies: The Contribution of Design Culture in Emergencies 263
Chiara De Angelis

PROCESSES. Histories of Processes and Processes for History

Exhibiting Design as a Process 275
Fiorella Bulegato and Marco Scotti

Toward Paris! 45 Years of Domus for a Design à la Français 285
Elena Dellapiana

Archival Projects. Tools and Methods for Promoting the Corporate Culture Starting from Historical Brand 295
Elena Dellapiana, Ali Filippini, Chiara L. Remondino, and Paolo Tamborrini

Working in Regress and Beyond, with Rural Material Culture [1] 304
Elisabetta Rattalino

PROCESSES. Design Methodological Processes

Air as a Design Tool: Raw Material, Infra-material Space, and Transformative Matter 315
Francesca Ambrogio

Evasion Design for the Novacene Era Design and Production of Cultural Imaginaries 325
Mario Ciaramitaro and Pietro Costa

The Physical Model as an Evolution of the Design Process: From the “Capostipite” to the Finished Product 334
Alessandro Di Stefano and Davide Paciotti

The Felicitating Factor. Cinzia Ruggeri’s Clothing Project 344
Elena Fava

Environmental Affordances: Some Meetings Between Artificial Aesthetics and Interior Design Theory 354
Fabrizio Gay and Irene Cazzaro

PROCESSES. Dematerialized Processes

The Critical Forms of Design Futures Scenarios: Introducing Unconventional Ways of Scenarios Making 367
Ammer Harb

How Do Design Narratives Play a Role in Cognitive and Social Processes? An Explorative-Systematizing Expert Interview 377
Yasuyuki Hayama and Francesco Zurlo

Human-AI System Co-creativity to Build Interactive Digital Narratives 388
Anca Serbanescu

Envisioning Technological Artefacts Through Anticipatory Scenarios and Diegetic Prototypes 399
Mila Stepanovic and Venere Ferraro

EXPERIENCES

Feeling Through Technology 411
Jocelyn Spence

EXPERIENCES. Education and Culture

Storytelling as a Tool to Design Museum Experiences: The Case of the Secret Marquise 423
Licia Calvi, Bertine Bargeman, Moniek Hover, Juriaan van Waalwijk, Wim Strijbosch, and Ondrej Mitas

Open Communication Design A Teaching Experience Based
on Anti-disciplinarity, Thinkering and Speculation 434
Francesco E. Guida

Fashion Education: Cultivating Fashion Designers-Plants 443
Clizia Moradei

Accessible Experiences. Designing Synaesthetic Access to Culture 452
Dina Riccò

Misleading Design Implications of Adopting Embodied Interface
in Everyday Objects 462
Umberto Tolino and Ilaria Mariani

EXPERIENCES. Transitions

Communication Design for Welfare, the Challenge of Preserving
Human Interactions in Remote Participation. Rethinking and Redefining
Collaborative Activities for a Virtual Environment 475
*Valeria Bucchetti, Michela Rossi, Umberto Tolino,
Benedetta Verrotti di Pianella, and Pamela Visconti*

Aesthetics of Design for Social Innovation. Pathways for a Dialogue
with Everyday Aesthetics 485
Annalinda De Rosa and Laura Galluzzo

*Designing Employee Experience to Experiment with Novel Working
Modes. Action Research Project to Support Organizations in Engaging
Employees in a Post-pandemic Scenario* 493
Michele Melazzini and Gianluca Carella

Design for Behavior Change in Design Education. A Case Study 503
Margherita Pillan

EXPERIENCES. Can Experiences Be Measured?

Italian Cultural Institutions Across and Beyond Covid-19: Designing
Digital Cultural Experiences in Extra-Ordinary Times 513
Ilaria Bollati, Valeria Morea, Federica Antonucci, and Marta Spanevello

Beyond Visualisation Data as Raw Material for Uncoded Experiences 526
Lucilla Calogero

Designer and AR Technology: The Relationships Between the User and Virtual 534
Antonio de Feo and Luca Casarotto

The Robotic Service Objects. Design Approach for the Multidimensional Evaluation of Robotic Aesthetics 544
Claudio Germak and Lorenza Abbate

EXPERIENCES. Tourism and Mobile Experiences

Designing a New User Experience for the Travel Sector: A Research Project Reimagining the Role of Travel Stakeholders in the Digital Post-pandemic Age 555
Venanzio Arquilla, Federica Caruso, Davide Genco, and Chiara Parise

Operazione Arcevia. Existential Community. The Reality of the Experience and the Utopia of the Vision 569
Anna Mazzanti

Collaborative Dialogues Between Souvenirs and Territories: From Evocative Objects to Experience-Objects 584
Marina Parente

NARRATIVES

For a Novel and Transversal Narration of Extemporaneous Places of Artistic and Design Thinking: The City's Network of Crossroads Between Art and Design: The Milanese Case in the 20th Century 595
Giampiero Bosoni

Design Narrative 603
Raffaella Trocchianesi

NARRATIVES. Communications, Strategies, Tools

Space as a Narrative Interface. Phyigital Interactive Storytelling in the Field of Cultural Heritage 613
Letizia Bollini

Worldbuilding Practice as a Collaborative and Inclusive Design Process. The Case of ACTS-A Chance Through Sport 623
Mariana Ciancia and Francesca Piredda

The Role of Infographics in the Representation of Design Research	632
<i>Vincenzo Cristallo and Miriam Mariani</i>	
The Open Logo and the Closed History Notes of a Social History of Visual Identities	640
<i>Michele Galluzzo</i>	
An Advanced Design Tool for Archiving, Mapping, and Narrating a Complex System: The ADU Packaging Innovation Observatory	649
<i>Clara Giardina</i>	
NARRATIVES. Cultural Heritage, Museums, Territories	
From Narrative to Phygital. An Experimental Semantic Survey	661
<i>Marco Borsotti</i>	
Enhancing Local Cultural Heritage by Designing Narrative and Interactive Exhibitions. MEET at the “Museo del Territorio di Riccione”	671
<i>Alessandra Bosco, Silvia Gasparotto, and Margo Lengua</i>	
Making Value: Storydoing Actions for Cultural and Creative Industries	682
<i>Simona Colitti, Ami Liçaj, Lorela Mehmeti, and Elena Vai</i>	
Ustica, a Whole World in an Island Fragment	694
<i>Cinzia Ferrara and Marcello Costa</i>	
NARRATIVES. Interaction, Digital, Sustainability	
Craftmanship and Digitalization in the Italian Knitwear Industry. A Paradigm Shift for the Narrative of Made in Italy	705
<i>Martina Motta, Giovanni Maria Conti, Giulia Lo Scocco, and Rachele Didero</i>	
Design in the Metamorphosis of Matter	714
<i>Michele De Chirico</i>	
Counter-Narratives Against Gender-Based Violence. A Twofold Perspective on Choices in Interactive Dramas	724
<i>Sofia Peracchi and Ilaria Mariani</i>	
Sustainable Mobility as a Sport	735
<i>Domenico Schillaci, Salvatore Di Dio, and Mauro Filippi</i>	

NARRATIVES. Critical Approach, Languages, Explorations

Provocation Through Narratives: New Speculative Design Tools
for Human-Non-Human Collaborations 747
Francesca Casnati, Alessandro Ianniello, and Alessia Romani

Designer as Drama Manager: Understanding the Roles of Narrative Within
Design Processes for Change 756
Mariana Ciancia, Francesca Piredda, and Maresa Bertolo

Interaction and Verisimilitude. How Narration Can Foster the Design
Process 765
Andrea Di Salvo

Conversation Design for Raising Awareness on the Responsible Use
of the Internet: Co-design of a Chatbot Game with Secondary School
Students 773
*Mauro Filippi, Salvatore Di Dio, Domenico Schillaci, Stefano Malorni,
Angelo Scuderi, and Sabrina Guzzo*

From a Word-Formation to a Concept-Formation: Mnemosphere
as a Connective Tool in Interdisciplinary Design 783
Clorinda Sissi Galasso and Marta Elisa Cecchi

Author Index 795



Design in the Metamorphosis of Matter

Michele De Chirico^(✉) 

Università Iuav di Venezia, 30135 Venice, Italy
mdechirico@iuav.it

Abstract. The contribution refers to the research topic of materials experience by framing a methodology related to the way materials are catalogued and interpreted in design.

The study specifically concerns the design for the sustainable management of production residues in the tanning supply chain and is aimed at their semantic valorisation as material resources.

Starting from the interpretation of by-products as the material legacy of a know-how, the valorisation takes place through the application of a specific method based on the definition of expressive-sensorial parameters. The project prefigures the prototype of a cataloguing system in the shape of a multi-level map.

As a matrix of design possibilities belonging to a territorial culture, the tool intercepts values such as identity and recognisability of a know-how processes, whose by-products become evidence of it and represent the “material” of the project that acquires physical form in the tangible surface of the artefacts.

Keywords: Secondary Raw Materials · Materials Experience · Know-how · By-products · Contextual Design

1 Introduction

1.1 Tangible Legacy of a Know-How

In the contemporary scenario, the principles of sustainability and the paradigms activated by the circular economy set at the centre of design issues, among others, the topic of production by-products, which means understanding how to use them and to overcome the notion of production residues as waste. As Ingrid Paoletti [1] suggests, it is necessary to think about by-products at the beginning of the design activity, that is, to anticipate the use of what she calls “residue”. Such premises lead to a focus on “designing with the residue”.

The contribution refers to the research topic of material design and frames a methodology related to the design and cultural organisation and interpretation of secondary raw materials coming from production residues. The “design in the metamorphosis of matter” refers to the possibility of interpreting production residues as a resource that embodies a form of knowledge [1], as a tangible legacy of the production transformations of matter [2] through the processes of a specific know-how.

The research field of investigation, in a broader sense, concerns materials as enablers of sensory relations between user and artefact, and therefore as enablers of cultural meanings. This becomes relevant if by “material culture” we mean the transition of the intangible aspects of a civilisation onto the tangible world around us, which can be said to sediment on the surface of objects [1, 3, 4]. Therefore, design is the discipline that allows us to develop such connections between the tangible and intangible, and providing design insights is fundamental to outline new production and consumption scenarios based on a systemic perspective, in which the outputs of one production chain become the inputs of another [5].

The study concerns the design for the sustainable management of production by-products in the tanning supply chain and is the outcome of a research project, funded by the Regione Veneto’s FSE POR 2014–2020 through an inter-university research grant that involved the Università Iuav di Venezia and the Università Ca’ Foscari di Venezia, jointly with the partner company Dani, a tannery in Arzignano in the centre of the Veneto tanning district [6, 7].

1.2 Design for the Sustainable Management of Tanning Supply Chain Residues

The first step of the research consists of a review of best practices in terms of circular economy, so the production chain and the conditions of the local and national scenario as regards sustainability are analysed. In particular, the relationship with logics and tools for the valorisation of production waste and by-products is investigated. As a result, the hypothesis of a research path concerning leather production residues is proposed, aimed at overcoming the notion of the production residues as waste, supporting its valorisation as a material resource.

It is intended to propose examples and possibilities related to the integration of raw materials, semi-finished materials, or materials coming from disposed goods, within processes mediated by the development of an interpretative design key provided by the expressive-sensorial qualification of materials. The research focuses on promoting the development of leather manufacturing companies in Veneto through the valorisation of production residues and on innovating the production processes in relation to the synergy of methods, systems and skills involved in the disciplines of design and economics. This is implemented with the identification of the quantity and the quality of leather production residues to design a classification model that is the basis of a system shared by the supply chain, in order to collect leather production residues according to their quality, resulting in lower disposal costs. In this way, the research task may generate new design scenarios and enable the development of a set of indicators to measure resource savings through material reuse and recycling.

The main goal is to highlight the relationship between a local cultural identity and the globalised context [8], that is how processes resulting from the sedimentation of a specific know-how increasingly enrich knowledge by shaping the tangible surface of artefacts. Assuming these premises and in order to enable the territory to acquire values such as sustainability, identity and recognisability, the required shift is a cultural one [9]. This is intended to make the company aware of the design potential and tools useful to trigger innovation processes and added value.

1.3 Rethinking Materiality

In Veneto there is one of the most important districts in the world where big brands find small and medium-sized companies developing top quality products for the international market [7, 10–12]. The Veneto district is characterised by constant research in terms of innovation of internal supply chain relations, more sustainable technologies, and efforts in training through incubators for new skills [10]. The search for a sustainable industry requires significant investment in research for innovative technologies and production solutions. The issues related to processing and disposing of waste assume a significant role among the research areas related to the production sector, [13].

As a continuation and implementation of a previous research project that identified the re-use of production waste as one of the potential design approaches to investigate the meaning of “traceability for sustainability” [14], the study proposes to show how the integration of good practices for sustainability – in its environmental, social and economic multi-dimensionality – in the Veneto territory can trigger a technological innovation on the one hand, and a meaning innovation on the other, in response to contemporary scenarios that require a rethinking of materiality [1].

Specifically in tannery, the amount of waste and by-products along the production chain is very high: we are dealing not only with final leather trimmings, but also with by-products originating in all process steps of leather manufacturing. Today, there are several established procedures aimed at recovering and treating the resources involved in leather production. The protein residues from shavings, together with the flesh residues, are used for fertilisers and bio-stimulants. The upcycling of the finished leather and shavings, through a chemical process, allows proteins to be obtained that can be used in agriculture or in the leather finishing process. The dried chromium baths are treated to reuse 85% of the chromium already used. And the recovered salt is used for road de-icing [13].

The research issue is whether there are ways to activate sustainable processes of innovation, to valorise production residues and to identify design possibilities such as to develop new scenarios in response to the context’s needs. In other words, the question is whether material residues, which today are considered waste or are used in predominantly chemical reuse processes, can lead to design opportunities and be upgraded from waste to material resources, with their own dignity and design autonomy.

2 Sense Making Materials

2.1 Design Tracks

The research investigated how the topic is interpreted in other local, national and international contexts, leading to a collection of one hundred case studies that were systematised in order to achieve possible research frameworks.

Some specific design trajectories were identified:

- the development of technologies for environmental sustainability, with actions aimed at encouraging the reduction of environmental impact and the valorisation of manufacturing residues in accordance with circular economy requirements;

- the development of process technologies, with activities aimed at a considerable improvement and optimisation of production processes in terms of resource utilisation;
- the development of product technologies, with initiatives aimed at supporting the development of new products with special performance features and high added value.

Two very significant best practices for the development of the research concern, in the first case, “Structural Skin”, the work of Spanish designer Jorge Penadés [15] who used leather scraps together with a natural binder, derived from the same animal bones, for the production of furniture products. The topic of the natural binder made it possible to broaden the considerations on the deeper meaning of the “sustainable reuse” of material residues used to generate new materials, as it is strictly related to the various binders that are used.

The second case is a local best practice from the Veneto context in which leather residues are no longer considered as leather itself: the Favini paper mill produces a number of papers using leather scraps instead of cellulose [16]. The paper mill implemented several similar processes using algae, or wool waste, or waste from the agro-food chain, and each of these examples results in a sensorially augmented paper with different sensory attributes depending on the employed kind of residues. Above all, it makes the user’s experience with the papers particularly original.

As a result of this review, the main objectives of this research became clear: it attempts to highlight the relationship between local territorial cultures and the globalised context [8], in order to valorise production residues as a material resource with its own design dignity. It is possible by conveying how the sedimentation of know-how, inherent to a specific territorial, social and economic context, can stimulate innovation and knowledge, while acquiring physical form on the surface of artefacts.

2.2 Thinking-By-Doing

The research project continued with a hands-on approach with the matter, consisting of design experiments with the residues, by manipulations or technological transfers, so that a system of organisation and cataloguing of both the residues and the concepts that were developed could be set up, based on the definition of expressive-sensorial attributes. The integration of production residues within design processes was mediated by their expressive-sensorial qualification: an interpretative filter drawn from the studies inherent to the recent research topics of the so-called “design skins” [17] and the materials experience [18, 19], referring to the issues of the multi-sensoriality, the design of new materials or the innovative use of existing materials, showing how materials can be interpreted not only from a technical-performance point of view, but also by considering their expressive-sensorial attributes [20] in the relationship between the user and the artefact.

In a first stage, three macro-actions were established to define how to operate on and with residues, i.e. to add, to subtract, to mould. Each of them was subsequently defined more specifically, in order to generate specific sensory experiences, or sensory enhancements.

In the second stage, a number of different material concepts were developed, on the one hand using different types of residues, and on the other achieving different perceptual outcomes with the same input material used.

In the third stage, the qualities of all samples, both residues and concepts, were evaluated in a comparison with each other. This means that such a system offers a constant comparison between the samples (see Fig. 1). At the same time, the evaluations, which are qualitative, allow an understanding of how the samples relate to the sensory properties which are explored each time.

Sensorial attributes

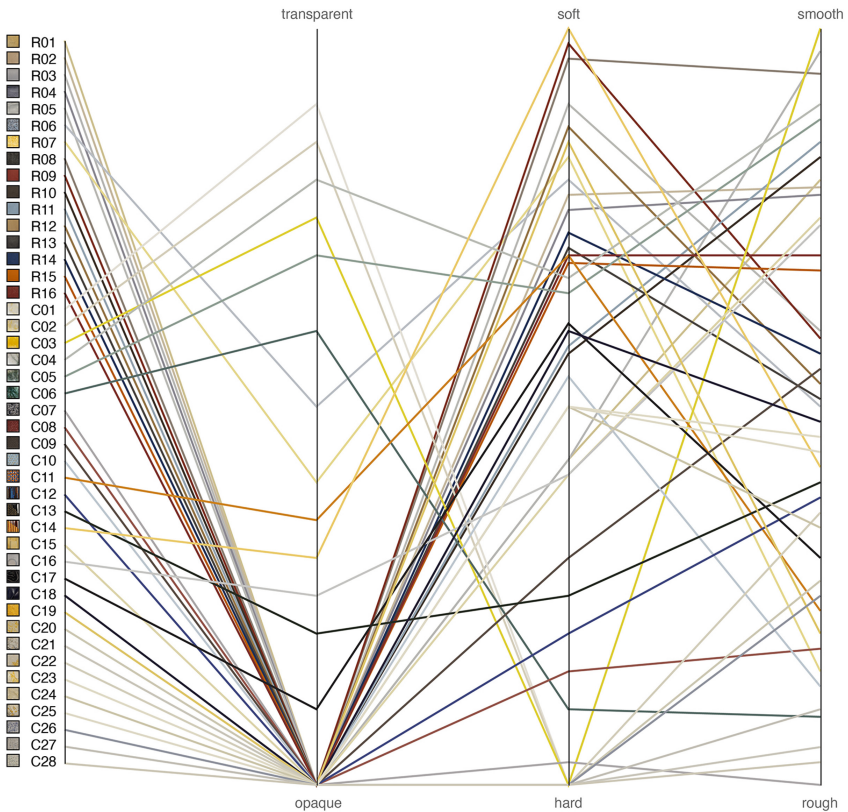


Fig. 1. Cataloguing of by-products and material concepts through the analysis and comparison of some single sensory properties defined by oppositional pairs: transparent-opaque, soft-hard, smooth-rough. Michele De Chirico, Università Iuav di Venezia, data-visualisation support by Jacopo Poletto.

2.3 Multidimensional Maps as a Cataloguing System

The proposed method allowed the author to prefigure a cataloguing modality that takes shape in a multi-level “talking” map [21], which provides us with different information: it is a sensory map, as it conveys the perceptual pathways and mutations of matter; a time map, as it traces the successions of the process phases of which the residues are the tangible outcome, that is, a trace of the metamorphoses of matter; and a matrix map that offers a series of suggestions intended as design possibilities for the development of new materials or new applications, which means a generative matrix that “succeeds in establishing a relationship between the past and the present, by providing [...] a cultural experience that concerns both the production process itself and the context of use” [22].

In a first data-visualisation, one can observe the collection of material residues and material concepts, lined up in relation to the properties of transparency, softness and roughness (see Fig. 1).

The map works through opposing pairs transparent-opaque, soft-rigid, smooth-rough, as can be assumed from the scientific literature concerning the materials experience [20, 23, 24]. In other data-visualisations, the relationship between the residues – on which the related process step is indicated – and the resulting concepts is also mapped. The consequence is that the original material concepts are also clearly related to those specific process steps. The example presented here concerns the correlation between the sensory attributes of roughness and softness (see Fig. 2).

As it has just been described, if the relationship between material resources and original material concepts, resulting from specific design actions, can also be deduced from such maps, then it becomes evident how the comparison between resources is fundamental for a designer when not only choosing a material for a project, but also in the early conception of a secondary raw material [20, 25, 26].

2.4 The Place of Possibilities

Such a mapping of design possibilities does not simply reproduce the ordering principle of analytical knowledge, but seeks to record transformations by becoming “a framework that organises movements as changes” [21] and manages to project the designer outwards.

It is a cognitive map in which we find traces of hybridisations and potential design fields, bringing out the material as “matter of invention” [23]. In this way, the material map achieves a deeper meaning through the user’s experience, in which the sensory paths become a “spatial-visual assemblage in motion” and “embody a sensuous assemblage” [21] in which the place of experience hosts the materiality of sensory interactions and the design potentialities themselves.

The map is a surface of combinatorial categorisation, it is made up of multiple relational itineraries that can be travelled forwards and backwards, at accelerated speed or in slow motion. One who travels on this map is free to *wander* within its perimeter, but also to leave it. There are no predetermined directions, just as there are no given design solutions, so the many possible routes lead to different destinations that are the result of experiential knowledge.

A space to be traversed in motion – at different sensory and cultural levels – that make the map a “cognitive prosthesis” [21], a spatial sensor for the designer, like a “prosthesis

Multi-level map

soft-hard and smooth-rough

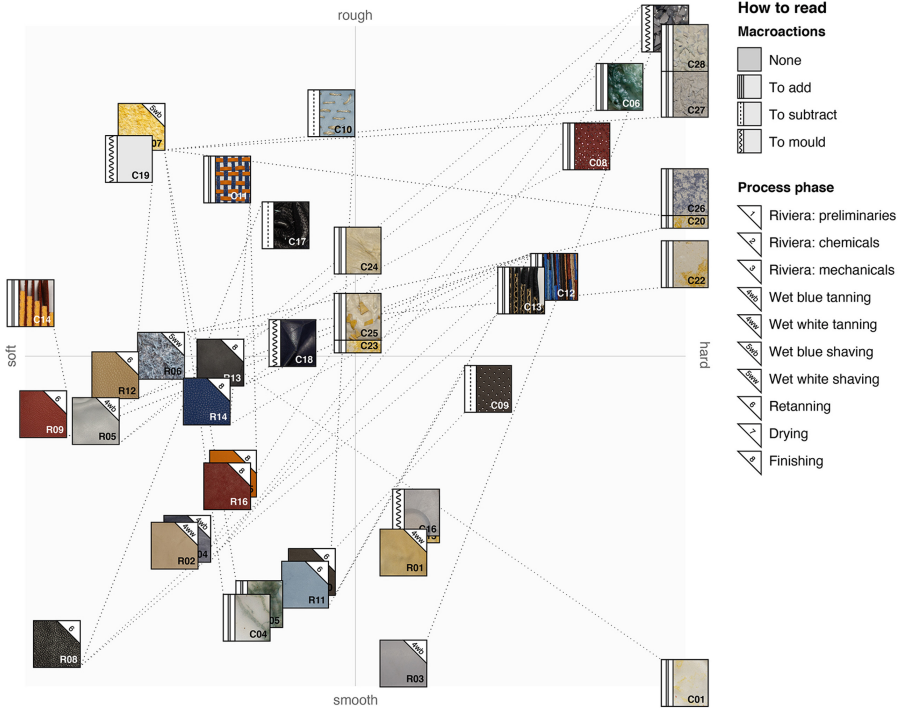


Fig. 2. Multilevel map indicating the correlation between different sensory properties and between a resource and a material concept resulting from specific design actions. Michele De Chirico, Università Iuav di Venezia, data-visualisation support by Jacopo Poletto.

of concreteness” [28] through which it is possible to expand the necessary abstraction of the virtual models of the design tools (the two-dimensional interfaces) by combining them with physical modules in the shape of the materials gradients map. The relational approach in materials research can employ different perceptual modalities, making the system not only comprehensible and shareable, but also more engaging.

As Brunner [29] suggests, the search for an appropriate categorisation system can facilitate the recognition of the peculiar qualities of secondary raw materials to outline criteria for their knowledge, valorisation and use. Therefore, it is a process aimed at understanding their qualities and sustainable design potential.

As a classification model at the basis of a system shared by the supply chain of a specific territorial culture, such a tool represents an interceptor of values such as identity and recognisability of a know-how – in this case, the tannery one – whose residues become the tangible evidence and “matter” of the project. In this way, research activity can develop design scenarios thanks to new opportunities for the valorisation of material resources, according to the circular economy requirements.

3 Conclusions

Design emerges as a connector of material cultures and an opportunity to discover traditional know-hows at the intersection with original ones, in the sense of contextual design, with the meaning of referring to the social, economic and technological contexts and focusing on the role that design can play within specific contexts. This design approach allows us to outline research trajectories starting from what each context and territory offers in terms of identity, history and material culture, through critical considerations aimed at combining technology, practice and meanings with the productive system and the institutions of a territory [30].

By proposing a prototype that can be applied to other supply chains, the aim is to interpret production residues as a resource that embodies a kind of knowledge, as a legacy of the metamorphosis of matter through the processes of a specific know-how, which is to say a vehicle for the identity and recognisability of said know-how.

Such a methodological approach, which has been tested in this pilot case study and is developable to other case studies, aims at.

- analysing and enhancing a know-how, embedded in a specific local, cultural, social and material context, through an *ad hoc* design method related to the use of production residues;
- with the intention of interpreting these leftovers in design terms and of achieving “generative” design possibilities, whose interpretative filter is the user-artefact relationship and the multidimensionality – by which we mean the different levels of interpretation of a material: the geo-historical, functional, expressive, economic and sustainable ones [22, 25] – which can actually describe what we call here “the metamorphosis of matter”;
- to revitalise existing systems for categorising materials, by envisioning a specific system dedicated to “second generation materials” obtained by the design with the recovered matter of production processes (as well as the author’s current topic of investigation related to his doctoral research at the Università Iuav di Venezia), to activate, or re-activate, networks between companies and supply chains aimed at optimising resources in production chains and to facilitate research trajectories of “design in the metamorphosis of matter”.

References

1. Paoletti, I.: *Siate materialisti!* Einaudi, Torino (2021)
2. Coccia, E.: *Métamorphoses*. Rivages, Paris (2020)
3. Oxford Bibliographies. *Material Culture*. <https://www.oxfordbibliographies.com/view/document/obo-9780199766567/obo-9780199766567-0085.xml>. Accessed 03 Sept 2022
4. Dei, F., Meloni, P.: *Antropologia della cultura materiale*. Carocci, Roma (2015)
5. Bistagnino, L.: *Design sistemico: Progettare la sostenibilità produttiva e ambientale*. Slow Food Editore, Bra (2009)
6. Gruppo Dani: *Shaping Together a Sustainable Future: Bilancio di sostenibilità (2020)*. https://www.gruppodani.com/content/uploads/2021/01/Bilancio_sostenibilita_2020.pdf. Accessed 03 Sept 2022

7. Zampiva, F.: *L'arte della concia ad Arzignano, nel vicentino, nel Veneto e in Italia. Dalle origini ai giorni nostri*. Egida Libreria Editrice, Italia (1997)
8. Russo, D., Tamborrini, P.: *Design & Territori. Università e aziende tra sperimentazione e innovazione*. New Digital Frontiers, Palermo (2019)
9. Buono, M., Giusto, R.M.: *Giacimenti culturali Made in Italy*. MD J. **9**, 210–219 (2020)
10. Mecenero, L.M.: *Il Distretto Veneto della Pelle tra innovazione e resilienza. Come un distretto industriale è diventato un'area sistema integrata d'innovazione*. Franco Angeli, Italia (2021)
11. Grasso, G., Santoprete, G., Del Pezzo, L.: *L'industria della concia e del cuoio*. Giappichelli, Torino (1990)
12. Gasparini, D.: *L'arte della concia nel Veneto: le questioni, le fonti, gli studi*. In: Gensini, S. (ed.) *Il cuoio e el pelli in Toscana: produzione e mercato nel tardo medioevo e nell'età moderna*. Pacini Editore, Firenze (1999)
13. UNIC. *Report Sostenibilità UNIC 2020*. https://unic.it/storage/Rapporto%20sostenibilità%202020/Report_Sostenibilita_UNIC_2020.pdf. Accessed 03 Sept 2022
14. Bassi, A., Calogero, L., De Chirico, M.: *Territory, sustainability and design*. DIID disegno industriale Ind. Des. **19**(73), 86–95 (2021)
15. Penadés, J.: *Structural Skin*. <https://oficinapenades.com/projects/structural-skin-furniture/>. Accessed 03 Sept 2022
16. Favini: *Remake*. <https://www.favini.com/gs/carte-grafiche/remake/caratteristiche/>. Accessed 03 Sept 2022
17. Del Curto, B., Fiorani, E., Passaro, C.: *La pelle del design*. Lupetti, Milano (2010)
18. Karana, E., Pedgley, O., Rognoli, V.: *Materials Experience: Fundamentals of Materials and Design*. Butterworth-Heinemann, Oxford (2014)
19. Carullo, R., Del Curto, B., Lucibello, S.: "Perceptions" versus "Conceptions." Mapping materials between memory, responsibility, and technology. In: Bisson, M. (ed.) *III International Conference on Environmental Design*, pp. 151–158. Palermo University Press, Palermo (2019)
20. Ashby, M., Johnson, K.: *Materials and Design*, 2nd edn. Butterworth-Heinemann, Oxford (2010)
21. Bruno, G.: *Atlante delle emozioni*. Johan & Levi, Monza (2015)
22. Belfanti, C.M.: *Storia culturale del Made in Italy*. Il Mulino, Bologna (2019)
23. Rognoli, V., Levi, M.: *Il senso dei materiali per il design*. Franco Angeli, Milano (2011)
24. Carullo, R., Pagliarulo, R.: *Interior | Design. Action on Surfaces*. International Exhibition. Rubbettino, Soveria Mannelli (2018)
25. Karana, E., Hekkert, P., Kandachar, P.: *A tool for meaning driven materials selection*. Mater. Des. **31**(6), 2932–2941 (2010)
26. Bak-Andersen, M.: *When matter leads to form: material driven design for sustainability*. Temes De Disseny: Nueva Etapa **34**, 10–33 (2018)
27. Manzini, E.: *La materia dell'invenzione*. Arcadia, Milano (1986)
28. Dal Bò, M.T.: *Tra prefigurazione e configurazione. Modalità e strumenti per l'inizio del progetto*. In: Riccini, R. (ed.) *Frid: Forum nazionale dei dottorati di ricerca in design*, pp. 50–56. Il Poligrafo, Padova (2016)
29. Brunner, T.A.: *Aesthetics of Sustainability Material Experiments in Product Design*. Triest Verlag, Zürich (2021)
30. Design Academy Eindhoven. *Contextual Design*. <https://www.designacademy.nl/p/study-at-dae/masters/contextual-design>. Accessed 03 Sept 2022

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

