POLITECNICO DI TORINO
Repository ISTITUZIONALE

New design-oriented directions for the regional economy: proposal of a framework for classifying industrial conversions and product diversification cases in mature industries

Original
New design-oriented directions for the regional economy: proposal of a framework for classifying industrial conversions and product diversification cases in mature industries / Bruno, E.V., Palazzolo, V.F., Lerma, B., Montagna, F.. - ELETTRONICO. - (2023), pp. 10-19. (2022 WDO Research and Education Forum Foshan (CN) 22 February 2022).

Availability:
This version is available at: 11583/2984074 since: 2023-12-15T20:21:13Z

Publisher:
World Design Organization (WDO)

Published
DOI:

Terms of use:

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

(Article begins on next page)

24 October 2026

RESEARCH + EDUCATION FORUM 2022

Design for the Unimagined

Proceedings Document

WDO WORLD DESIGN ORGANIZATION

The following document is the published collection of technical papers accepted to the 2022 WDO Research and Education Forum that took place online, hosted by Economic Promotion Bureau of Shunde People's Government of Foshun (China) on 22 February 2022.

Chair

Prof. Thomas Garvey, PhD,
Carleton University (Canada)

Education Committee Members and Reviewers

Academic Reviewers

Prof. Roberto Iñiguez-Flores
TEC Monterrey (Mexico)

Prof. Pier Paolo Peruccio
Politecnico di Torino (Italy)

Prof. Pradyumna Vyas
Confederation of Indian Industry (India)

Prof. Lou Yongqi
Tongji University (China)

Prof. Martha Zarza
Autonomous University of Mexico State (Mexico)

Industry Reviewers

Anne Asensio, VP Design Experience
Dassault Systèmes (France)

David Kusuma, Senior VP of Product Management & Innovation
Oregon Tool (USA)

Michael Lai, Senior VP Knowledge Management
TANG (China)

Editorial Team

Andréa Springer
Programmes & Communications Director, WDO

Natalie Dutil
Communications Manager, WDO

Sarah Virgini
Programmes & Communications Officer, WDO

Document Design

Marie-Andrée Couture
Designer

Special thanks

We would like to acknowledge and thank the Economic Promotion Bureau of Shunde People's Government of Foshun (China) who supported this process and enabled the successful execution of this event.

The authors of individual papers are responsible for technical, content, and linguistic correctness. All content remains the property of authors, editors and institutes.

ISBN: 978-1-7770192-1-1

Copyright © 2023

© World Design Organization (WDO)®
455 St-Antoine Street West, Suite SS10
Montreal, Quebec, H2Z 1J1 (Canada)
WDO.org

Message from the Chair of WDO Education Committee	Messages from WDO	Speakers/ Panelists	Forum Themes and Papers
Page VI	Page VII	Page VIII	Page 1

About this publication

Held online on 22 February 2022, under the banner of Design for the Unimagined, the 2022 WDO Research and Education Forum hosted by the Economic Promotion Bureau of Shunde People's Government of Foshun (China) aimed to share perspectives and explore trends to better prepare young design professionals for new challenges and opportunities.

Bringing together academics, students and industry leaders online due to the ongoing COVID-19 pandemic, the event explored three sub themes relating to the new dawn facing designers in the aftermath of the largest pandemic in a century: response in extreme times, human centred technologies and the emergence of new learning. Through a series of online activities, the forum fostered engagement around the challenges universities and design schools had to overcome in remote environments, the ways we lean on technology at an increased pace and the possibilities available to us when we explore the unimagined.

The following proceedings are the collection of papers selected for publication.

To view the keynote presentations, panel discussions, as well as the poster presentations, please visit WDO.org/world-design-assembly

Theme 1 Response in extreme times

Our world is facing many complex challenges – from the ongoing COVID-19 pandemic to climate change, overpopulation and global migrations. These extreme circumstances have not only forced us to rethink how we live our lives, shifting daily habits and patterns, but have also brought us together in new ways that showcase how humans can adapt in times of crisis.

It starts at home! Design research for sustainable behavior in the kitchen

Dr. Elif Kocabıyık Savasta[1,2,3], Dr. David Kusuma[4,2]

Institutions: [1]Izmir University of Economics, Izmir (Turkey). [2]World Design Organization, Montreal (Canada). [3]Izmir Metropolitan Municipality Mediterranean Academy, Izmir (Turkey). [4]Oregon Tool, Portland (USA)

Page 2

New design-oriented directions for the regional economy: proposal of a framework for classifying industrial conversions and product diversification cases in mature industries

Eva Vanessa Bruno
Virginia Flavia Palazzolo
Beatrice Lerma
Francesca Montagna

Institution: Politecnico di Torino (Italy)

Page 10

Rivers as Persons in Human-Centred Design: Centring Indigenous Leadership and Knowledges in the Design Process

Sara Hubberstey

Institution: Human-Centred Design Lab, Algonquin College (Canada)

Page 20

The Innovative Design Ecology of Intangible Cultural Heritage in Social Transformation: Based on 12 Years of Design and Social Innovation Practice in Rural China

Xiaolei Min
Tie Ji
Tianyi Tang
Yinman Guo

Institution: School of Design, Hunan University (China)

Page 28

Universal Design and Disabling Environments: What we can learn from the COVID-19 pandemic to strive to design for unexpected environments

Julia Dickson

Institution: Carleton University (Canada)

Page 36

Thomas Garvey

How can we better prepare our young design professionals for new challenges and opportunities? In many ways, this has been the guiding question of the WDO Research and Education Forum since the event was reinitiated in 2019, and together with our community, the years that followed have fostered many insightful discussions exploring the future of design education around the world.

2022 marked the first time that this forum was held in a virtual format, an important reminder of not only our global context, but also of the digital age in which we find ourselves. There is no doubt that the rise of online learning and the influence of digital technologies have led to a significant shift in the way we teach, learn and apply the practice of design.

Under the theme of design for unimagined, the 2022 WDO Research and Education Forum sought to explore how these forces are reshaping the academic landscape, and how design students and professionals are adapting to this new reality to meet the relevant social and environmental challenges facing our world.

Centred around three key sub-themes: response in extreme times, human-centred technologies for social and environmental benefit and the emergence of new learning, we were able to shed new light on the evolution of design methodologies in the digital age.

We are happy to see that these themes and issues resonated across our global audience as we received a large number of abstracts and posters. This publication compiles the papers that were selected and presented on 22 February 2022 by international research academics, designers and educators. On behalf of WDO's Education Sub-Committee, we would like to thank them for sharing their insights on these important topics and for contributing to the discussion as we all endeavor towards a better future through design.

Thomas Garvey, Chair of the Education Committee

Srini Srinivasan

An integral part of the World Design Assembly, WDO's Research and Education Forum represents a key moment for designers, academics, students and design professionals from around the globe to gather and discuss the future of design education. Under the banner of 'design for the unimagined', the 2022 Research and Education Forum offered key insight into how design can continue to adapt and thrive in times of uncertainty.

As a reflection of the global context in which we found ourselves, 2022 also marked the first time the forum was held in a fully online format. Indeed, much of the knowledge exchanged helped to shed new light on the changes we've witnessed within the design discipline over the last few years – from the shift to online learning, to the emergence of new methodologies and the rising influence of technology on the way we design.

Thank you to the Government of Shunde, as well as WDO Member Industrial Design Society of Shunde for their collaboration and support in hosting this event. A special thanks as well to the WDO Research and Education Forum Committee who committed their time and expertise to overseeing the development of the programme. And finally, thanks to all the members who contributed to this Forum as we continue to find ways to improve the quality of life through design. Looking forward to the next edition of the Forum.

Srini Srinivasan, President of WDO (2019-2022)

Speakers

Keynotes

Karel Vredenburg
Director, Global Design Leadership, Culture, External Engagement, and Academic Programs, IBM

Karel Vredenburg has led design in various roles worldwide at IBM for most of his three decades with the company, and is currently responsible for IBM's Global Design Leadership, Culture, External Engagement, and Academic Programs. He chairs the Design Executive Team comprised of top managerial design executives in each business unit and the Design Leadership Board comprised of the technical and managerial design executives responsible for the review and appointment of Design Principals and Distinguished Designers.

Meikang Yao
Dean of School of Design, Shunde Polytechnic

Prof Meikang Yao, who is Dean of School of Design and Director of Academic Committee of Shunde Polytechnic. He is also the Chief Architect of Shenzhen Civil Engineering Tongji Architectural Design Institute. Professor Yao has been keen on research interests in architectural design and theory, urban planning and design and landscape and environmental art design. He was granted a National Innovative Design Skills Master Studio in 2019, a Top 10 Most Influential Designers in China from 2011 to 2012, and German Red Dot Award in 2017.

Panelists

Mariana Amatullo
President, Cumulus

A practitioner-scholar, educator, and design strategist, Mariana is the President of the Cumulus Association. She is an Associate Professor of Strategic Design and Management at Parsons School of Design. She serves as the Vice Provost for Global Executive Education and Online Strategic Initiatives at The New School, New York. Previously, Mariana co-founded and led the award-winning social innovation department, Designmatters, at ArtCenter College of Design in Pasadena, California. Mariana's research and publishing bridge the design and management fields and examine the role designers play in advancing social innovation and organizational learning.

Kari Kivinen
Education outreach expert, European Union Intellectual Property Office (EUIPO) Observatory

Kari Kivinen is involved with the Intellectual Property in Education Network-project, which promotes creativity, innovation, entrepreneurship and responsible digital engagement among young Europeans. He has worked in international schools in Finland, Luxembourg and Belgium. He is the former Secretary-General of the European School system and ex-Head of the Finnish French school of Helsinki. During his professional career, he has combined his everyday work with research and further studies.

Isabelle Vérilhac
President, Bureau of European Design Associations (BEDA)

Isabelle is the head of International Affairs and Innovation and coordinator of Saint-Etienne (France) UNESCO City of Design and the President of the Bureau of European Design (BEDA). Isabelle holds a Post-Diploma in design research, a Doctorate in material chemical physics, and gives lectures in industrial design. She was the director of the Saint-Etienne Medical Technologies Cluster from 2003 to 2007, and has worked in design, medical research and development activities. For 14 years she has been in charge of the relations with economic stakeholders at the Cité du design Saint-Etienne.

Theme 1

Response in extreme times

Title:

New design-oriented directions for the regional economy: proposal of a framework for classifying industrial conversions and product diversification cases in mature industries

Authors:
Eva Vanessa Bruno
Virginia Flavia Palazzolo
Beatrice Lerma
Francesca Montagna

Institution:
Politecnico di Torino
(Italy)

Abstract

Design and Innovation Management find common ground and interesting collaborations in defining strategies that manufacturing companies can implement in extreme circumstances. Design-oriented industrial conversion and product diversification could be an outcome of such strategies, identified to explore and manage emerging technological paradigms. This research focuses on manufacturing companies within industrial districts that are in difficulty and try to orient them towards new strategic directions, driven by product design. For this purpose, the research proposes a framework for classifying case studies of companies that have successfully applied the strategies mentioned above. It displays expansion directions, sectors, products or processes that could be of value for a territorial context.

Keywords: Industrial conversion, product diversification, design, framework, innovation strategy

Introduction and research context

The current economic-financial environment that Italy is going through calls companies in critical and unstable economic conditions to be guided by business strategies able to systemize the skills and assets they already possess. A growing body of literature recognizes that the discipline of design could be an enabling key to expand innovation strategies (Dorst, 2015), since it is intrinsically linked to business (Muratovski, 2015).

This paper describes a possible design-oriented framework to investigate (and ultimately orient) companies' industrial conversion or diversification strategies. New products with new shapes, materials, functionalities, purpose, meaning, as the key elements of design and innovation, with processes equal to or integrated with those already adopted, could be the tangible outputs of such strategies. Methodologically, the framework is built on 60 case studies of Italian companies that, in the last 50 years, have effectively succeeded in adapting and moving to more profitable markets or industries.

In this sense, the paper also helps to shed light, at least for the people that are not used to business analysis, on the terms 'conversion' vs 'diversification'. The expression 'industrial conversion', in fact, is often associated with the military sector when companies temporarily convert their production plants to produce military armaments. During the First and Second World Wars, for instance, metallurgical companies (i.e., companies with a strong know-how in processing metals to be exploited as automobile and household goods companies) converted to produce weapons and armaments.

Moreover, especially in the architecture and industrial design fields, the term is confused with a building renovation of industrial plants. In this paper, we intend for industrial conversion the use of resources and assets aimed at a product, by which enter a completely different industrial sector (Johnson, Christensen & Kagermann, 2008). Conversion embodies an extreme situation with respect to diversification, which instead (here) represents the different use of the same assets in other markets, maintaining in parallel the current business (Le, 2019).

It is worth noting that industrial conversion often is a suitable strategy for extreme circumstances. It was adopted not only during the Second World War, but the term finally returned to the pages of the newspapers during the COVID-19 pandemic. Textile, alcohol, and automobile companies converted for a moment to manufacture masks, hand sanitizer, respirators, etc.; all extremely urgent and rare goods in that time.

The framework presented here is a preliminary result of a doctoral research effort in collaboration between Torino's Chamber of Commerce and Politecnico di Torino. A multidisciplinary team of product designers and industrial engineers, experts of innovation management, has challenged steering companies towards unexplored markets or different business models.

Theoretical background

Observing a territory and its dynamics is essential to comprehend its features and potentialities, especially when considering a territory as the design object (Parente & Sedini, 2017; Bassi, Calogero & De Chirico, 2021), aiming at protecting, preserving, and transmitting the productive cultural asset of the territory. In Italy, for instance, one can observe that the majority of firms are included in production clusters and industrial districts made of small, medium companies. Clusters and districts provide strong relations between territory and companies, sometimes operating at the regional level, other times cooperating at the national level, also through material and immaterial transactions, when one also considers networks (Celata, 2009).

From an economic point of view, industrial districts embody a territorially delimited production system composed of companies with interconnected activities. They live because of agglomeration economies, which provide companies with benefits, such as transport cost savings, raw materials closeness, network externalities in sharing resources, competencies, and services higher to competition forces (Porter, 1998). These different benefits indeed also drive clusters' origin differently, so that they can be derived as geographical (such as the wine cluster in California, the flowers one in the Netherlands); sectoral (if companies are operating together from within the same commercial sector, e.g., Silicon Valley), horizontal (when interconnections between businesses at a sharing of resources level) and vertical (i.e., a supply chain) clusters (Greenstone, Hornbeck & Moretti, 2010).

If one adopts a design-oriented perspective instead, industrial clusters could be distinguished in view of products and services they provide to the territory (Vasquez, Celaschi, Formia, Iñiguez Flores, León & Triana, 2020) and how they characterize such territory through the design activity (Germak, 2008), as where design is an actor within a collaborative process between many players. In Piedmont, the Italian region where such doctoral research is developed, some design-oriented industrial clusters operate: the houseware industry (Alessi, Bialetti, Sambonet and Lagostina); furniture and complements (Gufram and Serralunga); fashion and accessories (Ermenegildo Zegna, Loro Piana, Cerruti, Herno, Miroglio, Carlo Pignatelli, Robe di Kappa, K-Way, Superga); gold-working districts of Valenza (1.500 micro and small companies and workshops) (Piemonte Agency, 2021). With regard to the entire Piedmontese territory, in 2017 some categories that had diffusion at the regional level without a particular geographical characterization stood out. In addition to traditional design for living (design of furniture, furnishing accessories, appliances, lighting and objects, street furniture), the development of communication represents the most representative sector. The design of services, social design, design for the food and wine sector moreover emerged as new sectors connoting "making design" in Piedmont, although still with small numbers or limited numbers (De Giorgi, Montagna, Coccimiglio, Dal Pozzolo & Albano, 2018).

Two elements can characterize and industrial district in terms of design: the complexity of the product architecture (intended as the interdependent subsets that compose the product structure) to which the cluster is devoted to, which induces specific industrial configurations and technological paradigms (Montagna & Cantamessa, 2019) and the degree of design orientation. The authors adopt Calabretta's definition (Calabretta, Montaña & Iglesias, 2008) of design-orientation, namely when design represents "a major force for innovativeness, in the sense that designers drive and support actions throughout the entire development process and across a broad scope of functional activities". Design orientation (Venkatesh, Digerfeldt-Månsson, Brunel & Chen, 2012) can have a positive impact, creating competitive advantage through creativity in the meanings of a product and qualities that Verganti attributes to "radical design-driven innovation" processes (Verganti, 2009; De Goey, Hilletofth & Eriksson, 2019). Indeed, Design could be considered as a key strategic asset and a source of value added for companies (Celaschi, Celi & Garcìa, 2011) and should start to be considered as a repeatable and systematic approach that companies can apply to sustain innovation (Van Der Pijl, Lokitz & Solomon, 2020) and to lead a relationship between design, identity and company culture (Bargellini, 2014).

That said, especially in mature industries, economic crisis, emerging technological paradigms, and, nowadays we could say, emergencies (such as a pandemic), could push companies toward industrial conversion and product diversification strategies to exploit internal resources and capabilities, sustain their competitive advantage (Grant, 2015), expand the product portfolio (Lüthge, A. 2020), embrace new trends and increase the potential for new geographic markets (Denis, Denis & Yost, 2002).

However, often, perhaps also given the context of needs/opportunities from which they derive, these strategies are driven by purely managerial and economic levers, without considering that industrial conversion and product diversification can lead towards goods or services capable of characterizing a territory. In this sense, therefore, it could be essential foreseeing industrial designers to collaborate in the definition of such strategies, contributing to technological vision and context and leveraging on the existing company's capabilities. The design culture is a value added for manufacturing companies that have not exploited it yet, especially because design can be a booster for the company's ability to cope with change (Borja de Mozota, 2010).

Therefore, this research's primary goal is to create a sharable design-driven framework for the analysis of possible industrial conversion or diversification strategies to be provided to companies that are exploring new opportunities of business.

Research approach and methodology

The framework is built on 60 case studies of Italian companies that, in the last 50 years, implemented design-oriented industrial conversion and product diversification strategies. Among all the case studies possible, this research has considered only companies that were in difficulty or in decline. In these cases, in fact, it is demonstrated that there is a greater awareness for the necessity of a change in product service offered to counteract a possible crisis/bankruptcy (Sarkar & Osiyevskyy, 2018); as well as, post-conversion products or services and/or production processes are completely different from the previous one.

The case studies have been collected according to the well-established iterative path proposed by Yin (2017, in Fig. 1). The sources consulted for the collection are many and varied: reports from research centres (such as Deloitte, 2019 and Symbola 2020), articles from national newspapers and territorial institutions (such as the Chambers of Commerce), as well as already known business cases (such as the ones from the Harvard Business Review library).

These case studies have been also characterised through the information about the territory and its resources (geographical location, production system), the size of the company, the factual and causal knowledge that allowed the diversification or conversion, and the materials and production processes used before and after the strategies.

The research has considered adverse events and historical crises, such as international conflicts, the 2008 economic crisis, the industrial district's crisis, and the COVID-19 pandemic.

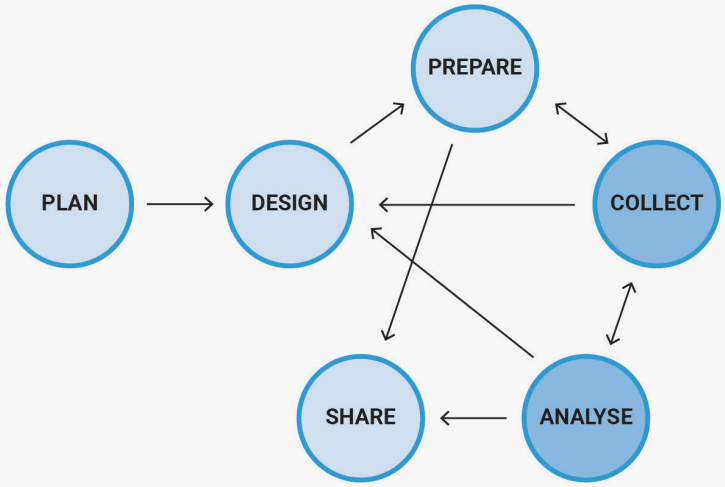

Figure 1: Doing case study research by Yin, 2017

A preliminary outcome: a classifying framework

From this preliminary analysis of the case studies, some preliminary variables for the analysis have been defined (in Fig. 2). First of all, it has been possible to understand if the company has operated a strategy of diversification (i.e. the different use of the same assets in other markets, maintaining in parallel the current business) or a complete industrial conversion (i.e., the use of the assets for a product entering a completely different industrial sector). Then, it has been possible to investigate whether this modification has involved only the product, sustaining technological competencies and maintaining the production process or vice versa, or instead if it has led to a completely different production process from the original assets, resources and competencies.

The knowledge of a specific family of materials (ceramics or porcelain stoneware), for instance, can not only support a change of product, such as from sanitary ware to outdoor tiles, but even a change of process, from moulded production (sanitary ware) to slab production possibly enabled by recycled components to support product robustness.

This can then be further characterized, distinguishing precisely whether it has been a geographical, market, segment, or business diversification, what has been the extent of this change (small change, total change) and whether this has occurred from shrinking, stable or expanding sectors.

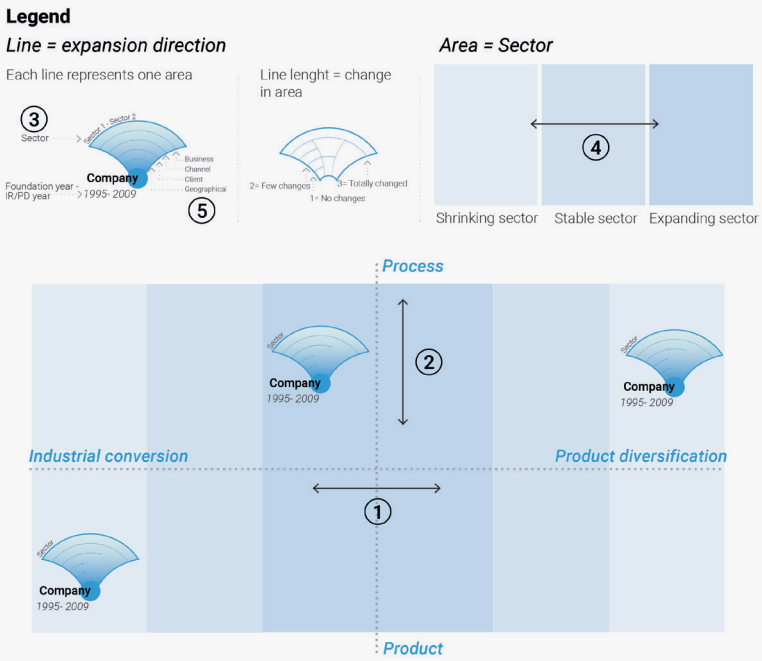

Figure 2: The structure of the designed framework

The further phase of the research will consist in validating this conceptual framework by interviewing companies that have tried to implement the above-mentioned strategies. Selected companies, to be representative of the Italian territory, will be small or medium-sized; they will be studied according to the economic and design-oriented criteria, which emerge from the theoretical framework:

- Industrial manufacturing sector (semi-finished product, component, product);
- Within a production sectoral cluster;
- Presence of a business instability/economic distress;
- Post-conversion product or process far from the previous core business;
- Low to medium complexity of the product architecture;
- Degree of design orientation: overt or potential.

The following section will describe a company included in the framework, Serralunga, an Italian company based in Piedmont in the province of Biella that produces modern outdoor furniture. Such a description will exemplify how the framework can be methodologically adopted to read the path companies have followed, but also (when it will be validated) to drive design-driven strategic decisions for further cases.

The Serralunga tannery case study

Pietro Serralunga founded the Serralunga tannery in 1825 to produce leather for soles and uppers. The existence of an industrialized economy, centred on textiles, and with high rates of mechanization of manufacturing processes, and his son, Giovanni Battista, guided the company towards the production of transmission belts and articles for textile machinery experimenting with new tanning processes (Corbetta & D'Alessandro, 2006). The first crisis that marked the company dates back to around the 1930s when the European market for rawhides was under the influence of the German market, and in Italy, the increase in imports had resulted in a greater volume of stocks than production and national exports dropped significantly. Among the leather substitutes, natural rubber was the favourite due to its lower cost advantage and shorter production cycle.

After the Second World War, the tanning sector faced new challenges concerning the technological and innovation aspects related to the introduction of alternative materials to leather and the search for new industrial applications. The company took steps to acquire the technical skills to adapt and guide new production processes to treat new materials. The quality improved and the availability of synthetic raw materials, synthetic rubber and thermoplastic resins, which had characteristics that were more able to satisfy market demand, increased.

The real revolution came around the 1950s when advances in the chemical industry led to the spread of synthetic rubber and plastics. Despite the crisis, the company concentrated its efforts on continuous and systematic research and updating materials, machinery, and equipment. This strong drive for innovation and the perseverance of the new generations led to the introduction of plastic injection moulding and the rotational moulding technique imported from the USA towards the end of the 1950s.

The experience in America was probably the most important formative experience in Marco Serralunga's studies. Although employed in management and production roles, Marco Serralunga found ways to take advantage of the experience to gain familiarity and expertise in the technical aspects of the production process and see new business opportunities. Parallel to the company's traditional activities, Marco Serralunga, driven by market needs and the desire to explore new businesses, began producing plastic vases using the rotational moulding process. The new vases replaced the terracotta ones and had features that favoured their popularity: they were lighter and easier to transport. A slow transformation process began within the company from this moment on and lasted ten years. During this time, the older generation continued to produce components for machines in the textile industry, while the new generation explored the plastic vase market and made the first collaborations with relevant design personalities. The production process of making the vases was different and required an economical and technological effort. Rotational moulding is an industrial technology that results in limited production to a few dozen pieces per day and requires a great deal of skill and excellent manual dexterity from specialized technicians. Therefore, the company's efforts were many: the purchase of new machinery, equipment and skilled labour, identifying new suppliers, key partners and a new target market, and finally, the definition of a new communication strategy to reach new customers. Therefore, the previous business was fundamental in this transition phase for the economic sustenance of the company itself. The process of industrial conversion ended in the early 1990s, when Marco Serralunga, driven by personal motivations, decided to definitively abandon the old reference market, making Serralunga a design-driven company (Fig. 3).

The real revolution came around the 1950s when advances in the chemical industry led to the spread of synthetic rubber and plastics. Despite the crisis, the company concentrated its efforts on continuous and systematic research and updating materials, machinery, and equipment. This strong drive for innovation and the perseverance of the new generations led to the introduction of plastic injection moulding and the rotational moulding technique imported from the USA towards the end of the 1950s.

Figure 3: Illuminated pots and lamps of Serralunga, photo by Federico Villa; Holly All vase, designed by Philippe Starck; Santavase vase, designed by Denis Santachiara; Paloma, designed by Eero Aarnio.

If one looks at Serralunga according to the variables suggested by the framework (Fig. 4), one could say that the company operated an industrial conversion leaving an industry that was suffering a crisis. Serralunga changed entirely its reference industry by taking a forward-looking view and entering the outdoor furniture sector through investment in an innovative and pioneering production process. For this reason, it can be displayed on the “Industrial conversion - process” quadrant of the framework, in the “shrinking sector” area. While maintaining its previous location and building, the company implemented several changes in terms of business model, distribution channel, and customers. The new family of design-oriented products allowed entering a B2C market, specifically devoted to that segment of customers interested in ‘made in Italy’ and the refined taste of Italian design.

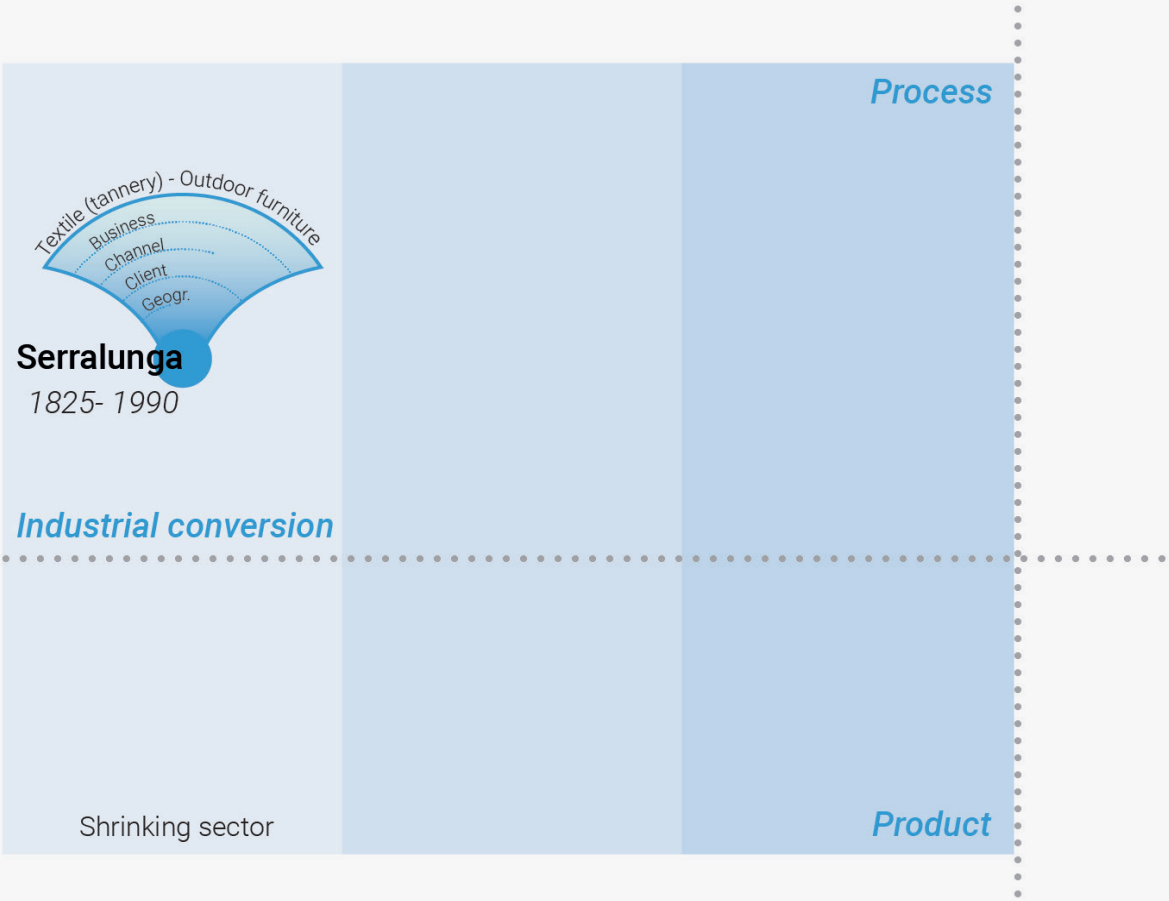

Figure 4: Serralunga in the framework

As mentioned, the slow decline of the tanning industry began after 1950 with the entry of rubber and plastics into the field of technical articles. In Biella, the number of employees halved in 10 years and of the six tanneries only two remained, which were able to face the challenge of new materials and completely changed production, machinery, plants, retraining the workforce. Today, the old factories are industrial archaeology (Fig. 5).

Figure 5: Industrial ruins in Biella, photo by Ibello

Discussion and conclusions

The case study shows how the framework can guide the analysis of industrial diversification or conversion choices made by companies and help understand the importance of a pioneering and far-sighted vision in anticipating a crisis and riding the wave of change. Furthermore, by placing the single company in the same frame as other companies in the sector, it is possible to observe how other companies of the same sector operate. Thus, it is possible to qualitatively observe, for example, the trend of analogous territorial specializations, production clusters and industrial districts. In some cases, the framework can highlight cases where low innovation possibilities or ineffective implementation strategies could be due to cognitive traps and organization inertia (Anthony, Trotter, Bell & Schwartz, 2019; Bertolini, Duncan & Waldeck, 2015). Obviously, in this case, this eventuality should then be explored more rigorously through the appropriate tools from Management.

Operatively, Torino's Chamber of Commerce does not currently have a list that details the various conversion and diversification paths of companies in the territory. Therefore, the framework will be a helpful tool to analyze the current state of the art and forecast possible re-categorizations of Piedmont production, exploiting the territorial capital (Camagni, 2017). The next step envisaged is an analysis of production trends in the Piedmont/Turin region to combine quantitative and qualitative research. What emerges from this tool is the power of industrial districts, as in the case study described. These strategies can weave new forms of relationships between district enterprises and territorial contexts, recognized as large pools of potential intervention (Arquilla, 2005).

Currently, the major limitation is represented by the number of case studies. Few companies in Italy have implemented diversification according to the above specifications, and even fewer have implemented an industrial conversion. In future work, the authors intend to test a hypothesis: can the industrial conversion of companies of a district give rise to collaborations and mutual support?

References

- Anthony, S.D., Trotter, A., Bell, R., & Schwartz, E.I. (2019). The transformation 20. Strategic change rankings from 2019. Spotlighting the 20 global companies that have achieved the highest-impact business transformation over the past decade. Boston: Innosight.
- Arquilla, V. (2005). Design e Impresa - Distretti industriali, design e percorsi di sviluppo, in Arquilla, V., Simonelli, G. & Vignati, A. (eds), Design, Imprese, distretti - Un approccio all'innovazione (pp. 85-149), Milano: Edizioni Poli.Design.
- Bargellini, J. F. (2014). Costruire un'azienda design oriented. Milano: Franco Angeli.
- Bassi, A., Calogero, L., & De Chirico, M. (2021). Territory, sustainability and design. From traceability to the upgrade of production waste. DIID, 73, 86–95. https://doi.org/10.30682/diid7321g
- Bertolini, M., Duncan, D., & Waldeck, A. (2015). Knowing when to reinvent – detecting marketplace "fault lines" is the key to building the case for preemptive change. Boston: Harvard Business Review.
- Borja de Mozota, B. (2010). The Four Powers of Design: A Value Model in Design Management. Design Management Review, 17(2), 44–53. https://doi.org/10.1111/j.1948-7169.2006.tb00038.x
- Calabretta, G., Montaña, J., & Iglesias, O. (2008). A cross-cultural assessment of leading values in design-oriented companies. Cross cultural management, 15(4), pp. 379–398.
- Camagni, R. (2017). Territorial capital, competitive- ness and regional development, in Huggins, R. and Thompson, P. (eds), Handbook of Regions and Competitiveness (pp. 232- 244), Cheltenham: Edward Elgar Publishing. [Online] Available at: doi.org/10.4337/978178347 5018.00016
- Celaschi, F., Celi, M., & García, L.M. (2011), The Extended Value of Design: An Advanced Design Perspective. Design Management Journal, 6(1), 6-15. https://doi-org.ezproxy.biblio.polito.it/10.1111/j.1948-7177.2011.00024.x
- Celata, F. (2009). Spazi di produzione – Una prospettiva relazionale. Editore, Torino: Giappichelli Editore.
- Corbetta, G., & D'Alessandro M. (2006). Cent'anni in movimento: 1906-2006 La Chiorino di Biella tra continuità e innovazione. Biella: Chiorino s.p.a.
- De Giorgi, C., Montagna, F., Coccimiglio, A., Dal Pozzolo Luca, & Albano, R. (2018). Analisi dell'evoluzione dell'offerta di design in Piemonte 2017. Torino: Camera di commercio di Torino.
- De Goey, H., Hilletofth, P., & Eriksson, L. (2019). Design-driven innovation: a systematic literature review. European Business Review, 31(1), 92-114. https://doi.org/10.1108/EBR-09-2017-0160
- Deloitte (2019), Report Best Managed Companies.
- Denis, D.J., Denis, D.K., & Yost, K. (2002). Global diversification, industrial diversification, and firm value. The Journal of Finance, 57(5), 1951–1979. https://doi.org/10.1111/0022-1082.00485
- Dorst, K. (2015). Frame Innovation: Create New Thinking by Design. Cambridge MA: MIT Press.
- Grant, R. M. (2015). Contemporary strategy analysis. Hoboken: John Wiley & Sons.
- Germak, C. (2008). Design e industria in Piemonte. Torino: Allemandi.
- Greenstone, M., Hornbeck, R., & Moretti, E. (2010). Identifying Agglomeration Spillovers: Evidence from Winners and Losers of Large Plant Openings. Journal of Political Economy, 118(3), 536–598. https://doi.org/10.1086/653714
- Johnson, M. W., Christensen, C.M., & Kagermann, H., (2008). Reinventing your business model. Harvard Business Review.
- Le, H. (2019). Literature Review on Diversification Strategy, Enterprise Core Competence and Enterprise Performance. American Journal of Industrial and Business Management, 9, 91-108. doi: 10.4236/ajibm.2019.91008.
- Lüthge, A. (2020), The concept of relatedness in diversification research: review and synthesis, Review of Managerial Science, 14, 1-35. https://doi.org/10.1007/s11846-018-0293-0
- Montagna, F., & Cantamessa, M. (2019). Unpacking the innovation toolbox for design research and practice. Design Science, 5, E8. https://doi.org/10.1017/dsj.2019.3
- Muratovski, G. (2015). Paradigm Shift: The New Role of Design in Business and Society. She Ji: The Journal of Design Economics and Innovation, 1(2), 118-139. http://dx.doi.org/10.1016/j.sheji.2015.11.002
- Parente, M., & Sedini, C. (2017). Design for Territories as Practice and Theoretical Field of Study. The Design Journal, 20(1), S3047-S3058. https://doi.org/10.1080/146 06925.2017.1352812
- Piemonte Agency (2021). Report Piemonte Fashion Luxury Design.

- Porter, M. E. (1998). Clusters and the new economics of competition, Harvard Business Review, 76(6).
- Sarkar, S., & Osiyevskyy, O. (2018). Organizational change and rigidity during crisis: A review of the paradox. European Management Journal, 36(1), 47–58. https://doi.org/10.1016/j.emj.2017.03.007
- Symbola (2020), Design Economy.
- Van Der Pijl, P., Lokitz, J., & Solomon, L. K. (2020). Design a better business Nuovi strumenti, skill e mindset per la strategia e l'innovazione. MIlano: Franco Angeli.
- Vasquez, J., Celaschi, F., Formia, E., Iñiguez Flores, R., León, R., & Triana, N. (2020). Design & Territories: Emergencies and Conflicts at the Time of the Anthropocene. Strategic Design Research Journal, 12(2), Strategic Design Research Journal, 2020-03-23, Vol.12 (2).
- Venkatesh, A., Digerfeldt-Månsson, T., Brunel, F., & Chen, S. (2012). Design Orientation: A Grounded Theory Analysis of Design Thinking and Action. Marketing Theory. Boston U. School of Management Research Paper, 2012-20, http://dx.doi.org/10.2139/ssrn.2104017
- Verganti, R. (2009). Design-driven innovation: changing the rules of competition by radically innovating what things mean. Boston: Harvard Business School Press
- Yin, R. K. (2017). Case Study Research. Design and Methods. Los Angeles: SAGE Publications.

World Design Organization (WDO)®
455 St-Antoine Street West, Suite SS10
Montreal, Quebec, H2Z 1J1 (Canada)
WDO.org