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The Contribution of Design Discipline in Business Decisions through Design-Oriented Production Diversification: A Case Study in Italian Furniture Sector

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Abstract

Firm diversification is a growth strategy that allows firms to launch new products in untapped markets to increase revenue. It is the identified approach where industrial designers can contribute to exploring new tactical assets. The paper analyses the design-oriented diversification of a furniture company in Italy, where Design played a crucial role in positioning new demands. The tool applied to display the current and the feasible product portfolio is the Product Space. The company has leveraged its know-how on bent glass to produce iconic objects, winning prestigious design awards.

Keywords: industrial design, product design, product diversification, business models, ambidexterity

1. Introduction and Research Context - Designers in Companies as Explorers

In recent years, there has been an increasing interest in disruptive business strategies where industrial designers are *"engaged in experiments with the design of business models"* (Simonse, 2014). The discipline of Industrial Design could be an essential key to expanding the horizon of innovation (Dorst, 2015). From this perspective, the designer acts like an explorer who searches for new meanings by creating unexplored project areas, modern production processes, original products and new distribution markets (Lerma, 2018). The existing body of research on business strategies suggests several interesting, innovative business visions where the discipline of Industrial Design can make essential contributions in innovative materials, new technologies, and advanced production processes, not forgetting *"to relate and correctly calibrate the links between function, inspiration, innovation and adaptation to context"* (Germak, 2008). However, we believe that the role of industrial designers throughout business strategies needs to be further investigated and find a broader perspective. Indeed, companies can no longer base their strategies on low pricing to compete in global markets. A further step is needed to look at the design culture as an added value (Borja De Mozota, 2003) for companies that have not yet exploited it as a potential competitive advantage, and implemented design-driven innovation, commonly represented as the innovation of product meanings (De Goey, Hilletofth, and Eriksson, 2019). The contribution of industrial designers can be particularly successful in manufacturing companies where there is a defined competence in semi-finished products, components, and finished products. Moreover, the architecture complexity, intended as a product structure not composed of numerous interdependent subsets, should be medium.

This research examines the emerging role of the discipline of Industrial Design in the context of corporate business and its positive impact through the diversification process; in this study, it is intended as an ambidextrous strategy capable of exploiting the existing capability to explore new markets. In particular, this investigation examines a case study of one relevant Italian furniture firm.

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The choice of sector, as explained below, is not arbitrary. However, the entire research, the applied methodology and the identified tools can be spread to other sectors where design can emerge as a critical success factor. The research focuses on the Italian furniture firm FIAM that, since 1973, has aimed to make the glass a leading protagonist of its design. Specifically, the company has started to produce chairs and tables entirely in glass and has differentiated its portfolio with additional products by exploiting its glass processing skills. The authors organised the company's product portfolio through the tool of the Product Space Analysis (Hidalgo and Hausmann, 2009) to better understand the current state of the art and the new product opportunities that the company can seize. In detail, we highlighted the primary manufacturing sector, glass processing, and subsequently the products in the product portfolio, looking for connections between common manufacturing skills.

This study finds that the Product Space Analysis can help industrial designers define the paths to introduce new products based on the companies' know-how and competencies, contributing to new business decisions.

This work aims to generate fresh insight into the field of Industrial Design research in connection to Business Management. We believe that this relationship can be able to find unexplored meanings and needs, because of *"the nature of design as an integrative discipline places it at the intersection of several large fields"* (Friedman, 2003). The design-oriented diversification process is the strategy identified to explore and take advantage of emerging technological paradigms, creating new products that highlight the design culture.

In order to focus on the cited goals, we defined the following research questions for this initial study (Blessing, 2009):

1. What is the role of the discipline of Industrial Design in corporate business?
2. How to help industrial designers generate new concepts exploiting the company's competencies?

2. Diversification as Ambidextrous Strategy

2.1. Brief Overview

Diversification is a business strategy adopted by firms to increase their revenues and spread the business risk by changing and updating the product portfolio. Igor Ansoff (1957), a Russian American business manager and mathematician, was the first who identified in the mid-1900s four main strategies for firms' growth in turbulent markets: increasing in market penetration, market development, product development and diversification, as illustrated in the matrix in Figure 1. In particular, when implemented, diversification must satisfy stakeholders' interests, and companies that decide to diversify will have to decide which products to launch, improve or eliminate. This choice depends on the stage the product is at in its life cycle. Moreover, diversification focuses on new markets with a new product; it makes the competition irrelevant, creating and capturing new demand, as the "Blue Ocean" strategy does (Agnihotri, 2016). Companies operating in mature or declining sectors implement corporate-level strategies, and diversification is now customarily used. Moreover, the literature in this regard is vast (Lüthge, 2020).



Figure 1. Matrix of key strategies for increasing company business, including diversification. Source: Authors' adaptation from Ansoff, 1957

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The combination of the company's intrinsic competencies and the exploration of new markets was firstly defined by Duncan (1976; Tushman and O'Reilly, 1996) as an ambidextrous strategy, which aims at modelling a flexible company, ready for new opportunities (exploration capability) and able to exploit the resources it already possesses (exploitation capability). As O'Reilly affirms (O'Reilly and Tushman, 2013), the appropriate lens through which to view ambidexterity remains that of dynamic capabilities, the ability to integrate, build and reconfigure internal and external competencies to deal with rapidly changing environments (Teece, Pisano and Shuen, 1997). This strategy is identified as particularly interesting and helpful to industrial designers who thus propose a reasonable and profitable exploration. Product diversification proves to be particularly advantageous when exploiting existing capabilities to explore new markets as an ambidextrous strategy does. Moreover, we agree with Stoimenova when asserting that the designers can play in managing ambidexterity, and this topic is missing from the debate. Therefore, in this research, product diversification is intended as an ambidextrous business strategy where industrial designers can provide the most outstanding contribution, combining their skills in exploring innovative uses of production processes to create new products. Through this alternative product-market strategy, industrial designers leverage existing company's capabilities, embrace new trends and increase the potential for new geographic markets (Denis, Denis and Yost, 2002).
In addition, industrial designers allow, starting from a company that processes materials and produces products, to include new materials in the production process or increase the number of production processes to differentiate the product portfolio (Figure 2).

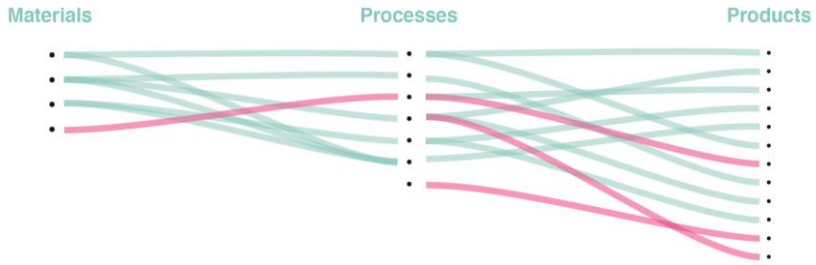


Figure 2. Diversification introduces new materials, new production processes to design new products. Source: graphic by authors

2.2. Displaying the product portfolio

The paper aims to schematize and make visible the production diversification of the company through the "product space" tool. It was born as a data visualization medium of the Atlas of Economic Complexity (Hidalgo and Hausmann, 2009), developed by Harvard University and launched for the first time in 2013. The Atlas allows to study global trade flows through data about the breakdown of exports and imports by products, displaying new and feasible opportunities for diversification, and tracking these dynamics for every country for a time. The product space is one of these tools that help in the visualization of complex data. Specifically, it shows what products a country produces and exports and connects more than 1200 products by the similarities of productive capability required to manufacture them, as shown in Figure 3. The main clusters are highlighted by different colours: chemicals, machinery, vehicles, minerals, textile, electronics, metals, stone and agriculture.
Countries (and firms) tend to diversify by moving toward nearby related products or requiring similar know-how to leverage existing capabilities. The Product Space is a visualisation of the "capacity distance" between products. The analysis estimates how it is easy to obtain the necessary know-how to make new products based on existing production capabilities. Therefore, the authors suggest it here as a methodology to identify new sectors and goods where a firm is more likely to be ready to change, given the current productive capabilities. The resulting schema is a visualisation of the connections between products based on the know-how they share. Visually proximity products require similar capabilities, with a greater likelihood of diversification success. Two products that require entirely different capabilities are visually distant, and the diversification process could require more efforts, investments and resources. The Product Space is the tool we have chosen to visualise the company's product portfolio and explore possible production diversifications. Although the tool has been designed on a

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large scale, that of a country, we believe it can be very well adapted to a smaller scale, that of a company. In fact, it is crucial to consider the resources and competences that a state/industry has to identify new opportunities. One parameter that makes up the product space is the Product Complexity Index (PCI), which ranks the diversity of the productive know-how required to manufacture a product. It will help the research to understand the degree of complexity of the production of the analysed company.

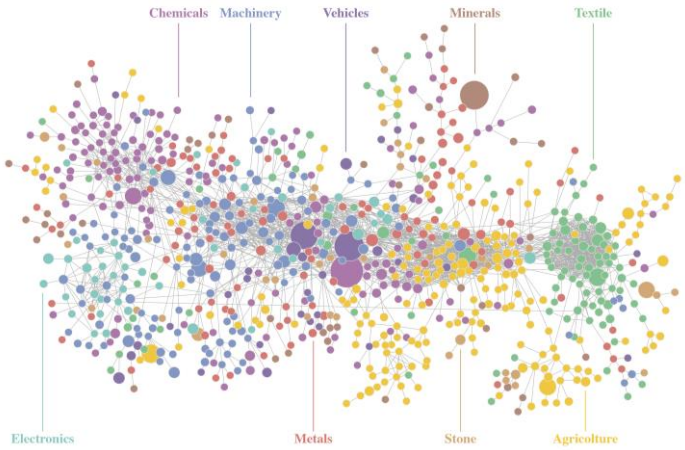


Figure 3. Product Space tool, Italian Economic Complexity representation. Source: atlas.cid.harvard.edu, 2018

3. Research approach

3.1. Data sources

The study described here is a portion of the author's doctoral research that uses the collection of case studies as a research method, following the well-established iterative path proposed by Yin (2017) in order to gain insights into new business design modes. The database catalogues 60 case studies of Italian firms from different production sectors that have applied the strategy of design-oriented diversification. We agree and apply Calabretta's definition (Calabretta, Montaña and Iglesias, 2008) of design-orientation, namely when "design is 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". The sources consulted for the collection of case studies are many and varied, such as reports from research centres, articles from national newspapers and territorial bodies. The database collects information regarding the territory and its resources, the size of the company, the factual and causal knowledge that allowed the diversification, and the materials and production processes used before and after the strategy.

3.2. Inclusion criteria

In particular, we will describe the business reality of one company of the cited database and how it gained a competitive advantage through diversification strategy. Among the case studies collected, furniture is the sector chosen for this research because it is an essential field for studying human needs (de Medeiros, da Fonseca and Rocha, 2021) and because it is one source of great experimentation in terms of shapes, materials and processing. The research not presented here expands its boundaries beyond the furniture sector, as in automotive, fashion, household appliances, for example. However, furniture is one of the main representative sectors that communicate the excellence of the Made in Italy in the world: in fact, furniture is a leading sector in Italy at the European and world level, according to data from the report "World Furniture Outlook 2020" (CSIL, 2020). Thanks to the most significant number of furniture companies in Europe, Italy ranks fourth worldwide for production and fifth for exports. In addition, 23 out of the top 100 European furniture manufacturers are Italian

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enterprises, indicating how the sector is deeply linked to the Italian production culture, so the authors opted to focus on this inspiring sector in the following paper.
The research, partially presented here, adopted criteria for selecting the firm as follows: as mentioned before, manufacturing companies that produce semi-finished products, components, and finished products with a medium architecture complexity, high impact of innovation, exploration of new opportunity, and broad diversification of the product portfolio. The strategies adopted by the firm led to winning the design award Compasso d'Oro, the most longstanding prestigious world design award, instituted in 1954 from an idea of the architect Giò Ponti to highlight the value and quality of Italian design ("Design from abroad", 1962). The award selects products or services based on product performance (usability, versatility for human diversity), social and design responsibility (aesthetic-formal, typological, functional, perceptual, experiential, cognitive), reduction of environmental impact (disassembly, recycling or recovery of parts, energy-saving, optimisation of resources), appropriate and innovative use of technologies, materials, components and processes and finally formal coherence (ADI, 2022).

4. Case Study: Product Diversification of FIAM

4.1. Introduction

In the following paragraph, we will investigate the diversification strategy of the Italian company FIAM. In particular, a brief historical description will precede the analysis of the materials used and of the core expertise that the company has developed over the years. The subsequent visualization of the product space aims to describe the strategies that the company has successfully adopted. The analysis follows the production path accordingly. First of all, we will discuss the material that the company wants to make the protagonist of its business: glass. Subsequently, the production and transformation processes of the raw material will be described, with particular attention to the opportunities it offers. FIAM specializes in cutting and bending glass but has added silvering to create mirrors from sheets of glass and design any glass furniture among its expertise over the years. As we will see, the company has maintained its core business in cut and bent glass, a high-complex technique thanks to which they have won numerous awards, but has added new products to its portfolio, improving its market positioning.

4.2. FIAM: from Moulded Glass to Smart Mirrors

The company under study is the Italian FIAM, founded in 1973 by the entrepreneur Vittorio Livi in Tavullia, in the Marche region in central Italy. The company's core business is evident from the first product released on the market, Onda, a pouffe made of wired glass with smooth and rounded shapes. FIAM was the first company to produce furnishing elements in bent glass. Indeed, the production of bent glass is complex due to the highly specialized processes involved. Briefly, the first step of the process is forming a steel mould of the desired shape; it must be preheated before placing the flat pane of glass to prevent the glass from shattering. The glass is cleaned, polished and checked with a UV lamp to remove dirt. Once the mould is preheated, the clean glass lax is laid on top and placed back in the kiln at a temperature of 700° C. The glass will slowly deform and take the shape of the mould. Finally, the shaped glass is gradually cooled. The sheer number of variables is vast, only one has to be wrong, and it is a write-off.
Over the years, FIAM added to the product portfolio other chairs, coffee tables, desks, and the first table made from a single, large sheet of glass. Success came in 1987 with Ghost, the first glass armchair designed by Cini Boeri. The chair immediately became an icon of Italian design and the *Made in Italy* all over the world. The concept of a chair made entirely of glass can be defined as design-driven innovation, capable of developing new meanings and creating new markets (Verganti, 2009). Indeed, design-driven innovations are radical visions that do not address current needs but future desires. As Cini Boeri said:

> *"I would never have thought of making a chair from glass… My initial distrust of an idea which seemed quite unrealistic was overcome by the desire to take up the challenge and see whether it could actually be made." (FIAM, 1987).*

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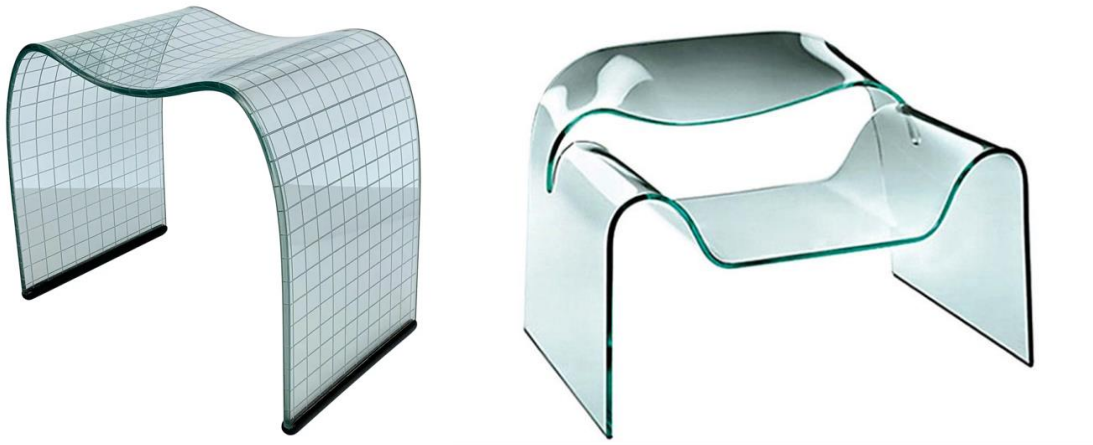


Figure 4. Onda pouffe, design Vittorio Livi, 1973, and Ghost armchair, design Cini Boeri, 1987, FIAM. Source: FIAM Italia

Eleven years later, in 1998, FIAM continued with its product diversification by adding one material, metals, and a production process, silvering. Silvering is the chemical process of coating glass with a reflective substance to produce a mirror. Although the process maintains the name "silvering", different metals were used over the years, from tin and silver to aluminium powders. French designer Philippe Starck designed Caadre, the first product in which bent glass is combined with the mirror element. In this case, the company implemented the strategy of diversifying production by orienting it towards related products. Chairs, tables and mirrors are not only part of the same sector, furniture, but they have a strong connection thanks to the primary material, glass. The company has diversified its product portfolio using the same material by adding a process (silvering) related to its know-how.



Figure 5. Caadre mirror, design Philippe Starck, 1998, FIAM. Source FIAM Italia

In 2001, founder Vittorio Livi received the prestigious design award, the Compasso d'Oro to the career. The jury did not award a specific product, but the company and the use of glass, such an old material, in a new project dimension, where design, connected to innovations in production processes, has allowed unique and innovative solutions. Through glass and the ingenuity of industrial transformations, FIAM's design has developed and renewed the product's image within the home. The company continued its glass and mirror manufacturing experiments in the following years, such as hand-interwoven spun glass and increasingly complex amorphous mirrors in fused glass.

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Figure 6. Macramè coffee tables, design LucidiPevere, 2012 & Christine, Christine di Dante O. Benini, Luca Gonzo e Helidon Xhinxha, 2015, FIAM. Source: FIAM Italia

In 2021, the company added a set of TV mirrors to its product portfolio through a co-branding deal with LG. The result is an integration of the previous mirrors already on the market with a television that is invisible if turned off, so the mirror has its original reflective function. Co-branding is a diversification strategy that allows the two brands to make a single or complementary product to secure mutual benefits. This collaboration has the effect of strengthening the notoriety of the two brands and extending it into the other's niche market. Co-branding could also be considered an ambidextrous strategy because it takes advantage of existing resources and seeks new opportunities with another brand.



Figure 7. Caadre TV, 2021, FIAM and LG. Source: FIAM Italia

Nowadays, thanks to the innovations brought to glass processing, FIAM is the leader of a discrete panorama of Italian companies specialising in bent glass processing, such as Veur, Duzzle, Vetrotec.

5. Findings and Discussion

5.1. FIAM: Strategy Analysis

According to the Product Complexity Index (reported on the website of the Atlas of Economic Complexity), FIAM produces highly complex products. The bent glass has a PCI of 1.95 and ranks 14th out of 1224 in products complexity. It means that the company owns a range of high-complex know-how in manufacturing ad highly skilled individuals' know-how. Sheet glass has an index of 1.39 (73rd in the ranking); therefore, the glass bending process increases the complexity of the final product. Glass mirrors has an index of 1.32 and is 91st in the ranking. The analysis does not include the PCI of televisions since they are not produced by the company, due to the co-branding strategy. Thanks to the diversification process, as seen in Figure 8, the company introduced new materials (metals and television), a production process (silvering) to manufacture new products (different chairs and bent glass tables, bent glass mirrors and mirrors with integrated television).

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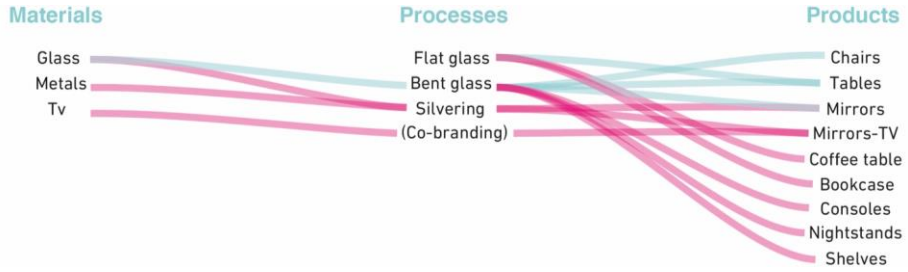


Figure 8. Visualisation of the diversification strategy. Source: graphic by authors

In addition, by consulting the product space tool, the company FIAM, given its expertise and know-how, can further diversify its production to expand the product portfolio while remaining in the furniture sector. For example, it can add copper foil production, whether printed or backed with paper, plastics or similar backing materials, optical elements such as prisms and lenses, safety glass (tempered or laminated), lamps and lighting fittings, sliding glass doors, glassware for interior decorative use. Designers, knowing the areas where they can operate within the company, can propose new products that fit into its strategy; one purpose is to find unexplored market niches that could be a driving force for the company. These are some examples of components or products with a suitable PCI for the company's production competences. The result is a visualisation of the current and feasible product portfolio.

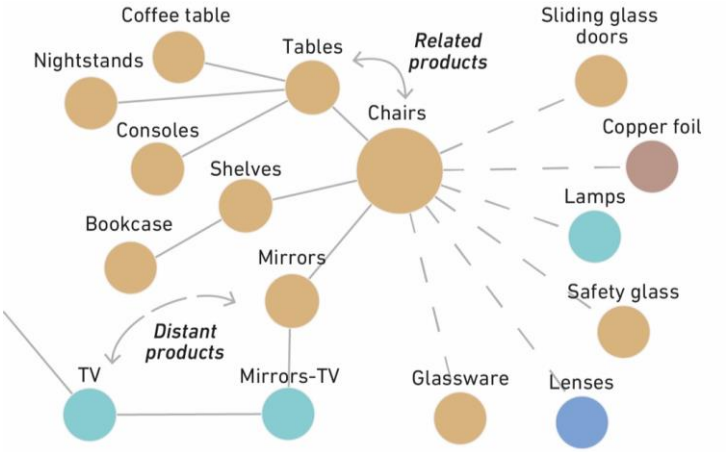


Figure 9. Current and feasible product portfolio. Source: graphic by authors.

5.2. Shifting to Related Products

In the current economic-financial uncertainty that Italy is going through, companies in critical and unstable conditions need to be guided by disruptive business strategies able to systemise the skills, competences and assets they already possess. A multidisciplinary team of product designers and innovation managers can challenge steering companies from saturated markets towards new markets with new related products but *"usually, the practitioners don't realise that what they are doing or using is something that originated within the design research community"* (Cross, 2018). In order to be effective, this process requires a change in the order of the idea generation process, as Herrmann proposes (Herrmann, Roth, and Binz, 2020); firms must first analyse new problems, about the internal and external business environment, and production requirements before looking for solutions in a structured way based on these. Therefore, we believe that the concept of relatedness can help industrial designers shift from analysing "what is" to begin considering "what could be?" according to the technological relatedness of diversification (Whittle, 2020).

6. Conclusion

The present research has investigated the role of design culture in business strategies, particularly in diversification as ambidextrous strategy. This dissertation followed a case-study design, with an analysis of FIAM, a leading Italian firm in glass processing. Indeed, the use of qualitative case studies is a well-

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established approach to report on innovative business strategies worldwide. The company took advantage of diversification strategy by updating its product portfolio over the years by adding new materials besides glass and complex manufacturing processing. The high skill in working with glass led to the victory of the Compasso d'Oro, the most prestigious Italian design award and be recognised as a virtuous example of Made in Italy throughout the world. In the beginning, FIAM produced only curved glass chairs; after 50 years, its catalogue boasts tables, mirrors, mirrors-tv, chairs, coffee and sides tables, consoles, library systems, nightstands, desks and shelves. The advantages of a diversification strategy are many. Firstly, FIAM spread the firm risk by producing similar and related goods to glass furniture, penetrating similar markets (furniture sector) using existing resources, know-how and experiences. The company uses common distribution channels and related management procedures by adapting resources, generating a synergy effect. Indeed, as a resource-based view, firms develop additional and specific competencies to product development in that particular field through a firm diversification strategy. Having recognised the firm's core competence, designers can develop new products that might allow the firm to enter the most profitable markets and exit when needed. The firm will continuously strengthen its core competencies because of the expertise gained in other fields (Cantamessa and Montagna, 2016).

The finding of this study suggests that industrial designers can consult the tool of economic complexity to steer company choices towards unexpected solutions that consider the company's production capacities. One issue encountered is that the economic complexity analysis and product space were designed to be applied at a national level, broader than the corporate level. However, the authors are planning to analyse the use of the methodology at the corporate level. The authors seek to contribute to the field of design study by defining the role of design in corporate business strategies. The role of industrial designers is changing and evolving: they are no longer eccentric artists, as famous gurus of the past, but vectors of innovative strategies oriented to the needs of the end-users (Muratovski, 2015). Indeed, *"designer need to diversify and blur the boundaries between sub-design-disciplines to develop successful multidisciplinary teams"* (Raijmakers, Thompson and van de Garde-Perik, 2012). Industrial designers can find profitable opportunities through new products to be included in the company's product portfolio, using the know-how already owned. Intended here as an ambidextrous strategy capable of increasing long-term firm performance (Raisch and Birkinshaw, 2008), diversification allows creating innovation at minimum cost.

A further study with more focus on "unrelated diversification" (Ng, 2007) is suggested. Although the distinctive line with the related diversification discussed in this research is still unclear, we can assume that the product space in unrelated diversification is longer than in the case study analysed previously. Moreover, to develop a complete picture of the designer role in diversification strategy, additional studies about the impact of design research groups and anonymous designers will be needed.

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