

## Designing a collaborative ecosystem for sustainability transition in the furniture industry: the Opendesk case

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**Abstract:** Humanity faces a period of changes, leading to a global transition with unpredictable outcomes. Design can play a key role in guiding society to face these challenges, helping the different socio-technical system stakeholders cope with the sustainable transition. The change towards more sustainable economic and social systems requires the design of products and services and new business models and integrated systems that deliver them. This implies shifting from individual company thinking towards coalitions and partnerships like collaborative ecosystems.

The furniture industry is facing a sustainable transition, therefore, companies and the market are experimenting with new approaches, including collaborative ecosystems. Because of this, it is important to understand how design can contribute to the definition, creation, and development of a collaborative ecosystem for sustainable transition in the furniture industry. The article adopts the single case study methodology, proposing the analysis of Opendesk, a furniture delocalised network.

The research shows how the design mindset has enabled Opendesk to create a collaborative, scalable, and resilient business that values stakeholders in the system and local production. It was possible to address the challenges of building and maintaining a community and network, creating engagement through design. Through the design mindset in the creation of a collaborative ecosystem, it was possible to help local manufacturers to be efficient and economically viable, allowing customers to contribute to the local economy and value. The case study shows the potential of design to catalyse relationships for fruitful collaborations between stakeholders with different goals and provide systemic innovations.

### Introduction

The historical period underway is characterised by transformative changes, defined as the Anthropocene, i.e. an era where natural processes at different levels have been impacted by human activities (Crutzen & Stoermer, 2000). This has generated a period of multi-level changes that has led humanity to a global transition, with uncertain outcomes depending on how environmental, economic and social persistent problems are solved (Raskin et al., 2002). These issues concern societal needs and are intertwined with different domains and stakeholders, demanding innovations aimed at sustainability (Rotmans & Loorbach, 2008). In this panorama of transitions, companies represent a fundamental asset for socio-technical systems, as they provide cultural innovation and social well-being and satisfy needs through their products and services (Mosca et al., 2015).

The design discipline can play a key role in helping to address social and business issues of sustainable transitions through design principles (Van Selm & Mulder, 2019). Indeed, transitions towards more sustainable economic and social systems require designing products and services and experimenting with new business models and integrated (eco)systems to offer them (Bocken et al., 2019). Therefore, sustainable design theory is connected to business concepts beyond the individual company, leading to coalitions of organisations working together for change, i.e. collaborative ecosystems (Manzini, 2017). The design of a collaborative ecosystem implies a strategic and systemic effort aimed at testing solutions for sustainable change of entire sectors (Konietzko et al., 2020).

Because of this, it becomes necessary to create customised solutions that look at specific markets. The furniture industry represents an

important sector of the European economy. Nowadays, it faces numerous environmental challenges and is going through a period of transition towards sustainability (Forrest et al., 2017). Furniture companies are exploring different approaches to achieve sustainability and circularity goals, which makes this sector fertile for new analysis and experimentation.

With this in mind, it becomes necessary to understand how design can support furniture industry stakeholders in an economic, organisational and social transition. Therefore, this article aims to answer the question: How can design contribute to defining and creating a collaborative ecosystem in the furniture sector that is driven by the objective of sustainable transition?

To answer this question, the article adopts the single case-study methodology, proposing the analysis of Opendesk. Through the case study, it will be possible to highlight the role of design in creating and developing it and address the barriers that arise.

### **New models of inter-organisational collaboration in business**

In recent years, the business sector has changed. An increasing number of firms have adopted the concept of shared value creation (Porter & Kramer, 2011) and positioned themselves as purpose-driven organisations (Gartenberg, 2021). This change influences the innovation approaches and growth mechanisms in current business practices. Due to the complexity of many of the world's urgent problems, creating and implementing needed solutions require diverse expertise, scalable business models, and inter-organisation collaborations for the private sector. No company could operate isolated and tackle system-wide changes; each exists within an ecosystem where various actors collaborate to achieve a collective impact (Angus-Leppan et al., 2010; Kania & Kramer, 2011). Therefore, the success of implementing new business models for companies also relies on the establishment of collaborative capacities across organisations to co-develop and co-shape the ecosystem (P. Brown et al., 2019). The concept of ecosystems is highly linked to strategic innovation and business models. A "macro" business model, is a collaboration between multiple organisations that create a value network and achieve a competitive advantage by co-delivering value propositions (Talmar et al., 2020). A collaborative shared

value at the ecosystem level with governments, social sector, and competitors is essential to guarantee both the corporates' business success and the social progress of society. In this way, companies can effectively tackle complex social issues, leading to sustainable economic opportunities and a redefined role for business in society (Kramer & Pfitzer, 2016).

### **Design for collaborative ecosystem towards sustainability**

Design is well suited to facilitating the understanding of complex systems (Hill, 2017). Buchanan's four orders of design (2001, 2015) serve as a foundational theoretical framework for understanding the different levels of scopes of design problems and practices. This framework not only categorises the evolution of the design discipline but also opens the potential for design to expand its scope into emerging fields and research domains. Over the past decades, design thinking (T. Brown, 2008; Dorst, 2011) has been increasingly acknowledged in both academic research and professional practice as a distinct cognitive framework for creative problem-solving and leading to business success. Design is often considered a process, method, and strategic tool for building organisational capacities and supporting companies in effectively framing and implementing their innovation strategies and activities. In business, design is often defined as a way to understand and manage complex social, environmental, and political problems. Irwin (2018) proposed the concept of Transition Design, proposing a framework to design for system-level change, fostering positive changes toward more sustainable and desirable futures. She developed a methodology and process for designers, stakeholders and organisations to work collaboratively and closely. The discussion of design's role at the systemic and ecosystemic level is also present in the significant framework of Design for Sustainability (Ceschin & Gaziulusoy, 2019). At the socio-technical system level, design concentrates on intervening in large-scale systemic changes, integrating technological innovations, societal norms, policies, and infrastructures to facilitate sustainability transitions.

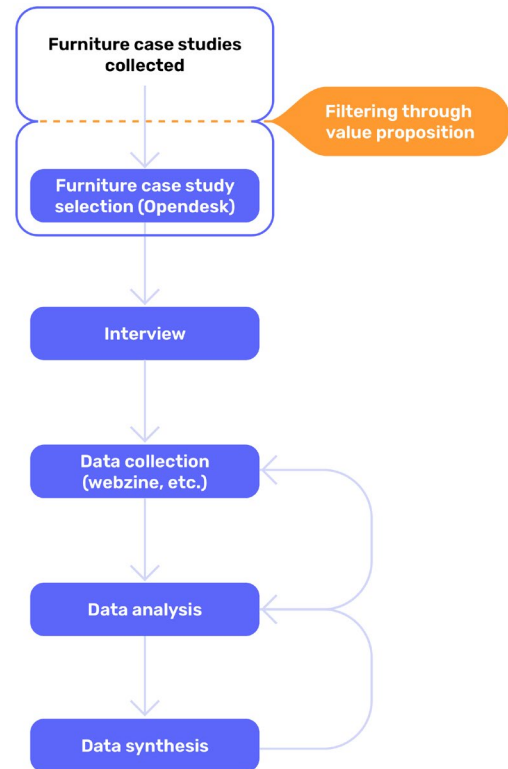
The transition to new societal or economic systems, such as a circular economy, requires the systemic design approach to strategically define and deliver new products, services

systems, and business models, as well as establish the conditions and collaborative capacities among organisations at the system level (Baldassarre et al., 2019). The current literature on collaborative ecosystem design explores strategies for fostering inter-organisational interactions aimed at transforming entire industries and markets to support the transition toward sustainability (Talmar et al., 2020). Literature extends beyond a firm-centric perspective to integrate with broader networks and systems. Design-driven collaboration can creatively address complex, systemic challenges within innovation ecosystems, emphasising the importance of engaging diverse stakeholders in co-creative processes to develop effective, sustainable, innovative solutions (Quint, 2024). This facilitates the formation of coalitions of organisations collaboratively advancing the transition toward sustainable development (Manzini, 2017). Conversely, the collaborative ecosystem design approach requires designers to embrace a systemic-shifting mindset to carry out their practices (Drew et al., 2022).

## Methodology

The case study methodology was adopted to understand how design can contribute to the realisation of a collaborative ecosystem in the furniture industry. Since the research question focuses on 'how' and complex organisational issues, it was considered appropriate to analyse a single case study in detail and develop theories (Yin, 2013) for the furniture sector. Indeed, individual case studies have the potential to investigate complex phenomena in specific contexts and clarify the relationships between constructs and actors (Siggelkow, 2007). Sample selection becomes crucial from this perspective, as the case study must be selected to provide a unique perspective and insight (ibid.).

In this research, the sampling strategy involved an initial phase of case study analysis in the furniture sector at large (Figure 1). Here, the companies that offered products and services or had business models oriented towards sustainability and CE were identified. Subsequently, these were re-analysed to identify firms whose value proposition was based on cooperation with other stakeholders and the collaborative ecosystem. Among these, Opendesk offers a unique perspective. Its offering is based on a network of partnerships with workshops and local manufacturing



companies, without which it could not produce

**Figure 1: Research process adopted**

the furniture. Through this, Opendesk aims to counter a massified market with global shipments and build a distributed and ethical supply chain.

Once the case study was identified, emphasis was placed on collecting data from multiple sources of information. First-hand data were collected through a semi-structured interview conducted online with an elite company member (Harvey, 2011), i.e. a figure with a strategic overview of the design and production process. As Opendesk is a micro-business, the interviewed figure holds multiple roles in the company, is the CEO, and performs design and supply chain management functions. The interview aimed to highlight the role of design during the experience of creating and scaling up the Opendesk collaborative ecosystem. The interview lasted 1 hour 15 min, and with the interviewee's consent, it was recorded, transcribed, edited to make it easier to read, and finally verified by the interviewee. The interview was complemented with desk research to eliminate bias and facilitate data triangulation. Second-hand data were collected using grey and company literature (e.g.,

company website, magazine and webzine articles).

The information collected was analysed and synthesised to create a coherent narrative of the findings. In particular, the interview was analysed using content analysis to facilitate categorising qualitative textual data into conceptual categories to identify relationships between variables and themes (Harwood & Garry, 2003; Julien, 2008), in this case, between design and collaborative ecosystem. The conceptual categories were first based on what has been defined in the literature, correlating concepts in sustainability and strategic/systemic design, focusing on shared value proposition, collaboration and stakeholder involvement, barriers and enablers. These categories were revised or confirmed after data interpretation. To increase the robustness of the results, the categories and findings were discussed by the authors and afterwards validated by the respondents (Goffin et al., 2019).

## Results and discussions

The data highlighted the potential of design in facilitating the creation, implementation, and development of a collaborative ecosystem in the furniture industry, primarily using design at the strategic, tactical, and operational levels. In addition, the interview revealed four main

barriers and enabling factors of sustainability transition in which design can play a role. Therefore, this section first describes the Opendesk collaborative ecosystem; then, the results are analysed following two macro clusters [1;2]. Figure 2 emphasises the barriers and connections to the design mindset.

### *A brief overview of the Opendesk collaborative ecosystem*

Opendesk is an online furniture marketplace that connects customers to local makers, creating scalable local manufacturing processes worldwide. The business concept is based on the design for digitalisation; indeed, virtual files can travel the world faster and sustainably than a real piece of furniture. For this reason, the company does not possess any means of production and does not mass-produce furniture in a centralised manner to be shipped worldwide. Instead, it creates partnerships with local workshops to make the products. Because of this, the company relies on principles of trust and flexibility with its manufacturing partners, which do not have to possess a specific machine model but understand the process and the objectives. Hence, the company defines itself as a designed, value-driven brand based on ethical and social objectives.

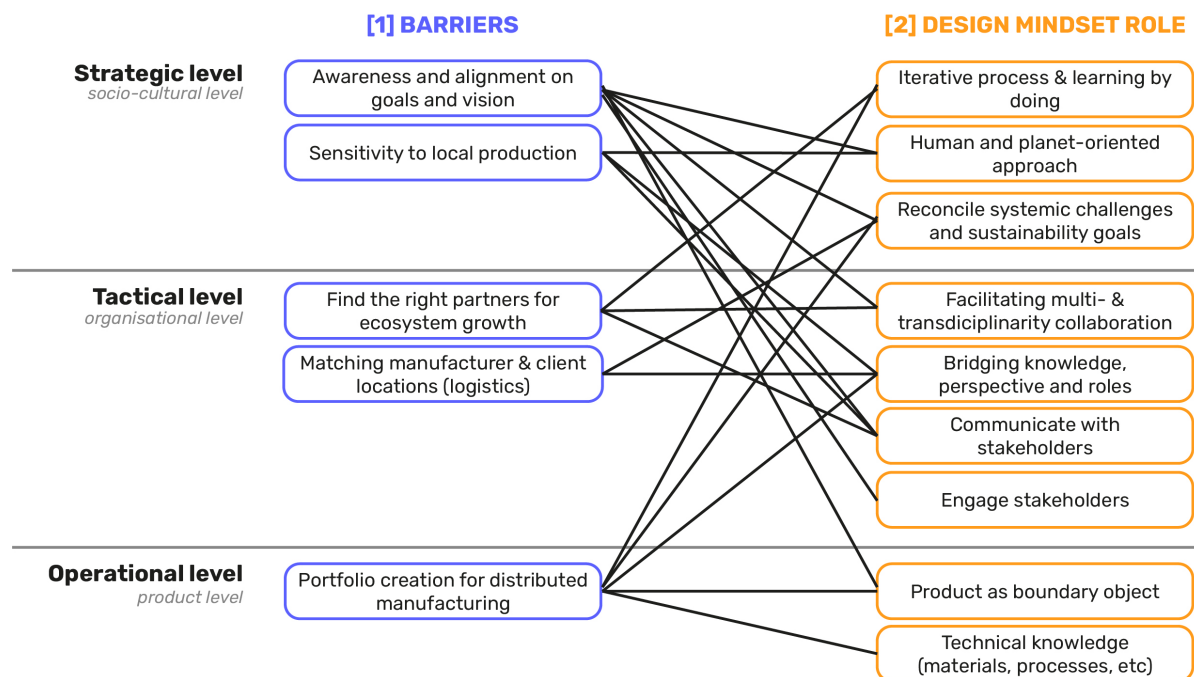


Figure 2: Barriers and the role of design emerging from the results of the case study analysed



Opendesk brings value to local businesses by giving them visibility, improving their efficiency, and connecting them with customers who contribute to their economic sustainability. On the other hand, customers receive local products manufactured according to sustainability standards. For this reason, the partnership principle allows Opendesk to expand and shrink as needed, to experiment in new markets without fear of failure, and not look at the company's growth merely on profit.

### *[1] Barriers to the establishment of a collaborative ecosystem in the furniture sector*

Thanks to the interview, it was possible to highlight the company's barriers while establishing and scaling its collaborative ecosystem. Four can be summarised, varying in breadth of scope, ranging from socio-cultural, organisational and economic barriers to product design.

One of Opendesk's first challenges was to design furniture that could be produced with any machinery and software in different parts of the world. For this reason, there was a continuous and fruitful dialogue with the workshops, through which it was possible to define a design language, standard elements (i.e. panel dimensions, metal fixings, components, finishes) and guidelines the designers must follow. Thanks to this effort, it was possible to develop a portfolio capable of accommodating and enhancing the different capabilities of local manufacturers worldwide.

Logistics was another challenge for Opendesk's collaborative ecosystem. Indeed, a decentralised production hides the need to rely on various organisations and associate each order with a specific supplier, matching both geographical locations and complicating the logistics. Linking customer demand to local production required frameworks to manage cost, efficiency, communication and quality without relying on traditional economies of scale. Therefore, Opendesk has developed bespoke software based on a multi-step process to deal with this problem while at the same time enhancing the dialogue with the customer and local manufacturers, acting as a bridge and relying on a proprietary database. Thus, to govern a collaborative ecosystem, setting up a flexible system and efficient communication channels becomes crucial to govern unpredictability and complexity.

Deciding to decentralise production, not owning the production means, and the ethical values underpinning the collaborative ecosystem have hindered the company's growth. On the one hand, ethical values have led to investor selection - identifying only those aligned with the company's philosophy - on the other hand, the efficient use of resources also has a significant impact. In this regard, the company collaborates with local manufacturers to find efficient solutions.

In large collaborative ecosystems, such as Opendesk, each stakeholder has different priorities and levels of understanding of the collaborative model; therefore, raising awareness among the manufacturing partners and customers about the benefits of this model required targeted efforts to communicate its value and benefits. Aligning ethical visions with economic aspects required strong commitment and consideration regarding investments, especially since profit was not the sole objective.

The consequence of a local manufacturer ecosystem is minor differences in products. This is why Opendesk also aims to propose a cultural change where these differences are enhanced, highlighting the value of local manufacturing and sustainable consumer choice. *"Our challenge was to show these differences as a strength, this means you're making a choice as a consumer"*. From this perspective, Opendesk's actions attempt to act on the socio-technical system, linking innovations in production models with a more sustainable consumption model.

### *[2] Role and application of the design mindset at different levels*

From the Opendesk experience, it is possible to highlight how design played a crucial role in the mindset with which the collaborative ecosystem's various steps of conceptualisation, implementation and development were approached. By design mindset, we mean a way of thinking and acting typical of the designer, which values curiosity and exploration, broad observational (ethnographic and ecological) insight, interdisciplinarity, as well as empathy, collaboration, and the ability to embrace and deal with uncertainty and complexity (Dong, 2015; Papile, 2022; Zurlo, 2022; Lavrsen et al., 2024). More specifically, this affected the strategic, tactical, and operational levels.

At a strategic level, the design mindset allowed Opendesk's founders to approach the process of ecosystem creation using an iterative process. This allowed them to move forward and learn by doing (also mistakes), adjusting their focus until reaching optimal solutions. This can be seen in the company's first steps, taken initially on familiar territory and then scaled up to foreign ones, but also in the failure to open up to a foreign market with different logic. Moreover, the design mindset allowed the founders to focus on human and planet-oriented aspects to put these values at the core of the shared value proposition. *"If something's made locally, it has the benefit of local employment, then also brings other benefits. Something made locally benefits the economy, also benefits the environment and travels a short distance"*. This is because the designer, prone to collaboration with various disciplines, naturally becomes the carrier of values and aspects of sustainability and ethics, enhancing them and placing them at the centre of his actions (Papile, 2022). Thanks to its approach and mindset, design can be a strategic catalyst for systemic change. It can help to create and sustain collaborative ecosystems, underscoring the importance of an iterative and uncertain path and balancing the needs of different stakeholders (human and non-human). This adaptability demonstrates how design can reconcile systemic challenges with sustainability goals, offering a pathway for other organisations aiming to innovate in complex contexts.

On a tactical level, the mindset and design skills have translated into the need and ability to engage stakeholders and the value chain. As mentioned, the designer is trained and prone to multi- and trans-disciplinarity, collaborating with different figures to integrate knowledge within a project. This translates into involving stakeholders and making them feel part of the process, communicating with different figures, and creating consensus around a common idea or objective. For Opendesk, this meant creating partnerships with local workshops, involving them by respecting their capabilities, giving them value (intellectual and economic) and acting as a bridge and mediator. *"We're trying not to dictate the process, but we're trying to control the outcome, and we're trying to support them and make sure that they're fully aware"*

Design also contributed to the operational level by designing and understanding materials, products, and processes. In particular, the

product is a *boundary object* (Oswick & Robertson, 2009) for Opendesk, the local manufacturers and customers; it serves as a medium for dialogue and facilitating connections at a systemic level (like partnerships, logistics, online platform). The product acted as a trojan horse to initiate a dialogue with local manufacturers within their comfort zone, i.e. the product. In addition, capabilities and knowledge about materials, production processes, digital manufacturing, and generative processes also had a direct influence.

## Conclusions

The Opendesk case study allowed us to emphasise the transformative potential of design in shaping collaborative ecosystems. The design mindset provides the necessary flexibility to deal with complex processes and systems to develop sustainable organisation and collaboration. Moreover, in practical terms, Opendesk embodies the values of Transition Design, providing a relevant case study to the academic community. By fostering resilience through scalable operations and leveraging localised resources, businesses can reduce environmental impact while enhancing adaptability. In addition, creating stakeholder networks highlights the importance of building shared values and trust, essential for sustaining collaborative relationships over time. The mindset and skills of the design(er) are also crucial in this, thanks to its interdisciplinary, communicative and mediation capabilities. Finally, Opendesk's efforts to redefine consumer perceptions and promote alternative consumption models underline the role of design in driving broader systemic change, influencing both industry practices and societal behaviour toward sustainability.

To validate the results and considerations drawn from this case study, future research may analyse similar collaborative ecosystem case studies, exploring different industries and markets also looking at different point of view from different stakeholder in the same ecosystem. In addition, future research could investigate the role of design in changing companies and ecosystems, which, unlike Opendesk, have integrated sustainability values over time, changing their nature.

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