

# The New European Bauhaus: The 'Simplicity' of Innovation in Design

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## ABSTRACT

European initiatives, such as the New European Bauhaus, foster collaboration across diverse sectors, artistic experimentation and new materials, creating a movement that inspires and guides the transition to a fairer and resilient future for the Next Generation. In this regard, design needs to experiment with a cultural and interdisciplinary implementation of approaches for serving as a bridge between disciplines and between technology and sustainability, ensuring that ethical and sustainable principles guide digital and scientific innovation. The paper presents "Biovision of the future", an educational and research experience conducted at the Saperi&Co research and service centre of Sapienza University of Rome on the issues of Bio Revolution and aimed to experiment with new hybrid processes and methodologies as fertile ground for converging different knowledge and perspectives on complex issues and to foster a more critical and strategic design culture regarding using advanced (bio)technologies. These methodologies, accomplished during a workshop phase and built on a strong interaction and hybridisation between the design methodologies (inductive-experiential-synthetical) and the scientific, sociological and psychological methodologies (deductive-logical-analytical), use visual tools to stimulate interdisciplinarity, critical thinking and strategic reflection during participatory dialogues and co-design activities. The results materialised in six design concepts as forward-looking strategies and solutions (products, processes, services, systems) to "rebuild" the lost links between humans and nature, technology and ecology, fostering Biorevolution from an ethical perspective. They prove the importance of employing systemic and lateral thinking, proactive and future-oriented approaches capable of managing a wide range of information, enabling the planning of actions, and making informed decisions. In this sense, implementing visual methods in design processes becomes central and proactive, materialising complex meanings in 'signs' and using a simple and universal language suitable for organising non-linear processes and 'simplicity'.

**Keywords:** hybrid visual methodologies; bio revolution; simplicity.

## 1 Introduction

The New European Bauhaus is a European Union initiative that blends design, sustainability, and social inclusion to shape a better future for Europe and the world [1]. The initiative comes from the German design school Bauhaus, founded in 1919, which significantly influenced 20th-century architecture, design, and visual arts. It aims to promote a holistic approach to design and innovation, integrating aesthetics, functionality, environmental sustainability, and social inclusion in daily life. The goal is transforming European cities and communities into more sustainable, enjoyable, and inclusive places. Moreover, the New European Bauhaus is an interdisciplinary initiative involving designers, architects, artists, scientists, and European citizens. It aims to foster collaboration across diverse sectors, artistic experimentation and new materials, creating a movement that inspires and guides the transition to a fairer and resilient future for the Next Generation [2].



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In this regard, design needs to experiment with a cultural and interdisciplinary implementation of approaches for serving as a bridge between disciplines and between technology and sustainability, ensuring that ethical and sustainable principles guide digital and scientific innovation.

Based on these premises, the paper presents "Biovision of the Future", an educational and research experience conducted by the author at the Saperi&Co research and service centre of Sapienza University of Rome, in collaboration with Stefano Marzano (architect and designer, former CEO of Philips Design) and Reon Brand (microbiologist and PhD in Virology, Senior Director of Foresight and Socio-cultural Trends at Philips Design). This experience featured a roundtable discussion, two lectures, a study day, a final workshop, and, in line with the principles of the New European Bauhaus, aimed to rethink our lifestyles through design and shape future ways of living that address broader contemporary challenges. The cross-cutting theme for the various activities concerned the Bio Revolution, namely the set of advances in the biological sciences and biotechnology, in computation, data analysis and automation, which are fuelling a new wave of innovation that could have a significant impact in different sectors – from food and consumer goods production to health – changing business models, value chains and design practice [3]. More broadly, the Bio Revolution refers to a new set of technological possibilities and issues that exceed our ability to remain within the domain of the artificial and make it almost impossible for us to break them down into existing disciplines. Moreover, the gradual fading of the boundary between things that represent the artificial and those that represent the biological, between culture and nature, is not limited to technologies but extends to political, economic and social systems, bringing a series of ethical-philosophical and practical-designing questions worth discussing [4, 5]. For these reasons, it seemed necessary and interesting to experiment with new hybrid processes and methodologies as fertile ground for converging different knowledge and perspectives on complex issues and to foster a more critical and strategic design culture regarding using advanced (bio)technologies.

These methodologies, accomplished during the workshop phase, have been built on a strong interaction and hybridization between the design methodologies (inductive-experiential-synthetical) and the scientific, sociological and psychological methodologies (deductive-logical-analytical), using visual tools to stimulate interdisciplinarity, critical thinking and strategic reflection during participatory dialogues and co-design activities. Indeed, visual methods refer to various techniques and approaches that utilize visual elements, such as images, graphs, photographs, videos, or other visual means, to conduct research, explore concepts, or communicate information. These methods are widely accepted as valuable tools for qualitative research and are increasingly used in various fields, including social sciences, art, design, psychology, anthropology, journalism, and many other sectors because they enrich research with new data and interrelationships among them, as well as facilitate efficient communication among subjects of different nature [6]. Especially in the realm of design, they harness the power of visual representations to acquire, analyze, and communicate information in different and often more effective ways compared to purely textual methods, whether it involves 'upstream' activities like exploring or expressing abstract ideas [7, 8] and tacit knowledge [9], or 'downstream' activities like presenting final results through storytelling [10] and 'visual narrative' [11].

This proactive design approach materializes complex meanings using a universal language suitable for organizing non-linear processes and 'simplicity' [12]. Berthoz's concept of 'simplicity' underscores the intelligence's ability to process sensory information, integrate it, and generate adaptive behaviors [12]. It is achieved through internal representation models to simulate the surrounding environment and anticipate the consequences of actions. In the same way, this article promotes visual methods usage to develop interdisciplinary representation models that facilitate designing 'simplicity' achieving informed (from the

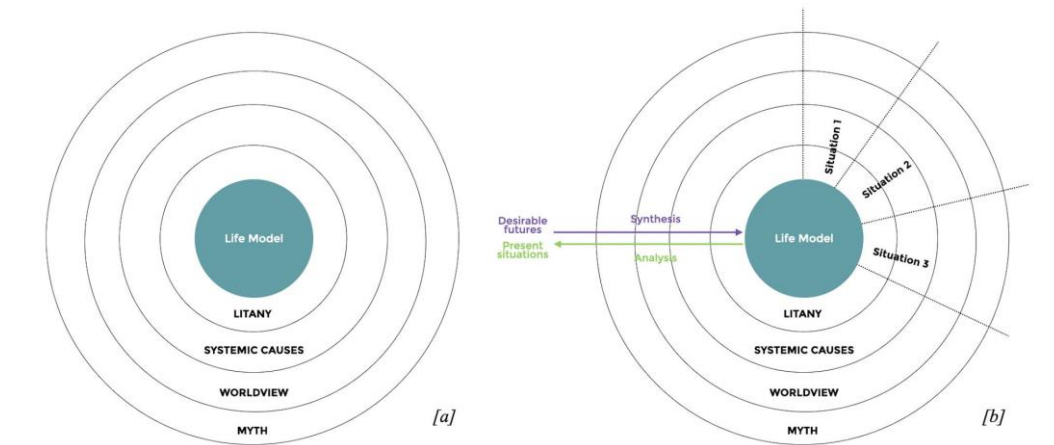
past) and adapted (to the present) solutions while simulating the complexity of the environment and anticipating future consequences of actions (for the future).

## 2 Materials and Methods

"Biovision of the Future" was a research initiative culminating in a workshop with 24 PhD students from six departments at Sapienza University. Over five days, participants engaged in a co-design experience to devise forward-thinking strategies and solutions (products, processes, services, systems) aimed at re-establishing connections between humans and nature, technology and ecology, fostering Biorevolution ethically. Preceding the workshop were preparatory activities, including roundtables and lectures, to equip participants with shared foundational knowledge. During the workshop, participants formed multidisciplinary groups focusing on four life aspects – the body, the home, the city, and the world – analysing sociocultural trends and identifying latent aspects to innovate life models towards sustainable human-nature coexistence.

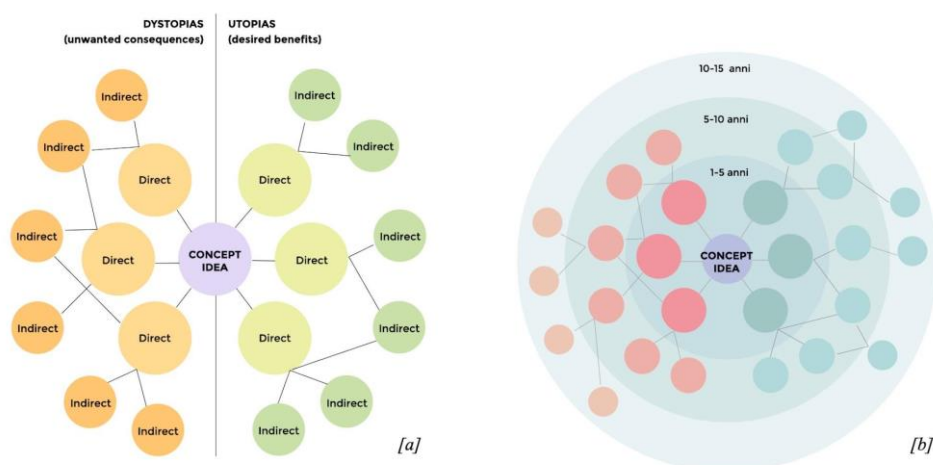
The workshop activities were divided into three main phases, each supported by visual tools or methodologies borrowed from various disciplines (future studies, UX and strategic design, psychology) and adapted to product design: a divergent phase utilizing Causal Layered Analysis (CLA), a questioning stage employing the Wheel of Futures, and a convergent final phase integrating storyboards, personas, and scenario visualizations for result synthesis.

In the divergent phase, the objective was to deepen understanding, gather extensive data, establish connections, and expand design possibilities. Causal Layered Analysis (CLA), a sociological tool, was incorporated to explore potential futures comprehensively [13, 14, 15]. Organized into four levels depicted as concentric circles, CLA guides from surface observations to deeper insights [16] (Figure 1a). The first level, 'litany' (inside) addresses visible events or phenomena, while the subsequent 'systemic causes' level delves into economic, cultural, political, and historical factors contributing to the observed situations. The 'worldview' level examines the values, languages, and cultural structures influencing these causes, while the 'myth/metaphor' level explores deeply ingrained narratives, beliefs, and collective archetypes. Participants utilized this framework to analyse various aspects of social, political, cultural, and economic issues, selecting pertinent questions and identifying relevant segments within each level (Figure 1b). By visualising the present situation through images, keywords, and graphics, they generated innovative design ideas, aiming to challenge prevailing myths and beliefs to create desirable futures. Indeed, the CLA model can be inverted and read from the outside-in to visualise alternative futures starting from the dominant paradigms. This process facilitated a holistic understanding of the present and inspired transformative design thinking towards preferable outcomes.



**Figure 1:** Causal Layered Analysis (CLA): on the left, the diagram illustrating the levels of inquiry [a]; on the right, an exemplification of its usage.

Following a productive co-design phase based on CLA results, we entered a questioning stage to explore various scenarios and examine potential utopias and dystopias. Utilizing the Wheel of Futures, a visualization tool from future studies, we mapped out positive and negative feedback on themes and their interconnected aspects, resembling a conceptual map. The Wheel of Futures method is forward-looking, moving from the present to the future to envision potential outcomes of events and trends, identifying causal loops impacting future strategies [17]. It aids in transitioning from linear to systemic thinking, facilitating complex interactions and bridging divergent and convergent phases [18]. In our approach, design ideas were placed at the centre of the Wheel, envisioning their production and dissemination. Utopian and dystopian consequences were explored, considering short-term to long-term implications up to the anticipated year of widespread acceptance. Each idea underwent detailed examination, from primary consequences at the first level (internally) to secondary and tertiary consequences at subsequent levels (externally) (Figure 2a). Additionally, a time frame was established for each level of the Wheel, focusing on nearer-term impacts within the first circle (1-5 years) and extending to longer-term considerations in subsequent circles (5-10 years and beyond) (Figure 2b).



**Figure 2:** Wheel of Futures Diagrams: on the left, illustrating levels of inquiry for direct (primary) and indirect (secondary, tertiary, etc.) consequences [a]; on the right, illustrating inquiry for temporal periods [b].

In the convergent and final phase, participants utilized downstream visual methods like storyboards, personas, and scenario visualizations to articulate and refine their concepts. These tools offer a clearer visualization of thought flow and aid in assessing project viability. While a fully detailed idea wasn't mandatory, having a well-motivated basic concept backed by solid assumptions was crucial. Three key tools were employed: (i) personas model for presenting the scenario; (ii) contextualization storyboard for presenting the proposal's innovativeness; (iii) usability storyboard for presenting the proposal's interaction with user.

The Personas model is a staple in UX Design and Marketing, it condenses information into narrative form, aiding in understanding user behaviour and developing effective strategies [19]. Furthermore, it has found innovative applications in initiatives aimed at social good and impactful purposes [20]. In our case, we embraced its core features – creating fictitious characters and utilising narrative form – while allowing flexibility in choosing subjects (e.g., individuals, cities, families) and information, thus creating a contextual framework for our project and facilitating scenario explanation.

Storyboarding, on the other hand, takes us into the realm of visual storytelling, where narratives come to life through images [10, 21]. Whether through drawings, graphics, animations, or videos, these images serve to captivate the audience, creating immersive experiences [22], and to make sense of our surroundings by showcasing clear connections between events. Specifically, the 'contextualization storyboard', derived from the 'user scenario' or 'utility storyboard', is a key tool in Service Design, illustrating how users interact with a service in daily life and helping understand user motivations, needs, and barriers [23]. It helps understand user motivations, needs, and barriers, visualising the usefulness and innovation of the product/service within a specific context. In our case, it facilitated understanding and illustrating future scenarios and the imagined utility for the product or service designed. Instead, the 'usability storyboard', rooted in UX and UI design, focuses on enhancing the relationship between the user and the product/service system [24]. It aims to improve usability, ease of use, and user satisfaction, providing insight into user journeys over time. This proved invaluable for workshop participants, enhancing their understanding of product usability and its potential to promote sustainable behaviours.

The strategic use of visual tools facilitated transdisciplinary collaboration and fostered inventive and lateral thinking. Doctoral students from diverse fields approached design, stimulating creativity beyond technical aspects and emphasizing perception and user experience. Visualizing complex issues encouraged unconventional avenues of innovation, diverging from traditional deductive and analytical thinking. Critical design approaches, particularly through 'upstream' visual methods like CLA and the Wheel of Futures, encouraged participants to look beyond immediate visibility, promoting the development of long-term solutions capable of addressing predictable risks.

### **3 Results and Discussion**

The results materialised in six design concepts emerging from the workshop activities (for each category: 1-body, 1-house, 2-city, and 2-world). The use of hybrid methodologies supported by visual tools proved indispensable, fostering the development of a critical stance towards issues and technologies, increasingly necessary in a world marked by "the challenge of complexity" [25]. The outcomes prove critical awareness and strategic reflection development within design processes. Additionally, a novel approach to technologies is encouraged, facilitated by interdisciplinary collaboration, novel ecological perspectives, and a systemic outlook towards more desirable futures.

During the initial divergent phase, we fostered critical awareness, which involves analysing situations based on the project's value, ethics, and morality, leading to meaningful outcomes. The CLA method was

instrumental in transcending short-term vision constraints, envisioning sustainable futures, integrating diverse perspectives, and challenging prevailing paradigms, fostering inclusive and innovative future visions. Analysing situations up to the 'myth/metaphor' level allowed for a deep understanding of behaviours, societal constructs, and the exploration of new design innovations. This approach emphasizes the intelligent application of advanced technologies to redesign human behaviours with an ecologically oriented perspective, considering various aspects of the human dimension: society, culture, nature, artifice, and technology. For example, in the "City 4D" project, participants utilized CLA to explore 'how we live together in the city', revealing a crucial insight: reconnecting with nature requires embracing our temporal dimension, which extends beyond a linear timeline to encompass cyclical rhythms like circadian, solar, and seasonal cycles. By embracing this dimension, humans can adopt more sustainable, collective behaviours through collaboration among citizens, nature, and information technologies. The project proposed urban 'aggregation centres' driven by metabolic cultivation processes of a specific fungus and their timing, offering a circular solution for deriving nutrients, healing substances, materials, and raw resources, as well as an alignment with nature's rhythms.

In another project called "Continuity", participants delved into urban issues like uncontrolled urbanization, heat islands, energy consumption, and social inequalities, all stemming from the modern approach of compartmentalizing problem-solving. They proposed continuity as the solution, bridging gaps between humans and nature, city centre and periphery, cultural aspects and city planning. This project envisioned a new connection between cities and nature, using biological matter to create an open-air museum. Specifically, focusing on Rome, it aimed to make the banks of the Tiber River bioreceptive, enhancing its unifying role between the city's core and outskirts, and preserving its historical-cultural significance.

In the subsequent questioning phase, strategic reflection emerged, prompting critical inquiry from risk assessment to value definition for devising a strategy. By anticipating potential scenarios, identifying variables, and planning actions, participants aimed to mitigate risks and achieve long-term goals with optimal probability. Using the Wheel of Futures, they assessed the project's potential impacts across various aspects of reality, weighing potential utopian and dystopian outcomes. Mapping out diverse aspects enabled the visualization of strategies to refine projects and prioritize preventive, ethical, and future-oriented approaches. For instance, in the "METAtto" project focusing on the 'body', the idea of an intelligent tattoo to monitor activity on the Metaverse is scrutinized. This involves a transdermal patch utilizing bacterial nanocellulose to monitor movement cessation, promoting user awareness, sensory rehabilitation, and human-nature equilibrium, while pre-emptively addressing potential risks and adapting the project accordingly. This includes considerations like creating a device capable of communicating with the user's computer while safeguarding data privacy to enhance product acceptability.

Essentially, the approach to technology shifts, distinguishing between fiction and speculation processes. Speculation involves analysing present-day visions for critical future insights. For instance, disciplines like "critical design" or "speculative design" ponder advanced technologies' potential trajectories [26]. This yields fictional products depicting future utopian and dystopian scenarios, fostering critical thinking and responsible technology usage. However, our approach begins with a critical analysis of the present (technological and sociocultural trends, constructs, thoughts, rooted beliefs), stimulating design actions for a desirable future. The resulting products, services, and systems are already feasible but inspire future-oriented behaviours aligned with emerging values.

Moreover, such artifacts can foster a more mature discourse on future decisions offering a experiential and tangible future vision. Thus, technology serves not as the starting point (one does not begin with what technology could or could not achieve) but as the means through which sustainable future behaviours and

interactions across various reality's facets become feasible. For these reasons, additional visual tools like personas and storyboards are also utilized. Designing behaviours demands more than mere project representation; it necessitates envisioning and visualizing the interplay between context and user, user and product, technology and nature, conceivable contexts and current actions. For instance, in the "Beehive" project under the 'world' category, participants scrutinized food consumption patterns, particularly focusing on transportation and preservation methods, both industrially and at the individual citizen level. This analysis birthed a system for food sharing and preservation to be deployed in the city's communal spaces, tackling issues of waste, hectic lifestyles, and food accessibility disparities. Notably, the project underwent significant revisions during the workshop's convergent phase following a thorough examination of potential target demographics, relationships between system components and the environment, and the compatibility of imagined technologies with biodiversity. Initially abstract, as depicted in the initial storyboard, the system was tailored for a youthful audience, adaptable in behaviour, and intended for school and university courtyards to encourage food sharing and preservation. Essentially, it comprises columns capable of interacting with external airflow, channelled to maintain food freshness with sophisticated bacteria-based technology. Users can utilize these columns to keep meals fresh or share surplus food simply and promptly. They could be manufactured with 3D printing, featuring variable context-specific geometries, and accommodating living matter in the gaps, contingent upon the responsible management of enclosed bacteria.

## **4 Conclusions**

In the face of complex technological convergence, design emerges as a transformative force, offering innovative solutions rooted in systemic innovation. The "Biovision of the Future" initiative was an attempt to define and validate interdisciplinary methodologies, using visual tools to foster critical thinking and ethical application of advanced (bio)technologies ethical application. Tools like Causal Layered Analysis (CLA), the Wheel of Futures, personas, and storyboards, played a crucial role in co-design activities, strategic reflection development and complex ideas articulation. The resulting design concepts demonstrate a shift in approach to technologies towards using them as a tool to reshape human behaviour with an ecologically oriented perspective. By envisioning feasible yet innovative solutions, the participants encouraged a more mature discourse on future decisions and behaviours, bridging humans-nature divides ethically. This highlights the need for ongoing experimentation with hybrid, interdisciplinary processes, emphasizing systemic and lateral thinking for informed decision-making. The proactive integration of visual methods simplifies complex ideas and promotes a universal language for non-linear processes and 'simplicity'. Overall, this underscores the essential role of visual methodologies in design education and practice, advocating for their proactive use in addressing pressing challenges and building a caring and sustainable future.

## **5 Declarations**

### **5.1 Competing Interests**

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

### **5.2 Publisher's Note**

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