



Designing under constraints: How entrepreneurs make the future in Belgium's construction industry

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ABSTRACT

Based on a qualitative case study, this paper explores how Greenbuildings, a Belgian eco-construction venture, engages in future-making (FM) practices to render sustainable alternatives compulsory in an unsustainable industry. Compulsory futures, we find, are imagined futures shaped not by aspiration but by necessity, when ecological, health, or economic threats impose non-negotiable constraints on what must be excluded or transformed in the present. Drawing on Simon's (1993, 1996) design theory and the FM literature, we identify practices that entrepreneurs engage in when making the future "compulsory", "desirable" and "plausible". We contribute to the FM literature by theorizing how entrepreneurs engage with undesirable aspects of the futures. We also extend the entrepreneurship-as-design (EaD) perspective by detailing how constrained environments prompt not just navigation but reconstruction of the problem space. In doing so, we show how designing within limits can become a generative and radical entrepreneurial response in the face of ecological breakdown.

Introduction

"When we are in a meeting or a seminar, there is always a moment when we talk about the impact of the construction industry, the future and what we must do. [...] It is important to start with an assessment and the necessity of the urgency. But, after, we need to exit this. So that people can get out thinking "[Yes!] I want to go there" and not "Oh my god ..."" (Louise V., June 2022)

The construction industry is a major contributor to greenhouse gas emissions, resource depletion, and environmental degradation (UNEP Global Status Report for Buildings and Construction, 2024–2025). Its reliance on unsustainable materials—such as polyurethane, cement, and PVC—remains largely unquestioned, with these defaults accepted as practical necessities, not conscious design choices. Against this backdrop, GreenBuildings (GB), a Belgian eco-construction venture, seeks to transform the industry by shifting sustainable building materials from niche to norm. This requires more than technical innovation: it calls for challenging deeply entrenched timelines, budgets, supply chains, material standards, and professional routines that, while taken for granted, are significant drivers of ecological harm and remarkably resistant to change.

The future-making (FM) literature (Comi et al., 2025; Wenzel et al.,

2025; Thompson and Byrne, 2022) provides a valuable lens for understanding how GB entrepreneurs construct and enact imagined futures to move sustainable building materials from niche to norm. This literature understands futures not as static endpoints but as emergent through practice (Schatzki, 2016). Entrepreneurs build futures by engaging with visual, material, and narrative tools that stabilize and make these futures actionable (Whyte et al., 2022; Comi & Whyte, 2018). Through such tools, entrepreneurs render the not-yet-visible real and negotiable in the present (Esposito, 2024; Thompson & Byrne, 2022). Much of this literature emphasizes hopeful, aspirational futures—those built around desire and shared visions (Comi et al., 2025; van der Gaast, 2023).

However, this optimistic focus risks overlooking a key category of futures: those that are unwanted but increasingly unavoidable. As Wright (2025) argued, some futures are not chosen but are imposed by ecological collapse, social fragmentation, or irreversible damage. These "undesirable" imagined futures must be understood in order to understand GB's challenge, yet they remain undertheorized (Wenzel et al., 2025). Calls for a more grounded approach are emerging (Nyberg et al., 2020; Wright, 2025), particularly in the context of ecological breakdown where systemic dysfunctions are irreversible, and futures are not freely imagined but constrained by necessity. However, we still lack a clear account of how such undesirable futures are integrated into

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entrepreneurial FM and design work.

A Simonian (Simon, 1993, 1996) lens invites us to take this “undesirable” seriously—to design the future *as it ought to be* under ecological constraints. In this paper, we seek to answer the following question: How do GB entrepreneurs mobilize FM practices to engage partners and construct their imagined future in an unsustainable industry? To do so, we draw on work by Simon (1993, 1996), who conceptualized FM as a design process in which humans deliberately construct artificial systems to achieve desired goals within a constrained environment. For Simon, imagined futures guide this process by shaping problem spaces—that is, mental representations of how the present can be transformed into a preferred state through purposeful design. Entrepreneurial action involves navigating this space and iteratively reshaping it through artifacts such as sketches, prototypes, and narratives (Berglund & Glaser, 2022). When the system is no longer functioning, entrepreneurs as designers can adapt the problem space or fully redesign it, notably by questioning its taken-for-granted assumptions and properties—that is, the “natural.”

To answer our research question, we perform an in-depth case study of GB by means of 29 interviews and eight observation instances. Using Gioia’s methodology (Gioia et al., 2013), we begin by identifying the practices through which GB entrepreneurs and partners from the eco-construction niche make their imagined future “compulsory.”

Compulsory futures, we find, are imagined futures shaped not by aspiration but by necessity, when ecological, health, or economic threats impose non-negotiable constraints on what must be excluded or transformed in the present. We identify that “making the future compulsory” involves entrepreneurial practices that expose and problematize the undesirable consequences of present “natural” norms, highlight the inevitability of irreversible systemic change, and redefine what is possible within the revised problem space. In the case of GB, this translates into three interconnected FM practices. First, GB problematizes human and planetary survival by reframing the natural of the construction industry—for example, common materials and professional habits—as toxic, revealing hidden consequences for health and ecosystems. Second, GB problematizes economic survival by mobilizing market logic, warning that firms that fail to adapt will face obsolescence. Third, GB closes the future by invoking scientific consensus that establishes the undesirable—but irreversible—aspects of the ecological crises. Together, those practices contribute to redesigning a problem space that makes harmful practices no longer possible.

These practices do more than raise awareness; they reshape the problem space, excluding unsustainable futures from the conceivable, and positioning sustainable alternatives as the only possible path forward—as the compulsory imagined future. Once this groundwork has been laid, GB focuses on making these alternatives desirable and plausible, enabling industry-wide uptake. As Elisa L. from GB reflected in her March 2023 TEDx talk, the goal is “to deconstruct the preconceived ideas that prevent people from using sustainable materials.” (Elisa L., March 2023).

By integrating Simon’s (1993, 1996) design theory with the literature on FM practices, our study offers three key contributions. First, we introduce the concept of compulsory futures to account for how ecological constraints shape entrepreneurial design. Doing so, we contribute to the FM literature and provide the building blocks to address the undesirable (Wright., 2025). Rather than freely imagining desirable futures, entrepreneurs engage in FM practices to redesign the problem space and use this foundation to develop alternatives that are both desirable and plausible. Second, we extend the entrepreneurship-as-design (EaD) literature by revealing the practices for redesigning the problem space. We show that, in the face of system dysfunction, the problem space is not merely navigated but can be actively reconstructed through a set of coherent FM practices. In GB, entrepreneurs achieve this by de-naturalizing harmful industry norms—those aspects that are often seen as “given”—and reframing sustainable alternatives as non-negotiable. This contribution provides a

transferable lens to examine how futures are imagined and made actionable under constraints in a variety of contexts where reframing is challenging, suggesting that “making the future compulsory” may serve as a strategic means for entrepreneurs to legitimize and enable the diffusion of innovations. Finally, we extend both the future making and EaD perspective by highlighting how entrepreneurial design is shaped not only by visions of the future but also by the consequences of past decisions and present limitations. Thereby, our contribution helps entrepreneurs to become more reflective and accountable in their choices as “good designers”. GB shows that designing within limits can be a generative response, not a fatalistic one. As Simon (1993, 1996) reminds us, good design avoids irreversible paths and preserves space for future choice. In the age of climate breakdown, compulsory futures may offer one of the most responsible—and radical—forms of entrepreneurial practice.

We begin with a review of Simon’s (1993, 1996) work and its relevance to FM compared to current FM research. We then present GB as an empirical case, and describe our method. Subsequently we detail our findings, which present the FM practices that emerge from the data structure and the model for designing the future under ecological constraint. In the discussion, we present our contributions to the FM and EaD literatures, the limitations of our work, and avenues for future research.

Literature review

Future-making as a design practice under constraint

Herbert Simon’s *The Sciences of the Artificial* (1996) provides a foundational lens for conceptualizing FM as a design practice that is embedded in constraints amid uncertainty. Simon distinguished between natural systems, which are considered “given”; and artificial systems, which are intentionally designed by humans to fulfill goals. While natural systems operate independently of human intent, artificial phenomena—such as ventures, technologies, or buildings—are purpose-driven and contingent on their environment. Building on this distinction between artificial and natural systems, Berglund et al. (2020) defined the natural as “phenomena that researchers treat as naturally existing and as governed by general mechanisms” (p. 827), which includes taken-for-granted assumptions about the way the systems work. In contrast, the “artificial” is “designed to achieve particular goals in light of environmental circumstances” (p. 827).

For Simon (1996, p. 114), design is thus fundamentally about the future and how things ought to be. In entrepreneurship, this translates to shaping future states based on goals, resources, and context. This involves using artifacts—such as narratives, sketches, and prototypes (Berglund & Glaser, 2022)—to transform a situation into a preferred one (Simon, 1996), with the artifacts being iteratively developed at the interface between the entrepreneur and their environment (Berglund et al., 2020). Entrepreneurs, in this view, are not merely rational decision-makers but satisfiers. Entrepreneurs are constrained both by the limits of their own cognitive capacity to fully understand the world and by the inherent uncertainty of a world that evolves in response to their actions—making the future fundamentally unpredictable (Sarasvathy, 2003).

In this sense, uncertainties that entrepreneurs strive to overcome are both epistemic and ontological (Berglund et al., 2022). On the one hand, entrepreneurs craft artifacts that serve as learning devices, allowing for information gathering and therefore epistemic uncertainty reduction (Berglund et al., 2022; Raneri et al., 2023). On the other hand, artifacts contribute to world-making and the reduction of ontological uncertainty. Ontological uncertainty implies a kind of future that is fundamentally indeterminate, open-ended, and unknowable in principle—not just because entrepreneurs lack access to knowable information (as in epistemic uncertainty), but because the future itself does not yet exist in any fixed form. From a design perspective, the future is therefore

cocreated into a new present that was not (exactly) foreseen (Sarasvathy, 2023).

Amid ontological uncertainty, “imagined futures” become central artifacts for entrepreneurs, as means to organize action today in the design of a future that is not yet fully known. For Simon (1996, p. 66), imagined futures are foremost shared mental representations; that is, “images” stored in our symbolic systems—our brains and collective narratives—that act as familiar templates that are more readily retrievable for making decisions in the face of uncertainties. Simon (1996 p 43) suggested that the construction and sharing of “imagined futures” are key mechanisms for absorbing uncertainty through coordination—that is, they form the basis for coordinated action among individuals who share interests and goals.

Entrepreneurs elaborate alternatives within a problem space that structures all possible states and actions that can be taken to move from an initial situation to a desired situation (or goal state, or the conditions signifying that a solution has been found). Simon (1996) used the concept of a problem space to formalize problem-solving as a search process through this space. The solver navigates through possible states, seeking a path to a desired situation (Simon, 1996). Thus, from a Simonian perspective, three complementary sets of mental representations are useful to consider when studying FM: (1) representations of the problem space, including visions of the natural and taken-for-granted when problematizing a unsatisfying problem space; (2) representation of the future as it might be—the range of plausible imagined futures that human intervention could bring about (even if these are not always the most probable or desirable), given the constraints of natural laws and available means within a given problem space; (3) representation of the future as it ought to be—the normatively preferred imagined futures that entrepreneurs believe are plausible and desirable in the problem space, as “good enough” alternatives (Simon 1996).

Thus, Simon’s (1996) work offers valuable conceptual tools for understanding FM as a design practice under conditions of uncertainty, with imagined futures serving as key artifacts in this process. However, the EaD literature is relatively nascent, and its contribution to the theorization of FM is still emerging (Berglund & Dimov, 2023). In contrast, the FM literature has gained significant momentum over the past decade (Wenzel et al., 2025), developing accounts of how entrepreneurs bring futures into being through various artifacts and practices. To assess the full potential of the EaD perspective for enriching this conversation, it is important to explore how the two literatures complement one another, and where future contributions might best be positioned. We now turn to this growing body of work on FM.

Imagined futures in the future-making literature

The FM literature shares key assumptions with the Simonian lens, particularly the idea that the future is ontologically uncertain (see, e.g., Ramoglou, 2021) and that entrepreneurs must craft it through interaction with people, artifacts, and the environment (Berglund et al. 2020). Indeed, if the future is (partly) unknowable, practitioners cannot rely solely on rational decision-making based on past statistical data or on predefined scripts, rules, and norms rooted in institutionalism (Beckert & Bronk, 2018, see also Thompson & Byrne, 2022). Entrepreneurs mobilize discursive and material tools—drawings, sketches, narratives, prototypes—not merely to communicate ideas, but to shape shared understandings and coordinate collective action (Whyte et al., 2022). These artifacts help to stabilize uncertain futures by providing tangible anchors for decision-making and coordination, even if those imagined futures may never occur, or may arise in unexpected ways (Esposito, 2024; Sarasvathy, 2018).

Comi and Whyte (2018) illustrated how visual artifacts, such as sketches and diagrams, support the iterative negotiation of alternative futures under uncertainty, as artifacts reify imagined futures, making them less susceptible to tinkering and harder to change back. Similarly, Thompson and Byrne (2022) emphasized practices such as the use of

display, arrangement, and relocation to organize preferred imagined futures. These studies both treated imagined futures not as static future states but as ongoing practices, and underpinned by collective norms, expectations, and practical know-how that temporarily stabilize an order of things and its boundaries in the present (Garud, 2021). In this literature, practices are defined as routinized patterns of action, unfolding across time and space, and embedded in specific social contexts (Teague et al., 2021). FM practices, then, refer to the sayings and doings that practitioners engage in when formulating, giving shape to, and organizing imagined futures (Thompson & Byrne, 2022; Van Der Gaast, 2023), and through which what is “not yet in existence” is brought into present course of action (Comi & Whyte 2018; Whyte et al. 2022). These practices transform abstract imaginings into concrete courses of action, mediated by artifacts and relational dynamics.

Despite these insights, the existing FM literature has often emphasized desirable imagined futures (Comi et al., 2025). For instance, Thompson and Byrne (2022, p. 250) suggested that “Constructing an imagined future is a process of developing a shared image of a desirable future situation that is intrinsically incomplete (Murphy, 2005; Thompson, 2018)”—as such, imagined futures are typically framed as hopeful, emancipatory, or transformative (Comi et al., 2021; Comi et al., 2025). Yet, according to Wright (2025), this optimism may obscure a critical reality: parts of the imagined futures are undesirable—emerging not from entrepreneurial aspiration, but from the necessity to respond to emerging economic threats, unsustainable trajectories, war conditions, social discriminations, or ecological breakdown (Gümüşay and Reincke, 2024; Rauch, 2025). Undesirable imagined futures can also arise from the creativity (Ortmann & Jörg Sydow, 2018) or framing efforts (Nyberg et al., 2020) of others. These facets of imagined futures highlight the need for FM research to more thoroughly examine how entrepreneurial FM can address grand challenges (Comi et al., 2025; Wright, 2025).

In addition, the literature lacks a clear account of how undesirable futures are integrated into the design process. Therein, undesirable futures from ecological crises might be the most difficult to formulate in a compelling way. As Nyberg et al. (2020) argued, the consequences of such crises are often seen as distant, complex, and unfamiliar, while effective action requires translating these distant futures into forms that are simple, familiar, and emotionally compelling. Like Wright (2025), Nyberg et al. (2020) thus called for taking more seriously the undesirable aspect of imagined futures in the face of ecological crises.

A call for taking the undesirable seriously

This blind spot in the FM literature might stem from its explicit focus on ontologically uncertain futures (Stingl & Gerdali, 2023). Accordingly, imagination is normatively set against prediction. Imagination is about opening up the future in an uncertain world, bringing emancipation (Comi et al., 2025). Prediction is about closing the future through probabilistic calculation and screening for the most (un)probable outcomes (Esposito 2024), which might divert individuals from various desirable alternative futures by taking as predictable a world that is not. For instance, Esposito (2024), as well as von Groddeck (2018), mobilized the concept of defuturization to show how FM in organizations can contribute to decreasing the diversity of alternative imagined futures.

Defuturization was first proposed by Luhman (1976), who engaged in a critical way with Simon’s work on organizational decision-making (von Groddeck, 2018). Simon (1996) defined a good design as one that preserves initial conditions and opens new paths for future generations, and thus a bad design as one that deprives future generations of the same opportunities; however, he did not elaborate on the way in which such accountability can be achieved. In defining defuturization as the closing of future possibilities, the FM practices literature has tended to suggest that “the challenge for decision-making is to be able to defuturize the future as little as possible” (Esposito 2024). We align with the emancipatory intentions behind “good design,” but we also suggest

that, by thriving to keep the future as open as possible, the FM practices literature might have neglected difficult conversations about dealing with undesirable scenarios and constraints.

A Simonian perspective can be useful in conducting such difficult conversations. For Simon, the biggest challenge is not about the search for futures that might be, or even the elaboration of preferred ones that ought to be (as satisfiers, entrepreneurs will accept “good enough” choices; see Simon 1996, p. 29). Instead, Simon (1996) suggested that the key challenge lies in the (re)design of the problem space when it is no longer satisfying.

Redesigning the problem space is crucial in contexts such as ecological collapse, where traditional goals and tools may no longer suffice. But how? As Simon (1996, p. 109) stated, “One doesn’t come equipped with a ‘space’ of representations, or even a generator of possible representations.” Simon’s perspective thus invites us to consider entrepreneurs as designers of futures who act not only on aspiration but also in response to necessity. In the face of systemic dysfunction—such as unsustainable building practices in the construction industry—FM involves the deliberate reshaping of what is taken for granted (the natural), in order to imagine alternative futures that fit the problem space, and to build on preferred futures (the artificial).

A Simonian perspective for taking the undesirable seriously

The current study largely aligns with the EaD perspective (Berglund et al., 2020; Sarasvathy et al., 2008), which sees entrepreneurial action as shaping the future “as it ought to be” (see Comi et al., 2025). Entrepreneurs build prototypes and narratives not to reflect an already-existing future but to co-construct a new present through an iterative design process. According to Berglund and Dimov (2023), this involves continuous negotiations between human intention and environmental constraint—between the artificial and the natural. Yet, the literature lacks a clear account of how undesirable elements of futures are integrated into the design process.

First, while Simon (1996) clearly articulated how problem spaces must be reconstructed when existing representations collapse, the EaD literature has yet to fully incorporate this mechanism of reproblematicization. When facing systemic dysfunction, entrepreneurs do not merely design within a given space; they challenge the space’s assumptions about what is natural. In sustainability contexts, this often means surfacing “the natural” as a contested terrain—revealing how dominant materials, processes, or standards are not given but open to redefinition.

Second, existing FM research has rarely examined how undesirable futures—such as those shaped by ecological breakdown—are made actionable within entrepreneurial practice. Promising FM research has pointed toward defuturization as a key construct (Esposito, 2024; von Groddeck, 2018), while at the same time being reluctant to focus on the ways in which entrepreneurs decrease the diversity of alternative imagined futures.

As a result, the literature lacks a clear account of how entrepreneurs engage in FM where ecological concerns are marginalized (Nygert et al., 2020). Next, we address this challenge by asking the following research question: How do GB entrepreneurs mobilize FM practices to engage partners and construct their imagined future in an unsustainable industry?

Method

We conducted a qualitative case study of the GB venture in Belgium’s construction industry to investigate how these entrepreneurs mobilize FM practices to engage partners and construct their imagined future. We first contextualize GB work within the construction industry, before providing more information about the data collection and data analysis procedures.

Research context

As one of the most polluting industries in the world, the construction industry is at the heart of the ecological crisis; in 2017, it accounted for 36 % of global final energy use and nearly 40 % of energy-related carbon dioxide emissions (International Energy Agency & United Nations Environment Programme, 2018). GB is active in the eco-construction niche of the construction industry. Eco-construction is defined here as a mode of construction that considers “all the dimensions of the building impacts on the environment and health in addition to the societal and economic factors” (IBGE, 2009).

GB was created in 2020 by five cofounders. It is a curator (or, in its own words, sourcer) of bio-based materials, and offers multiple services to achieve its mission. First, it sources, buys, and delivers sustainable building materials through its central buying office, acting as curator of these materials. Second, it provides a consulting service, guiding architects on which sustainable materials are best suited to their project. Finally, it facilitates the selection, purchase, and placement of sustainable materials for specific projects.

A key feature of GB is its material library (the so-called Materatek; see Fig. 1). This library is used to present and test sustainable materials to clients and prospective clients, as well as to organize workshops for testing the materials with partners and clients. By means of visuals on its walls, the Materatek also represents the history of the company, its impact, and its vision for the future of the industry. The creation of the Materatek aligns with GB’s mission statement: “Together, let’s move sustainable materials from niche to norm” (GB website, January 2022). Yet, this quest is made difficult by the highly interdependent and fragmented nature of the industry, which consists of many different “worlds” and trade and educational backgrounds. As one informant said, “There are many professionals and many companies who work for one another in subcontracting. So, to spread information or a new practice, it is super slow because there is not one market leader who pushes things and everybody follows” (Elisa S., November 2021). As such, we believe that construction is a suitable industry in which to study the challenges of FM practices, and feel that GB offers ample opportunity to theorize about FM practices in the face of ecological crisis.

Data collection

The data collection process took place from October 2021 to October 2023. We conducted 29 interviews in total (see Fig. 2).

As Fig. 2 shows, to understand the context of GB, we started with four exploratory interviews, which were later complemented with five additional interviews with members of the GB ecosystem (left column). To focus on FM practices (right column), we conducted multiple waves of interviews with the cofounders of GB, their first employee, and selected partners. Every three months we met with two members of the venture: the person in charge of communications and one of the two people in charge of strategy and prospective clients. This enabled us to gather sufficient data on the FM practices of GB members. Fig. 2 also shows the timeline of the data collection and profile of the interviewees. Each interview lasted between 22 and 78 min, giving a total of 1465 min and 421 pages of verbatim transcription (available upon request). The interviews were conducted mainly in French. The first author led the interviews and was later debriefed by the second author. In addition, each interview guide was discussed and refined with the second author prior to the interviews.

We also observed eight industry events: two conferences, one exhibition, two venture visits, one visit to a construction site, one training session for professionals on bio-based insulation, and the Materatek launch event in June 2022. Data were collected in the form of photographs and notes (available upon request). While our analysis draws primarily on the interview data, the supplementary observations and related data ensured that we obtained a more holistic understanding of the case. For instance, some emerging practices were first witnessed or



Materatek, a space for achieving your sustainable ambitions



b. There was a time when the science of materials was inseparable from architecture itself. Master builders embraced the function of designer, engineer and builder at the same time.

Fig. 1. The GB Materatek. 1a. Photos taken during a visit to the Materatek, March 2022; 1b Details about the Materatek captured from the GB website, March 2024.

Understanding the overall context of GreenBuildings	Understanding the future making-practices of GreenBuildings
Exploratory interviews - October 2021	
Member of GreenBuildings (1)	
Architect (1)	
Builders (2)	
	1st wave of Interviews at GreenBuildings - June and July 2022
	Members of GreenBuildings (6)
	Follow-up interviews at GreenBuildings - September and October 2022
	Members of GreenBuildings (2)
	Builder (1)
	Architects (2)
	Insulation producer (1)
	Follow-up interviews at GreenBuildings - December 2022
	Members of GreenBuildings (2)
	Follow-up interviews at GreenBuildings - March 2023
	Members of GreenBuildings (2)
	Follow-up interviews at GreenBuildings - June and July 2023
	Members of GreenBuildings (4)
Ecosystem interviews - September and October 2023	
Policy maker (2)	
Industry federation (1)	
Academics (2)	

Fig. 2. Data collection timeline.

even experienced during observations, such as the use of the “materatek suitcase”, a suitcase with multiple prototypes and samples. Later, an informant made sense of its use in those terms: “*I know that when they’re going to give a presentation, they always bring the suitcase with the samples. (...) I’d just say one thing though — it’s anecdotal, of course. I once ended up with a sample of one product, but we tend to get stuck on that particular product. I think it might be better to have ten. Or none at all. In any case, to properly convey the model we have.*” (Augustin O., June 2023). Then, during the next training that we attended, the founders of GB shared that, indeed, they used their suitcase for making sustainable materials tangible, but in a way that stimulates imagination, with multiple samples and material types.

When we first started to collect data, our focus was on better understanding the possible paths for scaling ventures to create a more sustainable future. Thus, we designed an interview guide with broad questions on the sustainability transition in the industry and the evolution of entrepreneurial projects. We identified GB as a potential case and had already identified cues regarding its FM practices—such as the use of the Materatek, including the portable suitcase version, which was used to convince partners that GB members are not “*crazy dreamers*” (Augustin O., June 2022). When the agreement to collaborate was made, we refined the interview guide and asked members of GB how they envision the future of their business, and of their industry more generally, as well as the ways in which they negotiate those imagined futures with their partners. We also asked participants about their understanding of what sustainability is and how they envision the future of sustainability in their industry. In the interviews with GB’s partners, we asked questions about the relationship between the entrepreneurs of GB and the partners’ organization, their vision of the future of the industry, and how they and GB engage with that vision. Example questions were “How do you present the mission of GB?” (targeting sayings) and “How do you make use of the Materatek?” (targeting doings). For the final interviews, we met with stakeholders from the broader ecosystem of GB who were mentioned during the case study interviews. The interview guide also included questions about the future of the industry, the multiplicity of actors, and how they collaborated.

Thus, the interviews were designed to collect data about the FM practices of entrepreneurs within sustainable ventures. With this aim, we focused the data collection on asking about sayings and doings both directly (what they said and did during interviews and events) and indirectly (what they said that they said and did). As Champenois et al. (2020, p. 185) suggested, interviews are “well suited to understand real activities, processes and the meaning attributed to them.” Interviews thus provided access not only to “sayings” but also to the design rationales that guide participants’ actions. Through these conversations, enriched through our observations, we uncovered how informants make sense of their intentions, motivations, and thought processes when “making the future.” Next, we turn to the analysis methods.

Data analysis

Following the Gioia methodology (Gioia et al., 2013), we started by coding the content of the interviews in the NVivo software package in order to build the data structure.

During the first-order analysis, codes emerged through open coding, reflecting the informants’ experience of FM. Then, codes gradually gained in coherence through axial coding, as we reflected on the similarities and differences across interviews and observation data. Although some first-order codes relate to an unsustainable past or present, they always came from part of a discussion about the imagined future—what it is, and how to get there. For instance, when one informant said “*we are screwed*” or when others mentioned power struggles and health issues, they were linking the past or present with worries and hopes for the future.

While first-order codes are informant-centric, with labels close to the terms used during the interviews, the second-order themes are intended

to be research-centric, with labels informed by the theoretical lens. Determining codes entailed a back-and-forth process, going from the data to the literature, to find emerging “concepts that might help us describe and explain the phenomena we are observing” (Gioia et al. 2013, p. 20). The first lens was FM research, which was later complemented by the Simonian lens to reach theoretical saturation. Informed by this theoretical framework, we identified 12 FM practices, such as “highlighting survival concerns,” “making the future beautiful,” and “reassuring.” At first, those labels remained closely tied to the language of the informants, reflecting the embedded nature of social practices within the specific contexts of GB. At the same time, to enable greater theoretical abstraction, each practice was also assigned a research-centric label. For instance, “highlighting survival concerns” became “*problematizing human and planetary survival*”. While this dual-labelling approach deviates from the method outlined in Gioia et al. (2013), we believe that presenting both labels enhances transparency in our process. It also allowed us to remain faithful to the empirical material while supporting the emerging theorization.

We then assembled the practices into aggregated dimensions. We found dimensions that closely align with the FM literature—namely, “making the future desirable,” and “making the future plausible” (see Comi et al., 2025). We also found that some practices were associated with a more negative and unavoidable making of the future, which is more difficult to theorize within the FM literature. After discussion within the research team, and using a Simonian lens, we labelled the aggregate dimensions “making the future compulsory.”

At that point, the analysis revealed a coherent data structure, from first-order informant-centric codes to research-centric second-order themes and aggregated dimensions. To theorize GB’s process of designing the future, and in line with the Gioia methodology, we reflected on potential relationships between the second-order themes. We identified that, from a Simonian perspective, the FM practices of GB entrepreneurs and their partners imply challenging the perception and conceptualization of the natural in the construction industry—for instance, what was once taken for granted and has now come to be questioned by the informants, such as the unaccounted-for impacts of past design choices of the construction industry. Again, this was an iterative process. As we reflected on the connection between FM practices (as second-order themes), we refined their labels or position in the data structure. Ultimately, we were able to delineate a grounded model that makes sense of GB’s FM practices as a process.

Findings

Making the imagined future compulsory, desirable, and plausible

We reveal three aggregated dimensions of FM practices: making the imagined future compulsory, desirable, and plausible (Fig. 3). Those practices are mobilized by GB to construct their imagined future of the construction industry, implying many radical changes in terms of building materials, and to engage their partners and other industry stakeholders in actually designing it with them.

Making the imagined future compulsory

We find that GB entrepreneurs and their partners from the eco-construction niche are designing a “*compulsory future*”—an imagined future shaped not by aspiration but by necessity, where ecological, health, or economic threats impose non-negotiable constraints on what must be excluded or transformed in the future.

To do so, we found, GB entrepreneurs first *problematize human and planetary survival*. They question the nature of the industry and highlight its undesirable impacts on the planet and people’s health (e.g., sickness, broken or rotting buildings). As expressed by Pierre (September 2023):

“If you put polyurethane, you have emissions that are much higher for the same function [compared to the use of sustainable materials]—it is a crime.

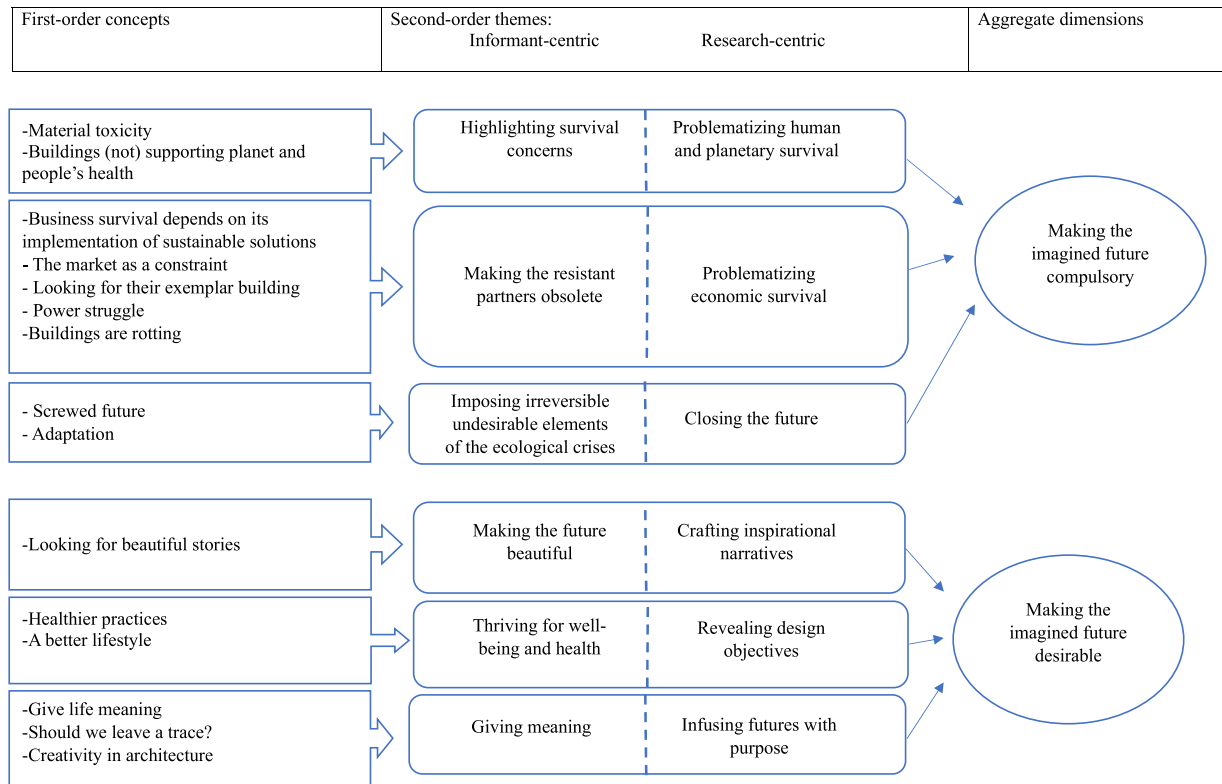


Fig. 3. Data structure of FM practices.

You are [destroying] the planet and pushing climate change, which will displace millions, kill millions of others, and pollute the lungs of your children. And that is true, I am not exaggerating. If you say that to a contractor, he will say: "Ok, I might not put polyurethane." (Pierre C., September 2023)

Thus, GB and its partners problematize what is considered natural in the industry by emphasizing the impacts on human health and the planet. By making these consequences visible and highlighting survival concerns, they compel stakeholders to acknowledge them, redefining the problem space in a way that excludes harmful materials from the set of possible alternatives—what the future might be. The elimination of toxic materials is not an optional design preference, but an urgent, non-negotiable response to survival concerns. As one informant emphasized:

"We need to change the way we build; we don't have a choice. Is it going to be with sustainable materials? I think it is. [...] Are we moving 150 billion in revenue in something eccentric? But today, I am certain that investment going toward polyurethane and Styrofoam, it is totally misdirected." (Georges B., June 2022)

Thus, for GB entrepreneurs and their partners, sustainable construction is a matter of survival, as traditional materials are often associated with severe health consequences. Several informants recounted personal experiences involving illness or death related to conventional building materials:

"What gave me the will to change radically was the death of a friend. He passed away from an aggressive cancer at 38. He wasn't careful, he inhaled [some harmful materials.] He worked a lot with Gyprock and MDF. He never wore a mask." (Victor A., September 2022)

Yet, a lot of harmful materials are used by default in the industry: it is taken for granted that "insulation" means "polyurethane foam boards." Another example comes from a quote from a GB founder about the health crisis of the industry workers:

"Today, painters and workers [are] using plaster [...] so the Polish at the beginning and then the Portuguese, the Spanish, all the people who worked in the family business [as builders], all these people died at 60, 65 years old. Because it is muck, they inhaled toxic shit for 35 years." (Georges B., June 2022)

2022)

Thus, by questioning the natural, GB entrepreneurs *problematize human and planetary survival* in a compulsory future that is doing away with harmful habits.

The data also revealed that questioning the natural (to reveal its consequences) creates a power struggle between members of the eco-construction niche and the stakeholders that economically benefit from the present natural. As Victor A. (September 2022) said, "The big stakeholders are the most influential. They try to maintain their prerogatives—I won't say their privileges, because they are also clinging to things that are crumbling." Likewise, Pierre C. (September 2023) issued a warning to industry members and policymakers about implications for the future if the natural stays as it is:

"What does this imply? If we continue to put copper everywhere, especially for economies that are going to develop further and that aspire to reach a level of development like the economies of the Western world. It's a huge material implication and we don't have the materials we need to provide for that."

By problematizing human and planetary survival, GB addresses the hegemony of the natural in the construction industry, allowing the mainstream partners to align with the new problem space without being antagonized. Yet, this does not work in every instance. When problematizing human and planetary survival is not enough, notably with bigger promoters and corporations, GB turns to other practices to make the future compulsory.

The second practice pertains to making the actor obsolete and, thus, *problematizing economic survival*. GB uses market logic to influence resistant stakeholders, warning that their business's existence increasingly depends on sustainable practices in the competitive construction industry. To win contracts—public or private—firms must demonstrate commitment to ecological innovation, often through exemplary pilot projects. As one informant remarked, "With the promoters, it's more... we need to put them under pressure. 'If you miss this opportunity, ooh la, in five months you will go under, man'" (Georges B., June 2022). In doing so, GB questions the natural while playing with the dominant economic logics of the industry, making resistant incumbents obsolete as the new

imagined future becomes compulsory. Such an approach centers on *problematizing economic survival* in a compulsory future.

Finally, to make the future compulsory, GB entrepreneurs *close the future*. They reveal the undesirable aspects of the ecological crises as unavoidable, drawing on scientific consensus that confirms their irreversible consequences. As one structural engineer and researcher starkly put it, referring to the Intergovernmental Panel on Climate Change (IPCC, 2023) and other scientific reports he had been working on, *"Even if we stopped everything today, we are still screwed"* (Pierre C., September 2023). As such, GB imposes a compulsory future that reflects planetary boundaries under pressure. GB and its partners use FM practices of closing the future to compel clients and industry stakeholders to confront the undesirable—but unavoidable—aspects of the ecological crisis, aligning them with a redefined problem space that makes harmful practices no longer possible.

For GB, constructing a new problem space that includes the compulsory elements of the future, leading to the inevitability of change in the industry, is an important condition for engaging partners or industry peers. Yet, they sense that this condition does not suffice to foster engagement. Next, we present how the GB entrepreneurs also work on making the future desirable.

Making the imagined future desirable

GB and its partners recognize that, after confronting stakeholders with the undesirable aspects of their imagined future, they must also present it as a positive and exciting opportunity for industry transformation:

"When we are in a meeting or seminar, there is always a moment when we talk about the impact of the construction industry, the future, and what we must do. We try to avoid being conceited... It's important to start with an assessment and acknowledge the urgency. But then, we need to move on—so that people can get out thinking, '[Yes!] I want to go there,' not 'Oh my god...we are screwed'" (Louise V., June 2022)

In GB case, we see that the desirable imagined future is first communicated through *crafting inspirational narratives*, notably by sharing success stories of inspiring entrepreneurs launching sustainable materials and contributing to local ecosystems, like in the tiny house movement. *"We tell the stories of the producers; we narrate the opportunities."* (Louise V., June 2022). Those stories are embedded in concrete inspirational space and communities, as GB organizes those storytelling events in beautiful and sustainably built environments. It is about making the imagined future desirable through beauty and energy.

Second, imagined futures are also made desirable by explicitly *revealing its benefits as design objective*, such as promoting health care and better lifestyle. As expressed by Pierre C.:

"If you say to someone, 'Oh yeah, you have a great apartment with two facades and side ventilation. Well, now you're going to live in half of that and you don't have a balcony anymore. That's brutal. But if you say to him, 'Okay, we're going to live in something that's cross-ventilated, that's a little smaller. You don't have your balconies anymore, but instead you have an internal multi-purpose room for the kids in winter, one in summer with a terrace and a slide on it with a built-in barbecue. And by the way, all of that is better from an environmental perspective. So maybe people will say, 'Actually, yeah, I'm in because 'I have a better lifestyle''" [in English in the original transcription].

Likewise, promoting health becomes a salient design objective. Unlike traditional, potentially hazardous materials, alternative sustainable materials are safe and engaging to interact, as showcased in GB workshops where people (including ourselves) can test, touch, smell and play with materials. In this context, health emerges as a connecting topic linking both the compulsory and desirable imagined futures.

In this context, health emerges as a connecting topic, linking both the compulsory and desirable imagined futures. Whereas compulsory elements of the future underscore the undesired toxicity of traditional materials, desirable facets of the future emphasize the health and well-

being benefits offered by sustainable alternatives. As one informant put it: *"I think it is very important to have buildings that are both healthy for us and in which you feel great. The two things go hand in hand—it makes sense"* (Victor A., September 2022). Doing so, GB engages in *revealing the desirable design objective*.

Finally, GB entrepreneurs also *infuse their imagined futures with purpose*. For instance, a lot of architects are disillusioned by a profession driven by budgets and "excel files". Yet, with GB, they rediscover that they can be creative, and that this creativity is a key feature of the imagined future. As expressed by Louise V (June 2022):

"Among architects, we feel a crazy pull. You feel that this reconnection with the material is something that... they get a kick out of it, you know. They come here, they're like kids. They see the material... They talk about it for 2 h, they're so happy". This search for purpose resonates with the experience of GB founders: *"Everyone was looking for a little meaning in their lives and I told them, 'well, I think that there, if we want to give meaning to life, there is a subject' and so that was 3 years ago, 3 and a half years ago. I started to do some research, to see who was interested. I think it was exactly 3 years ago. I suggested to everyone that we go out for a bite to eat during the holidays, saying to them 'I think we might have a subject in general construction' and then there you go, they all took the plunge."*

A Simonian lens thus suggests that, when making the future desirable, GB entrepreneurs and partners form new desirable alternatives within the new problem space constrained by the inclusion of the planetary and human health as aspiration in the design. GB makes the imagined future desirable by attracting potential partners and clients through inspirational narratives, by revealing new design objectives, and by reconnecting partners like architects to the core drivers of their profession. These practices present the appeal of a future artificial world that is healthy, slow, green and creative. It depicts a society where the present natural, exposed as undesirable, has been replaced by a better designed artificial which respects the planet and the people. An example is the tiny house movement, which promotes a simpler life using less space and less resources: *"a tiny house removes the need to manage a huge space and allows the occupants to be closer to nature – challenging the reconceived idea of 'what a house looks like'"*. (Pierre C., September 2023). But the partners also need to be convinced that these desirable options are also feasible. Next, we turn to making the imagined future plausible.

Making the imagined future plausible

Finally, GB entrepreneurs strive to render their imagined future not only compelling but plausible. They seek to demystify sustainable construction and make it feel achievable. Thereby, *making the future plausible* addresses the transformation of the present natural into the future artificial: it reveals how constraints of the industry (materials, norms, timelines) are changed by sustainable materials and therefore become a conscious object of design.

For instance, an architect from Loop architecture (2022) said, *"It is not part of our [academic] training. For example, a cinder block is a certain amount of CO₂ [...] That's why it is interesting to work with GB, they make presentations explaining that."* When GB members meet with potential clients,

the goal is ultimately to reassure. *"To say 'Yes, it's already been done.' And from time to time, we're super happy when someone says 'I want to do something that no one has ever done.' So great, let's do it, let's launch it. But hey, most of the time, it's still more like, 'No, don't worry, someone has already done it, we have photos, proof, technical documents, feedback.'"* (Georges B., June 2022)

A first practice for making the future plausible is thus about *representing the familiar* to "reassure" stakeholders. This is achieved via training to help people get comfortable with the new knowledge on how to implement sustainable alternatives. Lived examples are also used. In this way, some architectural firms use personal experimentation to reassure hesitant clients:

"I'm doing a project in my house. That frustration—the difficulty of

convincing people to use sustainable materials—I don't want to pass it on to the client. So I'm doing it at my place. [...] Maybe they can come to my house. I'm not saying I'm going to rent out my bedroom, but I'll be able to show what it is and use it as a lab." (Loop Architecture, September 2022)

Another practice for making the future plausible is about showing the richness and diversity of sustainable materials, bringing into existence multiple imagined futures and, thus, *materializing future plural possibilities*. This involves showing implementations in multiple sites, again, for the materialization of the multiple pathways that bring the imagined future in the present. It is also about showcasing multiple prototypes through initiatives like the Materatek (and its suitcase) and spreading practical knowledge about these materials. As claimed by Elisa: *"the step of seeing, touching, smelling, kneading the thing and see that it exists, it is making tangible and alive concepts that, otherwise, can seem a bit futuristic or utopic or conceptual"* (Elisa L., December 2022). Importantly, informants insisted on the variety of prototypes. Bringing just one prototype or material is not enough: it is materializing only one pathway that might be a dead-end, as the stakeholders might not resonate with this specific instance. Instead, with a plurality of prototypes and materials, all kinds of paths are materializing: *"I think it might be better to have ten. Or none at all."* (Augustin O., June 2023).

Likewise, GB also offer multiple supply and distribution channels to help stakeholders access the materials, which is often seen as insurmountable by partners. They engage in *embedding their propositions in a future-ready infrastructure*, making it accessible for partners. The architect from Mater Architecture explains: *"Now, I think everyone shares these concerns. Not sharing them would really be like living on a deserted island. The real issue is the investment of energy, time, and brainpower that it requires, and some engineering firms might be hesitant at that level."* (October 2021). GB steps up to canalise efforts and to make the value-chain visible. As Milena F. claims: *"It's not more complicated. You see, it's about demystifying sustainable building materials. We tell architects, contractors, and promoters: it's ok, you know; it is possible to build a whole house sustainably. It's not a crazy idea."* (Milena F., July 2022).

Finally, GB engage in *amplifying emerging commitments* to the imagined future. GB makes its imagined future plausible by pointing at the growing demand—showing proofs that clients want sustainable materials, that the ecosystem is organizing, and that GB is becoming its keystone that is recognized by clients, partners, and policymakers. One GB partner said, *"They (GB) were published in various Belgian journals and newspapers within a period. I saw that they were quite involved in joint activities [with public bodies], creating connections"* (Loop Architecture, September 2022).

Through these actions, entrepreneurs create awareness of the feasibility of sustainable materials, portraying a future in which GB, the industry, and policymakers are actively making the transition happen. This contributes to the transformation of the natural into the artificial. By engaging in representing familiarity, in materializing the plural forms of sustainable materials, in developing infrastructure, and in amplifying the emerging commitments, GB transforms the natural constraints of the industry (materials, norms, timelines) as subjects of conscious design—thus altering them into elements of the artificial world GB seeks to build.

A model for designing the future under ecological constraints

GB's mission statement includes the term "from niche to norm"—that is, it seeks to make sustainable building materials the new norm in the industry. To achieve this imagined future, the construction industry must experience a deep transformation—ranging from altering building practices and timelines (e.g., different drying periods) to shifts in suppliers, material producers, budgets, and architectural specifications. Many of these elements are, in today's traditional industry, taken for granted, a given, or—in a Simonian terms—natural. As noted above, for example it is taken for granted that "insulation" means "polyurethane foam boards." Likewise, "plaster board" refers to "Knoff plaster board";

"ventilation systems" are "double flux ventilation systems." These elements that shape buildings and the industry are not conscious design choices; they are made without conscious thought, they seem natural. As Elisa L. from GB said about a TEDx talk she had given, *"[the aim of the talk was] to deconstruct the preconceived ideas that prevent people from using sustainable materials"* (March 2023).

When constructing the data structure and its three underlying FM practices, we showed that each dimension mobilized the natural in a specific way. First, making the future compulsory questions the natural by revealing its undesirable consequences, reframing the problem space by taking out unsustainable practices (making them unthinkable or impossible). Second, making the future desirable formulates the appeal of sustainable solutions in the reframed problem space; it infuses the search for alternative imagined futures with new aspirations and purpose. Third, making the future plausible shows how the natural is transformed into the artificial. By bringing the future into existence and reassuring stakeholders, GB transforms the natural of the industry (materials, norms, timelines) as subjects of conscious design, thus transforming them into elements of the artificial world GB seeks to build. Together, these three sets of practices form a model for designing the future when the natural is in crisis (see Fig. 4).

When the system is dysfunctional—as it is the case according to GB and its partners regarding the construction industry's use of harmful materials—entrepreneurs might seize on the problem in an effort to correct or redesign it.

This starts with GB entrepreneurs making the imagined future compulsory. They force acceptance of the irreversibility of the environmental crisis and its undesired impacts. According to GB, industry change is a prerequisite to avoid human illness and bankruptcy for construction firm. This does not seek to change the undesirable but compulsory elements coming from ecological crises, but can help to avoid worst-case scenarios.

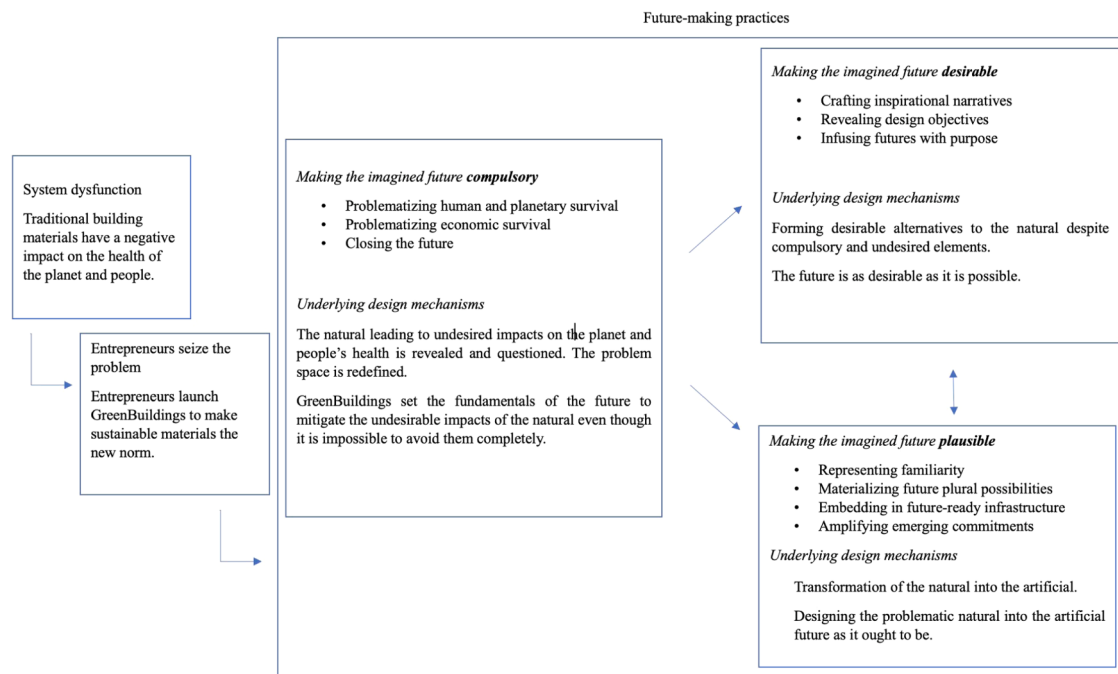
By forcing the revelation of the current undesired impact of the natural on planetary and human health, and imposing its inclusion as a constraint in the design process of the industry's future, GB entrepreneurs go back to the core of their mission, leading society toward greater sustainability and thus creating the conditions for a (more) desirable and plausible future. The problem space that determines design purposes and fitting solutions has been redefined; now, the future-in-design must take into account planetary and human health and be accountable for the past design choices and simplification that led to the naturalization of harmful materials and practices.

Once entrepreneurs and their partners agree on those fundamental elements of the compulsory future, entrepreneurs can turn to practices that are more familiar to the FM literature, making the future desirable and plausible. In making the future desirable, GB gives form to desirable yet little-known sustainable alternatives within a compulsory future—leading to a future that is as desirable as possible. In making the future plausible, it transforms the natural into elements of the artificial world it seeks to build, notably through training partners and curating sustainable materials; it designs the problematic natural into the artificial future as it ought to be.

Discussion

Contributions to FM and EaD theory

Our findings offer three main contributions to theory. First, we provide a conceptual extension of FM by introducing the idea of compulsory imagined futures. This addresses a gap in the FM literature arising from the tendency to focus on hopeful, emancipatory, or transformative futures (Whyte et al., 2022; Comi et al., 2025) while overlooking those that are necessitated by undesirable ecological or systemic constraints. In doing so, we respond to Wright's (2025) call for a more grounded, less idealized approach to FM. In the face of system dysfunction, GB entrepreneurs use FM practices to design a new problem



entangled or whether social and material elements retain some analytical distinction.

Additionally, we did not leverage the longitudinal aspect of our data collection to its full benefit. Especially, we call for further research that would explore in greater detail how the FM process evolves as the venture scales, when audiences diversify, or when disruptions erupt (Garud, 2021).

Finally, we developed our case study in the context of the construction industry, where the impact of the natural is visible in concrete terms (both literally and figuratively); this aligns with a study by Comi and Whyte (2018), who focused on architects' practices. Further research in different—and more, or less, material—industries could be relevant, as could a multi-case setting. For instance, examination of different industries, such as space industry and exploration (Michaud, 2025), could reveal other types of (un)desired FM practices, where the undesirable future could be imposed by human purpose rather than (or beyond) ecological collapse.

Conclusion

This study identifies three set of FM practices mobilized by GB to shift sustainable materials from niche to norm: making the future compulsory, desirable, and plausible.

To make the future compulsory, GB activates three interconnected practices. It problematizes human and planetary survival by revealing the toxic consequences of conventional materials, and reframing these as urgent health and ecological threats. It also problematizes economic survival, warning that businesses that resist sustainable transitions face obsolescence, and it uses market logic to pressure hesitant stakeholders. Finally, it closes the future by invoking scientific consensus on irreversible ecological collapse, insisting that some futures are no longer possible. Through these mechanisms, GB entrepreneurs redefine the problem space: harmful practices are no longer optional and are thus pushed out of the future *as it might be*. Once this foundation is established, entrepreneurs can pursue making futures desirable and plausible.

GB makes the future desirable by crafting inspirational narratives, revealing new design objectives through immersive experiences, and infusing the imagined future with a sense of purpose for both individuals and collectives.

Finally, it makes the future plausible by reassuring stakeholders, showcasing the plurality of sustainable futures, embedding their propositions in a future-ready infrastructure made of diversified supply pathways, and amplifying emerging commitments. GB entrepreneurs transform what was once natural and taken for granted into a consciously designed, artificial world that reflects how the future ought to be.

Together, these practices reframe the construction industry's problem space—emptying it of unsustainable yet taken-for-granted habits and filling it with desirable and plausible futures in response to systemic ecological dysfunction. Thus, rather than imagining idealized futures, GB confronts undesirable future elements and reinterprets them as compulsory constraints for their imagined future.

This reflects a deeply Simonian process. GB entrepreneurs and partners redefine the space of possible futures—rejecting the continuity of the present's natural—and engage partners in shaping a sustainable future *as it ought to be*. GB does not envision utopias; it highlights illness and decaying buildings, revealing past design failures. It engages in what Simon (1996) called re-representing the problem; facing unsatisfactory outcomes, GB reconstructs the problem space to include natural consequences as central design parameters. By doing so, it reshapes the industry's design logic, framing environmental and health constraints as non-negotiable, and sustainable materials as the only viable solution. These compulsory futures mark thresholds from which more hopeful alternatives may emerge. Although Simon (1996) defined good design as one that opens possibilities, such defuturization (Esposito, 2024) can serve as a form of accountability—accepting that good design, in the

face of ecological crisis, may simply mean “as desirable as possible.”

To conclude, the compulsory future involves not surrendering to doom but mounting a generative design response. This allows entrepreneurs to act under (ecological) constraints without denying reality or abandoning hope. As Simon (1996) reminded us, good design avoids irreversible paths and opens space for those who come after. In the age of ecological crisis, designing compulsory futures may be one of the most responsible—and radical—forms of entrepreneurial practice.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used chatgpt in order to improve language and spelling. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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