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Bounded Sustainable Entrepreneurship: Uncertainty, Perceptions, and Tensions

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ABSTRACT

Entrepreneurs experience subjective perceptions of uncertainty and other barriers as they attempt to design their business model. These create boundaries of a cognitive nature that entrepreneurs must navigate. It has been suggested that sustainable entrepreneurship is inherently even more uncertain and complex than traditional entrepreneurship. Through semi-structured interviews, we study the decision-making of 22 sustainability-oriented start-up entrepreneurs. These interviews reveal the perceived barriers and uncertainties they encounter when developing sustainable business models. We identify a multiplicity of perceived barriers but also uncover inherent tensions and emotional responses associated with sustainable entrepreneurship. Our data highlight the trade-offs between profit and impact priorities, leading to internalized tensions experienced by entrepreneurs. These tensions, along with other identified barriers, contribute to an understanding of bounded sustainable entrepreneurship. In this context, perceived constraints shape and limit entrepreneurial decision-making, forcing entrepreneurs to constantly renegotiate their understanding of sustainability. We furthermore uncover a multiplicity of individual entrepreneurial motivations. This leads us to propose a typology of sustainable entrepreneurs' identities based on their approaches to profit-impact tensions. We define four distinct types of sustainable entrepreneurs: the classical entrepreneur, the serial entrepreneur, the solution entrepreneur, and the mission entrepreneur.

1 | Introduction

Sustainable entrepreneurship involves the pursuit of opportunities that generate economic, social, and environmental value while benefiting individuals, communities, and the broader social-ecological system (Muñoz and Cohen 2018, 2017; Scartozzi et al. 2024; Shepherd and Patzelt 2011). Such entrepreneurship is characterized by a multiplicity of objectives and stakeholders (De Clercq and Voronov 2011; Green et al. 2024; Jayashankar et al. 2018; Schaltegger and Wagner 2011), as well as the development of sustainable business models (Lüdeke-Freund 2020; Schaltegger et al. 2016). Entrepreneurship addressing sustainability and other grand challenges is therefore

bounded by high levels of complexity (Voegtlin et al. 2022). The entrepreneur must address simultaneous tensions in economic, social, and environmental value creation (Belz and Binder 2017; Carmine and de Marchi 2023; Hahn et al. 2015) and operate with limited data on, and ability to forecast, sustainability impact (Fichter et al. 2023). Complexity, in turn, leads to higher perceived uncertainty (Dess and Beard 1984; Duncan 1972; Lawrence and Lorsch 1967; Sund et al. 2022). However, entrepreneurs operate within the limits imposed by their own subjective perceptions of uncertainty, rather than any objective state of the environment. This perceived uncertainty can influence their response to environmental challenges (Dewald and Bowen 2010), their decision-making processes (Baron 1998; Busenitz and

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Summary

- Sustainable entrepreneurial decision-making is shaped by subjective perceptions of uncertainty.
- We examine barriers experienced by entrepreneurs engaged in developing business models for sustainability-oriented start-ups.
- Tensions between profit and impact priorities are commonly perceived as a barrier to sustainable entrepreneurship.
- The identified perceived barriers and tensions shape and limit entrepreneurs' decision-making, forcing them to constantly renegotiate their understanding of sustainability.
- We propose a typology of sustainable entrepreneurs' identities based on their approaches to profit-impact tensions.

Barney 1997; Shepherd et al. 2015), and their actions McMullen Baylor and Shepherd (2006). Perceived uncertainty thus acts as a boundary on the realization of sustainability-oriented market opportunities (Patzelt and Shepherd 2011), hindering the development of effective strategies that contribute to more sustainable development.

Entrepreneurs face a unique uncertainty challenge, as they must design business models that address value creation and appropriation before they know what the economic value of the opportunity they pursue might be (Alvarez and Barney 2005). Beyond this, they must design activities, choose partners, and orchestrate resources with often very limited information or experience available. The recent research stream on business models as mental models (e.g., Martins et al. 2015; Massa et al. 2017; Sund 2024) and business model innovation as a cognitive process (e.g., Andreini et al. 2022; Frankenberger et al. 2013; Jensen and Sund 2017; Roessler et al. 2019; Schneckenberg et al. 2017) are particularly relevant for the study of entrepreneurial perceptions and decision-making. The business model can be viewed as a cognitive construct, held in the entrepreneur's mind, and related to the environment through perceived cause-and-effect relationships (Huff 1990; Sund 2024). When these relationships appear complex and uncertain, they act as a boundary, or perceived set of barriers, that the entrepreneur struggles to overcome (Baldacchino and Sasseti 2025).

Barriers to entrepreneurship are conditions that prevent opportunity recognition or pursuit (Khanin et al. 2022). Entrepreneurs face many potential generic barriers, such as a lack of resources, high capital costs, or a lack of market knowledge (e.g., Álvarez Jaramillo et al. 2019; Bocken and Geradts 2020; Geissdoerfer et al. 2023; Laukkanen and Patala 2014). It has been suggested that sustainable entrepreneurs face more challenges in terms of access to financial, administrative, and informational support than traditional entrepreneurs (Hoogendoorn et al. 2019). It has also been suggested that entrepreneurs are more susceptible to decision-making biases and the use of heuristics than managers in larger organizations, due to the environmental uncertainty and complexity they face (Busenitz and Barney 1997). However, few studies have taken a cognitive perspective on the study of

individual perceptions of uncertainty and associated perceived barriers to sustainable business model innovation (Acciarini et al. 2021; Korteling et al. 2023; Shepherd et al. 2015). We explore the specific barriers that characterize the experiences of sustainable entrepreneurs, beyond those faced by regular entrepreneurs. Through a qualitative exploration of multiple cases of sustainability-oriented start-ups, combined with an interview-based elicitation of founder-entrepreneurs' perceptions, we investigate the decision-making processes of such founders as they develop their business models. Specifically, we ask the question: what are the main uncertainties and barriers perceived by sustainable entrepreneurs?

Our findings indicate that founders perceive a multifaceted array of barriers when designing business models for their sustainability-oriented start-ups. First, they face the classical challenges of securing funding, managing stakeholder relationships, and navigating the complexity of customer and supplier dynamics. These barriers appear to be intensified in the sustainable entrepreneurship context, where business models need to balance economic, environmental, and social imperatives. Beyond this, our data reveal barriers directly linked with entrepreneurial cognition. These include various difficulties triggered by context complexity, lack of necessary knowledge, and perceived shortages, such as limitations in forecasting impact. We also uncover perceived uncertainties and barriers unique to the context of sustainable entrepreneurship. We find that sustainability-oriented founder-entrepreneurs are significantly influenced by emotional factors associated with their ventures, which can give rise to perceived tensions and conflicting priorities in the design of business models. Perceived as a complex phenomenon surrounded by uncertainty, sustainability represents a fluid construct that is constantly renegotiated by founders.

In consideration of the discrepancies in founders' perceptions of boundaries and their underlying motivations for initiating the venture, we identify four distinct sustainable entrepreneur identities. We speculate that these identities may influence how sustainable entrepreneurs perceive and respond to barriers, particularly in managing the tension between profit and impact. With this typology, we aim to advance discussions on how entrepreneurs' individual characteristics shape their decision-making in sustainable business model design. Furthermore, through our findings, we generally seek to provide a more nuanced understanding of the cognitive perspective within sustainable entrepreneurship.

While some critics argue against focusing on cognitive limitations (Hastie 1991; Porac and Tschang 2013), we argue that understanding perceived barriers and uncertainties is vital for developing effective coping strategies when dealing with sustainability challenges. We acknowledge that studying perceived barriers focuses on the limitations that entrepreneurs subjectively experience. However, we move beyond viewing these barriers as implications of entrepreneurs' axiomatic bounded rationality that merely need to be accepted (Massa et al. 2017; Simon 1955, 1987). Rather, we suggest a need to fully understand the coping mechanisms and developing strategies of entrepreneurs in response to these barriers. This, in turn, facilitates the successful implementation of sustainable business models and the nurturing of sustainable entrepreneurship.

2 | Materials and Methods

To understand the barriers and uncertainties perceived by entrepreneurs of sustainability-oriented business models we took an interpretivist approach. We studied multiple cases of sustainability start-ups, drawing entrepreneurial reasoning processes through founders' recollections of key decisions and experiences (Chetty 1996; Langley 1999). This is a commonly used approach to uncovering perceptions of entrepreneurship and business model design (e.g., Roessler et al. 2019; Schwenk 1985; Sund et al. 2021). Start-ups are typically free from pre-established organizational heuristics and complex organizational structures (Bingham and Eisenhardt 2011) yet navigate the high uncertainty and resource constraints typical of small businesses (Osievskyy and Dewald 2015; Tan 2001).

We approached a diverse group of start-up founders engaged in designing sustainable business models. Through purposive sampling, we identified start-ups with a proven sustainability focus, such as B Corp certification or participation in sustainability-focused accelerators like Green Up in Denmark. We also conducted additional screening of company websites, presentations, and any additional sources of public information we could find to ensure sustainability was integral to their business models. We identified participants from various industries and countries (Eisenhardt 1989). A list of these firms can be found in Table 1.

Primary data was collected through semi-structured interviews, suitable for exploring complex phenomena like entrepreneurial decision-making (Creswell and Poth 2018). Founders are by

TABLE 1 | Sample and data description.

Respondent	Respondent role	Industry	Location	Year founded	Length of the interview
1	Co-founder and CEO	Environmental services	Denmark	2022	20 min
2	Co-founder	IT services and consulting	Denmark	2021	45 min
3	Founder	Health and human services	Canada	2018	51 min
4	Founder	Food and beverage manufacturing	Denmark	2019	40 min
5	Sustainability manager (since 2018)	Textile manufacturing/services	USA	2011	58 min
6	Co-founder and CEO	Consumer services (car-sharing)	Denmark	2015	72 min
7	Sustainability manager (since 2022)	Design services	Australia	2017	56 min
8	Co-founder	Manufacturing (personal care)	USA	2020	49 min
9	Sustainability Manager	Food and beverage services	Australia	2009	85 min
10	Co-founder	Manufacturing (beverages)	Australia	2017	70 min
11	Co-founder	Biotechnology research/textile manufacturing	Indonesia	2015	58 min
12	Co-founder	Retail apparel and fashion	Denmark	2022	27 min
13	Sustainability manager	Laundry and dry-cleaning services	England	2018	51 min
14	Co-founder	Manufacturing (packaging and containers)	Denmark	2020	57 min
15	Co-founder	Manufacturing (snacks)	USA	2014	58 min
16	Co-founder	Retail (homecare)	Australia	2020	59 min
17	Co-founder	Climate data and analytics	Denmark	2021	41 min
18	Co-founder	Wholesale building materials	Denmark	2016	58 min
19	Co-founder and CCO	Retail (packaging)	Denmark	2018	50 min
20	Founder and CEO	Farming technology	USA	2019	50 min
21	Co-founder	Technology services (food industry)	Germany	2022	50 min
22	Co-founder	Retail apparel and fashion	Denmark	2019	50 min

definition considered entrepreneurs (Begley 1995). Founders' verbal accounts were thus treated as direct representations of entrepreneurial reasoning during sustainable business model design (Eisenhardt 1989). Between October 2023 and June 2024, 18 founders from 22 start-ups were interviewed. For the remaining four start-ups, the interviews were conducted with the start-ups' sustainability managers in consultation with the founders' responses to the interview guide, to ensure that the founders' perceptions were represented. We appeared to reach data saturation at which stage the data collection concluded. Interviews lasted on average 52 min, resulting in over 19 h of recorded data and 160,000 words of transcribed data. Additional background data consisted of company presentations and website data, used to cross-reference where necessary.

The interviews aimed to prompt detailed explanations of the sustainable business model design process. The interview guide included questions on the motivations for starting the venture and explored decision-making across various business model areas, focusing on cognitive, sustainability-related, and generic barriers, along with tensions and uncertainties faced by founders (the more detailed interview guide is found in the Appendix A). We adapted our questions throughout each interview to investigate any emerging conversational themes further (Eisenhardt 1989).

We conducted a classical thematic analysis of interview data. The interviews were recorded and transcribed verbatim. We used a combination of manual coding and ATLAS.ti coding. To ensure reliability, each author coded interviews separately. Subsequently, the codes were discussed in a workshop setting. Consistent with our interpretative methodology, we adopted an inductive approach, allowing themes related to perceived barriers to emerge organically from the data without artificially filtering for sustainability-specific barriers (Gioia 2021). This approach honored the entrepreneurs' narratives, acknowledging that they experience barriers holistically. Several iterations of cross-case comparisons were conducted to group codes and refine overarching themes (Gioia et al. 2013). The final coding themes include the full spectrum of perceived uncertainties and barriers, including perceived barriers to entrepreneurship in general, barriers to sustainable entrepreneurship and business modeling, and experiences linked to decision-making. A simultaneous comparison with established literature and frameworks on barriers in sustainable entrepreneurship and business model design ensured that the naming of codes corresponded to established research, while more novel aspects of perception and cognition were grounded directly in the data.

3 | Findings

3.1 | Perceived Uncertainties

Founders in our sample perceived multifaceted uncertainties in their ventures, many of which are unique to the sustainability context (see Table 2). For example, environmental factors, including climate change and seasonality, introduce uncertainty in predicting costs and guaranteeing operational stability. One founder experienced the cost of a key ingredient soaring by 130% in 6 months due to climate issues. Other external factors causing uncertainty included events such as the recent COVID-19

pandemic or geopolitical tensions and associated economic sanctions, all of which potentially disrupting operations and market conditions unpredictably. One founder commented on their feeling of low controllability over such events, and the need to build resilience through decentralized production models in response. Other founders discussed their low trust toward suppliers.

A shared uncertainty of many of the founders in our sample was the degree to which their ventures would truly result in more sustainable business models. Founders faced significant uncertainty regarding their business model's actual impact. They voiced concerns over a potential gap between intended and realized outcomes. This uncertainty affected strategic decision-making and resource allocations, as these founders struggled to measure and validate their business model's effectiveness in real-world conditions. The pace of environmental degradation and climate change raised further questions in their minds about whether their efforts will be timely and significant enough to drive meaningful change. One founder confided in us that "the greatest fear that I have is that actually we are too late. We will be too late. The problem is too big, it's already too big" (Respondent 11).

Predicting demand is challenging, especially for non-essential or innovative products. One founder expressed uncertainty regarding how economic fluctuations affect purchasing power:

Economic uncertainty is also a factor because, as I said, it's not the cheapest product in the market. So, when times are tough, will people go out and just buy the cheapest supermarket brand?

(Respondent 16)

Founders in our sample, in general, struggled to accurately forecast demand, often relying on imprecise estimations. Furthermore, they worried about being accused of greenwashing. One founder had a perception that radical sustainable business model innovation will likely appeal only to a niche, while more incremental innovations will appeal to the masses, but at the risk of being accused of greenwashing. Another was worried about communicating too openly about the green qualities of their product, telling us that "we're probably more green hushing than green washing" (Respondent 22). Several founders voiced uncertainties about certifying their products or practices as sustainable, weighing how consumers might interpret such claims. Linked to this is uncertainty resulting from the perceived unpredictability of legislative changes, which made founders doubtful about whether their current choice of materials and practices is future proof.

Interestingly, some founders viewed the environmental uncertainties in positive terms, as serving their venture's development. They claimed that their business models are developed to solve sustainability-related problems and mitigate associated uncertainties for their customers or offer value despite the surrounding uncertainties. For some founders, the perceived uncertainty drives the direction of innovation and forces continuous business model refinement. This dynamic landscape requires founders to remain agile and responsive throughout their venture's lifecycle.

TABLE 2 | List of key perceived barriers and uncertainties to sustainable entrepreneurship and business modeling identified in the study.

Theme	Generic	Sustainability-specific
Cognition and emotions	Cognitive overload during decision-making	
	Strong emotional attachment to initial ideas	
	Limited information	
	Limited knowledge and experience	
Governance and growth	Trade-off between achieving scale and maintaining agility	Trade-off between venture growth and staying true to sustainability-related values
Economics and finance	Seeking funding requires time and resource investment	Perception that investors primarily focus on profit
	Minority entrepreneurs perceive investor biases	Trade-off between the sustainability of an offering and additional costs
Operations		Trade-off between product design and energy consumption
Suppliers	Low trust toward suppliers	Finding sustainability-oriented suppliers
		Convincing suppliers to make necessary sustainability-oriented changes
Market and customers	Difficulty identifying target segments and pricing	Customers' pejorative perceptions of the sustainability characteristics
	Uncertainty concerning forecasting demand	Customers' unwillingness to pay a premium for sustainability offerings
		Customers' resistance to change and risk aversion
		Customers' user behavior disabling impact (B2B) customers' dominant logic
Regulation and external environment	Disadvantageous regulatory environment	
	Uncertainty concerning geopolitical tensions and economic sanctions	
	Uncertainty concerning the COVID-19 pandemic	
Societal impact		Limited knowledge and experience with forecasting impact
		Uncertainty regarding certification of offerings
		Fear of greenwashing accusations
		Uncertainty regarding the impact size

3.2 | Perceived Barriers to Sustainable Entrepreneurship and Business Modeling

A specific barrier to sustainable business model design experienced by several founders relates to finding sustainability-oriented suppliers. Several founders experienced that a lack of suppliers fulfilling their quality, environmental, or social requirements inhibited the sustainability of their start-up and

business model. Respondent 16 told us that “no [local] suppliers wanted to even talk to us because the quantities were just too small”. This particular start-up had to find foreign suppliers, increasing its carbon footprint. Commonly, when facing a shortage of adequate suppliers, founders struggled with convincing these to make necessary sustainability-oriented changes, such as emission reductions or increasing the durability of supplied parts. Some founders showed signs of feeling

cognitively overwhelmed by decisions about the supply chain amidst the lack of certainty and missing information. One confided to us a sense of frustration at lacking information, knowledge, and experience of how to organize the supply chain, saying:

... a lot of it was that there was no understanding or expertise of what the textile industry is like. Some of it was just a matter of we don't have the information for this. We can't make any key decisions.

(Respondent 5)

Barriers also resulted from founders' experiences with investors and their assessments of new ventures. Founders had to balance their time between developing their venture and continuously seeking fresh funding. Our founders indicated that they perceive investors to be primarily focused on monetary returns. They perceived that this inhibits them from securing funding for ventures that, by design, are aiming to yield both financial and socio-environmental returns. Founders experienced frustration at having to look for funding. They also divulged an interesting dynamic tension: lack of funding created a barrier to scaling their operation, while scaling itself was perceived as a potential barrier to agility. Two minority founders shared a perception of investors' disregard against female founders or ethnic minorities.

Other barriers experienced by founders related to customers, who are perceived to be resistant to change. A common perception was that customers are not willing to pay a premium for sustainability. Some feared that the value coming from the sustainability aspect of their offer might be regarded as just a nice-to-have feature, rather than as a necessity. Some experienced challenges with influencing consumer behavior to use their offering in a designated way, which disables its sustainability. Others experienced customer inertia and risk aversion as an obstacle inhibiting the use in the first place. Founders were also challenged by business-to-business (B2B) customers' dominant logic and their various expectations borrowed from traditional markets, such as fast-moving retail markets with constantly changing product collections. One founder said that those customers who were willing to consider sustainable alternatives seemed to overly focus on CO₂ emissions as opposed to broader indices of impact. Moreover, founders seemed to perceive customers in general as a group that lacks internal motivation to change toward sustainability, therefore requiring an incentive or external motivator, such as a message of urgency or novel regulations. Some saw it as an exercise of trust for the customers to believe that a systemic change is possible. Others perceived the challenge as rooted in customers' thinking being heavily anchored in the short-term horizon and the "here and now" narrative.

Several founders noted the need to address customers' pejorative perceptions of sustainable offerings as less effective, overly costly, or associated with mere greenwashing intentions. Founders struggled with B2B customers' perception of sustainability as a needless additional level of complexity. A similar view was shared in the business-to-government context with one founder telling us: "There were definitely challenges, certainly

with governments and institutions, because they're very rigid, as we know, and especially if they're an institution that's polluting, they do not want to hear how they need to change." (Respondent 20). There was a perception among some founders that their current regulatory environment acts as a barrier, since it was designed to support the status quo of traditional industry practices. Furthermore, many struggled with the uncertain future of the regulatory systems within which they navigate. Some indicated that building coalitions with other firms to lobby for regulatory changes could be a strategy.

As already briefly discussed, many founders we interviewed perceived the market for their products as a niche. Respondent 16 reflected that addressing a niche "reduced the barrier of having to explain to people why sustainability was important". Nevertheless, some founders found it challenging to identify the right target customer group. One founder felt inhibited from launching their most impactful offering after having trouble with foreseeing a big enough market for it. As a result, they launched a product with a less positive impact, yet secure and stable market demand. Other founders were more positive in their evaluation of market potential.

At last, founders experienced sustainability tensions occurring among various aspects of their business models. For example, they perceived trade-offs between the design of the product and the energy consumed in the development of that design. Increased sustainability of an offering was often associated with additional costs incurred. Some founders considered the sustainability aspects of their business model as inherently unscalable. One founder in the food sector, for example, reflected that: "When you start farming on a certain scale, organics just go out the window. The cost of scale is diversity. In a farming landscape, you then just start monocropping and lots of machinery, and you're producing quantity at that point" (Respondent 10).

3.3 | Differing Motivations and Identities

Founders differed in how they identify themselves. Some appeared to have a strong identity as entrepreneur, while some identified as people with a mission, working on what one founder called "the biggest problem in the world" (Respondent 15), that is, sustainability. Some displayed a greater emotional attachment to their business idea than others.

Reflecting on the above, we found that the founders in our sample could usefully be grouped into four types as illustrated in Figure 1, based on their core motivation and the degree to which they identify with the particular product, service, or solution they offer to the market. We speculate that this typology can be generalized to sustainable entrepreneurs in general. Entrepreneurial motivations for engaging in sustainable entrepreneurship can thus be understood through this typology, which considers both their emphasis on business or impact and their degree of product identification. The more traditionally business-focused founders in our sample spoke mainly about the business side of their venture and identified strongly with the classical role of the entrepreneur. Impact-focused founders considered cost and revenue to be important but not the deciding factors when dealing with core business activities. These

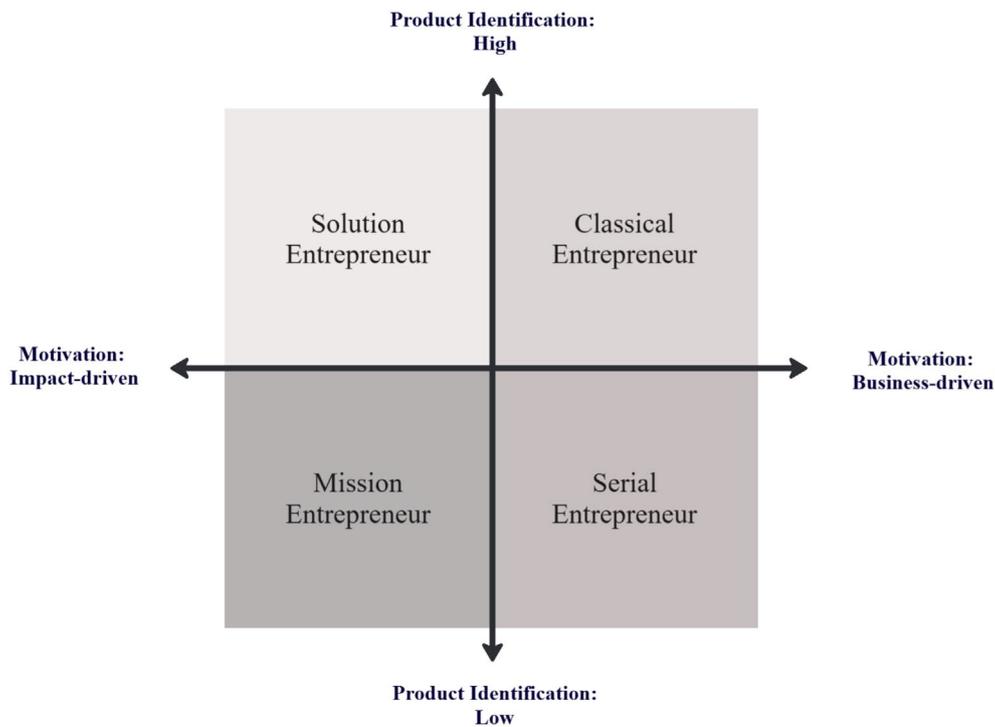


FIGURE 1 | Typology of motivation and identity among sustainable entrepreneurs. [Color figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1002/jsc.2684)]

founders in our sample emphasized practices like paying above the real living wage. They believed such approaches ultimately pay off through competitive advantages and increased funding opportunities, arguing that being ahead of the curve in sustainability can win over competition.

3.4 | Classical (Novice) Entrepreneur

A core tension we identified in our study is that between impact and business objectives. In the wider entrepreneurship literature, entrepreneurs have typically been classified into two types: novice entrepreneurs, who are starting a business for the first time, and habitual entrepreneurs, who have experience. What we term the classical entrepreneur is a novice who has an idea, pursues this idea, and although this involves sustainability, has a focus on the business side. They still must balance impact and business considerations, but they are willing to make some compromises on sustainability if this is necessary for the venture to be viable. They identify strongly with their product idea, which leads them to stay with this business rather than attempt serial entrepreneurship.

One co-founder in the food industry commented that uncertainty was leading them to reconsider being fully organic. Another quite young founder, developing a novel solution for the building industry, had a great focus on perfecting the business model, improving processes to lower costs, and adopting the right pricing—all classical business concerns. In our sample, all of these more classical founder-entrepreneurs were still driven by a wish to introduce sustainable products, business models, or solutions, but there was at least as great an emphasis on the business side. They are willing to make compromises on sustainability if necessary for the venture's success. These entrepreneurs

often respond to consumer preferences and regulatory pressures or seek differentiation through sustainability certifications like B Corp. They balance their desire to introduce sustainable products or solutions with classical business concerns such as perfecting business models and improving processes to lower costs, or adopting the right pricing.

3.5 | Serial Entrepreneur

Habitual entrepreneurs are typically divided into serial entrepreneurs, who start businesses one after another, and portfolio entrepreneurs, who manage multiple businesses at the same time (Plehn-Dujowich 2010). We identified several founders that we would label as serial sustainable entrepreneurs in our sample. What differentiated these entrepreneurs from others was that they had typically made several attempts at launching sustainable or (non-sustainable) businesses. Furthermore, although leading sustainability-oriented businesses, they had more of a business focus. For example, one founder told us that they “explored so many projects. It’s like before starting this, there were six projects that we worked together, and some of them they literally died at the idea stage, and some we built it and we couldn’t find [...] the proper customer for it” (Respondent 21). This type of entrepreneur was not as focused on any particular problem or solution, but rather on launching a successful business that they could exit, to start over again with a new business. They thus did not see the particular product as something they would pursue in the long-term, signaling a lower product identification. Conversely, we would hypothesize that in order to want to stay with a particular product for a long time, the entrepreneur would need to strongly identify with it. It should be noted that we did not identify any portfolio entrepreneurs in our sample. We thus cannot say whether a portfolio (sustainability-oriented)

entrepreneur would experience high or low product identification (or be impact-driven).

3.6 | Solution Entrepreneur

This type of sustainable entrepreneur is driven by the pursuit of a solution to a particular problem. They tend to identify strongly with that solution and are highly motivated to push that solution into the world. They are more interested in the technical and impact side of the solution than the business side. One such founder told us: “I established the company in 2016. I just got some initial ideas when I was studying, and I started. I thought that, you know, maybe someday I could turn this idea into a business. I was provoked by the old-fashioned way of thinking in the industry. So, I said to myself: we must be able in this modern time to innovate the industry in some way” (Respondent 18). The same founder-entrepreneur indicated reluctance to compromise on sustainability, even if this made it more difficult to be profitable. This entrepreneur was educated and had previously worked in the same industry and clearly had a strong identification with this industry and the solutions they were developing.

3.7 | Mission Entrepreneur

This type of sustainable entrepreneur is on a mission to create a more sustainable world, with less emphasis on the specific means of achieving it. Contrary to the solution entrepreneur, whose motivation is to find a solution to a particular problem and who identifies strongly with that solution, the mission entrepreneur is less motivated by the particular product and more by the idea that they are changing the world. For example, one founder told us that they have “climate anxiety all the time”, and instead of pursuing an MBA and climbing a corporate ladder, they sought a mass market product that could be a vehicle to realize the mission. They told us:

Maybe I can start something that will be helpful in alleviating my anxiety. And when I did a quick audit, it was toothpaste. Toothpaste is the number one because everyone, whether you are in Africa or Asia, Australia, New Zealand, wherever you are in the world, people do brush their teeth, and that was a number one generator of plastic waste.

(Respondent 8)

This particular founder was approached by global companies that wanted to acquire their business. However, they refused to sell as they were worried about whether the buyer would continue to prioritize the product's impact. Thus, the motivation of the mission entrepreneur is not to get an idea, sell it, and get rich, but rather to be on a lifelong mission to create a more sustainable world through systemic change. Mission entrepreneurs are often driven by emotion, mentioning climate anxiety or frustration with traditional corporate practices as motivators. Although we did not encounter any portfolio mission entrepreneurs in our sample, it is perfectly possible that some go on to start and grow multiple businesses concurrently, as long as these have a strong impact.

3.8 | The Dynamics of the Impact-Business Tension

Founders also reflected in various ways on the dynamic tension between being business and impact-driven as entrepreneurs. Some founders indicated that they fear that venture growth may disable them from staying true to the core sustainability-related values. While some perceived it as a barrier and tried to avoid scaling their business model, others tried to pursue scale despite the realization that scaling may lower their positive impact. A third group of founders approached scaling in an opposite way, perceiving it as a necessary element to reach the desired level of widespread impact. In addition to this, some founders displayed a strong emotional attachment to their initial ideas, struggling to pivot even when market conditions demand change or when the original impact vision hinders company growth.

Furthermore, a more nuanced perspective emerges with founders who viewed sustainability on par with profit, aiming to create an “engine for positive growth” (Respondent 2) by intersecting doing good with doing well. Although most founders clearly see the profit motive and impact motive as distinct, some see a possibility to align them. Some founders, for example, linked business success with economic empowerment in developing regions or designed their business model to align profit-making with direct contribution to environmental benefits through carbon absorption. One developed a regular product option to cover financial losses from the sustainable product option, while another adopted a freemium business model to provide a free version of their product. Some founders were clearly mission-driven, with Respondent 15 saying they wanted to “make change from the inside out” to demonstrate to the rest of their industry that sustainable practices can be financially lucrative.

This balance was challenged by those who viewed impact and profit as a dichotomous choice, arguing that traditional business models struggle to maintain a dual focus. As previously mentioned, scaling represented a particular challenge for some founders. Furthermore, many founders voiced that sustainability alone is insufficient as a value proposition, emphasizing the need to create additional customer value through user-friendliness or product appeal. Some founders prioritized financial aspects at the expense of sustainability, stating that impact investors demand returns comparable to traditional venture capital.

4 | Discussion

The context of sustainable entrepreneurship is unique in several ways, which became apparent as we studied the start-ups in our sample. Sustainable entrepreneurs face more radical uncertainties, partially attributable to the added complexity of navigating the triple bottom line of financial, social, and environmental value (Belz and Binder 2017; Cohen et al. 2008; Hahn et al. 2015). Complexity appears to be an inherent property of sustainable business models (Bastian and Caputo 2024; Rosati et al. 2023). This leads to uncertainty regarding critical decisions, particularly in areas related to sustainability. For instance, entrepreneurs may struggle with whether to invest in carbon offsetting or pursue alternative solutions that

potentially offer a greater positive impact. In some cases, we interpreted founders' descriptions as indicative of a heightened cognitive load.

We identified various challenges related to decision-making and planning (Hahn et al. 2014). Founders frequently acknowledged the limitations of their own knowledge and prior experiences, which led to significant uncertainty in their decision-making. This uncertainty surfaces in various aspects of business operations, such as determining the optimal location for production or selecting appropriate suppliers. Difficulties with forecasting emerge as another significant cognitive barrier. First, forecasting the impact of a business model proves to be a complex task involving numerous variables and long-term considerations that challenge entrepreneurs' cognitive capacities. Entrepreneurs struggle with setting the boundaries of their business model's impact, often uncertain about how far-reaching the effects of their decisions might be. Second, uncertainty in forecasting revenue potential hinders the ability to attract funding and to plan production and scaling. Not having direct points of comparison makes forecasting difficult. Third, this uncertainty extends to predicting the areas where resource allocation would yield the greatest impact.

A significant finding is the centrality of the tension between profit and impact priorities for the sustainable entrepreneur. This has previously been highlighted as a barrier in incumbent-led sustainable business model innovation (Bocken and Geradts 2020) but also turns out to be at the heart of an internalized tension that entrepreneurs experience between profit and impact goals. In extension, we observe that some founders perceive a significant threat in scaling or growing, as they believe this may lower the sustainability of their venture. We develop a typological framework classifying sustainable entrepreneurs' identities based on what motivates them, leading to different navigations of the boundaries imposed by this internal conflict.

Apart from instances of perceived uncertainty and tensions, we find a variety of cognitive barriers, such as perceived shortage of knowledge, complexity, or difficulty in forecasting impact. These barriers represent founders' common perception of their self-concern regarding their abilities, knowledge, or certainty. These perceptions, to some extent, contrast with previous findings on entrepreneurial optimism and overconfidence (Shepherd et al. 2015). Our results suggest some divergence from Cassar's (2010) observations of nascent entrepreneurs' optimism about venture success. They also differ from the study by Palich and Bagby (1995), who found founder-entrepreneurs to be more optimistic and overconfident than non-founders when evaluating business situations. The founders in our sample appeared less positive. To some extent, this could be due to the current uncertainties linked to post-COVID-19, supply chain difficulties, and current geopolitical tensions.

However, our study also reveals insights in line with prior research, with cases of founders who either do not perceive uncertainty regarding their sustainable business models or see it as a driving force for their ventures. Such apparent discrepancies simply reflect Shepherd et al.'s (2015) observation that entrepreneurs are heterogeneous in their optimism and overconfidence. Our findings are also consistent with previous studies

on entrepreneurs' heavy reliance on prior beliefs and previously chosen alternatives (Burmeister and Schade 2007; Parker 2006; Shepherd et al. 2015). McMullen Baylor and Shepherd (2006) discuss the relationship between entrepreneurial action and uncertainty, referring to studies that see uncertainty as "producing hesitancy by interrupting routine action" (Dewey 1933) and "encouraging procrastination" (Yates and Stone 1992). This aligns with our conceptualization of uncertainty as a cognitive barrier in the context of sustainable entrepreneurship (McMullen Baylor and Shepherd 2006).

5 | Conclusion

The importance of the cognitive perspective is underscored by the nature of sustainability issues, which are often characterized by experiential vagueness, complexities, and impacts that are difficult to perceive directly (Dembek et al. 2023). As Korteling et al. (2023) note, our understanding of societal challenges is largely built on indirect and abstract cognitive information. Therefore, adding a cognitive perspective to understanding barriers to sustainability is crucial. This is especially important in sustainable business modeling, where heightened uncertainty significantly influences entrepreneurs' perceptions and decisions. Our findings both complement and extend previous research on barriers to business model development (Chesbrough 2010; Egfjord and Sund 2020; Sund et al. 2021; Vatankhah et al. 2023) and sustainability in entrepreneurship (Álvarez Jaramillo et al. 2019). They shed light on the cognitive constraints that influence how entrepreneurs navigate these barriers.

We contribute to this literature by introducing a view of sustainable entrepreneurship as bounded by perceived uncertainties and barriers. We also demonstrate how entrepreneurs may have differing motives and identities that lead them to cognitively navigate and renegotiate these boundaries in different ways. While previous research has identified key organizational-level barriers to business model development (e.g., Vatankhah et al. 2023), sustainable business model innovation (e.g., Bocken and Geradts 2020), and sustainability in entrepreneurship (e.g., Álvarez Jaramillo et al. 2019), we argue that the subjective perceptions of entrepreneurs themselves are relevant to study. Our approach illustrates how entrepreneurs' cognitions and identities shape their decision-making and framing (Hahn et al. 2014). This extends previous research that has identified unique perceptions of and attitudes toward risk and uncertainty among sustainable entrepreneurs (Hoogendoorn et al. 2019).

Our findings have practical implications for both entrepreneurs and investors in the sustainability space. For entrepreneurs, recognizing these perceived uncertainties and barriers early can help in developing strategies to address them proactively. Specifically, entrepreneurs should remain mindful not only of objective business challenges but also of how their own perceptions might influence decision-making. Our typology offers a strategic approach to investor selection, enabling entrepreneurs to seek out investors who align with their specific motivational orientation and approach to sustainable entrepreneurship. For investors, understanding the different types of sustainable entrepreneur identities and their varying approaches to navigating

profit-impact tensions can aid in better aligning their support and expectations with founders' motivations.

While our study provides valuable insights into sustainable entrepreneurship, the relatively small sample size of 22 entrepreneurs suggests caution in generalizing the proposed typology. Although typical for qualitative research and developed through data saturation, our typology should be viewed as an exploratory framework rather than a definitive categorization. The predominantly developed-country sample (Denmark, the United States, and Australia) may limit applicability to global contexts. Future research could validate this typology through larger, more diverse samples and additional methodological approaches.

More generally, future studies could also explore the evolution of uncertainty perceptions among sustainable entrepreneurs, examining how these perceptions shift over time, as they gain knowledge and experience, and develop their ventures (Belz and Binder 2017). It might examine heuristics and coping mechanisms (Bleda et al. 2023; Gilbert-Saad et al. 2018; Ringvold et al. 2022; Roessler et al. 2019) and how these vary across different types of sustainable entrepreneurs. Future research could also study country- and industry-specific differences in entrepreneurs' perceptions of uncertainties and barriers, as well as in approaches to addressing these. Comparative studies could investigate the psychological nuances of uncertainty, including potential variations in emotional responses across entrepreneurial identities and between sustainable and traditional entrepreneurs. Finally, perceived uncertainty is commonly theorized as related to environmental dimensions such as dynamism, complexity, ambiguity, munificence, or rate of change (Duncan 1972; Sund et al. 2022). Future research could study how these separately create boundaries for sustainable entrepreneurship.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

For confidentiality reasons and to ensure anonymity of interview respondents, the data from this study cannot be openly shared.

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Appendix A

List of interview guide questions.

Introduction

1. What is your role in the company?
2. Could you shortly describe your company's business model?
3. What was the main motivation behind setting up the company's business model?

Sustainability of the Business Model

4. What makes your business model a sustainable business model? In what way is it sustainable?

5. How do you see the relationship between the company's business model, society, and the environment?
6. How do you create value? How do you capture it?
7. (When it comes to sustainability of your business model) which aspects did you take into consideration when making the decision to get involved in the business model design?

Process of Business Model Design, Its Barriers, and Uncertainties

8. Could you tell me about the process of designing your business model?
 - a. Do you remember the phases that you went through? Could you please describe how the phases looked for you?
 - i. (For each phase) What barriers did you encounter in this phase?
 - ii. (For each phase) Did you face any key uncertainties in this phase?
9. Let's focus on the present situation. What barriers are you encountering at the moment? Are there any uncertainties?
10. At last, let's focus on the future of your start-up. How do you perceive its future? Can you think of any barriers or uncertainties that might arise?