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Strengthening Incubator Support for Sustainability Startups

A Study in the Lombardy Entrepreneurial Ecosystem
Master's thesis in Management and Economics of Innovation

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SUMMARY

Sustainability startups develop innovative solutions to environmental and social problems, making them important contributors to sustainable development. However, they often face challenges when trying to grow and scale their businesses. Their progress depends to large extent on the founding team, but the surrounding entrepreneurial ecosystem and the support structures within are also of critical importance. Incubators are key actors that help startups grow, but limited research has looked at how incubators can adapt their support to the specific needs of sustainability startups.

The purpose of this study is to investigate the challenges faced by sustainability startups in the Lombardy entrepreneurial ecosystem, and to examine how incubators can improve their support to better address these challenges. The research is based on a qualitative and exploratory design using an abductive approach. Data were collected through semi-structured interviews with 26 interviewees, including sustainability startup founders, incubator representatives, and other support actors.

The findings identify six main types of challenges; financial constraints, a conservative ecosystem and risk aversion, a lack of internal capabilities, market understanding and positioning, market access and adoption, and policy and regulatory barriers. Furthermore, four areas of incubator support are seen as valuable; business and regulatory support, capital access and financial navigation, networking access and exposure, and mentorship. The study also shows that incubator support is most effective when it is tailored to the specific needs of each startup, delivered through close and selective engagement, and backed by incentive models linked to measurable value creation. Finally, the findings shape a framework aimed at strengthening incubator support for sustainability startups, improving the understanding of how these actors work together in the Lombardy entrepreneurial ecosystem.

Keywords: Entrepreneurial ecosystem, sustainability startup, incubator support.

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Abbreviations

EE	Entrepreneurial Ecosystem
SDG	Sustainable Development Goal
SME	Small and Medium-sized Enterprise

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1. Introduction

The initial chapter introduces the research topic and establishes the context and motivation for this study. It begins by outlining the growing importance of startups in addressing sustainability, the concept of entrepreneurial ecosystems and the key intermediary role of startup incubators within these systems. Further on, the purpose and research questions are presented, followed by the delimitations of the study. Altogether, this section gives an overview of the study and its position within existing research.

1.1. Background

Sustainability startups are often recognised as important contributors to addressing major societal and environmental challenges, as they develop and scale innovations that help respond to these issues (Terán-Yépez et al., 2020). In line with this view, startups with business models addressing one or more of the Sustainable Development Goals (SDGs) introduced by the United Nations (United Nations Development Programme, n.d.), can be defined as sustainability startups (Tiba et al., 2020). One interesting example is the Swedish deep-tech startup Glenntex, which contributes to SDG 12 (Responsible Consumption and Production) by developing graphene-enhanced material solutions that improve the performance of recycled plastic in packaging, thereby enabling increased use of recycled materials while reducing the carbon footprint (Glenntex, n.d.). Similarly, Algeno provides AI-based heating optimisation solutions for buildings, helping property owners reduce energy consumption, lower carbon emissions and improve indoor climate in urban environments (Algeno AB, n.d.) aligning with SDG 11 (Sustainable Cities and Communities).

Yet, turning sustainability ambition into scalable solutions is rarely easy. Many sustainability startups face big constraints in their development and growth, including limited resources, insufficient capabilities, and weak networks (Hoogendoorn et al., 2019). Importantly, whether these startups manage to grow is not only a question of internal strategy or founder capability. Their trajectories also depend on the surrounding setup of actors, institutions, and resources that can provide access to knowledge, legitimacy, partnerships, finance etc. An entrepreneurial ecosystem (EE) captures this broader environment by focusing on how entrepreneurial activity emerges through interaction across multiple actors. The concept builds on the ecological idea of an “ecosystem” and was later adapted to economic and organisational settings to emphasise how interdependent communities co-evolve over time (Moore, 1996). Building on this perspective, an EE can be described as an interactive community within a geographic region, composed of interdependent actors such as entrepreneurs, organisations, and institutions, as well as contextual factors including markets, regulation, support structures, and culture. These elements grow through ongoing interaction and collectively shape new business creation (Vogel, 2013).

Within ecosystem support structures, business incubators are often positioned as key intermediaries that help entrepreneurs access resources and relationships that are otherwise difficult to mobilise. Business incubators are commonly described as entrepreneurial support organisations that provide a combination of tangible and intangible resources (Mian et al., 2016). Within an EE, this means that incubators can influence how startups connect to capital, knowledge, and markets, as well as how quickly they gain credibility and form partnerships. Research on EEs has gained increasing attention (Isenberg, 2010), and incubator or accelerator engagement has been shown to support business development by strengthening network access and signalling legitimacy to external stakeholders, thereby reducing uncertainty in the early stages (Kaur et al., 2024).

Although EEs are often discussed as important for both entrepreneurship and sustainability, there is still limited empirical evidence on how they can support sustainability startups in dealing with challenges

(Bertello et al., 2022). While many incubators have extensive experience supporting conventional startups, their support models are often not tailored for the specific conditions that sustainability startups face when developing and scaling innovations (Karahan et al., 2022).

The number of innovative startups in Italy, as well as the support available to them, has increased in recent years, with more than 14,000 firms registered under the national “innovative startup” framework (Italian Trade Agency, 2023). A growing share of these operates in sustainability-related areas such as circular economy, energy, and environmental technologies, indicating an increasing focus on sustainable innovation (ESA, 2023). Within the Italian context, Lombardy stands out as the most developed and innovation-intensive region, with the highest concentration of startups and support structures. The Italian EE is, however, characterised by administrative complexity, limited access to finance, and regional disparities, which can make startup creation and development more challenging (Sanders et al., 2020). These conditions create an environment in which incubators can play a vital role in helping sustainability startups navigate such challenges, making it an interesting setting for empirical research.

Taken together, the literature shows that sustainability startups are key actors in addressing environmental and social challenges, yet their ability to grow depends not only on the startup itself but also on the surrounding ecosystem. EEs shape entrepreneurial activity through interconnected actors where incubators hold a central role as intermediary organisations that can facilitate access to networks, finance, knowledge etc. Despite increasing interest in sustainable entrepreneurship, there remains limited empirical understanding of the specific challenges sustainability startups face and what incubator support is perceived as valuable for these ventures.

1.2. Purpose & Research Questions

Based on the background, the study aims to better understand the interplay between sustainability startups and incubators in Lombardy. The study focuses on identifying ecosystem-level obstacles hindering these startups and to examining how incubators, as key intermediaries, can adapt their support to address these perceived challenges. The report is guided by two research questions:

1. What challenges do sustainability startups face in the Lombardy entrepreneurial ecosystem?
2. What incubator support is perceived as valuable for sustainability startups in the Lombardy entrepreneurial ecosystem?

1.3. Delimitations

This study focuses on the EE in Lombardy, Italy. The region was selected due to its concentration of startups, incubators, universities, and innovation support actors, making it a relevant setting for exploring how sustainability startups interact with support structures in the ecosystem. By focusing on a single regional EE, the study enables a more context-specific understanding of the challenges, relationships, and support dynamics influencing sustainability startup development.

The study further focuses on sustainability startups, defined as ventures less than five years old that contribute to one or more of the SDGs through innovative products, services, or business models. This delimitation was made to examine challenges and support needs within a group of startups that often operate under conditions different from conventional ventures. The study does not evaluate the environmental or social impact created by the startups. Instead, the focus is placed on how founders and ecosystem actors perceive the conditions influencing startup development and growth.

In addition, the research focuses on the role of incubators as support actors within the EE. The purpose is therefore not to analyse the internal operational processes, technological development, or financial performance of individual startups, nor to evaluate the effectiveness of specific incubator programmes. Instead, the study examines perceived challenges, support areas, and ecosystem interactions described by the interviewees.

2. Theoretical Framework

The second chapter presents the key concepts, definitions, theories, and previous research that guide the study and inform the analysis. It begins by defining sustainability startups as they are understood within this research. The section then introduces EEs, including definitions, core components, and prior research linking ecosystems to sustainability. The focus is then narrowed to incubators, with specific attention given to startup incubators and their role within the EE. Finally, the Italian ecosystem context is described.

By outlining existing research within each of these areas, the chapter establishes an analytical foundation for understanding how sustainability startups operate within EEs and how incubators can act as intermediary actors.

2.1. Sustainability Startups

The term *startup* is widely used in academic, policy, and practitioner contexts, yet it lacks a single, stable definition. Startups are often described using criteria such as innovation, growth orientation, firm size, or early-stage development, but these characteristics are applied inconsistently across different literatures (Cockayne, 2019). In this study, a startup is defined as an independent firm that is less than five years old, in line with the Ministero delle Imprese e del Made in Italy (2025b), measured from the date of legal incorporation. However, it is recognised that the label is used differently across various contexts.

The concept of sustainability startups has a variety of related terminologies, including sustainable entrepreneurship, green startups, social startups and knowledge-intensive sustainable entrepreneurship. These are just a few of the terms used to explain overlapping but not identical phenomena, reflecting differences in focus across research streams. While the terminology varies, the common denominator is the focus on entrepreneurial activity that addresses environmental and/or social challenges alongside economic objectives (Cohen & Winn, 2007; Tiba et al., 2021; Sharma & Subba, 2025; de Moraes et al., 2025).

A central concept within the literature is *sustainable entrepreneurship*. Cohen and Winn (2007) define sustainable entrepreneurship as the process of discovering, creating, and exploiting opportunities that simultaneously generate economic value and contribute to improved environmental and social conditions. The definition frames sustainability not just as a responsibility, but as a solution to market imperfections. Within this broader concept, de Moraes et al. (2025) introduce *knowledge-intensive sustainable entrepreneurship*. While sustainable entrepreneurship covers any venture that addresses the triple bottom line, knowledge-intensive sustainable entrepreneurship narrows the focus by looking specifically at ventures that introduce innovation into the economic system by leveraging intense knowledge inputs, such as R&D, scientific research, or advanced technology.

Other related terms focus on specific value drivers. *Green startups* are entrepreneurial ventures that explicitly prioritise environmental responsibility, embedding these principles into their products, technologies, and business operations. In practice, green startups often pursue solutions such as eco-efficient technologies, renewable energy applications, and circular economy models to reduce environmental impacts, while still aiming for commercial viability (Odeyemi et al., 2024; Sharma & Subba, 2025). Similarly, *social startups* are hybrid organisations that aim to generate a positive social impact alongside financial returns. Unlike purely profit-driven ventures, social startups are defined by a dual mission where social value creation is integrated into the core business model, though commercial viability remains necessary for scaling (Laspia et al., 2025; Yang et al., 2020).

Synthesising these perspectives, Tiba et al. (2021) define *sustainability startups* as ventures that contribute to sustainable development through innovation by addressing social and/or environmental challenges, rather than primarily through operational practices. Importantly, this definition does not limit sustainability startups to non-profit ventures, nor does it require that social or environmental value creation outweigh economic objectives. Instead, sustainability startups may be for-profit firms, as long as their core activities and innovations contribute to one or more sustainability goals. The focus is therefore placed on the outcomes and domains of innovation, rather than on ownership form, stated mission, or profit orientation.

A widely used point of reference for defining such challenges is the United Nations' Sustainable Development Goals (SDGs), which constitute a global framework for sustainable development. The SDGs were developed in 2015 through a multi-stakeholder process involving governments, civil society organisations, businesses, and researchers (United Nations Development Programme, n.d.). As such, they have become a dominant reference point for sustainable innovation and entrepreneurship. Following this perspective, sustainability startups can be understood as entrepreneurial activity that contributes to one or more of the SDGs through innovation. While all industries share responsibility for contributing to sustainable development through responsible operational practices, certain SDG areas require substantial innovation to address unmet societal and environmental needs. This is particularly evident in domains such as healthcare, clean energy, and environmental technologies. Startups are often regarded as especially well-suited to address these challenges due to their flexibility, innovative capacity, and willingness to operate under high levels of uncertainty (Tiba et al., 2020).

Based on the above, this study adopts the view of sustainability startups as ventures less than five years old that intentionally create social and/or environmental value through innovations aligned with one or more of the SDGs, regardless of their economic objective. This definition makes it possible to capture a broad range of business models and sectors, which is highly relevant in an incubator context where startups may pursue sustainability goals in varying ways and at different stages of development.

2.2. Entrepreneurial Ecosystems

Entrepreneurial ecosystem (EE) has emerged as a central concept for understanding how entrepreneurship works in practice. The perspective moves beyond looking at individual founders or companies in isolation, highlighting instead the importance of interactions among multiple actors and contextual factors within a specific area (Isenberg, 2010; Vogel, 2013). In this view, entrepreneurial activity is shaped not only by the characteristics of the entrepreneurs themselves but also by the surrounding environment of institutions, networks, and resources that either enable or constrain startup creation.

2.2.1. Defining Entrepreneurial Ecosystems

Simply put, an EE can be viewed as a system of multiple interacting elements that together shape entrepreneurship. It is therefore rarely the result of a single factor, such as a lone government policy or the entrepreneur working in isolation. Rather, they emerge from many different components working together (Hruskova, 2024; Isenberg, 2010; Spigel, 2017; Stam & van de Ven, 2021). An important feature of the EE perspective is that it places entrepreneurs at the centre of the system, where they actively shape their environment by building networks and support arrangements that stimulate entrepreneurial activity. At the same time, this approach focuses on the interdependencies among components and adopts a holistic view of how actors, institutions, and contexts co-develop and mutually reinforce one another over time (Wurth et al., 2023).

From a systems-oriented framework, Stam and van de Ven (2021) describe an EE as “a set of interdependent actors and factors” within a particular geographic area, that together enable or constrain entrepreneurship. Their research show that stronger ecosystem quality is associated with a greater prevalence of high-growth firms (Stam & van de Ven, 2021). This relational logic is central to Spigel’s (2017) conceptualisation, where EEs are defined by how different attributes connect in ways that produce resources and benefits for entrepreneurs. Extending this perspective to how ecosystems function in practice, Hruskova (2024) underlines that EEs involve diverse actors, structures, and processes that collectively support entrepreneurs in starting and growing ventures. Hruskova argues that coordination in such ecosystems takes place through collective action and becomes visible through, what the author terms “ecosystem pipelines”. These pipelines can be understood as structured pathways connecting actors, through which entrepreneurs are directed toward relevant support and resources as their needs change over time. In this view, entrepreneurs might enter the ecosystem through one actor and subsequently be guided to others that better match their needs as they progress. Ultimately, entrepreneurial outcomes cannot be explained by looking at components separately, but rather by understanding how they interact within their shared context.

2.2.2. Components & Structure of Entrepreneurial Ecosystems

To operationalise the EE concept, widely used frameworks provide structured ways to describe its composition. A central task in the literature is specifying the key components involved and understanding how they relate to entrepreneurial activity. One of the most influential frameworks is provided by Isenberg (2010), who defines an EE as a set of interconnected domains that together shape entrepreneurship and growth. In the framework, shown in *Figure 2.1*, the ecosystem is structured around six domains; culture, support, policy, human capital, finance, and markets. These are understood as mutually reinforcing rather than sufficient in isolation (Isenberg, 2010).



Figure 2.1: Entrepreneurial ecosystem domains framework by Isenberg (2010).

While Isenberg presents the necessary domains of an EE, Vogel (2013) adds analytical clarity by organising components into different levels. The author conceptualises EEs as interactive regional communities and organises ecosystem components into three layered categories, visualised in *Figure 2.2*. The first category in Vogel’s model is the general external environment, which includes broad factors such as infrastructure, innovation, government regulations, geographic location, and market

conditions. These elements provide the necessary foundation for any business but are not unique to startups. The second category refers to the entrepreneurship-specific context and includes elements explicitly designed to help new ventures, such as financing, entrepreneurship education, and support networks. These components directly shape the conditions under which entrepreneurship is encouraged, supported, and legitimised. The third category focuses on the individual level, primarily the entrepreneurs themselves, whose activities both influence and are influenced by their surroundings (Vogel, 2013). This layered approach is useful because it distinguishes between general contextual conditions and targeted entrepreneurial support (Vogel, 2013), while still recognising the central role of entrepreneurs within the system (Wurth et al., 2023).

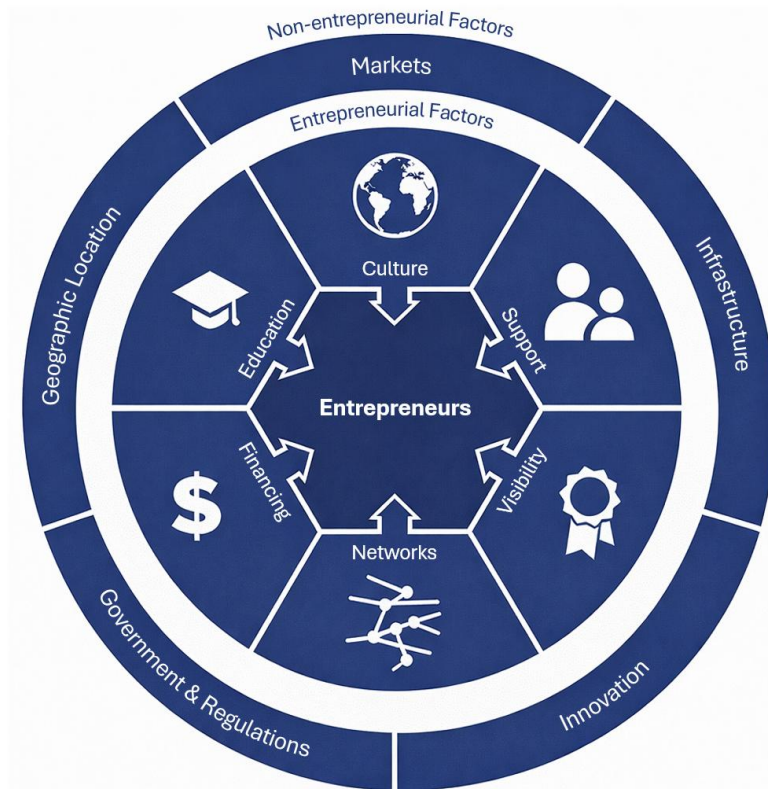


Figure 2.2: Entrepreneurial ecosystem map based on Vogel (2013).

Other research offers complementary ways to describe ecosystem structure by focusing more explicitly on underlying resources and relationships. Spigel (2017) conceptualises ecosystems through cultural, social, and material attributes. Cultural attributes relate to shared attitudes and histories that shape the legitimacy and desirability of entrepreneurship in a region. Social attributes involve the networks and relationships through which entrepreneurs access information, mentors, and investment capital. Material attributes include tangible resources such as universities, policies, infrastructure, and support services that provide direct inputs for venture development. Importantly, this framework notes that ecosystem functioning depends on how these attributes connect and reinforce each other, rather than simply on whether individual components are present (Spigel, 2017).

Similarly, Stam and van de Ven (2021) propose a structured set of ten ecosystem elements that can be used for empirical analysis. Their model distinguishes elements that capture institutions and resources, such as formal institutions, culture, networks, finance, talent, knowledge, intermediaries, physical infrastructure, leadership and demand, and links these elements to entrepreneurial outputs. In this view, productive entrepreneurship represents an output of the ecosystem, reinforcing the idea that ecosystem

structure should be assessed by listing its elements and by examining how they relate to entrepreneurial outcomes (Stam & van de Ven, 2021).

Taken together, these perspectives show that EEs can be structured and described at different levels of abstraction. Vogel (2013) clarifies how components operate across levels, while Spigel (2017) and Stam and van de Ven (2021) provide frameworks that further specify ecosystem attributes and elements, highlighting how these relate to resources, relationships, and entrepreneurial outputs.

In this study, Isenberg's (2010) domain framework is used as the primary analytical lens. Compared to more detailed ecosystem models, Isenberg provides a broader, clearer, and more operational structure for organising ecosystem conditions into categories relevant to entrepreneurial development. As this study focuses on perceived challenges and support areas within a specific regional EE, rather than quantitatively measuring ecosystem performance or modelling interdependencies between actors, Isenberg's broad domain structure is more suitable for categorising and interpreting the empirical material.

2.2.3. Entrepreneurial Ecosystems as Dynamic & Context-Specific Systems

EEs are not static structures but dynamic systems that evolve over time as actors, institutions, and support mechanisms develop, adapt, or decline (Isenberg, 2010; Vogel, 2013). According to Isenberg (2010) this evolution is rarely linear, but ecosystems grow through organic processes of experimentation, learning, and long-term interaction among diverse actors. A central implication of this dynamic view is that ecosystems are highly context dependent. Both Isenberg (2010) and Vogel (2013) agree that EEs are shaped by local economic structures, institutional arrangements, cultural norms, and historical conditions. Research is stressing the importance of studying ecosystems individually, since they tend to consist of unique domain configurations and evolving relationships among actors (Stephens et al., 2022).

Consequently, EEs cannot be effectively built by copying models from other regions, such as the well-recognised Silicon Valley, since visible features may not function similarly when underlying relationships and contextual conditions differ (Isenberg, 2010; Spigel, 2017). No single actor drives ecosystem development alone. Instead, ecosystems emerge through interaction among entrepreneurs, support organisations, public actors, investors, and institutions that assume different roles over time (Vogel, 2013). EEs are therefore characterised by the presence of actors and the relationships among them. Colombo et al. (2019) emphasise that these relationships form the core of EEs, as they develop over time and are difficult to replicate. From this perspective, managing EEs involves strengthening networks, cooperation, and interactions between actors.

Another important aspect of EEs concerns governance and coordination among actors. Colombo et al. (2019) argue that actors within an ecosystem often have different objectives, making governance important for allocating resources, coordinating activities, and managing interdependencies. For example, entrepreneurs may prioritise company growth, investors might focus on financial returns, while policy actors emphasise regional development. Additionally, the authors distinguish between bottom-up ecosystem development, driven by entrepreneurial activity and informal networks, and top-down governance, where institutions and policy actors actively shape ecosystem development. In practice, most ecosystems evolve through a combination of both, where intermediary actors can play a central role in connecting stakeholders and facilitating coordination.

A systems perspective further describes bidirectional causality between ecosystems and entrepreneurial activity. Stam and van de Ven (2021) outline upward causation, where ecosystem elements help explain entrepreneurial activity within a geographic region, and downward causation, where entrepreneurial

activity can feed back into and strengthen ecosystem elements over time. This enhances the view of ecosystems as evolving systems shaped by interdependence and feedback rather than as static collections of components.

2.2.4. Entrepreneurial Ecosystems & Sustainability

Previous EE research has largely focused on economic and entrepreneurial growth. More recently, literature has begun to explore how this concept can be extended to address sustainability challenges. Rather than replacing existing EE frameworks, new research builds on them by examining how ecosystem structures support sustainability-oriented entrepreneurial activity, although such studies remain relatively limited (Theodoraki et al., 2022).

Huang et al. (2023) explore *sustainable EEs* to conceptualise how economic, social, and environmental considerations can be incorporated at the ecosystem level. Drawing on a triple bottom line perspective, they show that sustainable entrepreneurship is not just a result of a single firm's strategy. Instead, it is influenced by broader ecosystem conditions across the three dimensions. From this view, EEs are not just engines for profit, but structures that can actively drive sustainable development.

Some studies have tested which specific ecosystem elements matter most. Khatami et al. (2022) applied five elements of Isenberg's model to sustainable innovations and found that policy, finance, and support organisations had the strongest positive influence, although their effects vary across contexts. Similarly, Audretsch et al. (2023) show that the quality of an ecosystem depends on the interaction between entrepreneurs' sustainable orientation and institutional quality, rather than by sustainability-oriented behaviour alone. Their results highlight that EEs vary notably by region, and sustainability outcomes depend on how these specific actors and institutions are configured.

In recent research, de Moraes et al. (2025) examined how EEs can actively enable sustainable transitions, analysing the specific conditions needed for knowledge-intensive sustainable entrepreneurship. Their study indicates that formal policies, institutions, and entrepreneurial culture are the most critical enablers for these high-tech ventures. They found institutional factors to be more essential than traditional mechanisms like financing or networking services suggesting that the broader institutional environment plays a stronger role than individual support mechanisms alone for knowledge-intensive sustainable startups.

Taken together, the literature suggests that sustainability startups cannot be understood in isolation. EEs consist of interconnected actors and subsystems that together influence entrepreneurial activity. Incubators are one of those actors and can facilitate interactions between startups and the wider ecosystem, thereby strengthening the overall structure (Colombo et al., 2019; van Rijnsoever, 2020). This provides a relevant foundation for analysing what sustainability support is perceived as valuable for sustainability startups.

2.3. Startup Incubators

This section on startup incubators provides a foundation for understanding what incubators are and how they function within EEs. It outlines the role of incubators in supporting startups, presents a few different types of incubators and their varying objectives, and examines how incubation practices relate to sustainability.

2.3.1. The Role of Startup Incubators

There is no single definition of incubators, and different types are used pragmatically (Von Zedtwitz & Grimaldi, 2006). One definition is made by Mian et al. (2016) who describe business incubators as

support organisations with the aim of improving the survival and development of early-stage businesses by providing a combination of infrastructure, services, and access to networks. Within the context of EEs, incubators function as intermediary actors that connect startups to key ecosystem resources, including knowledge, capital, and market access (Mian et al., 2016).

A key contribution of incubators within EEs lies in their role as intermediaries addressing so-called weak network problems. These problems arise when actors within an ecosystem are insufficiently connected, limiting knowledge transfer, access to finance, and commercialisation opportunities. Incubators can mitigate such issues by actively creating meeting opportunities, building relationships, and enhancing trust between startups and external stakeholders, such as investors (van Rijnsoever, 2020).

Beyond firm-level support, incubators also contribute to ecosystem development more broadly. Through community-building and field-building activities, they help create shared norms, increase network density, and stimulate interaction both within and beyond the incubator environment. This systemic role suggests that incubators not only support individual ventures but also shape the functioning and evolution of EEs over time (Mian et al., 2016). Another relevant angle is that incubators may act as ecosystem leaders, especially in regions where resources are scarce or where there is limited entrepreneurial momentum (Roundy, 2021).

Moreover, the literature emphasises that incubators are not universally effective and their impact depend on the context. Differences in regional conditions, institutional environments, and incubator designs influence whether they successfully contribute to entrepreneurial and regional development. This has led to critical discussions regarding the effectiveness of incubators as policy instruments, particularly when supported by public funding (Tavoletti, 2012).

2.3.2. Different Types of Incubators

Business incubation is not a uniform phenomenon, and the literature consistently highlights the importance of distinguishing between different types of incubators. Incubators vary in their objectives, governance structures, funding models, target firms, and the types of support they offer, which in turn influence their outcomes and roles within EEs (Mian et al., 2016).

One common distinction is between *non-profit* and *for-profit* incubators. Non-profit incubators are typically publicly funded and focus on regional economic development, job creation, and promoting entrepreneurship. These incubators often provide affordable space and general business support to reduce entry barriers for new businesses. In contrast, for-profit incubators are more likely to pursue financial returns through equity participation or fees and tend to offer more specialised resources and managerial expertise (Barbero et al., 2014).

Looking beyond this basic division, several typologies identify more specific incubator archetypes. A widely cited classification distinguishes between *economic development incubators*, *university business incubators*, *basic research incubators*, and *private incubators*. Economic development incubators aim to stimulate entrepreneurship and reduce regional economic disparities by supporting a broad range of ventures. University business incubators are closely linked to academic institutions and focus on commercialising research and supporting academic spin-offs through access to laboratories, faculty expertise, and technology transfer services. Basic research incubators are typically embedded within or closely connected to research institutions and focus on ventures emerging from fundamental research. These incubators often support technology-intensive startups and emphasise networking and collaboration within specialised clusters. Finally, private incubators, including corporate and independent private incubators, are usually oriented toward profit generation and leveraging proprietary

knowledge, corporate networks, or venture capital connections to speed up venture development (Barbero et al., 2014).

These differences imply that incubators should be evaluated based on their specific objectives and ecosystem contexts, rather than through uniform performance metrics. The effectiveness of an incubator depends on how well its support mechanisms align with the needs of its target ventures and the broader EE (Tavoletti, 2012).

In this context, it is also relevant to consider related support mechanisms that have emerged alongside traditional incubation models. A large proportion of incubators provide accelerator programmes, which represent an intensive and time-bound form of startup support. Accelerators are commonly defined as fixed-term, cohort-based programmes that include mentorship, educational components, and networking opportunities, typically culminating in a public pitch event. Compared to traditional incubation models, accelerator programmes are shorter in duration, often lasting only a few months, and frequently provide seed funding in exchange for equity alongside structured learning and interaction with mentors and investors (Pauwels et al., 2016). In the Italian context, accelerators have expanded in recent years and are increasingly recognised as important mechanisms within EEs, although their impact remains dependent on contextual and startup-specific factors (Del Sarto et al., 2020).

2.3.3. Sustainability-Driven Business Incubation

As sustainability startups gain importance in addressing environmental and social challenges, incubators are increasingly expected to contribute to sustainable development rather than only providing traditional support. Consequently, incubators face growing pressure from policymakers, investors, and other actors to demonstrate sustainability impacts, which has encouraged the development of in-house sustainability protocols and impact assessment practices. This trend is reinforced by the role of incubators as publicly supported ecosystem intermediaries and by arguments positioning business incubation “*at the heart of green policy*” (Petrucci et al., 2025).

This shift has given rise to the concept of sustainability-driven business incubation. Karahan et al. (2022) define *sustainable business incubators* as organisations that support the establishment and growth of businesses that sustain the natural and/or communal environment and contribute to the SDGs. The authors argue that incubators should avoid generic sustainability programs and instead design targeted support configurations aligned with the specific ambitions of sustainability startups.

Audretsch et al. (2023) extend this view by emphasising the role of incubators in shaping the broader institutional environment. They argue that effective incubation programs must go beyond operational support to actively nurture a culture of sustainability. This involves acting as intermediaries that specifically target the creation of networks between sustainable entrepreneurs, venture capital, and government agencies. By doing so, incubators ensure that startups have access to localised financial and social resources. However, Lamperti et al. (2025) show that practical implementation often lags. By examining how incubators operationalise sustainability internally, they find that such support often remains secondary to economic viability. This highlights persistent tensions between financial performance and sustainability objectives, where support often involves rhetorical commitments without meaningful changes to incubator practices. The authors observe a clear need to embed sustainability into core processes, such as selection criteria, program content, and performance assessment.

Related work on sustainability acceleration suggests that accelerators can be an effective channel for operationalising this type of support. Evidence from a cross-country survey study including Italy indicates that accelerator participation is associated with stronger adoption of sustainable business

practices among Italian startups, even though these practices do not appear to translate into immediate revenue growth. This supports the view that sustainability support needs to be embedded in programme design and delivery, not only framed as a general ambition (Rata et.al., 2024).

2.4. The Italian Entrepreneurial Ecosystem Context

The Italian EE provides the contextual foundation for understanding the environment in which the studied sustainability startups operate. It outlines the key structural characteristics of the Italian ecosystem, signals national and regional initiatives that support startup development, and introduces the role of certified incubators as part of the formal support infrastructure.

2.4.1. Characteristics of the Italian Entrepreneurial Ecosystem

Italy's EE is shaped by deep historical roots. Its universities rank among the oldest in the world, with the University of Bologna commonly recognised as the oldest university in the Western world, established in 1088 (Università di Bologna, n.d.). A similar historical depth is visible in intellectual property protection. Italy is often presented as an early pioneer of patents, with Florence recording Filippo Brunelleschi as a patentee already in 1421 (Frumkin, 1945).

A second defining feature is the structure of the Italian economy. From a variety of capitalism perspective, Italy is classified as a mixed or Mediterranean market economy, with an entrepreneurial economy of locally embedded, often family-owned small and medium-sized enterprises (SMEs), making up a major share of its economy (Sanders et al., 2020). In the non-financial business sector, SMEs (up to 250 employees) account for 99.9% of Italian enterprises, while large firms (more than 250 employees) make up only 0.1% (European Commission, 2025a). This SME base is connected to strengths in product and process innovation driven by quality, design, and production capabilities (Rolfo & Calabrese, 2003).

Over time, Italy has developed infrastructure for research-commercial links, including a wave of science and technology parks in the 1990s (Liberati et al. 2016). However, regional unevenness persists, and southern regions lag the centre and north in terms of regional entrepreneurship and development. Lombardy is one of the leading regions, characterised by an early and sustained investment in innovation support structures such as science parks, technology transfer initiatives and university business incubators (Sanders et al., 2020). For instance, Politecnico di Milano's Polihub was ranked top five in the world top university business incubator ranking 2019/2020 by UBI Global (UBI Global, 2019). This regional variation has been explored by Cavallo et al. (2023), who identify four distinct types of EEs across Italian provinces. Within the framework, Milan is classified as part of the strongest ecosystem cluster, alongside Rome, and is identified as one of the areas with the highest concentration of innovative startup activity, together with Turin.

Beyond regional differences, constraints related to Italian entrepreneurship have been grouped by Sanders et al. (2020) into three connected areas; ambition, human capital flows, and the business environment. Ambition is affected by the fact that entrepreneurs in Italy are less likely than those in coordinated or liberal market economies to create radically or incrementally innovative ventures. Instead, they show a tendency to set up ventures based on the replication of existing technologies. Labour market institutions also shape early entrepreneurial ambition. Because dependent employment offers benefits and security, founders in Italy are more likely than their counterparts in the UK or the USA to start a venture part-time rather than full-time. In terms of human capital, the challenge lies less in producing quality graduates and more in ensuring that this talent flows toward entrepreneurial ventures (Sanders et al., 2020).

Herrmann et al. (2018) describe the business environment as a major practical barrier to venture creation and early-stage growth. Based on founder reported evidence, their study highlights how administrative bureaucracy slows and complicates the process of starting and developing a firm. For instance, requirements such as notary involvement and the complex procedures associated with establishing a società a responsabilità limitata (S.r.l.), the Italian equivalent of a limited liability company (LLC), make the process both time consuming and burdensome. In addition, regulatory uncertainty, characterised by unclear rules and frequent changes, further increases the complexity faced by entrepreneurs. The startup creation process is additionally constrained by structural financial limitations, including low stock market capitalisation and restricted access to debt financing. As a result, founders often rely on personal savings as well as funding from family and friends during the initial stages (Herrmann et al., 2018).

2.4.2. Initiatives for Startup Development

To address structural barriers affecting startup creation and growth, Italy introduced a national policy framework through the Italian Startup Act (Decree Law 179/2012, converted into Law 221/2012). The initiative aimed to strengthen innovation driven entrepreneurship and improve access to finance, talent, and market opportunities for early-stage ventures (Biancalani et al., 2022).

A central feature of the Startup Act was the introduction of a formal legal category of innovative startups. To qualify, firms must meet general criteria, such as being less than five years old, having limited turnover, and not distributing profits, while also fulfilling at least one innovation-related requirement. These requirements include investment in R&D, employment of highly qualified personnel, or ownership of intellectual property. Startups registered under this category gain access to several support measures, including tax incentives for private investors, simplified administrative procedures, flexible labour regulations, and public loan guarantees. This targeted approach aims to direct support toward innovation-driven startups with growth potential and improve their access to financing (Italian Ministry of Economic Development, 2019). Empirical research suggests that these initiatives have contributed to improved funding conditions. Startups registered as innovative startups were found to obtain more equity financing, increase access to bank loans, and experience higher employment growth compared to non-registered firms (Biancalani et al., 2022).

In addition to national policies, regional initiatives support startup development across Italy. In Lombardy, support is primarily provided through funding calls, innovation programmes, and financial instruments managed by *Regione Lombardia* and its financial agency, *Finlombarda*. Many of these initiatives are cofinanced through the *European Regional Development Fund* and aim to support research, technological development, and innovation. Funding is often directed toward areas such as advanced manufacturing, digitalisation, and sustainability-related innovation. These calls frequently encourage, and in some cases require, collaborative applications involving startups, SMEs, universities, and research organisations (European Commission, 2021; Regione Lombardia, 2026).

Alongside regional programmes, startups in Lombardy can apply directly to European Union funding initiatives such as *Horizon Europe* and the *European Innovation Council*. These programmes are managed at EU level and fund research-intensive and highly innovative projects. Applications are often competitive and frequently require international collaboration between organisations from multiple countries. Such initiatives provide grants for innovation-driven ventures, with a focus on sustainability, digitalisation, and technological development (European Commission, 2025b).

In addition to funding instruments, the European Commission has proposed initiatives such as the “*EU Inc.*” framework, which aims to introduce a common set of corporate rules across EU countries. By simplifying registration procedures and enabling fully digital company operations, the initiative seeks

to reduce administrative complexity and make it easier for startups to operate and scale across national borders (European Commission, 2026).

2.4.3. Certified Incubators in Italy

In addition to subsidies for startups, the Startup Act introduced the concept of *certified incubators*. These are companies that provide services to support the creation and development of innovative startups, while meeting a set of formal requirements established by national legislation (Decree Law 179/2012, art. 25).

To retain this status year by year, incubators must demonstrate a set of requirements related to infrastructure, expertise, and networks necessary to support startup development. According to the framework, certified incubators are required to provide appropriate facilities and equipment for startups, such as dedicated workspaces, testing infrastructure, and access to high-speed internet. Furthermore, the management team must have individuals with recognised experience in innovation and entrepreneurship, and maintain formal collaborations with universities, research centres, financial partners, and public institutions involved in innovation activities. These requirements aim to ensure that certified incubators possess the necessary resources and capabilities to effectively support innovative startups (Ministero delle Imprese e del Made in Italy, 2025a).

Beyond these requirements, specific performance indicators must be fulfilled to maintain the certification. These include metrics such as the number of startups hosted, the number of ventures completing incubation programmes, employment growth within supported startups, and the amount of capital raised by incubated startups. Minimum thresholds are defined to ensure that certified incubators maintain an active incubation environment (Presidenza della Repubblica Italiana, 2025). The entire certification is based on a self-declaration submitted by the legal representative of the organisation, who attests that the incubator meets the required criteria (Ministero delle Imprese e del Made in Italy, 2025a).

There are also several benefits from being a certified incubator, especially regarding policy incentives intended to facilitate operations, and improved access to financial resources. One of the most important advantages is simplified and free access to a fund providing guarantees on bank loans covering up to 80% of the credit granted to startups and certified incubators. The regulatory framework additionally enables startups and incubators to use equity-based compensation mechanisms, such as stock options and work-for-equity agreements, which can facilitate collaboration (Ministero dello sviluppo economico, 2022).

Overall, the certification framework seeks to ensure that incubators possess the necessary capabilities to support innovative startups and contribute to the broader development of the national innovation system.

3. Methodology

The research methodology is based on a qualitative research approach through semi-structured interviews. The following section outlines the overall research design, including the exploratory nature of the study and the choice of an abductive approach. The chapter then describes the data collection process and explains how the collected data were analysed. Finally, limitations, ethical considerations, and the use of AI within the study are discussed.

3.1. Research Strategy & Design

The research strategy outlines the general framework through which a study is conducted. For this project, a qualitative approach was used. Qualitative research emphasises the interpretation of non-numerical data, such as interviews, narratives, and recurring patterns, to capture meanings, perspectives, and experiences more in depth (Merriam & Tisdell, 2016; Bell et al., 2022). This approach aligns closely with the purpose of the study and is especially suitable for exploring diverse stakeholder perspectives and conducting a thorough investigation of complex phenomena (Creswell & Creswell, 2014), such as relations between actors in EEs.

An exploratory research design was employed, involving an iterative process where data collection and theory development occurred simultaneously (Creswell & Creswell, 2014). According to Olawale et al. (2023), this design is particularly appropriate for research problems that are not yet clearly defined. It typically begins with a broad area of interest and seeks to identify aspects that may be valuable for further investigation. This aligns with the aim of this study, as identifying EE-related challenges helped shape the overall research direction. Rather than testing predefined hypotheses, the study focused on examining the research questions from multiple perspectives. The process began with a review of existing literature to gain an understanding of the topic, followed by primary data collection through interviews. These findings then informed a more refined and critical reassessment of the literature, the research questions, and the semi-structured interview guides (Olawale et al., 2023).

Although the design was exploratory, the analytical logic followed an abductive approach. Abductive research integrates aspects of both deductive and inductive reasoning to overcome limitations associated with each individual approach (Timmermans & Tavory, 2012). In deductive research, hypotheses are developed prior to data collection and subsequently tested through analysis. Inductive research, in contrast, allows theoretical insights to emerge directly from the data. An abductive approach differs by continuously moving between empirical data and existing theory, enabling a more refined understanding of the studied phenomenon (Bell et al., 2022). This flexibility allows for the integration of relevant concepts from several theoretical frameworks (Timmermans & Tavory, 2012), which in this context is valuable as it supports the gradual development of new insights rather than restricting the analysis to a single perspective.

The study examined the interplay between sustainability startups and incubators in Lombardy through multiple perspectives. The chosen approach allowed for a broader understanding of ecosystem challenges and support areas, enabling the study to capture interactions between different actors and identify patterns across their experiences. This is a particularly suitable since EEs are shaped by context-specific configurations and relationships (Isenberg, 2010). As argued by Stephens et al. (2022), EEs should be studied individually, as they consist of unique configurations of domains and are characterised by complex and evolving relationships between multiple actors and support structures. Focusing solely on the Lombardy EE allows the study to examine the ecosystem as a whole, rather than treating its elements in isolation.

3.2. Data Collection

The qualitative data for this study were collected through semi-structured interviews during March and April 2026 with sustainability startups, incubator employees, and other support actors operating within the Lombardy EE. Interviews were designed to capture perspectives on ecosystem-related challenges, development barriers, and the role of incubators in supporting sustainability startups. Attention was given to addressing both the perceived needs of sustainability startups, and the support provided by incubators.

The data collection process started by engaging founders of sustainability startups connected to incubators in Lombardy. All startups had one or more connections to the SDGs, according to the definition of sustainability startups used in this study. The interviews with startups are listed in *Table 3.1*.

Table 3.1: Overview of sustainability startups interviewed.

ID	Focus Area	Main SDG*	Level of Incubator Engagement**	Duration
S1	Accessible healthcare	3 GOOD HEALTH AND WELL-BEING	Moderate	30 min
S2	Pollution reduction	3 GOOD HEALTH AND WELL-BEING	Moderate	40 min
S3	Wastewater treatment	6 CLEAN WATER AND SANITATION	Moderate	45 min
S4	Energy efficiency	7 AFFORDABLE AND CLEAN ENERGY	Moderate	45 min
S5	Renewable energy	7 AFFORDABLE AND CLEAN ENERGY	High	40 min
S6	Decommissioning robotics	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Moderate	40 min
S7	Digital solutions	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Low	45 min
S8	Digital solutions	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Low	30 min
S9	Urban logistics	11 SUSTAINABLE CITIES AND COMMUNITIES	Moderate	30 min
S10	Noise reduction	11 SUSTAINABLE CITIES AND COMMUNITIES	Moderate	60 min
S11	Urban agriculture	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Moderate	30 min
S12	Waste-based material	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	High	30 min
S13	Waste-based material	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	High	30 min
S14	Waste-based material	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Moderate	30 min
S15	Waste-based material	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	High	40 min
S16	Waste-based material	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	High	45 min
S17	Bio-based material	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Low	30 min
S18	Emission reduction	13 CLIMATE ACTION	Moderate	100 min

* Indicates the *primary* SDG addressed by each startup.

** Incubator involvement refers to a startup's engagement with incubators. This was categorised by the researchers as Low, Moderate, or High based on the number and depth of interactions with incubator programmes and support activities.

A snowball sampling method was employed throughout the study to identify additional interviewees. Snowball sampling implies that initial interviewees recommend other relevant individuals for interviews (Bell et al., 2022). This is a popular approach in qualitative research, as it offers an efficient way to reach suitable interviewees, even without pre-existing networks. Despite criticism for not producing a random sample, snowball sampling is an effective strategy for exploratory research lacking a predetermined theoretical framework. It allows for the identification of key individuals based on new insights throughout the process (Parker et al., 2019). Interviewees in this study were all identified through the snowball method, except for the incubator hosting the thesis. Support actors are presented in *Table 3.2*.

Table 3.2: List of interviewed support actors. Incubators have an ID starting with "I", while other actors' ID start with "A".

ID	Support Actor Type	Role of Interviewee	Duration
I1	Basic research incubator	Strategic project director	30 min
I2	Economic development incubator	Program coordinator	35 min
I3	Independent private incubator	Incubation program lead	45 min
I4	Independent private incubator	Head of incubator	45 min
I5	University business incubator	Analyst	30 min
A1	Regional cluster	President	45 min
A2	Sustainable innovation hub	Innovation consultant	30 min
A3	Technology transfer office	Head of technology transfer office	45 min

Three separate interview guides were developed, one for sustainability startups, one for incubator representatives, and one for other support actors, see *Appendix I – III*. While all guides were aligned with the overall research aim, they were tailored to reflect the different perspectives of the interviewees. Each guide contained a core set of questions that were asked to all interviewees, while leaving room for follow-up questions based on individual responses. This flexible approach encouraged in-depth conversations and helped uncover areas that were of relevance or interest to the interviewees (Olawale et al., 2023). Given the exploratory research design, semi-structured interviews were considered a suitable choice, as they allowed new perspectives to emerge during the collection of data. Moreover, semi-structured interviews are appropriate for smaller sample sizes, since they enable rich and detailed data collection from each interviewee (Mwita, 2022). This aligns with the scope of the study, which involved 18 startup founders, 5 certified business incubator representatives, and 3 additional support actors.

Most interviews were recorded, when interviewees consented to it, and transcribed using transcription software. Interviews were conducted either in English or Italian and were carried out online or in person depending on interviewee availability and practical considerations. Both researchers were present during all interviews, with one leading the conversation and the other taking notes. This approach

supported consistency in the data collection process and reduced the risk of missing important information.

3.3. Data Analysis

The data analysis followed an iterative process, illustrated in *Figure 3.1*. The process was inspired by Braun and Clarke’s six-step approach to thematic analysis (Braun & Clarke, 2006) and informed by Isenberg’s EE model (Isenberg, 2010), already described in 2.2.2. *Components & Structure of Entrepreneurial Ecosystems*. Rather than generating codes and themes entirely from scratch, the analysis was guided by Isenberg’s domains which served as an analytical lens to structure and categorise identified challenges and support areas.

The first stage involved familiarisation with the interview data. The transcripts and notes were read several times to gain an overall understanding of recurring patterns and relevant insights. Through this iterative process, perceived challenges, support experiences, and ecosystem interactions were identified and placed in themes inspired by Isenberg’s EE domains.

The final step consisted of synthesising the findings in relation to the research questions. From the themes, six groups of sustainability startup challenges, three main structural incubator conditions and four areas of valuable support were identified which guided the creation of a framework. The findings were then interpreted in relation to existing literature in order to generate analytically grounded insights into how sustainability startups experience challenges and which forms of incubator support are perceived as valuable within the Lombardy EE. This enabled an assessment of how incubator practices can be adapted to better fit the needs of sustainability startups in Lombardy.

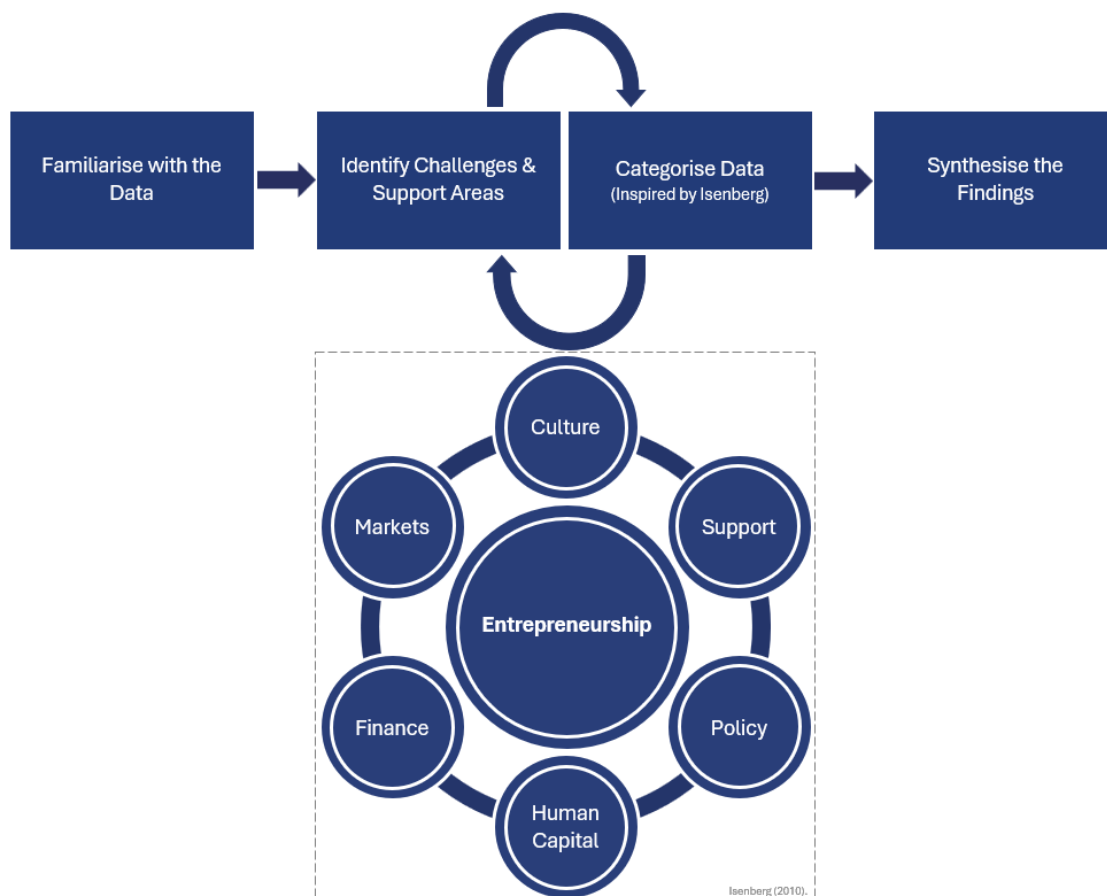


Figure 3.1: Data analysis process. Inspired by Braun and Clarke (2006) and Isenberg (2010).

3.4. Limitations

From a methodological perspective, the study has several limitations that should be considered when interpreting the findings. First, the research is grounded on a qualitative and exploratory design focused on sustainability startups and incubators within the Lombardy EE. While this approach supports a understanding of ecosystem dynamics, it also means that the findings are closely tied to the characteristics of the regional context. As such, the study aims to generate analytical insights rather than statistically generalisable results. However, the findings may still offer relevant insights for similar EEs, particularly those with comparable institutional and innovation environments.

Second, the empirical basis of the study consists of a limited number of semi-structured interviews, with interviewees identified partly through snowball sampling. Although this approach fits exploratory research and gives access to knowledgeable actors, it may bias the sample towards more visible or well-connected stakeholders and underrepresent less visible or critical perspectives. In addition, the study is based on self-reported perceptions and therefore cannot determine how common or how important specific challenges or support are beyond the interviewees included in the study.

Another point worth acknowledging is that startup founders were overrepresented in the sample, while fewer support actors, such as incubators, were included due to time constraints and access limitations. This imbalance may influence the findings by asserting startup perspectives over those of ecosystem support actors.

3.5. Ethical Consideration

This study followed the ethical guidelines established in *The European Code of Conduct for Research Integrity* (All European Academies, 2023), which emphasises research integrity, participant protection, and transparency throughout the research process. The framework is based on four key principles; reliability, honesty, respect, and accountability, guiding all stages of the study.

All interviewees were informed about the purpose of the study, the voluntary nature of their involvement, and their right to withdraw at any time without consequences. They were also informed about the structure and content of the interviews, ensuring that consent was provided voluntarily and based on adequate information.

All personal data were treated with a high level of confidentiality. Interviewees remained anonymous in the report, with references made only to their roles or functions. Data collection and handling followed the *General Data Protection Regulation* (European Commission, n.d.), ensuring that only necessary personal data were collected and that data were stored and handled securely throughout the research process.

3.6. Use of Artificial Intelligence

Generative AI tools (e.g. ChatGPT and Google Gemini) were used during the research and writing process as a supportive resource for language refinement, text structuring, and the clarification of certain concepts. These tools were mainly used to improve readability and flow, as well as to assist in summarising and rephrasing text.

Important to acknowledge is that all conceptual development, theoretical interpretation, data collection, data analysis, and conclusions remain the authors' own work. The use of these tools did not replace

independent academic judgement. All content was carefully reviewed, verified, and adjusted by the authors to ensure accuracy, originality, and strict adherence to academic integrity standards.

4. Findings

The chapter begins by addressing the first research question concerning the challenges faced by sustainability startups and then presents the findings related to the second research question regarding valuable incubator support.

4.1. Challenges Faced by Sustainability Startups

From the interviews, six categories of challenges faced by sustainability startups within the Lombardy EE emerged, see *Figure 4.1*. These consist of financial constraints, a conservative ecosystem and risk aversion, a lack of internal capabilities, market understanding and positioning, market access and adoption, and policy and regulatory barriers. Together, they illustrate the primary obstacles that ventures encounter when developing and commercialising sustainable innovations.

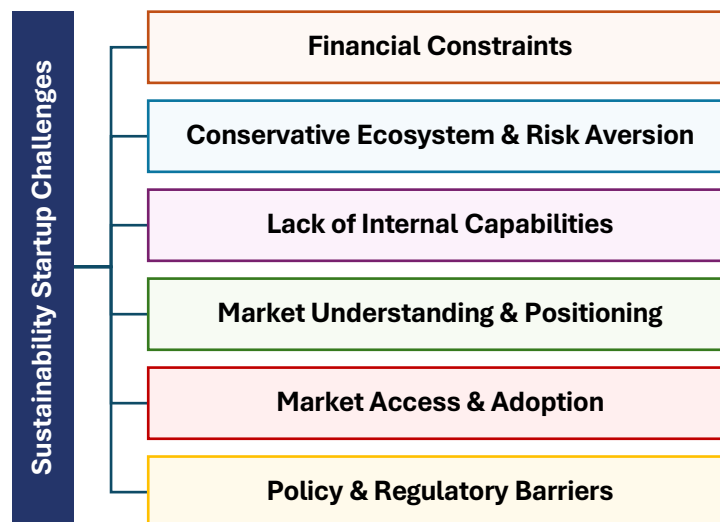


Figure 4.1: Six challenges faced by sustainability startups in the Lombardy EE.

4.1.1. Financial Constraints

The interview data points to funding access as the primary constraint for sustainability startups in Lombardy. It is particularly evident among deep-tech and science-based ventures, which typically have high capital requirements and long development cycles before they can generate commercial value. Funding is not only necessary for growth, but also a prerequisite for starting and sustaining development. Several startups in the study described their business models as capital intensive, especially when hardware or industrial processes are involved. S2, with its innovative and disruptive solution, required huge upfront investment in prototyping, patenting, and testing, while S10 acknowledged the high costs of infrastructure and certifications. Similarly, S13 emphasised the financial demands of production and experimentation.

“The challenge was to have enough money. Enough money to produce enough [...] and to do all the trials”

(S13)

S18 further illustrated the cost structures in hardware-based innovation, noting the constant need for specialised materials, electronics, and complex system integration.

“We underestimated the initial costs of such a startup in which you have a production and a lot of hardware”

(S18)

These examples show that capital intensity is linked to the characteristics of sustainability startups, often involving physical products, engineering complexity, and industrial applications. S12, for instance, noted that scaling its solution to meet industrial demand would require major investment in infrastructure and facilities that are simply impossible for an early-stage venture to finance. As projects become more complex, startups face growing difficulties in attracting investors.

“One difficulty is getting to investors in the initial phase [...]. It becomes increasingly difficult as the project becomes more demanding both in terms of capital and technology.”

(S5, translated)

At the same time, the interviewed startups consistently revealed a gap in early-stage funding availability. Many interviewees explained a frustrating situation where investors are hesitant to commit capital before the startup has demonstrated market traction or generated revenue, creating a circular dependency.

“The first thing that an investor asks [...] is ‘How much money do you earn every year?’ None, because I’m starting. [...]. ‘We will talk about it when you are earning something.’”

(S15)

This reflects a broader perception that investors expect a level of maturity that early-stage startups have not yet reached, often prioritising companies that are already successful and generating revenues. A similar pattern applies to bank financing according to S7, where getting a loan requires financial proof that a startup by definition does not have. This enhances the paradox that startups need capital simply to receive capital. As a result, once startups begin generating revenue, they unlock additional financing opportunities but surviving long enough to reach that milestone remains difficult.

Even though some interviews revealed that funding opportunities do exist, they emphasised that the time required to secure investment is critical. Interviewees widely perceived Italian investors as risk-averse and slow to make decisions. Usually, they prioritise low risk opportunities and delay engagement until technologies are validated, leading to extended fundraising cycles. In S4’s case, the initial round took one year and required deep preparation and examination of the business model, making it a major challenge even for an experienced team. This slow pace creates major survival risks for young firms.

“There are long cycles [...]. For a seed round in 12 months, I will be dead. So that’s the main problem. When you meet an investor, they say ‘Okay, good project. Come back to me in six months.’”

(S3)

An additional dimension that emerged from the data is the difficulty of communicating the value of innovative sustainability solutions to investors. S2 noted that the more novel and complex a technology is, the harder it becomes to explain and justify to investors who are used to shorter time horizons and more predictable returns. This challenge is particularly relevant for sustainability startups introducing new materials, processes, or business models that do not fit into existing market logics. In such cases, uncertainty is not just technological but also cognitive, as investors struggle to assess unfamiliar solutions. Moreover, sustainable business models themselves can introduce funding barriers. S9 illustrated how a strong commitment to social and environmental goals can create a mismatch with

traditional investors, as the company itself does not prioritise quick, scalable exits or profit maximisation above all else.

While public funding is frequently mentioned as an alternative source of capital, particularly in early stages, it is rarely seen as easily accessible. A big issue highlighted by interviewees is the requirement for upfront capital.

“In Italy, if you participate in a [...] €100k funding call [...] you need to pay this money. [...]. Maybe after six months, you can receive back half of what you spent. But you need to have this €100k before. So, if I don't have money, how can I spend the money to participate in a funding call?”

(S7)

This funding structure excludes startups with limited financial resources, as they are unable to pre-finance activities before receiving reimbursement. Furthermore, these often function as temporary support rather than stable long-term financing, forcing startups to rely on a combination of grants, competitions, and personal resources to survive initial stages.

“We won awards, but we did not receive an investor. We mainly relied on awards and personal money”

(S17)

While such strategies enable progress, they also create a dependency on uncertain funding sources. Moreover, founders noted how limited financial resources constrain their ability to focus on core development, as time must be allocated to securing funding rather than advancing the technology. Due to the heavy administrative burden associated with public funding, private investment is often preferred.

“It's much easier with a private investor than a public one. In the case of public investment, you would need to do continuous reports on the progress of the work, on how the money is spent, which is a commitment that can distract from other activities. And I'm a bit allergic to the bureaucracy of public tenders.”

(S5, translated)

The transition from university environments to independent ventures reinforces these challenges. S6 and S10 expressed the advantages of university-based development, where access to infrastructure, expertise, and initial funding reduces early costs and facilitates validation. However, moving beyond this stage requires larger financial resources and new types of investment that are more difficult to secure. This transition represents a bottleneck in the startup lifecycle, as startups must shift from protected research environments to market-oriented financing structures. S5 illustrated this dynamic by describing how projects at the prototyping and validation stage are often perceived as too advanced for research funding but too immature for private venture capital. This creates a gap in which startups require financial resources to further develop and validate their technology but cannot secure those resources without already having a more mature product.

At a broader level, some described the Italian EE as underdeveloped, with limited availability of capital and relatively weak investor competition.

“US is the opposite. Good startups choose their investors and investors are chasing good startups. In Italy, investors are so few, that startups must chase them. Even the good startups.”

(S3)

Ultimately, financial constraints are not limited to a simple lack of capital but arise from a combination of high capital requirements, long development cycles, investor uncertainty, and misalignment between sustainability objectives and conventional return expectations. Together, these factors create a persistent barrier that affects both the early development and scaling of sustainability startups.

4.1.2. Conservative Ecosystem & Risk Aversion

The Lombardian EE is consistently described as conservative and characterised by a high degree of risk aversion among actors, including investors, customers, and industry partners. This cultural and structural feature shapes how sustainability startups are perceived and influences their ability to access resources, establish collaborations, and enter the market.

This risk aversion extends beyond investors' hesitancy to invest, as argued in the previous section, to industrial actors and potential customers. S12 provided a clear example of how large companies tend to favour established suppliers over startups, even when startups offer more innovative solutions. In one case, a potential collaboration was not realised because decision makers preferred working with traditional SMEs, reflecting a broader preference for proven, family-owned partners.

“In Italy, the tradition is really linked to small-medium companies, focusing on family businesses. [...]. When compared to a family company we always lose. I would say all the board members of big companies have this mentality.”

(S12)

S17 highlighted that industrial partners opt for solutions that are closer to market readiness. Similar patterns are observed across other interviews. S2 reported how companies are generally unwilling to engage in experimentation at early stages, instead choosing to adopt new technologies only after they have been validated by others.

“Companies in general want immediate economic returns with zero entrepreneurial risks. This is unfortunately the mentality. [...]. They prefer to pay 5-10 times more of the cost of your technology at the end, instead of spending one euro to experiment with you.”

(S2, translated)

This limits opportunities for startups to test and demonstrate their solutions in real-world environments, which reinforces the difficulty of securing early collaborations.

In addition to limited collaboration opportunities, conservative behaviour contributes to a slower pace of interaction within the ecosystem. S6, operating in a highly regulated industry, described long, relationship-based processes where trust must be established over time before any form of engagement can occur. This makes it difficult for startups to move quickly, as progress depends both on technological development and on building credibility with external actors.

“First examples were getting to a [...] level which was credible enough for people to actually listen to you. [...]. Even if it goes well, it might take five years before somebody is paying you, just because of the slowness of the business.”

(S6)

A similar perception of slow processes and cautious attitudes appeared across other interviews. S1 described the Italian context as “*very difficult and slow*” and emphasised that “*the mentality is very closed*”. This is reflected in everyday interactions in addition to general attitudes, where even basic processes such as scheduling meetings can take weeks.

Risk aversion seems to not be limited to financial decision making but embedded across the broader ecosystem. It shapes how new solutions are evaluated, delays collaboration processes, and creates a preference for established actors over emerging companies. For sustainability startups, this climate results in increased barriers to early validation and slower paths to market entry.

4.1.3. Lack of Internal Capabilities

Another reason contributing to the difficulties of establishing and scaling a business is the competence gap present within many sustainability startups. Across both startup and support actor interviews, founders are frequently described as having strong technical or scientific backgrounds, but limited experience in areas such as business planning, financial management, sales, and organisational development.

“There are some entrepreneurs that have a technical background that are completely lacking business notions.”

(I2)

This challenge is especially apparent among startups originating from research projects, where the initial focus has been on developing an innovative solution rather than building a commercial organisation. Several founders described how they possessed a patent, a prototype, or a strong sustainability idea, but lacked the knowledge required to structure a company and translate the innovation into a functioning business.

“We were two designers with an idea and a patent, but it’s very different to build a company.”

(S14)

Founders mentioned difficulties in understanding cost structures, preparing financial projections, managing fundraising processes, and adapting business models as the company evolves. As startups grow, additional hurdles arise related to creating internal processes, defining responsibilities, and building an organisation capable of handling increasing complexity.

The interviews revealed that team composition plays an important role in addressing these internal gaps. Startups with complementary founder profiles, combining technical and business expertise, often described this balance as beneficial. In one case, a founder with an environmental engineering background worked alongside a co-founder responsible for business and management, which was reported as essential for dividing responsibilities and avoiding overlap. Similarly, S17 outlined how their team was deliberately assembled to create “*the right balance of skills*” where one founder focuses on research and product development and another is responsible for economics, marketing, and partnerships.

However, not all startups have access to such complementary competences from the start. Several interviewees emphasised that an important challenge is not only developing business capabilities internally, but also attracting the expertise required to strengthen the organisation as the company grows. One founder described the difficulty of recruiting engineers to a young company:

“It’s hard to find engineers. Firstly, because nobody wants to come work for an unknown startup. And secondly because usually engineers, at least here in Milan, don’t have problems finding [other] jobs.”

(S3)

A dual capability challenge is often present. On one hand, founders need to develop business competences to manage and commercialise their ideas. On the other hand, they must build teams that provide access to the complementary technical expertise required to scale the business.

4.1.4. Market Understanding & Positioning

Identifying the right customers and application areas arises as a recurring challenge. In many cases the core technology is developed before a clear market need has been fully defined. Therefore, startups must engage in a process of exploration to determine where their solution creates genuine customer value and how it can support a viable business model.

S11 illustrated how its mission-driven solution required iterative adjustments before finally finding an appropriate application. Similarly, another startup founder mentioned an ongoing process of testing its technology across multiple industries in order to find where it provides the greatest value for customers.

“We have four pilots in different industries, and we are going to test other six industries this year. What we are looking for is the first industry where our technology is good, the first industry to bring to the market with a real product.”

(S3)

S14 similarly revealed the challenge of finding customers who both express interest in and understand the specific benefits of more sustainable materials, which has influenced how the company positions its offering in the market. This uncertainty often leads to strategic adjustments and pivots. A comparable situation was identified by S17, although their challenge was more related to investor interest than customer demand.

“At the beginning, we started focusing on [initial sector], but we found some difficulties, especially on the investor side. So lately we are switching to [another sector] where there are more investors, and companies are more open to innovate.”

(S17)

The pattern appeared across several interviews. S2, S10 and S15 described how they continuously evaluate alternative application areas and industries where customer demand and funding opportunities are more accessible. Other startups reported that initially targeted markets were not sufficiently mature or commercially viable, requiring changes in strategic direction. Moreover, A2 noted that startups struggle to secure a position in markets dominated by large firms and that they must focus on a narrow application area where they can offer a differentiated solution. Otherwise, it becomes difficult to gain a foothold in the market. These cases illustrate how sustainability startups frequently need to refine or even redirect their initial business models to align their solutions with actual market opportunities.

Furthermore, interviewees reported that sustainability alone is rarely sufficient to make customers prioritise one solution over another. Instead, many customers focus on cost efficiency and immediate business benefits. Since sustainable solutions often involve higher costs than conventional alternatives,

startups must work harder to demonstrate their commercial viability. S12 noted that while sustainability is appreciated, it is seldom a decisive factor, making positioning more difficult.

“If I tell you I produce a sustainable product, it’s a nice to have, but it’s not a game changer. Either way you need to have a good price.”

(S12)

The results in this area explained that market understanding and positioning are early-stage challenges for sustainability startups. Beyond developing the actual technology, founders must identify which customer segments and application areas offer the best commercial potential and determine how sustainability benefits can be translated into business value. They must also find a sufficiently focused market niche where they can compete alongside established firms. This often requires experimentation, strategic pivots, and refinement of the value proposition before a market opportunity becomes apparent.

4.1.5. Market Access & Adoption

Even after identifying a suitable market niche and refining the value proposition, sustainability startups face challenges in achieving market adoption and progressing towards commercialisation. These hurdles are linked to customer behaviour, market structures, and the practical realities of introducing new solutions into established industries.

A recurring issue is that market adoption often depends on prior validation. Multiple startups explained that customers show interest in new solutions but remain reluctant to engage unless the technology has already been tested and implemented elsewhere. I1 reinforced this perspective by highlighting that startups often require access to specialised testing environments, infrastructure, and external partners to generate evidence of performance for market adoption. S5 emphasised the importance of securing pilot projects to demonstrate the functionality of the solution in operational settings, noting that customers are hesitant to engage without prior validation.

“They were comparing different projects and ultimately prioritised the one that had already been demonstrated in practice, rather than engaging with a solution that required additional development.”

(S5, translated)

This creates a circular dynamic, where sustainability startups need customers to validate their solutions, while customers require existing validation before they are willing to proceed. As a result, securing the first adopter or a pilot project becomes a critical and demanding step in the commercialisation process.

Another hindering factor was shown in the case of S13, where customers expressed interest in a more sustainable alternative but remained hesitant to switch when implementation involved adjustments to their existing routines. This barrier extends beyond the end customer and may also involve other parts of the value chain. S11, for instance, described the unexpected difficulties encountered when trying to establish a relatively simple collaboration in practice.

“Two out of three would not give me their waste. I was collecting it for free. I would just ask them to separate it from the rest of the trash, but then they would be like, ‘I don’t think we can do it’. I would come home and think, ‘What is happening? I’m trying to do something good for the city.’”

(S11)

Market adoption therefore seems to depend not only on the end customers' interest, but also on the willingness of multiple stakeholders to modify established behaviours and traditional operational practices.

As startups progress towards commercialisation, the challenges become more amplified. Moving from initial contact to formal agreements often involves numerous stakeholders, internal decision-making processes, and the need to build trust over time. A2 explained that collaboration with large corporates typically involves multiple stages, including meetings, legal procedures, technical evaluations, and internal coordination across departments, each introducing additional delays. For that reason, commercialisation processes become time-consuming and resource-intensive, slowing down market entry for startups.

In contrast to startups finding it hard to reach the market, several founders communicated a misalignment between high demand and production capacity. S9 described how interest from large customers emerged at a stage when the company's operational capacity was still very limited, illustrating the gap between demand and delivery capabilities. A similar dynamic was observed in the case of S15, which emphasised that while there is clear market demand for its solution, their production scale remains a limiting factor.

“We are now building a pilot plant in order to increase our production [...], because now we produce a very small amount, and a lot of companies are asking for the product”

(S15)

Market adoption for sustainability startups is not constrained by lack of interest, but by structural and behavioural barriers that delay or prevent implementation. Securing early validation, convincing customers and partners to change established practices, navigating long sales processes, and building sufficient operational capacity all contribute to a demanding and uncertain commercialisation process.

4.1.6. Policy & Regulatory Barriers

A recurring theme in the interviews is the complexity and cost associated with establishing and operating a company in Lombardy. Interviewees described how legal, fiscal, and administrative requirements create barriers from the very beginning.

At the point of entry, founders face both formal requirements for incorporation and must account for additional expenses related to mandatory legal and fiscal advisory services. Both S3 and S6 highlighted that, in practice, setting up a company requires initial capital and the involvement of an attorney and legal consultant, making the process far more expensive than the formal registration fees alone.

“Just to do the incorporation, we spent like €6 000 for lawyers and notaries. That is ridiculous for a company to exist. And in general, there's this issue with how Italy perceives certain things, they assume you're doing something illegal until proven otherwise, which is the flip side of how everything should work.”

(S6)

Following incorporation, startups encounter ongoing difficulties related to administrative and fiscal complexity, which drives a continuous need for support. Several interviewees claimed that the Italian system of taxation and compliance is simply too complex to manage internally. S7 explained that even minor errors in tax handling can lead to financial penalties, making legal and accounting support

indispensable. However, the challenge is intensified by a lack of accessible expertise and clear guidance within the ecosystem. Interviewees expressed difficulties in finding consultants and support actors with sufficient knowledge of these regulatory requirements, leaving founders uncertain about how to ensure compliance.

“We had no knowledge about the regulatory part. We had to overcome many obstacles that nobody knew how to solve. It’s difficult to find consultants who understand this. [...]. We want to do things properly, but sometimes we don’t know how to. Navigating this complexity at the beginning was difficult.”

(S9, translated)

The interviews also pointed to limitations in policies that are intended to support startups, particularly in relation to taxation. While certain benefits exist for startups, these are described as insufficient. S7 highlighted that after a limited time, startups are treated as standard companies and become subject to higher taxation, which can be difficult to sustain during early growth stages. Furthermore, the interviewee emphasised that these support mechanisms are difficult to utilise in practice, as they depend on specialised knowledge that startups, and even accountants, often lack.

“Accountants don’t know about this, and the startups don’t know about this either. The startups need to focus on what they’re doing. They should not need to do the work of accountants. So, it’s a problem.”

(S7)

Another policy instrument intended for sustainability startups is public funding. The interviews indicated that sustainability startups have access to a wider range of public funding opportunities, such as grants and EU calls, reflecting increasing policy attention towards the green transition. However, these opportunities are perceived as difficult to utilise in practice and according to S12 they introduce exhausting reporting and legal requirements. Similarly, participation in public funding schemes often requires collaboration within consortia. As S5 explained, applying for Italian public funding typically involves working with multiple partners, which is notoriously difficult to coordinate.

“When you want to obtain public funding in Italy, you always have to apply together with other actors in a consortium, and coordinating everyone becomes complicated because they are all busy”

(S5, translated)

A similar perspective emerges within private funding. Investors tend to mitigate risk through complex and restrictive term sheets, often including extensive control clauses and heavy equity requirements. These agreements can be difficult for founders to understand and negotiate, and overly strict conditions at an early stage can make it harder to bring in new investors later on.

Regulatory complexity becomes particularly significant when startups begin testing and implementing their technologies. Once a startup reaches the stage of testing its technology in a real environment, additional delays arise from permits and compliance requirements, slowing down progress.

“Three months just to get them to see the technology [...]. Then if you want to [...] test at their facility, then it’s another four months or something for the permits and everything.”

(A2)

In sectors related to circular economy and resource utilisation, regulatory requirements for materials and waste streams introduce additional complications. A2 explained that startups working with byproducts must comply with certification frameworks to reclassify waste as usable material. Determining the correct certification pathway and obtaining the necessary approvals is described as a complex and uncertain process, particularly as it often involves many actors across the value chain. To comply with these environmental policies, S11 had to establish formal agreements with suppliers to ensure that materials were handled and separated according to regulatory requirements. In practice, this means that startups are required to validate their own technology, as well as align suppliers, partners, and customers with regulatory standards, which increases coordination efforts. S12 showed how regulatory processes in waste-related sectors are also highly time-consuming.

“It’s not aligned with the velocity you need as a startup. For example, in Italy, obtaining the necessary authorisations can take at least one year; but for a startup this is an extremely long time. You simply cannot wait one year to start working.”

(S12)

In addition, the interviews pointed to a lack of sufficiently strong policy incentives to support the adoption of sustainable solutions. I5 noted that sustainability alone is not a sufficient value proposition unless supported by regulatory mechanisms or economic incentives that make sustainable options financially competitive. This was also mentioned by founders who emphasised that the current legislative framework does not incentivise the transition towards sustainable alternatives.

“It would be very useful if there was more legislation that pushes companies towards the green transition. [...]. Of course, our product has a higher price compared to synthetic ones, that are usually produced in China. If the legislation was more helpful in reducing this gap, it could be very helpful for us in terms of time to market.”

(S13)

In this context, policy does not always hinder startups through restrictive rules, but rather indirectly limits their growth by failing to create enough market demand for sustainable innovations.

The findings suggest that policy and regulatory barriers affect sustainability startups throughout several stages of development, from company formation to market implementation. Administrative complexity, limited access to specialised expertise, lengthy approval procedures, and insufficient policy incentives all contribute to delays and increased uncertainty in the region.

4.2. Incubator Support Areas

The interviews revealed four forms of incubator support that sustainability startups in Lombardy perceive as valuable. They are all illustrated in *Figure 4.2* and explained throughout sections 4.2.2. – 4.2.5.

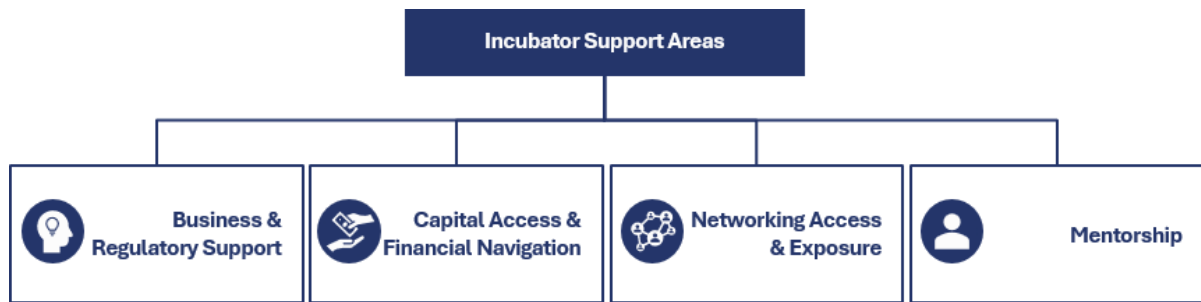


Figure 4.2: Four incubator support areas that were perceived as valuable by sustainability startups in the Lombardy EE.

However, the findings indicate that the value of these support areas depends not only on the services provided but also on how incubator support is structured and delivered. Therefore, three structural characteristics emerged as important enabling factors, see *Figure 4.3*. These are presented in the following section before the four support areas are explained in greater detail.

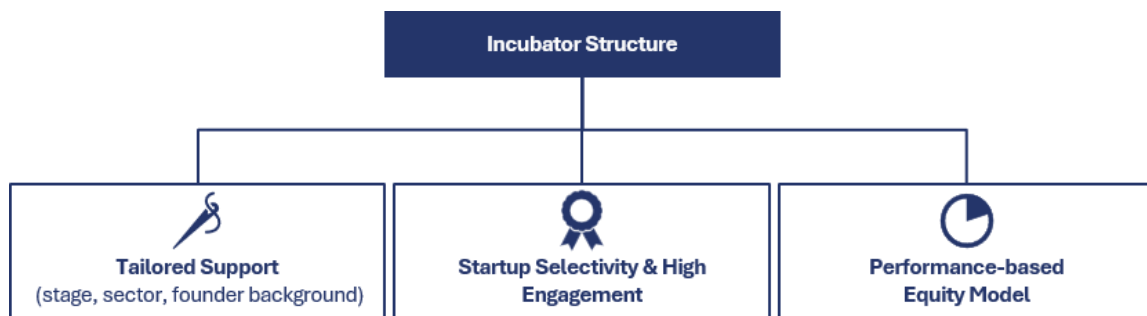


Figure 4.3: Three structural characteristics that enable the incubator support areas.

4.2.1. Incubator Structure

A clear pattern across all interviews, including startup founders, incubator representatives and other support actors, is that the value of incubator support depends not only on which services are offered, but also on how these services are structured and delivered. Although many incubators are organised around predefined programmes intended to cover the core areas of venture development, the perceived usefulness of these programmes largely depend on their ability to adapt to the specific needs of each sustainability startup.

“Our model support startups with business model development, market positioning, business planning, operational functions such as administration, finance, HR, and legal matters. [...] IP, regulatory pathways, [...], shared research infrastructure, prototyping, [...], pitch preparation, fundraising, and connections to scientific, industrial, and financial partners.”

(11)

Although such programmes aim to provide comprehensive support, the findings indicate that the value of these services also depend on how well they are integrated and adapted to the startup’s specific context. Fragmented structures, where startups must navigate disconnected support areas, reduce efficiency and increase complexity. At the same time, startup founders consistently underlined that their needs differ depending on maturity, sector, and internal capabilities. I5 highlighted this diversity, noting that *“some of them need more mentorship, some [...] need network or tools [...] some simply need money”*. Standardised approaches, therefore, often fail to address the challenges faced by sustainability

startups. Incubators themselves also acknowledged this limitation, and I2 stated that *“the hard part is to tailor this kind of support to a specific startup”*.

At the same time, incubators made clear during the interviews that their role is not to execute tasks on behalf of the startups. Instead, their purpose is to guide and structure decision-making processes while leaving responsibility with the founders.

“We are not consultants [...] we are telling you, you need to solve it like this”

(I3)

Many of the interviewed startups have participated in more than one incubator. Their experiences suggested that repeated incubation often leads to diminishing returns, as subsequent programmes tended to replicate similar content rather than provide support adapted to the startup’s maturity and evolving needs. This pattern reinforces the importance of programme flexibility and continuous adjustment over time.

Beyond the content of support, interviewees emphasised that the value of incubation also depends on the nature of interaction. The value of incubator support is not determined by access to advice itself, but by how relevant and applicable that advice is within the specific business context. Startups further underlined the importance of human interaction and the mindset of incubator representatives. Engaged, hands-on support, characterised by trust, openness, and direct communication, is more appreciated than distant or purely advisory guidance.

This preference was reflected in one startup’s journey, where the most valuable aspect of incubation was not the programme itself, but the opportunity to interact directly with the experienced incubator owner. S7 described this as *“completely different”* compared to interacting with employees. This dynamic highlights structural differences between incubator models. Larger incubators were sometimes perceived as less effective because of limited access to decision-makers and reduced personal engagement.

“If the incubator is too big, you start to talk with the employees [...] you never reach a point where you can talk really with somebody in charge.”

(S7)

This suggests that smaller or more closely connected incubator environments might facilitate stronger relationships, greater trust, and more customised support. S7 augmented this perspective, mentioning that incubators need to understand the founders’ ideas and motivations rather than *“treat people [...] like a cow where you can take milk”*, pointing to an overly transactional relationship. I3 extended such transactional dynamics by arguing that certain incubators prioritise financial returns, such as securing fees from funding rounds, over genuine belief in the startup’s long-term success.

The findings therefore imply a need to reconsider how incubators engage with startups. Rather than supporting a large portfolio of ventures at a relatively shallow level, several interviewees argued that incubators could achieve better outcomes if they adopted a more selective approach, focusing on fewer companies and committing more deeply to their development.

Another structural aspect concerns financial models, particularly the relationship between equity demands and the actual value provided to startups. Several founders expressed concerns regarding high equity requirements and control clauses that were not matched by corresponding contributions.

“They asked me for a 25% stake, but they didn’t participate in the project at all. The second incubator, also Italian, was going to finance [...] but I read the contract [...] I had to sell it [the company] whenever they decided.”

(S5, translated)

While equity-based models could, in principle, encourage long-term engagement, they could also create tension when support remains limited or only advisory. To encounter this, one alternative model was suggested where incubator compensation is more closely linked to performance and measurable value creation.

“The only good programmes are the ones where you [...] take equity or a success fee, only in case you reach certain milestones.”

(I5)

“[S5 wishes for] more direct support in the early stages, maybe even with a success fee method, where they would take a percentage of equity in case of success and more direct participation in the project.”

(S5, translated)

Several founders appeared to view this shift towards outcome-based engagement as reasonable. Multiple interviewees stated that giving up equity could be acceptable when it was matched by tangible value creation, such as funding or active operational involvement in the venture.

Incubator structure appears to function as an enabling condition for all other forms of support. The findings indicate that sustainability startups benefit most when support is tailored to their specific needs, delivered through close and selective engagement, and backed by incentive models that align incubator compensation with the long-term success of the venture.

4.2.2. Business & Regulatory Support

Knowledge and regulatory support constitute an important part of incubator assistance, particularly for sustainability startups operating in technically complex and regulated sectors. As examined in 4.1.3. *Lack of Internal Capabilities*, a recurring challenge is the transition from researcher or inventor to entrepreneur, requiring founders to develop new competences and adopt a different mindset.

“The second gap, [...] is then creating the startup. That means in some way changing the mind because you’re not a researcher anymore, but you start being an entrepreneur.”

(A3)

Several incubators described capability development as a core part of their offering. It includes workshops and structured guidance in areas such as business planning, intellectual property, financial projections, and fundraising strategies. A2 explained that startups were supported through focused sessions on topics such as life-cycle assessment, governance, and sales, helping founders develop the competences required to manage and commercialise their innovations. Such support appears to be particularly relevant during the initial phases of company formation, when founders are building the organisational and business foundations, and becomes less effective over time. As A2 noted, incubators “work very good in the early stages” but are more limited when startups move towards implementation and scaling.

The empirical material also indicates that the value of this support depends on the practical experience of the individuals providing it. S18 argued that startups benefit most from personnel who have previously managed companies or worked in a relevant industry, while criticising incubators that rely on younger staff with limited practical exposure. In contrast, it appears that incubators often depend on generalist profiles or individuals without any direct entrepreneurial background, creating a mismatch between the complexity of sustainability startups and the capabilities of those providing support.

Another important aspect of capability development concerns team formation. Several interviewees emphasised that sustainability startups not only need to strengthen their knowledge but also build teams with complementary business and technical competences.

“One thing that they are asking us for is to find a co-founder. They are searching for a co-founder. This is a big thing that they ask us.”

(I3)

In the case of S16, the founder described how they had initially started as a team of two engineers, completely lacking skills in communication, marketing, and sales. Through their participation in an incubator, they met a third co-founder with a business background, who later took on the role of COO. This was reported as highly valuable for the company’s development, as it complemented the team’s ability to manage business-related activities.

“Thank God we did the accelerator because we found this guy and he knew his stuff. It’s really important, because when you come out of university you are basically an engineer or in the research field, and you don’t even know what innovation is.”

(S16)

The findings also underline the importance of access to specialised experts. Incubators and other support actors can connect startups with legal advisors, accountants, industry specialists, and technical experts who can address specific issues that internal incubator teams cannot cover themselves. A3 explained that no single incubator can possess all the required competences internally, making the ability to identify and mobilise external expertise essential.

“No incubator can have all the competences inside. The important thing is to know where to find them and how to activate the right people when the startup needs them.”

(A3)

This need for specialised expertise is also evident in administrative and regulatory processes. Several interviewees described how startups require guidance in areas such as permit applications, legal documentation, certifications, and public funding procedures. For early-stage teams with limited experience and resources, these tasks can be especially demanding. The challenge is particularly pronounced for startups working with waste streams, biomaterials, and life sciences, where compliance with regulations is necessary before the solution can be tested or commercialised.

Taken together, the findings suggest that sustainability startups benefit from structured capability development, access to experienced individuals, and guidance in navigating regulatory and administrative complexity. This support helps founders build the knowledge and confidence required

to operate in sectors where legal compliance, certifications, and technical standards are critical to market entry and growth.

4.2.3. Capital Access & Financial Navigation

Enabling access to funding is helpful incubator support, and interviewees described how both private investment and public funding are highly dependent on prior connections and credibility within the EE. A central contribution of incubators is therefore to increase startups' investment readiness and visibility by helping founders structure their business models, refine pitch materials, and gain exposure to relevant investors. As S12 noted, "*raising in the first round is the most difficult because no one knows you*", demonstrating that early-stage fundraising is highly dependent on exposure within the ecosystem and referrals from incubators, as investors are unlikely to engage with unknown companies.

Interviewees further emphasised that incubators can support startups during negotiations with investors by reviewing term sheets and explaining the implications of specific clauses. This is considered particularly important for founders with limited fundraising experience, who might otherwise accept unfavourable conditions that affect ownership and future financing opportunities.

"This investor [...] said that the standard is a liquidation preference [...]. I was like, that's not standard, come on. That worried me, because [...] most of the startups didn't know and it really damages them down the line."

(S6)

Public funding, especially regional, national, and European programmes, is described as an important source of continuity for sustainability startups. For instance, S13 stated how European programmes had made the transition from pilot to industrial scale possible, as development was sustained through successive funding projects.

"Thanks to [Horizon 2020], we got funds to scale from pilot level to realise our first small size industrial plant."

(S13)

S8 stated that incubators are important for participation in public funding schemes, particularly calls that require forming consortia. This is because collaborative constellations are perceived as more stable and trustworthy than a single startup applying alone, according to S7. Incubators were described by A1 as valuable collaborators in this context, as they help identify concrete opportunities and support partnership development through events, webinars, and project-building activities. In this way, incubators also help startups navigate the structures associated with public funding, rather than simply assisting them in accessing financial resources.

Despite the efforts with external funding, a recurring critique from the startups was the limited availability of direct financial support from the incubators themselves. While many programmes focus on advisory services, startups emphasised that access to capital remains their most critical need. "*You are involved with incubators because you get money from the programmes*", as noted by S12, indicating that financial incentives are an important driver for participating in incubation. At the same time, interviewees pointed out that many incubators lack the resources to provide substantial funding themselves.

One way incubators partly address this limitation is by helping startups access alternative sources of early-stage funding. Apart from private and public investment, competitions were mentioned as an

important temporary source of capital. Startups described how incubators identify suitable competitions and, in some cases, support the application process. However, S17 pointed out that financial support through awards is often insufficient for scaling, indicating that such funding is useful in early stages but rarely solves larger capital needs.

Additionally, the importance of international investor and partner networks was mentioned in the interviews. The Italian funding landscape is perceived as relatively limited, particularly for capital-intensive sustainability startups seeking larger or specialised investments.

“In the last year in Italy, there were not so many initiatives that were good for us. This is probably because of a lack in our network. We don’t have a strong connection outside of Italy.”

(S17)

This illustrates how access to cross-border contacts could broaden the range of financing opportunities available to startups. Incubators with international networks are therefore perceived as especially valuable, as they connect sustainability startups to funding sources and opportunities that extend beyond the local ecosystem.

Taken together, the findings show that incubators support sustainability startups not only by facilitating introductions to investors, but also by helping them navigate the funding landscape. This includes identifying grants and competitions, supporting consortium formation, and opening access to international networks.

4.2.4. Networking Access & Exposure

While networks play an important role in securing funding, interviewees emphasised that their value extended beyond capital access. For instance, S16 described the “*whole ecosystem*” as the most critical outcome of incubation, highlighting the need for continuous interaction with founders, mentors, and industry actors.

“90% of the success is on the connections you have and the network, 10% on what you do inside the company.”

(S16)

Similarly, S6 noted that networking was the only support that remained valuable in the long run, suggesting that participation in multiple incubators was often driven by access to new contacts. This aligned with the incubators’ own view of their role, as I3 for example, who defined incubators as actors that connect startups to investors, mentors, and partners.

An additional role of networks is the building of recognition and credibility, with founders describing participation in competitions and incubator programmes as a strategic investment in visibility, helping to strengthen reputation at both national and international levels.

“Thanks to the participation in these competitions, accelerators, incubators, the name of the startup goes around at national, international level, and therefore it is also a form of advertising.”

(S2, translated)

In this sense, simply being selected by an incubator could function as a signal of quality, especially for young sustainability startups that lack an established track record. S12 similarly explained how such affiliation increases legitimacy and makes them more attractive to investors and partners by reducing perceived risk.

At the same time, I4 added an important incubator perspective by suggesting that access to networks is not automatic, but conditional. Introductions to external actors depend on trust and, as I4 put it; *“I need to trust in you first, before I will present you”*. Since external actors primarily trust the incubator rather than the individual startup, the incubator must assess whether the startup is capable of managing these relationships without damaging the incubator’s reputation. This positions incubators as gatekeepers of social capital, where network access is typically developed gradually, as startups demonstrate professionalism and readiness.

“Normally, it’s first with me, then with my colleagues, then with the local mentors and finally with the others.”

(I4)

Beyond legitimacy, networks are fundamental for market access and expansion. Several startups emphasised that reaching customers and entering new markets depend on connections to established companies. S16 concluded that incubators facilitate contact with multiple corporates that later turn into customers and collaborators. S11 similarly noted that the exposure provided by incubators enables startups to connect with actors in different industries, making it possible to enter new markets. Other interviews showed that collaboration with companies is essential to test and bring technologies to market, underlining the dependence on corporate partners for validation and commercialisation.

One founder illustrated how the effectiveness of networking interactions depends on their structure. S6 explained a matchmaking model facilitated by an incubator, where companies first outlined specific problems or needs, and startups responded only when they could offer relevant solutions, which increased the efficiency of establishing connections.

“We had like six matches in one hour, instead of one in three months. Just because the shift was completely opposite.”

(S6)

The importance of networks for market access was also reflected in the experience of S4, where prior industry connections enabled the team to navigate entry barriers more easily. This indicated that startups with an existing network can access markets more directly, whereas those lacking such connections are more dependent on incubator networks to establish initial industry links.

Networking and ecosystem access emerges as important areas for sustainability startup development. Through networks, startups gain access to legitimacy and market opportunities that are otherwise difficult to obtain. At the same time, access is not immediate but shaped by trust-based relationships, where incubators act as intermediaries that both enable and regulate how startups engage with the broader EE.

4.2.5. Mentorship

Closely linked to networking is mentorship. Regardless of whether the interviewed startups had extensive access to mentors or not, there was a clear consensus that mentorship played an important role in complementing internal capabilities and supporting the transition from idea to structured ventures.

“I think a mentor is one of the most underrated but useful profiles in startup growth [...]. Having people that support you every day, that know what’s going on in the business ecosystem, know the metrics, know what investors are going to deploy and what they are looking for.”

(S16)

Startups emphasised that the most valuable mentors are those with prior entrepreneurial or industry experience, as they can provide practical and context-specific guidance, filling the frequently present business competence gap. This was also acknowledged from an incubator point of view.

“The mentor is a person that has [...] extensive experience [...] has been there many times and [...] has a different vision.”

(I3)

This highlights the importance of practical experience among mentors, where the value lay not in theoretical knowledge, but in the ability to draw on prior real-world situations. From a startup perspective, mentorship is particularly valuable when it supports concrete decision-making processes. For example, one startup described how weekly mentorship was essential in structuring the company and navigating early uncertainty.

“You need a mentor for the business because the business model is changing a lot [...] and a mentor helps you to validate all the time if you are running in the right direction.”

Similarly, S17 identified mentorship as the most meaningful benefit of incubation, where mentors contributed to validating and refining the business idea. Mentorship is therefore not only about knowledge transfer, but also about guiding strategic direction and reducing uncertainty. In addition, mentors often provide access to specialised knowledge in areas such as legal, financial, and strategic development, further strengthening the startup’s competence base. It is also valuable for providing an external and objective perspective. Several interviewees acknowledged that founders might be too closely attached to their ideas, making it difficult to assess feasibility and market fit. In this regard, mentors contribute by offering a more rational viewpoint, which is considered very important in the beginning of a startup’s journey.

“Often you are in love with your idea, and you don’t have an overview about pros and cons. So, if you have someone more experienced, they can help you to have a different look at your idea and project.”

(S8)

Mentors are additionally seen as important for developing broader market understanding. Experienced mentors contribute with insights on industry dynamics, customer needs, and investor expectations.

“The link with the market means someone that has experience in that industry, that is able to explain to the entrepreneur which kind of product the market is ready to accept, which is the value of a product, the competitors, the positioning, all the stuff.”

A mentor can be present for a short period or a longer time. Based on the collected data, mentor relationships are in many cases extended beyond the formal duration of incubation programmes, suggesting a longer-term value. S17 noted that *“Months are passing, but we are still in contact with the*

mentors”, meaning that even after the incubation programme ended, the mentor remained engaged. In some cases, these relationships develop into deeper forms of collaboration.

“One mentor [...] started to follow us from the beginning, then also became another founder of the company.”

(S14)

At the same time, the data revealed important limitations of mentorship as a support area. A recurring critique was that mentorship alone is not sufficient, particularly when not complemented by other forms of support.

“The startup ecosystem is full of incubators that want to provide mentorship again and again and again [...] but [...] you need other things.”

(S14)

Mentorship is a highly valued and important component of incubator support. However, its effectiveness depends on the experience of the mentors, the practical applicability of their guidance, and its integration with other forms of support, rather than on its presence alone.

5. Towards a Framework on Strengthening Incubator Support for Sustainability Startup

This chapter synthesises the findings from both research questions and discusses how they relate to each other and previous research. By linking the empirical findings to the literature presented in 2. *Theoretical Framework*, the chapter provides a deeper understanding of how sustainability startups operate within the Lombardy EE and how incubators can support their development. To support the analysis, the results have been structured into a framework presented in *Figure 5.1*, which illustrates how the main challenges faced by sustainability startups in Lombardy relate to four core incubator support areas. The framework shows that startup challenges are closely interconnected and that addressing them often requires several complementary forms of support. It also highlights that the overall structure of the incubator influences how well these support areas are delivered.

5.1. Linking Startup Challenges & Incubator Support

The challenges on *Financial Constraints* show that sustainability startups often face high upfront investment needs, long validation cycles, a funding paradox, difficulties attracting investors, and a mismatch between sustainability ambitions and investor expectations. In the framework, this barrier is addressed through *Capital Access & Financial Navigation*, together with *Networking Access & Exposure*. Herrmann et al. (2018) characterise the Italian startup environment by structural financial limitations, including restricted access to debt financing and underdeveloped capital markets. Aligning with Herrmann et al. (2018), several sustainability startups reported relying on personal funds, awards, and grants before becoming visible enough to attract external investors. By supporting investment readiness, identifying relevant funding opportunities, and assisting with grant applications and consortium building, incubators can improve startups' ability to secure both private and public financing. Financial challenges are also closely linked to networking, since access to capital often depends on legitimacy, investor introductions, and connections with relevant ecosystem actors. This supports Roundy's (2021) view that incubators can function as ecosystem leaders, especially in environments characterised by constrained resource availability.

The findings additionally suggest that incubators can help address the mismatch between sustainability startups' environmental and/or social objectives and investors' focus on financial returns and lower-risk opportunities. Colombo et al. (2019) argue that EEs consist of actors operating with different objectives, making governance and coordination important. The perspective is reflected in the findings where incubators who mediate between founders and investors were perceived as valuable. In practice, this could mean helping sustainability startups frame and communicate their value propositions in ways that are better aligned with investor expectations while also connecting them with investors whose objectives are more compatible with sustainability.

Previous research suggests that the Italian Startup Act improved funding conditions for registered innovative startups (Biancalani et al., 2022). However, the findings indicate that many sustainability startups still perceive these systems as difficult to navigate due to administrative complexity, limited knowledge, and demanding procedures. A similar pattern appears in relation to regional and European funding calls, where sustainability-related innovation is often prioritised (European Commission, 2021; Regione Lombardia, 2026). Although these initiatives create important funding opportunities, identifying relevant calls, understanding application requirements, and forming the necessary consortia remain major barriers. Since many funding schemes require collaboration between multiple actors, incubators play an important role by facilitating partnerships and supporting startups throughout the application process.

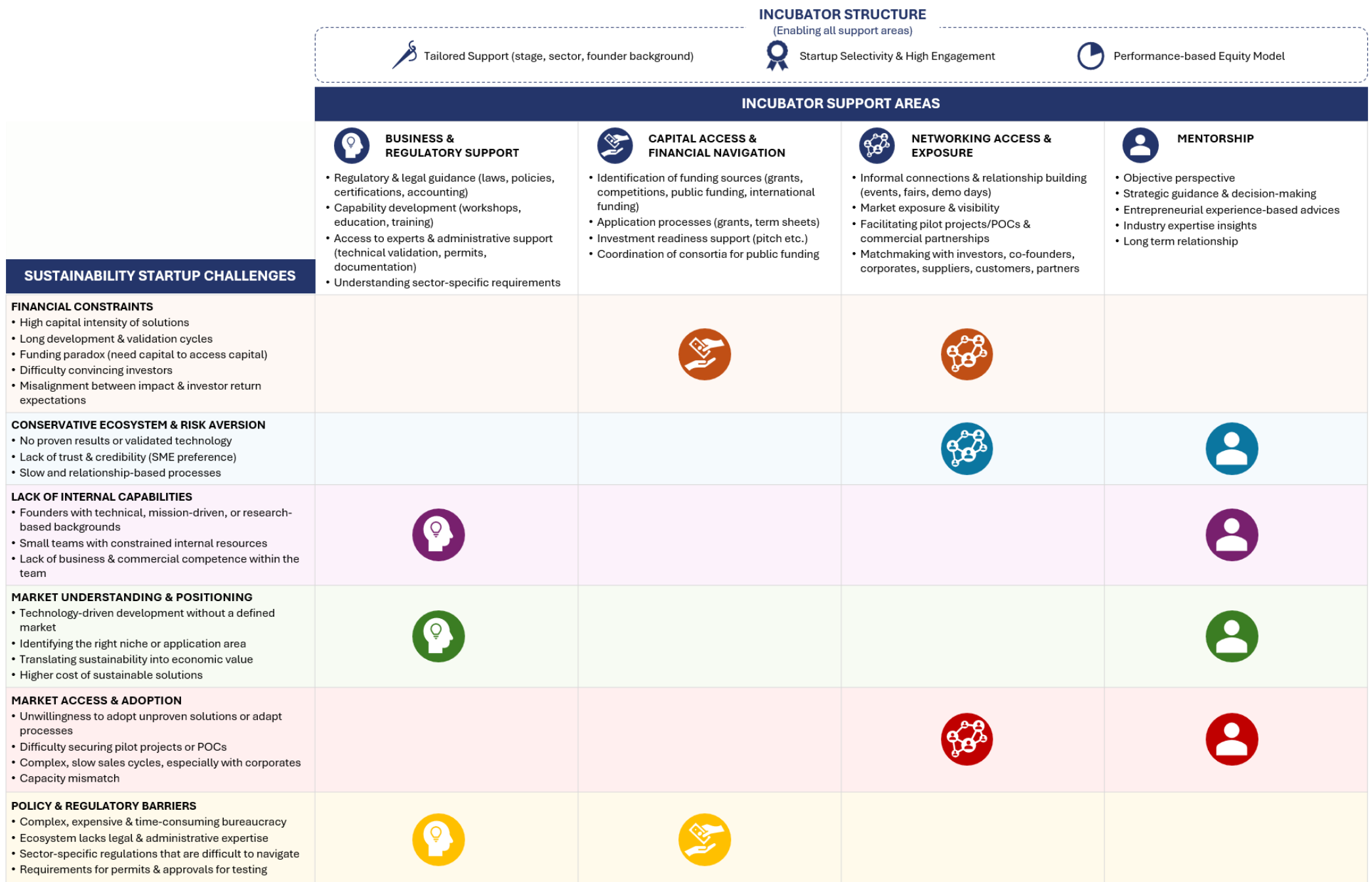


Figure 5.1: An integrated framework linking sustainability startup challenges with incubator support areas and structural principles.

The challenge of *Conservative Ecosystem & Risk Aversion* can primarily be linked with *Networking Access & Exposure* and *Mentorship*. Investors, corporates, and customers often prefer established actors and proven technologies, making it difficult for new ventures to gain attention and trust. In EEs, incubators function as intermediaries that help entrepreneurs access resources and relationships that would otherwise be difficult to secure (Mian et al., 2016), harmonising with the findings. They also function as signalling actors reducing uncertainty for external stakeholders. By screening and selecting promising startups, incubators provide an implicit validation of the startup's quality and potential. This is consistent with Kaur et al. (2024), who show that participation in incubator programmes can enhance legitimacy and strengthen networks, increasing assurance, during early stages which help the business development. Moreover, credibility is reinforced through networking activities and mentorship, since both formal and informal interactions increase visibility and help founders build trusted relationships over time. Incubators' intermediary role thereby aligns well with van Rijnsoever's (2020) argument that incubators help overcome weak network problems by creating relationships and trust between startups and external actors.

The business landscape recalled in the findings, can also be understood in relation to the nature of the Italian EE, characterised by local family-owned SMEs (Sanders et al., 2020). For sustainability startups, it creates a legitimacy problem, since their solutions must compete not only on technical and commercial merits but also against rooted preferences for established actors. Spigel's (2017) framework can help illustrate this dynamic. The conservative and risk-averse culture in Lombardy represents the cultural attribute, lowering the desirability of entrepreneurship and making it more difficult for startups to gain trust. This is where incubators, as material attributes, can strengthen the ecosystem's social attributes by leveraging their own trusted relationships, and connect entrepreneurs to mentors, partners, and investors.

Incubators in Lombardy should build on these structural characteristics rather than attempting to replicate support models from champion ecosystems such as Silicon Valley. Both founders and incubator representatives frequently referred to the United States as an ideal entrepreneurial environment, particularly regarding access to capital and openness to risk. However, previous research shows that EEs cannot be effectively built by copying visible features from other regions when the underlying relationships, institutions, and cultural conditions differ (Isenberg, 2010; Spigel, 2017). In the Lombardy context, the strong SME base should instead be viewed as a distinctive advantage. By building closer relationships with SMEs, incubators can create pathways for sustainability startups to access pilot customers, industrial partners and suppliers. Incubators are therefore important enabling actors both in gradually increasing startups' legitimacy and in leveraging local industrial strengths to support their development.

The study further supports the view that ecosystem elements are interconnected and mutually reinforcing (Spigel, 2017; Isenberg, 2010). One example in the Lombardy context is that cultural norms affect both market and investor behaviours, and access to human capital. Established firms are often preferred over startups, and entrepreneurial careers may appear less attractive than traditional employment. Together, these dynamics reduce the credibility of sustainability startups and slow their access to investment, customers, partners, and talent. In this sense, improving one part of the ecosystem, such as incubator support, can generate positive effects across multiple dimensions of startup development.

Market Understanding & Positioning is related to *Business & Regulatory Support* and *Mentorship*. Several startups described difficulties identifying suitable application areas and viable market niches, particularly when technologies were developed before a market need was defined. Incubators can

support startups through strategic guidance, external perspectives, and business-related support that help founders better understand how their solutions can be positioned and commercialised within the market. The findings indicate that mentorship is valuable when mentors have relevant industry experience and can challenge founders' assumptions about how their solutions create value. By helping startups refine their value propositions and identify the most appropriate market niche, mentors can support the translation of technical innovations into commercially relevant offerings.

The transferring support needed in this phase can be understood through Spigel (2017) whose theory include tangible resources such as universities, policies, infrastructure, and support services that provide direct inputs for venture development. However, Spigel (2017) emphasises that ecosystem performance depends both on the presence of such resources, as well as on how effectively they are connected and transformed into entrepreneurial outcomes. While the Lombardy EE offers research capabilities and supportive policy initiatives, startups often struggle to convert these resources into business opportunities. Within the framework, incubators play a bridging role by linking technological innovations with market needs and commercial opportunities helping to translate research, inventions, and institutional support into sustainability startups with clearer market positioning and commercial potential.

Market Access & Adoption is supported through *Networking Access & Exposure* and *Mentorship*. Several startups described difficulties establishing customer relationships and securing pilot projects. Mian et al. (2016) explain that incubators provide networking opportunities and can increase the internal and external network density of startups, thereby enhancing their access to relevant stakeholders and potential collaboration opportunities. The findings of this study suggest that such support may take the form of matchmaking activities, introductions, fairs, and networking events, which facilitate new connections. In addition, experienced mentors in the right industry may possess established relationships and practical credibility that help open doors to relevant decision-makers and potential partners. Through this combination of network access and mentor introductions, sustainability startups can overcome the critical step of securing a first pilot project or customer.

Lack of internal capabilities is a common challenge among sustainability startups and is primarily addressed through *Business & Regulatory Support* and *Networking Access*. This is in line with Rata et al. (2024) who argue that accelerators serve as an effective channel for operationalising sustainability support. To bridge the gap between founders' ideas and commercialisation incubators contribute by complementing internal capabilities through training, while networking support can help startups finding co-founders and external competences.

This coordinating role becomes particularly important in the Italian context. As described by Sanders et al. (2020), Italy possesses a strong base of qualified talent, but a central challenge is ensuring that this talent flows into entrepreneurial ventures. Incubators can play a role in coordinating this process by exposing researchers and professionals to entrepreneurial opportunities, connecting startups with experienced individuals, and helping founders build teams with the skills required for growth. Within the framework, this highlights that the value of incubators lies not only in developing founders' capabilities internally, but also in mobilising the broader competence base of the EE.

Policy & Regulatory Barriers can be addressed through *Business & Regulatory Support* and *Capital Access & Financial Navigation*. Sustainability startups often face challenges related to legal processes, certifications, permits, taxation, and public funding administration. This is consistent with Herrmann et al. (2018), who describe the Italian business environment as a practical barrier to venture creation and early-stage growth, where administrative bureaucracy slows and complicates the process of starting and developing a firm. Regulatory uncertainty and changing rules further increase complexity, and the

findings indicate that even experts may struggle to fully navigate existing frameworks and compliance requirements.

Colombo et al. (2019) argue that EEs are shaped through both bottom-up entrepreneurial activity and top-down governance driven by institutions and policy actors, where intermediary actors play an important role in facilitating coordination between stakeholders with different objectives and logics. This perspective is reflected in the findings, where navigating bureaucratic procedures, regulatory systems, public funding structures, and compliance-related processes emerges as valuable incubator support. Within the framework, this highlights the importance of incubators providing access to specialised legal and regulatory expertise, supporting startups in understanding policy requirements, and facilitating coordination with public authorities. When such expertise is not available internally, incubators need to maintain access to external specialists who can be engaged as needed.

Recent policy initiatives further illustrate why this support function is important. The European Commission's proposed EU Inc. framework aims to harmonise corporate rules across member states, simplify company registration, and enable fully digital business operations (European Commission, 2026). If implemented, such measures could reduce some of the administrative complexity that currently constrain startup development in Italy. These initiatives only create value if startups are aware of them and understand how to make use of the opportunities, suggesting that support actors need to continuously monitor policy development. By translating new regulations into practical guidance, they can help sustainability startups avoid unnecessary legal costs, reduce administrative burden, and take advantage of institutional changes designed to facilitate entrepreneurship.

5.2. Structural Conditions for Enabling the Support Areas

Interpreted through the findings, the value of incubator support depends not only on the support areas themselves but also on how incubators structure and deliver them. This suggests that certain organisational characteristics influence how incubators operationalise and adapt their support to the needs of sustainability startups. Three structural aspects emerge as important enabling conditions, see *Figure 5.1*.

Tailored support is highly important because sustainability startups differ a lot depending on sector, maturity, technology, and team background. The findings show that startups benefit less from standardised programmes when support is repeated or not adapted to their specific situation. Instead, incubators are perceived to be more valuable when they can adjust both the content and intensity of support over time. This confirms Tavoletti's (2012) argument that incubator effectiveness depends on how well support mechanisms align with both the needs of target ventures and the broader EE. The findings also support Karahan et al. (2022), who argue that incubators should avoid generic sustainability programmes and instead develop targeted support configurations adapted to the specific ambitions and conditions of each sustainability startup.

The findings further suggest that incubators may create greater value by adopting an approach with *Startup Selectively & High Engagement*, working closely with a smaller number of startups, rather than supporting a large portfolio through broader programmes. Startups particularly value direct access to experienced individuals, long-term engagement, and relationships extending beyond formal programme activities. This creates a tension in relation to the concept of Italian certified incubators, where performance indicators include the number of startups hosted and the number of ventures completing incubation programmes (Presidenza della Repubblica Italiana, 2025). In this sense, regulatory structures, which Vogel (2013) identifies as an important ecosystem condition, may unintentionally incentivise incubators to prioritise quantity over quality. At the same time, the findings indicate that

sustainability startups place strong value on experienced incubator personnel and ecosystem relationships, which corresponds with the certified incubator requirements on entrepreneurial expertise and formal collaborations with universities, financial actors, and innovation institutions (Ministero delle Imprese e del Made in Italy, 2025a). However, several startup experiences suggest that the practical quality and accessibility of such support vary considerably across incubators. One possible explanation is that the certification is based on a self-declaration by the legal representative of the incubator organisation, which may create variation between formal requirements and how support is experienced in practice.

In addition, incentive structures influence how incubator support is perceived. Large upfront fees and equity requirements are viewed critically, particularly when the incubator contribution remains limited to advisory support. In contrast, interviewees expressed more positive attitudes towards *Performance-based Equity Models*, where incubator compensation is linked to concrete startup progress, milestone achievement, or measurable value creation. Such approaches appear to strengthen alignment between incubator and startup interests while encouraging more active engagement from the incubator side. The preference for support that goes beyond theoretical guidance and leads to tangible results aligns with Audretsch et al. (2023), who argue that effective incubation programmes should go beyond operational support and actively connect sustainability startups with investors and government actors to provide access to financial and social resources.

At the same time, the findings indicate that incubator support alone is not sufficient to determine startup outcomes. While startups expect incubators to actively contribute to their development and create value, the responsibility for leveraging available resources, networks, and opportunities ultimately remains with the entrepreneur. This corresponds with Vogel's (2013) perspective on the entrepreneur as a central ecosystem actor, but whose activities both influence and are influenced by the surrounding environment.

6. Conclusion

This study examined the challenges faced by sustainability startups in the Lombardy EE and explored how incubators can strengthen their support to address these challenges. Based on 26 semi-structured interviews in Lombardy with startup founders, incubator representatives, and other support actors, the findings identify six main challenge areas and four forms of incubator support perceived as particularly valuable. The results further suggest that incubator support is most effective when it is tailored to startup needs, delivered through close engagement, and linked to value creation. Building on these findings, this chapter discusses the broader implications of the study, followed by recommendations for incubators and suggestions for future research.

6.1. Theoretical Implications for Sustainable Entrepreneurial Ecosystems & Incubation

A broader implication of this study is that sustainable development is not driven by sustainability startups alone, but by the EE in which they operate. Previous research on sustainable entrepreneurship and EEs emphasises that the ability of sustainability startups to create environmental and social impact depends on whether they can access finance, knowledge, legitimacy, and markets (Huang et al., 2023; Tiba et al., 2021). In this sense, EEs are not only mechanisms for economic growth but can also function as structures that enable sustainable transitions. The findings suggest that the Lombardy EE has great potential to support sustainable development, although this potential is not yet fully realised. Huang et al. (2023) argue that EEs can actively drive sustainable development when economic, social, and environmental considerations are embedded across the system. Several characteristics identified in this study support such a role. Specialised support actors, universities, startup initiatives and sustainability-oriented funding create favourable conditions for sustainability startups. At the same time, limited access to capital, conservative business cultures, and administrative complexity constrain the ability of these ventures to commercialise and scale. This indicates that while the ecosystem contains many of the structural components needed to enable sustainable entrepreneurship, the interaction between finance, culture, markets, and institutions continues to limit the translation of sustainable innovation into broader societal impact.

The results also add nuance to previous research on which ecosystem elements are most important for sustainable innovation. Khatami et al. (2022) found that policy, finance, and support organisations were the EE dimensions most positively associated with sustainable innovation. This corresponds closely with the present findings, where regulatory support, financial navigation, and mentorship are perceived as valuable forms of incubator support for sustainability startups. Worth acknowledging is that Khatami et al. (2022) examined 14 European countries at the macro level, whereas this study focuses on the specific regional context of Lombardy.

Moreover, the findings partly contrast with de Moraes et al. (2025), who argue that formal institutions, policy, and entrepreneurial culture are more important than networking and finance for knowledge-intensive sustainable entrepreneurship. In this study, they are indeed influential, particularly in relation to administrative complexity and regulatory burdens. However, both capital and networking access were consistently mentioned among the most valuable forms of assistance. Rather than representing a direct contradiction, this suggests that the importance of ecosystem elements may vary across contexts. Since de Moraes et al. (2025) examined entrepreneurship in Brazil and this study focuses on the Lombardy region in Italy, the differences may reflect the context-specific nature of EEs.

Hoogendoorn et al. (2019) show that sustainable entrepreneurs frequently encounter limited resources, insufficient capabilities, and weak networks. The present study confirms these barriers and

demonstrates that they are reinforced by other factors such as higher development costs, longer validation cycles, regulatory requirements, and market reluctance to pay a premium price for sustainability. Therefore, sustainability increases both the complexity and uncertainty of entrepreneurship, which further strengthens the importance of ecosystem support.

6.2. Recommendations for Incubators

The purpose of this study was to identify ecosystem level challenges hindering sustainability startups and to examine how incubators can adapt their support to better address these challenges in the Lombardy EE. Since EEs are highly context-specific, recommendations for incubators must be adapted to the institutional, cultural, and economic conditions in which they operate (Stephens et al., 2022; Isenberg, 2010; Vogel, 2013). The recommendations presented are therefore primarily directed towards incubators operating in Lombardy, although they may also be relevant for other support actors working with sustainability startups in comparable settings.

Regarding support for business and regulations, incubators should help founders develop core business capabilities in areas such as business modelling, market positioning, and commercialisation. Given the administrative complexity of the Italian business environment, incubators should also strengthen their regulatory navigation support by providing access to expertise in legal compliance, certification, taxation, and sector-specific regulations. In relation to capital access, incubators should help startups identify relevant funding sources, including grants, competitions, public funding, and private investment. They should also support application processes, investment readiness, and the formation of consortia for regional, national, and European funding programmes.

Networking should be at the centre of the incubation model. The findings show that access to investors, corporates, public actors, and specialised experts is often the most valuable outcome of incubation. Incubators should therefore act as active intermediaries that signal credibility, facilitate introductions and build relationships with actors that are willing to engage with sustainability startups. Mentorship is an important complement to the networking role. When there is a strong match between the startup's needs and the mentor's entrepreneurial and industry experience, mentorship provides objective feedback, strategic guidance, entrepreneurial insights, and industry knowledge that help founders make more informed decisions. Incubators should therefore place particular emphasis on carefully matching sustainability startups with mentors who possess relevant expertise and practical experience.

The way the incubator is structured is equally important to the support it provides. Sustainability startups differ considerably depending on sector, maturity, technology, and founder background. Incubators should therefore adapt both the content and intensity of support to the specific needs of each startup. The findings further suggest that incubators should prioritise quality of engagement over quantity of supported startups. Sustainability startups consistently value close interaction, practical guidance, and access to experienced individuals more than participation in standardised programmes.

Finally, incubators should align their incentive structures with startup outcomes. Large upfront fees and equity requirements are viewed critically when they are not matched by clear value creation. Performance-based models, where compensation depends on concrete progress or milestone achievement, appear to create stronger alignment between incubator and startup interests.

6.3. Future Research

This study contributes to the understanding of how sustainability startups operate within EEs and how incubators can support their development. However, several avenues for future research arise from both the limitations of the study and the findings.

Given the geographical focus on Lombardy, future research could extend the analysis through comparative studies across different EEs. Examining other regional or national contexts would make it possible to assess whether the challenges and support needs identified among sustainability startups are shaped by local conditions or reflect more general patterns.

There is also scope to broaden the empirical and methodological approach. The study is based on a qualitative design with a limited number of interviews, which allows for detailed insights but does not capture how widespread particular challenges are. Future studies could complement these qualitative insights with quantitative data, for example by surveying a larger number of sustainability startups and incubators within Lombardy, or by applying comparable survey instruments across multiple ecosystems. This would allow for a clearer assessment of which challenges and incubator support are most significant.

Another area for further research concerns the outcomes of incubator support. This study focuses on how support is perceived rather than how it affects development in measurable terms. Future research could therefore investigate how different forms of incubator structure or support focus relate to outcomes such as funding, market entry, or growth. This would provide a more direct understanding of how incubator activities influence startup development.

Finally, future research could explore sustainability-specific dynamics in more detail. The findings indicate that sustainability startups face particular challenges, including market adoption and the need to balance environmental and economic considerations. Future studies could explore how these conditions vary across sectors and types of sustainability innovation. For example, comparisons between deep-tech ventures and more market-oriented startups may provide a more nuanced understanding of how support needs differ within the category of sustainability startups.

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Appendix I: Interview Guide for Sustainability Startups

The interview is expected to take approximately 30-45 minutes. Participation is voluntary, and interviewees may decline to answer any question or withdraw at any time. All responses are treated anonymously and used solely for research purposes. With consent, interviews are recorded and later deleted after completion of the study.

Background and sustainability orientation

- Can you briefly describe your startup, including the problem you address and how your solution works?
- How long has the startup been running, and what stage would you consider it to be in?
- What is your current role, and what do you work with day-to-day?
- Which environmental and/or social challenges do your startup address?

Understanding sustainability startup challenges

- Reflecting on your journey so far, can you describe one (or more) big challenge you have faced when trying to grow your startup?
- What are the most urgent challenges you are dealing with right now, at your current stage?
- Looking back, what has been the most important factor enabling your startup to grow?

Role of the incubator

- Are you currently part of an incubator or have you participated in one previously? Why did you choose to join that incubator?
- In what ways has the incubator supported you? What kind of support have you received?
- Which forms of support have been most valuable/appreciated for your development?
- Were there any type of support you expected but did not receive?
- If you could give one advice to other incubators, what would it be? And why?

Entrepreneurial ecosystem and external support

- Which ecosystem actors have been most important for your development so far, and why?
- How would you describe your interactions with different actors in the ecosystem?
- Have you encountered any ecosystem barriers that have made growth more difficult?
- Are there ecosystem factors that you consider particularly supportive of your growth?
- If you could change one thing in this ecosystem to make growing easier for sustainability startups, what would it be?

Reflection and closing

- Is there anything else you consider important for understanding the challenges faced by sustainability startups in this ecosystem?
- Can you suggest other relevant individuals, organisations, incubators, or sustainability startups that we could contact for this study?

Appendix II: Interview Guide for Incubators

The interview is expected to take approximately 30-45 minutes. Participation is voluntary, and interviewees may decline to answer any question or withdraw at any time. All responses are treated anonymously and used solely for research purposes. With consent, interviews are recorded and later deleted after completion of the study.

Background and role in the incubator

- Can you describe your professional background and how you came to work at this incubator?
- What is your current role, and what do you work with day-to-day?

Understanding startup challenges

- Looking across the sustainability startups you have supported over the past years, what challenges tend to come up most often when trying to grow in this ecosystem?
- Thinking about the sustainability startups you are supporting now, what are the most urgent challenges they are dealing with in their current stage?

Role of the incubator

- Can you describe what types of support your incubator offers to startups?
- Which forms of support do you think are most critical for enabling sustainability startup growth?
- Where are your support limitations or constraints to be able to support sustainability startups effectively?
- If you could give one advice to other incubators, what would it be? And why?

Entrepreneurial ecosystem and external support

- Which ecosystem actors do you collaborate with most frequently to support sustainability startups?
- How would you describe how well the local ecosystem supports sustainability startups?
- Where do you see the biggest ecosystem gaps or bottlenecks?
- What are the strongest advantages of the ecosystem?
- If you could change one thing in this ecosystem to make growing easier for sustainability startups, what would it be?

Reflection and closing

- Is there anything else you consider important for understanding the challenges faced by sustainability startups in this ecosystem?
- Can you suggest other relevant individuals, organisations, incubators, or sustainability startups that we could contact for this study?

Appendix III: Interview Guide for Other Support Actors

The interview is expected to take approximately 30-45 minutes. Participation is voluntary, and interviewees may decline to answer any question or withdraw at any time. All responses are treated anonymously and used solely for research purposes. With consent, interviews are recorded and later deleted after completion of the study.

Background and role in the organisation

- Can you describe your professional background and how you came to work at [organisation]?
- What is your current role, and what do you work with day-to-day?
- Can you briefly describe [organisation], its role in the ecosystem, and the types of startups it typically engages with?

Understanding startup challenges

- Based on your experience with sustainability startups, what challenges tend to come up most often when trying to grow in this ecosystem?
- Are these challenges different for sustainability startups compared with other (conventional) startups?

Role of [organisation]

- Can you describe how you usually engage with sustainability startups? Which is the kind of interaction and/or support?
- Which forms of support do you think are most critical for enabling sustainability startup growth?
- Where are your support limitations or constraints to be able to support sustainability startups effectively?
- Are there needs that startups often have, but that [organisation] is not really designed to address?

Entrepreneurial ecosystem and external support

- Which ecosystem actors do you collaborate with most frequently to support sustainability startups?
- Where do you see the biggest ecosystem gaps or bottlenecks?
- What are the strongest advantages of the ecosystem?
- If you could change one thing in this ecosystem to make growing easier for sustainability startups, what would it be?

Incubator support

- Where do incubators currently add the most value?
- Where do incubators tend to fall short?
- How could incubators better collaborate with [organisation]?

Reflection and closing

- Is there anything else you consider important for understanding the challenges faced by sustainability startups in this ecosystem?
- Can you suggest other relevant individuals, organisations, incubators, or sustainability startups that we could contact for this study?

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