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REVIEW

Entrepreneurial support organizations as providers of entrepreneurial education and training

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Abstract
Entrepreneurial support organizations (ESOs), such as pre-incubators, incubators, and accelerators, have gained significant attention for their role in fostering entrepreneurship. Among their key functions is bridging theoretical and practical knowledge, making them important settings for entrepreneurial education and training. This research provides a comprehensive overview of the current state of knowledge regarding entrepreneurial education and training offered by ESOs. Through a systematic literature review of 64 peer-reviewed articles, we examine the factors that motivate and influence the variety of entrepreneurship teaching and learning initiatives within ESOs, as well as their outcomes. The key findings of this study are as follows: organizational and institutional factors are the primary "antecedents" of entrepreneurial education and training in ESOs. These factors influence the "variety" of initiatives within ESOs (e.g., selection practices, program duration, teaching and evaluation methods) and the "outcomes" at both the individual and organizational levels. Based on these findings, we develop a taxonomy of educational ideotypes for ESOs. This work contributes to the literature on entrepreneurial education and entrepreneurial ecosystems, providing valuable policy and practice recommendations.

Keywords Entrepreneurial support organizations · Pre-incubators · Incubators · Accelerators · Entrepreneurial education · Entrepreneurial training · Entrepreneurial learning

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1 Introduction

Over the last decade, there has been increasing academic interest in entrepreneurial support organizations (ESOs) (Bergman & McMullen, 2022), which primarily aim "to support individuals and collectives, via (in)direct and (im)material assistance, as they seek to initiate and progress through the stages of the entrepreneurial process." While most studies have largely focused on estimating the average effects of participating in ESOs on subsequent entrepreneurial outcomes (Oosterbeek et al., 2010; Huber et al., 2014), providing evidence at the individual (Kolade, 2018; Mayorga, 2019) or firm level of analysis (Lyons & Zhang, 2018; Åstebro & Hoos, 2021), they do not explore the variations in program design.

Among the relevant functions and services provided by ESOs, several studies have analyzed their role in entrepreneurial education and training, describing them as "teaching laboratories" (Kirby, 2006) where business practices can be linked with academic theory (Rideout & Gray, 2013). However, different ESOs intervene at various stages of the entrepreneurial journey, offering different services to different entrepreneurs (Lyons & Zhang, 2018): pre-incubation programs during the conception phase of the business idea (Bielicki, 2023); incubators in the development and pre-seed phases (Assenova, 2020); and accelerators in the go-to-market and seed phases (Cohen et al., 2019).

Therefore, academic and grey literature present different views about the role and impact of ESOs as providers of entrepreneurial education and training. On the one hand, ESOs are seen as contributing to the formation of a community of practice for situated learning, where participants can gain "an enterprising mindset that will help them whatever career they pursue in the future" (Jones et al., 2021, p. 375) or develop entrepreneurial competencies to handle uncertainty, solve problems, collaborate in team settings, and make informed decisions (Gibb, 2002; Williams Middleton & Donnellon, 2014). On the other hand, ESOs are tasked with providing experiential, hands-on programs focused on fostering participants' business creation and growth, with the aim of generating ventures that contribute to local employment and economic growth (e.g., Cohen et al., 2019), for instance through contact with external experts and networking in business and industry environments (e.g., Clayton, 2024; Chowdhury & Audretsch, 2024). We, therefore, maintain that these different types of ESOs, due to their varying structures, missions, and organizations, will have different pedagogical designs and approaches to education and training, ultimately leading to different learning outcomes for their participants. Hence, we address the following research questions: *What are the elements defining the teaching and learning context for participants in ESOs? How is entrepreneurship taught within ESOs?* To answer these questions, we cumulate and synthesize academic knowledge about entrepreneurship teaching and learning in the context of ESOs.

This paper changes our understanding of pre-incubators, incubators and accelerators by demonstrating how their educational approaches and outcomes vary significantly across different stages of the entrepreneurial journey. Unlike previous studies, which often focus on isolated aspects of entrepreneurship education and training, this work provides a holistic view, integrating the key elements that define the teaching and learning context in ESOs. It highlights the importance of educational ideotypes that address specific needs at each stage, ranging from raising awareness and building foundational skills in pre-incubators to enhancing startup scale quickly and/or to going international through experiential learning and mentorship in accelerators. Moreover, by developing a taxonomy of educational

ideotypes, this study provides a nuanced framework for understanding how entrepreneurial education can be aligned with the missions and operational structures of these support organizations, ultimately advancing their effectiveness in fostering entrepreneurial success.

This work contributes to the literature on entrepreneurial ecosystems, in particular on ESOs, by showing their distinct roles in nurturing learning across different stages of the entrepreneurial journey. In addition, it contributes to the literature on entrepreneurial education, by providing insights into the contextual dimensions of entrepreneurial education and training for (aspiring) entrepreneurs. It moves the focus outside the traditional classroom and beyond active learning approaches aimed at students and young peoples (Kirby, 2006).

The structure of our work is as follows. The first section outlines the research design used for the systematic literature review, along with a comprehensive overview of the studies included in the analysis. The second section presents the findings of the review, organized into three main thematic areas: the antecedents to entrepreneurship teaching and learning initiatives carried out by ESOs, the variety in the design of these initiatives, and their outcomes. The third section provides an in-depth discussion of two sets of considerations: first, we reflect on the identification of three thematic clusters in the reviewed literature; second, building on this synthesis and recognizing the differences between pre-incubators, incubators, and accelerators, we develop a taxonomy of educational ideotypes for ESOs. Finally, the fourth section presents the conclusions drawn from the study and suggests potential future research directions.

1.1 Research design

We develop a systematic literature review (Kraus et al., 2020) of entrepreneurial education and training in entrepreneurial support organizations. In line with methodological recommendations to ensure rigor and transparency in literature reviews, we followed four steps: sample generation, sample screening, coding, and analysis (Paul et al., 2021).

First, we generated our sample using the Web of Science (WoS) database, the most recognized database for its rigorous indexing of more than 20,000 high-quality journals and reliable citation tracking, which is essential for a comprehensive systematic literature review (Chapman & Ellinger, 2019). We conducted our search by querying three sets of keywords in the title, keywords, or abstract, resulting in a total of twelve queries: (i) keywords related to entrepreneurial support ("incubat*"; "accelerator*"), (ii) keywords related to entrepreneurship ("entrepr*"; "enterp*"); and (iii) keywords related to the field of education and training ("educat*"; "train*"; "learn*"). We limited our search to academic journal articles written in English. The twelve queries retrieved 448 records published between January 1993 and February 2024, when the review was conducted. After removing duplicates, the sample consisted of 444 records.

Second, to screen the articles, the first two authors reviewed the abstracts of the first 50 articles to delineate a common strategy for including or excluding the documents for further review. Therefore, the two authors individually coded the 50 articles for inclusion or exclusion, comparing their choices afterwards, which resulted in an inter-rater agreement of 84%. They discussed their criteria for coding and resolved disagreements to establish a common procedure for excluding articles that did not align with the study's purpose. These excluded cases regarded: (i) articles that did not specifically focus on entrepreneurial education and training in ESOs (e.g., Sternberg, 2012); (ii) articles focused on designing effective entre-

preneurial training (e.g., Mustar, 2009); (iii) studies on university or high school courses for students (e.g., Van Sebille, 2018); (iv) articles focused exclusively on the process of selection in business accelerators (e.g., Beyhan et al., 2024); (v) articles focused on social entrepreneurial training (e.g., Tam et al., 2021), social incubators (e.g., Bank et al., 2017) and sustainable entrepreneurship (e.g., Ahmed et al., 2022). Following these criteria, the first author then coded the remaining 337 abstracts extracted from the search, reducing the sample to 83 articles.

Third, we began the coding process for the 83 articles. Specifically, we conducted an in-depth reading of each article, developing a database that recorded the definitions of ESOs (distinguishing among pre-incubators, incubators, and accelerators), their aims, theories, methods, findings, and suggested avenues for further research. During this phase of in-depth reading, we decided to eliminate 19 articles because they fell outside the scope of the study, as they focused narrowly on mechanisms used by ESOs to attract talent for their tenants' companies (e.g., Cadorin et al., 2020) or on ESOs' and students' networks and their impact on entrepreneurial learning and venture performance (e.g., Sullivan et al., 2021).

After the first phase of coding, we prepared our analysis in two steps. First, we inductively categorized the documents in clusters based on similar topics. This process led to the identification of three categories of papers: (i) "Antecedents of entrepreneurial education and training in ESOs", which can be further distinguished at different levels of analysis: organizational and institutional; (ii) "Variety of entrepreneurial education and training designs in ESOs", focusing on important didactical elements that influence individual learning (see Fayolle, 2013), such as selection practices, temporal development, teaching and assessment methods; and (iii) "Outcomes of entrepreneurial education and training programs in ESOs", which represent outcomes at both the individual and organizational level of analysis. In the second step, we re-assessed each of these topic categories based on the different definitions of ESOs identified in the coding phase – namely, pre-incubators, incubators, and accelerators. The review process is summarized in Fig. 1.

1.2 Overview of the included studies

In this section, we provide a descriptive overview of the 64 papers included in our sample. The articles were published between 2011 and 2024, with a peak of scientific productivity in 2017 ($n=10$) and a steadily growing trend in time, indicating that the topic has gained increasing academic attention over the last decade (Fig. 2).

The literature is very fragmented, with the top 10 journals accounting for 28 out of the 64 articles (44%) (Table 1). The field of research is heterogeneous, encompassing management, entrepreneurship, economics, and educational research, among others.

As detailed in Table 2, less than 10% of the papers included in the sample (5 out of 64) are conceptual: two of these are literature reviews, and three are theoretical. Our work complements and differentiates from the two existing literature reviews by focusing explicitly on entrepreneurial education and training in ESOs, whereas the previous works analyze the historical evolution of services provided by ESOs (Jones et al., 2021) or discuss to role of technology business incubators in connecting education and training to regional development (Lamine et al., 2018).

Most of the articles included in our review are empirical (59 out of 64). Of these, 41% adopt a qualitative approach, predominantly using a single case study; 39% adopt a quanti-

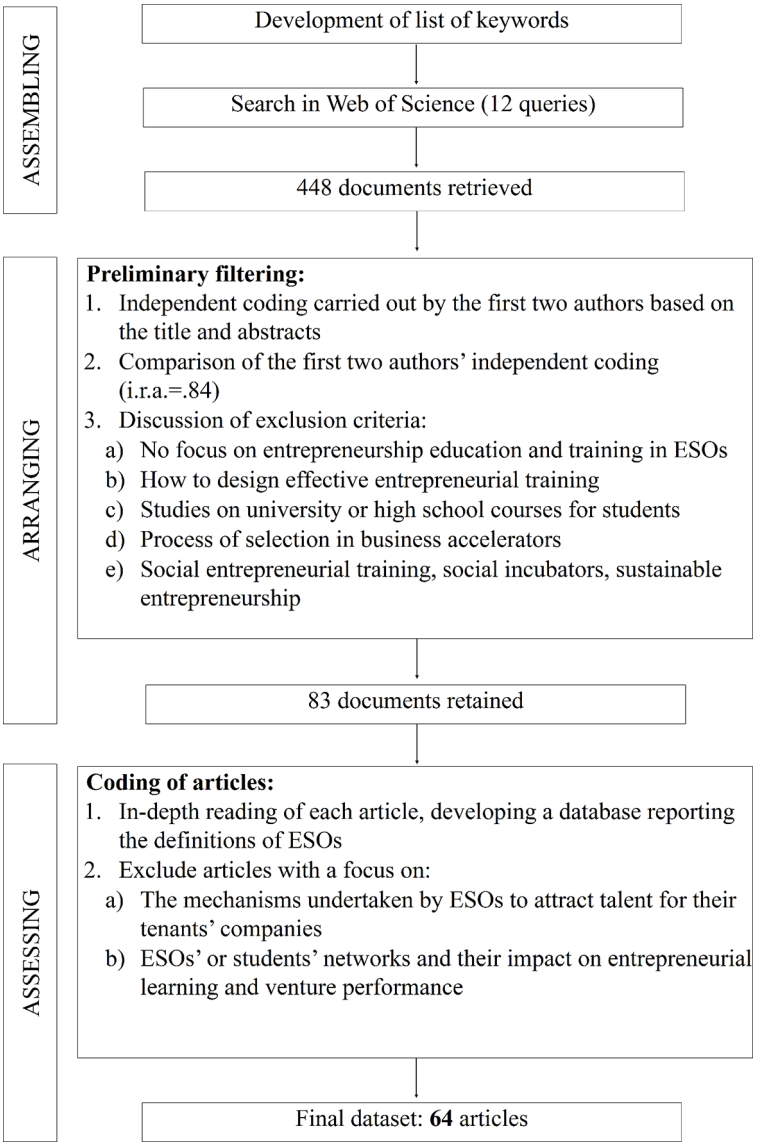

Fig. 1 Data collection process

tative approach, primarily using some form of regression; and 20% adopt a mixed-methods approach, offering an interesting triangulation of various data sources (interviews, surveys, archival data, and observation). Most of the reviewed empirical articles do not rely on a specific theory. Only 25 articles are clearly theory-based, with the majority rooted in cognitive literature, such as social cognitive theory (Bandura, 1999), the theory of planned behavior (Ajzen, 1991), or human capital theory (Becker, 1992).

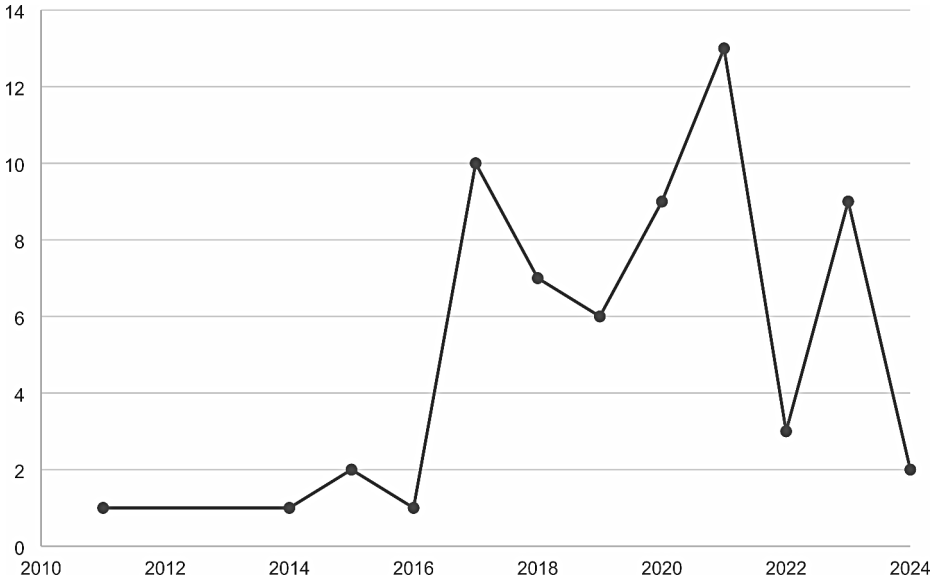

Fig. 2 Publication year of the articles included in the sample

Table 1 Top 10 journals in terms of the number of publications from the sample

Journals	Nº of Articles
The Journal of Technology Transfer	6
Industry and Higher Education	4
Education and Training	3
Organization Science	3
Regional Studies	2
Entrepreneurship Research Journal	2
Journal of Small Business and Enterprise Development	2
International Journal of Innovation and Technology Management	2
International Journal of Entrepreneurial Behavior & Research	2
Sustainability	2

1.3 Review findings

As outlined in the methodology section, we identified three themes that motivate and influence entrepreneurship teaching and learning within entrepreneurial support organizations, as well as their outcomes, as shown in the analytical model in Fig. 3.[1] We present our findings in the following sections.

[1] Due to space constraints and the need for brevity, we do not cite all 64 articles in our review. However, we provide an overview of the papers for each theme in Table A1 in the Appendix.

Table 2 Characteristics of sampled articles

Conceptual Articles ($N=5$)			
Theoretical	3 of 5 (60%)		
Review	2 of 5 (40%)		
Empirical Articles ($N=59$)		Data Source	Count (%)
Qualitative	24 of 59 (41%)	Primary	34 of 59 (58%)
Multiple Case Study	9 of 24 (38%)	Secondary	6 of 59 (10%)
Single case Study	12 of 24 (50%)	Both	19 of 59 (32%)
Ethnography	3 of 24 (12%)	Interview	33 of 59 (56%)
Quantitative	23 of 59 (39%)	Survey	24 of 59 (41%)
Regression	21 of 23 (91%)	Archival	15 of 59 (25%)
Other	2 of 23 (9%)	Observation	13 of 59 (22%)
Mixed Methods	12 of 59 (20%)	Database	2 of 59 (3%)

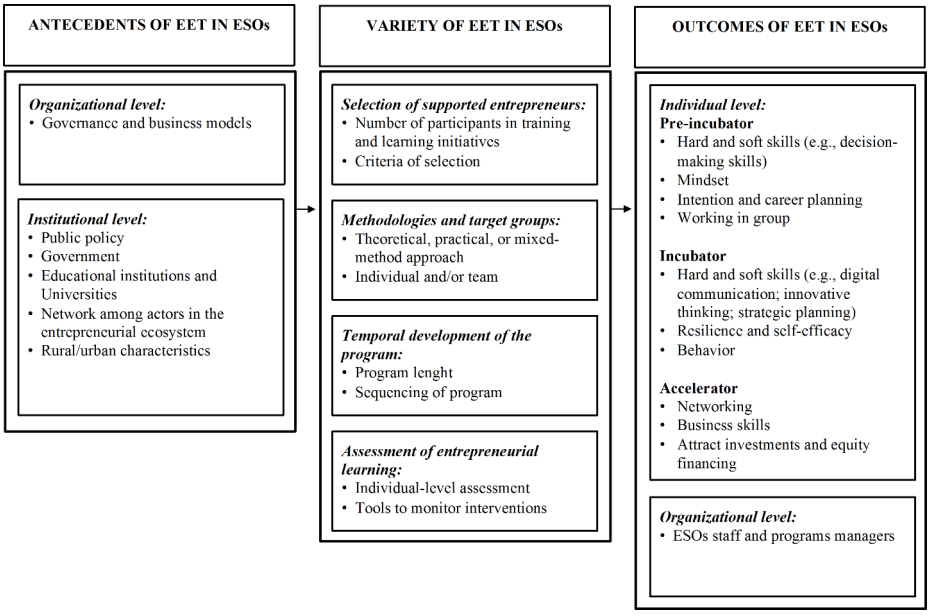

Fig. 3 Entrepreneurial education and training (EET) in ESOs: antecedents, variety, and outcomes

2 Antecedents of entrepreneurial education and training in ESOs

2.1 Organizational level

The articles grouped in this category suggest that entrepreneurial education and training activities by ESOs are influenced by the governance and business models of these organizations. An important example regards ESOs with public governance structures (such as those involving public universities or local government bodies), which are designed to promote local development by stimulating human capital development and new entrepreneurial initiatives (e.g., Secundo et al., 2020; Gupta & Etzkowitz, 2021). Education and training ini-

tiatives in these ESOs are often based on collaboration among various stakeholders, who share their complementary human resources, physical spaces, and networks (Cohen et al., 2019). The engagement of different actors in such collaborative efforts—such as managers of incumbent companies and (aspiring) entrepreneurs—is crucial for the exchange and enrichment of knowledge and experience in an interdisciplinary manner (Cohen et al., 2019). Additionally, the governance and business models of ESOs influence the methodological design chosen for entrepreneurial education and training programs (e.g., McGee et al., 2021). For example, in ESOs focused on developing entrepreneurial competencies in individuals (rather than fostering scalable startup creation), governance plays a significant role in shaping the design of education and training programs. In these programs, teachers and trainers are pivotal in providing customized learning experiences that help nascent entrepreneurs develop their "know-why" on the path to becoming entrepreneurs. These programs typically adopt an action-based approach, enabling participants to gain essential knowledge and insights about the actors and factors crucial to entrepreneurial success (Williams Middleton & Donnellon, 2014).

2.2 Institutional level

The institutional level plays a crucial role in the development of entrepreneurial ecosystems, where pre-incubation programs, incubators, and accelerators serve as bridges between entrepreneurship education, experiential knowledge, and regional development (Lamine et al., 2018). For instance, with the aim of increasing local employment through the creation of innovative startups (McKenzie, 2021), governments implement policies to promote the dissemination of entrepreneurial education and training programs offered by ESOs.

The papers examining the factors influencing the emergence of entrepreneurial education and training by ESOs often use the concept of the entrepreneurial ecosystem to analyze the actors—such as government or educational institutions—that are involved in the process (Cohen et al., 2019; Tripathi et al., 2019). Governments play a vital role in promoting value creation within local areas by leveraging on human capital to drive innovation, particularly in sectors with significant innovation needs (Piqué et al., 2020). As such, governments establish connections with key players in the entrepreneurial ecosystem, such as universities, to create ESOs that can disseminate entrepreneurial learning and promote human capital development (Fong, 2020; Jones et al., 2021). Empirical evidence from Breznitz and Zhang (2022) supports the collaborative efforts of governments and institutions in establishing pre-incubation programs, emphasizing the role of ecosystem networks in facilitating the generation of new, widespread knowledge. Indeed, ESOs serve as essential channels between entrepreneurship education, experiential knowledge, and regional development (Lamine et al., 2018).

When the goal of institutions is economic development, some studies highlight that entrepreneurial education and training should be particularly sustained in rural contexts, as it serves as a means of generating economic activity and is important for the development of these regions (Hagebakken et al., 2021). Another case is provided by Kapinga et al. (2018), who emphasize that in the context of a developing country, where participants enter with minimal knowledge of how to market their products and the financial tools required to start a business, entrepreneurial education should be adapted to meet the specific needs of the local population and participants.

2.3 Variety of entrepreneurial education and training designs in ESOs

The studies included in this category provide an overview of how different design elements influence the variety of training and education initiatives carried out by ESOs. We have identified four key issues in the available literature: (i) Selection of targeted entrepreneurs/participants; (ii) Education and training methodologies; (iii) Temporal development of the program; (iv) Assessment of entrepreneurial learning. We analyze each of these issues, paying particular attention to the nuances derived from the different ESOs definitions provided in the papers.

2.4 Selection of targeted participants

The literature on the selection of supported entrepreneurs examines both the number and type of participants who can benefit from training and learning initiatives, as well as the criteria to select participants. These two issues are often linked to the objectives and the temporal structure of the program.

Regarding the number and type of participants, while not all the reviewed papers provide specific details, it is common for ESOs to design education and training initiatives aimed at teams of participants. For example, the pre-incubation program described by Secundo et al. (2020) targets groups of about five people, with a maximum of fourteen groups per year. Similarly, the acceleration program outlined by Mansoori et al. (2019) admits up to 20 entrepreneurial teams per cohort, with each team consisting of at least two entrepreneurs.

With regard to the selection criteria, pre-incubation programs may adopt flexible approaches to participant selection (Secundo et al., 2020). In contrast, selection in incubators often follows a more fixed approach (Fong, 2020), such as formal admission interviews or motivational questionnaires to assess participant's level of commitment and understand their expectations from the program (Assenova, 2020). Finally, the selection process for accelerators can involve either a formal procedure (e.g., using deliberative scoring sheets) or an ad-hoc evaluation process (e.g., involving managing directors and external evaluators) (Cohen et al., 2019).

However, ESOs may fail to provide equitable access to entrepreneurial education and training opportunities for all individuals. For example, minorities facing structural discrimination and specific discrimination in business and entrepreneurship—such as women, people of color, and individuals with disabilities)—may encounter barriers that hinder their ability to access, participate in, and complete these programs (e.g., Kapinga et al., 2018).

2.5 Education and training methodologies

Several papers in our review provide insights into the methodologies employed across different entrepreneurial education and training programs offered by ESOs. We identified and categorized three primary methodological approaches used with participants: practical, theoretical, or mixed-method approaches. Additionally, depending on the target groups of the programs, the methods are either focused on individual or team-based training and learning (Fig. 4).

The papers analyzing training and education methodologies in pre-incubators provide evidence of practical, theoretical, and mixed-methods approaches. In pre-incubators, a prac-

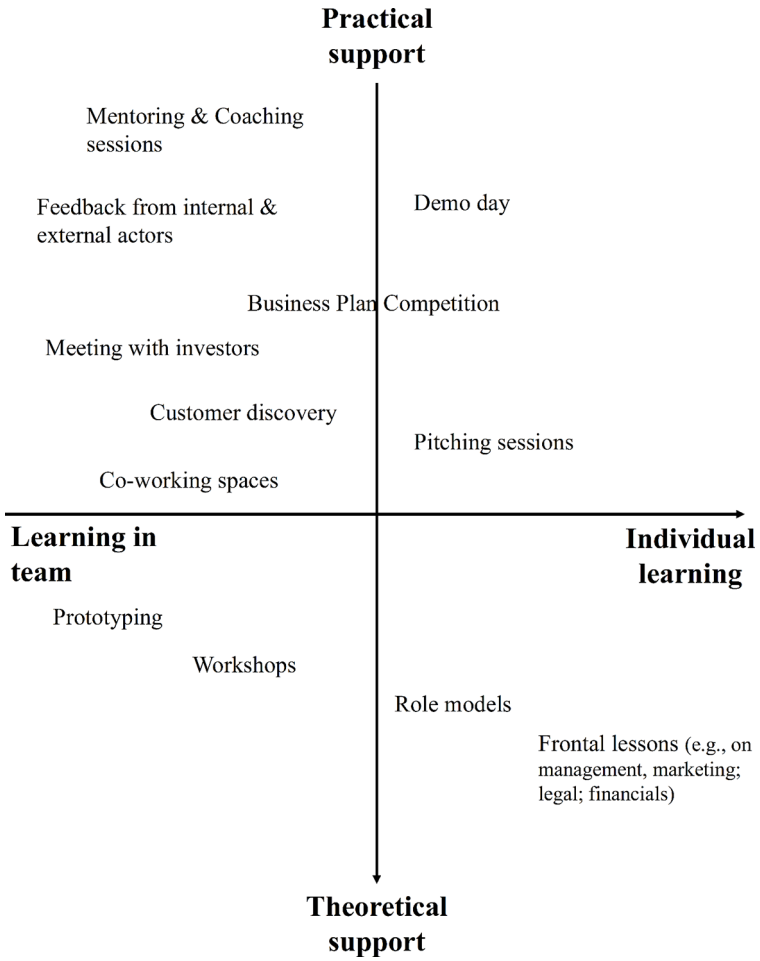

Fig. 4 Methodologies of entrepreneurial education and training (EET) in ESOs

tical approach is needed to help participants develop new entrepreneurial ideas. This often begins with creating a business plan to assess the feasibility of the project, test market demand, establish market credibility (Bezerra et al., 2017), and foster an entrepreneurial mindset among participants (Secundo et al., 2020). Practical learning environments, where individuals engage with their teams and peers, include co-working spaces (Jones et al., 2021), networking events (McGee et al., 2021), demo days (Haneberg & Aadland, 2020), as well as mentoring and coaching schemes (Wolf, 2017; van Stijn et al., 2018; Piqué et al., 2020). Additionally, banks, venture capitalists, and business angels collaborate in this process to assist aspiring entrepreneurs in evaluating the feasibility of the business ideas and developing their initial business plans, alongside research centers and university laboratories (Wolf, 2017). Through this learning-by-doing process, individuals and teams gain valuable insights and inspiration from the support they receive.

Pre-incubation programs often adopt a theory-based approach to help individuals develop their entrepreneurial ideas, in contrast to the more practical, learning-by-doing approach

typically found in other programs. This is evident in the case of student cohorts exposed to courses on venture creation and business performance (e.g., Zhao et al., 2022). Pre-incubation programs with a strong theoretical focus tend to divide the training period into multiple phases, often starting with a preparatory phase that can last anywhere from six months to a year (Williams Middleton & Donnellon, 2014). During this phase, aspiring entrepreneurs participate in workshops, conferences (including those abroad) (McGee et al., 2021), seminars with role models (Blank, 2021), and lectures on topics such as business opportunity recognition, marketing, fiscal management, and legal aspects (Boukamcha, 2015; Zheng et al., 2017).

While we distinguish between practical and theoretical approaches, several pre-incubation programs adopt a mixed approach (Kolade, 2018), combining theory with practice through seminars, case studies, project-based activities, mentoring, and consulting services (Secundo et al., 2020). For example, some programs are structured around a sequence of theoretical courses followed by a business plan competition, fostering strong interaction between entrepreneurial team members and stakeholders such as venture capitalists, business angels, and potential partners. In these programs, entrepreneurial teams are required to present their business plans and pitch them in front of mentors and external experts (Secundo et al., 2020), who provide advice and guidance. Additionally, teams may be matched with partner companies or entrepreneurs to develop career partnerships and expand their networks (McGee et al., 2021).

Taking into account the papers focusing on incubators, the review by Jones et al. (2021) provides an overview of how the concept of business incubator has evolved over the years. The first generation offered shared spaces, the second generation included business advice and networking, and the third generation introduced mentoring and coaching support. As a result, incubators increasingly provide environments rich in learning opportunities and support for fostering entrepreneurship, primarily through practical approaches. The reviewed literature suggests that learning takes place through collaborative industry projects (Fong, 2020), advanced mentoring strategies (e.g., Assenova, 2020), and practical assistance in areas such as developing profit plans, establishing fiscal management, and securing financing (Zheng et al., 2017). Important insights also emerge from the literature on the relational aspects developed between entrepreneurs and support staff, in particular mentors. Empirical evidence indicates that entrepreneurs paired with suitable mentors demonstrate more significant assimilation of new knowledge during the incubation period and, subsequently, substantial improvements in business performance post-incubation. Therefore, several studies emphasize the importance of the quality of the mentor assigned (Assenova, 2020) and the level of commitment and support provided by mentors to entrepreneurial teams (Nicholls-Nixon & Maxheimer, 2022). Additionally, incubators may adopt theoretical approaches, with training content typically covering areas such as identifying business opportunities, marketing strategies, and articulating a vision, all aimed at supporting customized business development and reflection for targeted entrepreneurs (Zheng et al., 2017).

In accelerators, practical, hands-on methodologies offer a wide range of opportunities for developing entrepreneurs and their businesses. In addition to meetings with investors (Cubukcu & Gulsecen, 2020) and demonstration days (Hagebakken et al., 2021), which provide a valuable platform for showcasing projects and attracting potential funders, other key elements contribute to the success of startups. Mentoring by industry experts offers valuable support, guiding entrepreneurs through the specific challenges of their field and

providing practical advice based on real-world experience (Cohen et al., 2019). A widely used methodology in this context is the lean startup approach, in which entrepreneurs learn through experimentation. This approach encourages entrepreneurs to formulate testable hypotheses about their business ideas, test them on the market with a Minimum Viable Product (MVP), and eventually revise their hypotheses based on the results (Mansoori et al., 2019). Miles et al. (2017) provide evidence that participation in an acceleration program leads to authentic learning (Herrington & Oliver, 2000), which includes specific elements such as realistic learning environment, tasks requiring the application of learned skills (e.g., pitching), role modeling, and authentic assessment conducted by coaches. Moreover, interviews with potential customers and face-to-face meetings with industry experts help entrepreneurs better understand market needs and adapt their solutions based on the feedback they receive (Cohen et al., 2019). Alongside these direct interactions, ad-hoc sessions with program directors and regular meetings with other businesses in the same cohort promote the exchange of knowledge and experience. These moments foster a collaborative environment in which entrepreneurs can share their challenges and find innovative solutions together. Additionally, events and workshops, as well as discussions with invited guests or speakers, further enrich entrepreneurs' knowledge base and provide valuable insights that can support their business growth (Hallen et al., 2020). Collectively, these activities not only contribute to the individual development of startups but also create networking and collaboration opportunities that can be critical to the long-term success of the businesses involved. Sharing resources, building relationships, and exchanging ideas in a supportive learning environment are key elements that characterize the accelerator experience and can significantly impact each participant's entrepreneurial journey.

2.6 Temporal development of the program

The duration of different entrepreneurial support programs varies and is often intricately linked to the startup life cycle (Fairlie et al., 2017). The reviewed evidence shows that, on average, pre-incubation and incubation periods for startups in the pre-venture and infancy stages last between one and five years; while acceleration periods for startups in the infancy and early growth stages typically last around three months (Cohen, 2013). However, the support period may vary from case to case, as programs may be designed to be either "concentrated" or "diluted" over time. For instance, the pre-incubation program "i-lab" described by Blank (2021) can be considered "concentrated", as it is launched every semester and lasts twelve weeks. Similarly, the German CEFE incubator program, described by Boukamcha (2015) as aimed at stimulating participants' entrepreneurial intentions in the short term (with a particular focus on desirability), lasted only 20 days (approximately three weeks). An example of a more "diluted" program, where participants are exposed to networking opportunities and practical development of their own business ideas, is the "Music Den" pre-incubation program, which lasts from four months to a maximum of one year (McGee et al., 2021). Another example is the "Contamination Lab" program described by Secundo et al. (2020), which is divided into two phases of three months each.

The duration of entrepreneurial support programs is an important factor influencing the outcomes of incubated startups and individuals (Fairlie et al., 2017). Longer exposure allows participants to maximize learning benefits, such as those gained through coaching

and vicarious learning, particularly within incubators (Ikebuaku & Dinbabo, 2018) and accelerators (Mansoori et al., 2019).

2.7 Assessment of entrepreneurial learning

Assessing participants in education and training initiatives carried out by ESOs is crucial, as it helps program organizers determine the desired outcomes and impacts. This assessment typically includes two main aspects: (i) participant-level assessment, which examines the alignment between goals, content, and learning outcomes for individual or groups; and (ii) program-level impact, which evaluates entrepreneurship and startup generation, as well as relationships with local and regional stakeholders (Hagebakken et al., 2021). The papers reviewed in this category focus exclusively on assessment in pre-incubation and acceleration programs, as none of the studies addressed the context of incubators.

Regarding participant-level assessment, especially with adult or young adult learners who respond well to active learning approaches, ESOs are encouraged to integrate both formative and reflective assessment methods. McGee et al. (2021) suggest that participants should engage in self-assessment exercises to evaluate their developmental potential, growth strategies, strengths and weaknesses, and problem-solving skills. Additionally, an emerging principle in individual-level assessment is authentic assessment. For example, in pre-incubation or accelerator programs, both informal and formal assessments of participants' learning are conducted throughout the program (e.g., periodic review panels, Patton & Marlow, 2011), or at the end, such as pitches or presentations at Demo Days aimed at attracting equity investments (Miles et al., 2017). Assessment can therefore involve a mixed approach, combining demonstrations of theoretical knowledge (e.g., written tests and oral examinations) with practical demonstrations of skills (Kolade, 2018).

Because many entrepreneurial education and training activities within ESOs involve collaboration with external partners such as mentors, coaches, experts, and consultants, evaluating their performance is critical to assessing the overall effectiveness of the program and to refine the program (Nicholls-Nixon & Maxheimer, 2022; Ting et al., 2017). Therefore, managers should implement indicators and tools to measure the impact of such relational supports on incubatees' achievements. For example, they could assess the effectiveness of mentors through periodic evaluations (Patton & Marlow, 2011; Nicholls-Nixon & Maxheimer, 2022).

Shifting the focus to program-level evaluation, ESOs develop tools to monitor the relevance of their programs. This includes assessing the alignment of programs with the priorities and policies of the target group, recipients, and donors. Additionally, effectiveness is evaluated based on the extent to which the intervention achieves its objectives. Impact evaluation measures the transformative effect of the intervention, while sustainability evaluation assesses the likelihood that the net benefits of the intervention will persist in the future (Hagebakken et al., 2021).

2.8 Outcomes of entrepreneurial education and training in ESOs

Our review testifies that existing research emphasizes the importance of the outcomes of entrepreneurial education and training in ESOs, both at the individual and an organizational level of analysis.

2.8.1 Individual level

Participation in entrepreneurial education and training within pre-incubation programs leads to various individual-level outcomes. Individuals gain technical skills relevant to their entrepreneurial ventures, while also improving soft skills, entrepreneurial awareness and mindset, and decision-making abilities (Kolade, 2018). For instance, Stephens et al. (2021), using the theory of socially situated cognition, suggest that entrepreneurial education and training in pre-incubation programs influence students' entrepreneurial frameworks, cognitive patterns, and academic perspectives, enriching them with increased knowledge and resources. Through networking opportunities, university affiliations, sponsorships, and professional services, these programs positively impact students' entrepreneurial decision-making (Stephens et al., 2021) and help cultivate an entrepreneurial mindset in recent graduates (Jones et al., 2021). Another key individual-level outcome, which is widely debated topic in the pre-incubation literature, is the impact of the training and education initiatives on the cognitive variables that drive entrepreneurial intentions (Bacq et al., 2017; Passaro et al., 2017; Guerrero et al., 2018). Drawing on cognitive theories like the Theory of Planned Behavior (Ajzen, 1991) and Social Cognitive Theory (Bandura, 1986), these studies show that participation in pre-incubation training courses increases participants' perceptions of entrepreneurship desirability and feasibility, ultimately enhancing their entrepreneurial intentions.

In the context of incubators, individual-level outcomes encompass a range of knowledge, attitudes, and competencies related to innovation and entrepreneurship. Incubators offer services that help participants develop essential business skills and gain access to market information, business networks, and technologies. These resources positively influence entrepreneurs' resilience and self-efficacy (Zheng et al., 2017), leading to improved business performance (Kapinga et al., 2018). Incubation programs also foster digital communication skills, social media expertise, industry engagement, research abilities, innovative thinking, and strategic planning. These capabilities drive innovation and encourage entrepreneurs to create new business plans and tackle specific challenges (Tang et al., 2023; Yasin & Majid Gilani, 2023). However, it is essential to acknowledge that, alongside these transformative outcomes, overconfidence can sometimes emerge, highlighting the complex relationship between incubation experiences and entrepreneurial development (Tang et al., 2023).

Participation in incubators and accelerators offers founders specific benefits that can lead to greater access to funding. Research on incubators shows that these programs help founders enhance their existing skills, resources, and networks, which in turn facilitates access to particular types of funding, such as venture capital for women and local government funding for immigrant founders (Clayton, 2024). In contrast, accelerator programs focus on improving the knowledge resources and organizational capabilities of founders, particularly by promoting the creation of new knowledge through the integration of different sources of information. This improvement in knowledge development positively affects the innovative performance of firms (Chowdhury & Audretsch, 2024). Notably, female entrepreneurial teams—whether all-female or led by female CEOs—experience greater increases in equity funding from acceleration programs compared to their male counterparts in mixed-gender teams or teams without female CEOs (Dams et al., 2022).

A few studies have provided evidence of the role of incubators in facilitating the acquisition of new knowledge for disadvantaged entrepreneurs, thereby serving as catalysts for their advancement in terms of employment and business outcomes (Assenova, 2020). For

example, mentoring within incubators is beneficial for entrepreneurs entering the program with limited prior knowledge and experience, helping to fill gaps in formal education and professional backgrounds (Ikebuaku & Dinbabo, 2018). These benefits are particularly salient for young entrepreneurs and ethnic minority entrepreneurs (Li et al., 2020; Antonovica et al., 2023).

In the context of acceleration programs, several studies have underscored the nuanced interaction between gender dynamics and the value of the training and learning activities, especially in light of broader support mechanisms within the entrepreneurial ecosystem. For example, Kwapisz (2022) reveals that women entrepreneurs in accelerators valued the benefits of knowledge transfer (such as business skills development) significantly higher than their male counterparts, but placed less value on networking in both formal and informal settings. This discrepancy may reflect gendered preferences or perceptions regarding the usefulness of networking activities in promoting entrepreneurial success. Existing studies suggest that entrepreneurial learning in acceleration programs positively impacts female founders' likelihood of obtaining equity financing (Clayton, 2024), sometimes even exceeding the outcomes observed among their male counterparts (Dams et al., 2022).

2.8.2 Organizational level

The studies in this cluster refer to the benefits of training and learning initiatives for ESOs themselves. In fact, by assessing the outcomes of individual/team learning and gathering feedback from participants, managers of pre-incubation programs and accelerators can engage in program redesign and growth (Mansoori et al., 2019; Secundo et al., 2020; Nicholls-Nixon & Maxheimer, 2022). For instance, an important set of program revisions involves the creation of tailored support activities (e.g., mentoring services) that address the unique needs of specific groups (Ting et al., 2017), particularly minorities (Nicholls-Nixon & Maxheimer, 2022). Other forms of program redesign include incorporating innovative and dynamic methodological approaches to foster experiential learning among participants (Mayorga, 2019) and implementing indicators and tools for the continuous evaluation of incubatee achievements (Patton & Marlow, 2011; Nicholls-Nixon & Maxheimer, 2022).

The development of training and learning initiatives places pressure on ESOs' management and staff to continuously improve. For example, staff members must consistently demonstrate skills and competencies that align with the specific needs of participants (Redondo & Camarero, 2017; Yusubova et al., 2019) and invest in customizing the resources offered to incubated startups by differentiating programs (Cubukcu & Gülseçen, 2020; Blank, 2021).

3 Discussion

We organize our discussion around two sets of considerations. First, we reflect on our identification of three thematic clusters in the reviewed literature: the antecedents to entrepreneurship learning and.

learning initiatives carried out by ESOs, the variety in the design of these initiatives, and their outcomes. Second, building on this synthesis and acknowledging the differences among pre-incubators, incubators, and accelerators, we develop a taxonomy of educational ideotypes for ESOs.

3.1 Antecedents, variety, and outcomes of entrepreneurship learning and training in ESOs

Organizational factors, such as ESOs' governance and business model, strongly influence the type of entrepreneurial education and training programs offered by ESOs. Different organizations with varying missions (not necessarily and explicitly focused on startup creation, such as municipalities, local governmental agencies, schools, etc.) play a supportive role in the ESOs context, as they contribute to the employability of students, citizens, or people in general, as well as to better territorial relational networks and opportunities. Additionally, institutional factors, such as networks among entrepreneurial ecosystem actors, local economic development, and rural/urban contextualization are key antecedents that determine the variety of entrepreneurial education and training programs. A general reflection on these antecedents is that institutional support and intervention emerge as key to bridging ESOs with other initiatives of entrepreneurship education, experiential knowledge, and regional development (see Cohen et al., 2019).

One consistent finding across several papers is that institutions should help ESOs develop tailored education and entrepreneurial support, taking into account the specificities of the local context (e.g., local development, industrial specificities, availability of rural areas, etc.). Importantly, such institutional effort appears to be transversally relevant for pre-incubation, incubation, and acceleration initiatives, with no major distinction between them. Institutional intervention can, therefore, contribute to making ESOs more effective in less developed contexts and rural areas, fostering networks among entrepreneurial ecosystem actors and promoting local economic development, thereby influencing the variety of entrepreneurial education and training programs.

The reviewed papers suggest that the variety of entrepreneurial education and training designs in ESOs is influenced by four key didactical factors: the selection of targeted entrepreneurs, the education and training methodologies, the temporal development of the programs, and the assessment methods. Some of these factors differ clearly across various types of ESOs, while others show less variation. For example, pre-incubation programs are characterized by greater flexibility and informality in the selection process. Regarding methodological approaches, pre-incubators tend to rely more on theoretical frameworks, accelerators emphasize hands-on learning and industry experience, while incubators adopt a mixed approach. In terms of temporal development, incubators and accelerators often use fixed or standard methods. As for assessment, there do not appear to be significant differences across ESOs, with methods typically including both evaluation of theoretical knowledge (e.g., written tests and oral exams) and practical demonstrations of skills.

However, the assessment of outcomes varies significantly across different types of ESOs. Pre-incubators focus on supporting the general improvement of soft skills, entrepreneurial awareness, mindset, and decision-making. Incubators, on the other hand, are centered on business-related learning (e.g., legal, marketing, business planning skills) through customized or mentorship programs. Accelerators primarily aim to achieve outcomes that help participants progress with startup growth, such as relational skills and networking.

Bringing together these insights and focusing on the differences among ESOs, we develop a taxonomy of educational ideotypes for ESOs. Such taxonomy, as indicated by the labels below, is based on different types of ESOs and their specific missions, emphasiz-

ing distinct learning approaches centered around knowing about, acting for, and navigating through entrepreneurship.

3.2 Educational ideotypes in ESOs

3.2.1 Knowing about entrepreneurship

This educational ideotype is more likely to be used by entities or organizations focused on raising awareness and building consensus around entrepreneurial opportunities, such as pre-incubators. In terms of antecedents, entrepreneurial competencies are viewed as transversal skills that should be fostered in a knowledge-based society (Bacigalupo et al., 2016; Luppi & Bolzani, 2019). ESOs that socialize entrepreneurship are often modelled around public or public-private arrangements (e.g., in terms of funding and corporate governance), with the goal of contributing to employment or employability. Regarding outcomes, such initiatives aim to establish a foundation in entrepreneurship by providing initial training in basic business concepts, soft skills, and networking. These initiatives socialize entrepreneurship, being designed for individuals who might not yet have an entrepreneurial idea but are interested in learning more about entrepreneurship or assessing the viability and market potential of their ideas when they arise. These initiatives are suitable for a wide range of individuals new to entrepreneurship, offering foundational knowledge on new venture creation, team building, and successfully starting a new business. They are likely to adopt a more theoretical approach, providing preparatory and transversal training sessions to educate people from diverse backgrounds with varying levels of expertise.

3.2.2 Acting for entrepreneurship

This educational ideotype is more likely to be used in entities or organizations, such as incubators, targeting individuals with entrepreneurial ideas, teams or founders of established startups. The entrepreneurial training and learning initiatives aimed at "planning" focus on the goal of "making things happen and being concrete," with the intention of ensuring that entrepreneurship is put into action. As such, the training combines both theoretical or practical aspects of starting and running a business, including industry and market analysis, business modelling, legal services, technical support, financial mentoring, and soft skills development. The targeted entrepreneurs or teams are those seeking comprehensive support to reinforce, validate, fine-tune, or test their entrepreneurial ideas, with a view to pursuing them in the medium to long term through a viable business plan, minimum viable product, or prototype. This educational ideotype requires organizational antecedents that ensure the sustainability of the programs, such as being run by private organizations selective of the best projects to guarantee a return (e.g., funding from incumbent corporates or public institutions based on branding and reputation, or activation of an owned investment fund). Often, this involves selecting "vertical" industry domains to deliver greater value through specialization.

3.2.3 Navigating through entrepreneurship

This educational ideotype is typically implemented by organizations of specialists and experts within specific vertical industry domains, targeting established startups and/or advanced entrepreneurial projects. These organizations offer opportunities to rapid scaling and international expansion. The educational approach is designed to expose the target to new opportunities and/or refine specific aspects of the business model. It focuses on intensive technical mentoring, coaching, and hands-on training, often with industry experts. This ideotype is suited for entrepreneurs with a strong bias for action and a pressing need to bring their product or service to market quickly. Learning primarily occurs through interactions with the external environment, relying on organizational and institutional antecedents that include ties with key actors in the entrepreneurial ecosystem. Open innovation strategies are taught and practiced, to attract the interest of potential investors and corporates. Entities in this category tend to have structured approaches, with fixed program length, rigid procedures, and tough selection criteria. The primary goal is to create the right networks to enhance the visibility of entrepreneurial ventures to external investors and potential stakeholders.

4 Conclusions and future research avenues

4.1 Contribution to the literature and practice

The provision of entrepreneurial education and training by ESOs is an emerging phenomenon that is gaining attention in the academic literature, as the antecedents and variety of such initiatives may determine their effectiveness in supporting nascent ventures (e.g., Rideout & Gray, 2013). Using a rigorous and replicable methodology (Kraus et al., 2020), this literature review aims to bring together the key elements that define the entrepreneurship teaching and learning context within ESOs and to explore how is entrepreneurship is taught in these organizations. With this work, we contribute to two streams of research.

First, we contribute to the literature on entrepreneurial ecosystems (Clark et al., 2020) shedding light on the distinct roles that ESOs can play in nurturing local connections in different stages of entrepreneurial journeys, starting with raising awareness and generating the right mindset to support scale-up and growth. Often, entrepreneurial ecosystems appear crowded with entities and organizations, which can create redundancy (Stam & van de Ven, 2021), raising questions about their role. In this paper, by specifically focusing on the domain of entrepreneurial training and learning, we demonstrate that there is potential for different actors, provided that their positioning is clear. Different actors can target distinct groups and create synergies from a value chain perspective. In this regard, we encourage studies that explore the relationship between ESOs' differentiation, their business models—particularly in terms of competencies and resources they possess and help generate—and their contribution to value creation within a coordinated ecosystem. We also encourage future studies to consider how the broader institutional environment, linked to factors like political stability and the accountability of political or executive leaders, shapes entrepreneurial decision-making, particularly by marginalized or underrepresented groups (e.g., Goel & Nelson, 2020).

Second, we contribute to the literature on entrepreneurial education, which has so far been addressed in the context of entrepreneurial universities (Gianiodis & Meek, 2020), academic entrepreneurship, and entrepreneurial ecosystems (Hayter et al., 2018). Over the last decade, entrepreneurial education and training have taken various forms, largely thanks to the growing number of public and private initiatives (Frenkel et al., 2008; Audretsch et al., 2020). Therefore, there is still a need to better understand the educational approaches, methods, and pedagogies that can be applied to entrepreneurship education across a wider variety of settings. For example, recent empirical evidence by Rechter and Avnimelech (2024) highlights mentorship's transformative role in accelerators, surpassing ad-hoc expert advice in areas like entrepreneurial human capital, network expansion, fundraising, legitimacy, psychological development, and operational progress. By proposing different educational ideotypes in ESOs, we shed light on the distinct learning and educational needs at various stages of the entrepreneurial process, as well as the corresponding didactical designs that should support them. Additionally, ESOs target a diverse range of applicants (young, mature, and adult individuals) with varying backgrounds and mindsets. Entrepreneurial education can address all of them through different programs based on a variety of pedagogical approaches. Previous literature has explored some potential differences in entrepreneurship training programs by conceptualizing them as *about* entrepreneurship, *for* entrepreneurship, and *through* entrepreneurship (Pittaway & Cope, 2007; Pittaway et al., 2009). Our ideotype taxonomy aligns with and extends this body of work by applying it beyond the typical formal education setting (e.g., university courses). In doing so, it highlights the distinctions among approaches, such as early-stage training in pre-incubators (which focuses on raising awareness and learning *about* entrepreneurship), more advanced incubation programs (which support the development of business plans and acting *for* entrepreneurship), and late-stage acceleration programs (which help entrepreneurs navigate *through* entrepreneurship).

Our study identifies the organizational and contextual factors that drive the emergence of training and education initiatives by ESOs, their pedagogical developments, and the potential outcomes in terms of socio-economic development and growth. These theoretical contributions provide a foundation for three sets of practical implications. The first set is for the managers of ESOs, helping them reflect on the factors that might (directly or indirectly) influence how they design effective entrepreneurial education practices for adult learners and the potential outcomes of these decisions. In this regard, we believe that our taxonomy of educational ideotypes can serve as a guide for ESOs managers to refine their positioning. Our advice to professionals and managers running ESOs is to identify their correct positioning and clearly communicate the competences and resources they can help generate. They should emphasize what differentiates them from others, how they create synergies, and at which stage of the entrepreneurial process or value chain they operate. This would help communicate the existence of a coordinated ecosystem working together to deliver value.

The second set of implications is for policymakers, as this work emphasizes the importance of understanding the variety of factors that influence the outcomes of entrepreneurial education and training interventions by ESOs. It also underscores the need for supporting the development of appropriate pedagogical approaches and competencies in the design, monitoring, and assessment of these initiatives. A final set of implications is for aspiring entrepreneurs. We suggest that they become more aware of the various factors that influence the design and the implementation of entrepreneurial education and training interventions

by ESOs. Our study can help provide an overview of these factors and guide individuals or teams in identifying the right entrepreneurial support programs for their needs.

4.2 Future research avenues

Our review of the antecedents to entrepreneurial education and training initiatives by ESOs reveals that the individual level has not yet been adequately addressed in research. Future studies could, for instance, analyze the role of aspiring entrepreneurs in becoming aware of available training and education programs at ESOs, and how they select these programs based on their goals and available resources (e.g., networks, information, time). Individual-level dynamics may influence the role of ESOs and contribute, through entrepreneurs' needs and expectations, to the evolution of educational ideotypes.

An important finding from this literature review is the heterogeneity of entrepreneurial education and training programs offered by ESOs. This finding is relevant for guiding future studies aimed at assessing and measuring the impact of ESOs on participants' competencies or business endeavors. The variety in selection processes, educational and training methodologies, target groups, temporal development, and assessment methods (e.g., Bergman & McMullen, 2022) suggests that many intervening variables may influence the outcomes and processes of these initiatives. Therefore, scholars should approach the evaluation of entrepreneurial support programs with care, avoiding simplified measures, such as simple dichotomous assessments of participation (e.g., Lukeš et al., 2019; Sansone et al., 2020), when determining the benefits for entrepreneurs and firms. Instead, they should adopt robust statistical techniques to explore causality and explanatory mechanisms, such as experiments (e.g., Camuffo et al., 2020; Assenova, 2020). Additionally, qualitative studies on how learning occurs during entrepreneurial education and training are a promising avenue (Mansoori et al., 2019). Patton and Marlow (2011) suggest critically analyzing whether the support measures provided to ensure learning are actually used by the founder and the entire entrepreneurial team. Future research should focus on a longitudinal, process-oriented approach (Wright et al., 2017) to track individuals throughout their entrepreneurial journey. For instance, if a training program is designed to lead to the creation of new companies, researchers should follow entrepreneurial team members from the moment they apply for the program, through their exposure to the training, and track their transition from having entrepreneurial intention to actual business behaviors. By obtaining a comprehensive overview of the entire process and the mechanisms behind different paths to business creation, we can better understand the learning outcomes achieved in relation to the teaching activities and identify what constitutes successful training. If the program's objective is to develop entrepreneurial competencies, individuals should be tracked over time to understand when and how the knowledge and practical insights gained during the training programs are applied in their professional or personal lives.

Finally, this work provides insights suggesting that ESOs should dedicate time to reflect on the design of their entrepreneurial education and training initiatives and, where necessary, revise them. A few studies have begun to explore how entrepreneurial education and training by ESOs should be more context-sensitive, such as by addressing the needs of participants in rural areas (e.g., Hagebakken et al., 2021) or in developing countries (Kapinga et al., 2018). Additionally, a limited number of studies have addressed issues related to equitable access to entrepreneurship training and education by ESOs, as well as inclu-

sive participation in the design and delivery of these programs (e.g., Kapinga et al., 2018). Therefore, we strongly encourage future research to further explore diversity, equity, and inclusion in such programs, examining both participants and ESOs' practices and structures across different countries and historical periods.

Appendix

Table A1 Papers included in the review and their classification across themes

Author	Year	Title	Journal	Classification	Typology
Al-edenat, M; Al Hawamdeh, N	2021	Revisiting the entrepreneurial ventures through the adoption of business incubators by higher education institutions	The International Journal of Management Education	Variety	Acting for entrepreneurship
Antonovica, A; Curiel, JD; Herráez, BR	2023	Factors that determine the degree of fulfilment of expectations for entrepreneurs from the business incubator programmes	International Entrepreneurship and Management Journal	Outcomes	Acting for entrepreneurship
Assenova, VA	2020	Early-Stage Venture Incubation and Mentoring Promote Learning, Scaling, and Profitability Among Disadvantaged Entrepreneurs	Organization Science	Variety, Outcomes	Acting for entrepreneurship
Bacq, S; Ofstein, LF; Kickul, JR; Gundry, LK	2017	Perceived entrepreneurial munificence and entrepreneurial intentions: A social cognitive perspective	International Small Business Journal	Variety, Outcomes	Knowing about entrepreneurship
Bezerra, ED; Borges, C; Andreassi, T	2017	Universities, local partnerships and the promotion of youth entrepreneurship	International Review of Education	Variety, Outcomes	Knowing about entrepreneurship
Blank, TH	2021	When incubator resources are crucial: survival chances of student startups operating in an academic incubator	The Journal of Technology Transfer	Antecedents, Variety, Outcomes	Knowing about entrepreneurship
Boukamcha, F	2015	Impact of training on entrepreneurial intention: an interactive cognitive perspective	European Business Review	Variety, Outcomes	Acting for entrepreneurship
Breznitz, SM; Zhang, QT	2022	Entrepreneurship education and firm creation	Regional Studies	Antecedents	Knowing about entrepreneurship
Breznitz, SM; Zhang, QT	2022	Entrepreneurship education and firm creation	Regional Studies	Outcomes	Knowing about entrepreneurship

Table A1 Papers included in the review and their classification across themes

Author	Year	Title	Journal	Classification	Typology
Castro, CC; Antunes, LGR; Freire, CD	2021	Critical Factors in the Formation and Development of Technology-Based Firm Networks in Incubation Environments in Brazil	International Journal of Innovation and Technology Management	Variety	Acting for entrepreneurship
Chowdhury, F; Audretsch, DB	2024	Paradoxes of accelerator programs and new venture performance: Do varieties of experiences make a difference?	Small Business Economics	Variety, Outcomes	Navigating through entrepreneurship
Clayton, P	2023	Different outcomes for different founders? Local organizational sponsorship and entrepreneurial finance	Small Business Economics	Outcomes	Acting for entrepreneurship
Clingingsmith, D; Drover, W; Shane, S	2023	Examining the outcomes of entrepreneur pitch training: an exploratory field study	Small Business Economics	Outcomes	Knowing about entrepreneurship
Cohen, S; Fehder, DC; Hochberg, YV; Murray, F	2019	The design of startup accelerators	Research Policy	Variety	Navigating through entrepreneurship
Cohen, SL; Bingham, CB; Hallen, BL	2019	The Role of Accelerator Designs in Mitigating Bounded Rationality in New Ventures	Administrative Science Quarterly	Antecedents, Variety	Navigating through entrepreneurship
Cubukcu, C; Gulsecen, S	2020	How Entrepreneurs Utilize Accelerators: A Demographic Factor Analysis in Turkey using Regression	International Journal of Advanced Computer Science and Applications	Variety, Outcomes	Navigating through entrepreneurship
Dams, C; Allende, VS; Cornejo, M; Pasquini, RA; Robiolo, G	2021	Impact of Accelerators, as Education & Training Programs, on Female Entrepreneurs	Impact of Accelerators, as Education & Training Programs, on Female Entrepreneurs	Outcomes	Navigating through entrepreneurship
de Klerk, S; Miles, MP; Bliemel, M	2023	A life cycle perspective of startup accelerators	International Entrepreneurship and Management Journal	Antecedents	Navigating through entrepreneurship
Del Sarto, N; Ferrigno, G; Parida, V; Di Minin, A	2023	Do start-ups benefit from coworking spaces? An empirical analysis of accelerators' programs	Review of Managerial Science	Variety, Outcomes	Navigating through entrepreneurship
Fong, TWM	2020	Design incubatees' perspectives and experiences in Hong Kong	Higher Education, Skills and Work-based Learning	Antecedents, Variety, Outcomes	Acting for entrepreneurship

Table A1 Papers included in the review and their classification across themes

Author	Year	Title	Journal	Classification	Typology
Guerrero, M; Urbano, D; Cunningham, JA; Gajon, E	2018	Determinants of Graduates' Start-Ups Creation across a Multi-Campus Entrepreneurial University: The Case of Monterrey Institute of Technology and Higher Education	Journal of Small Business Management	Outcomes	Knowing about entrepreneurship
Guerrero, M; Urbano, D; Gajon, E	2020	Entrepreneurial university ecosystems and graduates' career patterns: do entrepreneurship education programmes and university business incubators matter?	Journal of Management Development	Outcomes	Knowing about entrepreneurship
Gupta, N; Etzkowitz, H	2021	Women founders in a high-tech incubator: negotiating entrepreneurial identity in the Indian socio-cultural context	International Journal of Gender and Entrepreneurship.	Antecedents	Knowing about entrepreneurship
Hagebakken, G; Reimers, C; Solstad, E	2021	Entrepreneurship Education as a Strategy to Build Regional Sustainability	Sustainability	Antecedents, Variety, Outcomes	Navigating through entrepreneurship
Hallen, BL; Cohen, SL; Bingham, CB	2020	Do Accelerators Work? If So, How?	Organization Science	Variety, Outcomes	Navigating through entrepreneurship
Haneberg, DH; Aaboen, L	2020	Incubation of technology-based student ventures: The importance of networking and team recruitment	Technology in Society	Variety	Knowing about entrepreneurship
Ikebuaku, K; Dinbabo, M	2018	Beyond entrepreneurship education: business incubation and entrepreneurial capabilities	Journal of Entrepreneurship in Emerging Economies	Outcomes	Acting for entrepreneurship
Jones, O; Meckel, P; Taylor, D	2021	Situated learning in a business incubator: Encouraging students to become real entrepreneurs	Industry and Higher Education	Antecedents, Variety, Outcomes	Knowing about entrepreneurship
Kabore, FP	2021	Entrepreneurial hysteresis and persistence in higher education a quasi-experiment on academic innovation	African Journal of Science, Technology, Innovation and Development	Variety, Outcomes	Knowing about entrepreneurship
Kapinga, AF; Montero, CS; Mwandosya, GI; Mbise, ER	2018	Exploring the contribution of business and technology incubators to women entrepreneurs' business development in Dar es Salaam, Tanzania	Journal of Global Entrepreneurship Research	Antecedents, Variety, Outcomes	Acting for entrepreneurship

Table A1 Papers included in the review and their classification across themes

Author	Year	Title	Journal	Classification	Typology
Kolade, O	2018	Venturing under fire: Entrepreneurship education, venture creation, and poverty reduction in conflict-ridden Maiduguri, Nigeria	Education + Training	Variety, Outcomes	Knowing about entrepreneurship
Kwapisz, A	2021	What do female and male entrepreneurs value in business accelerators?	Journal of Business & Industrial Marketing	Variety, Outcomes	Navigating through entrepreneurship
Lamine, W; Mian, S; Fayolle, A; Wright, M; Klofsten, M; Etzkowitz, H	2018	Technology business incubation mechanisms and sustainable regional development	The Journal of Technology Transfer	Antecedents	Acting for entrepreneurship
Li, C; Ahmed, N; Qalati, SA; Khan, A; Naz, S	2020	Role of Business Incubators as a Tool for Entrepreneurship Development: The Mediating and Moderating Role of Business Start-Up and Government Regulations	Sustainability	Antecedents, Outcomes	Acting for entrepreneurship
Mansoori, Y; Karlsson, T; Lundqvist, M	2019	The influence of the lean startup methodology on entrepreneur-coach relationships in the context of a startup accelerator	Technovation	Variety, Outcomes	Navigating through entrepreneurship
Mayorga, LK	2019	HEIs and workforce development: Helping undergraduates acquire career-readiness attributes	Industry and Higher Education	Outcomes	Knowing about entrepreneurship
McGee, C; Schwartz, N; Ehrlick, S	2021	The Music Den: A framework for entrepreneurship education in a university start-up incubator	Industry and Higher Education	Antecedents, Variety, Outcomes	Knowing about entrepreneurship
Miles, MP; de Vries, H; Harrison, G; Bliemel, M; de Klerk, S; Kasouf, CJ	2017	Accelerators as authentic training experiences for nascent entrepreneurs	Education + Training	Variety, Outcomes	Navigating through entrepreneurship
Miller, A; O'Mahony, S; Cohen, SL	2024	Opening the Aperture: Explaining the Complementary Roles of Advice and Testing When Forming Entrepreneurial Strategy	Organization Science	Variety, Outcomes	Navigating through entrepreneurship
Monsson, CK; Jorgensen, SB	2016	How do entrepreneurs' characteristics influence the benefits from the various elements of a business incubator?	Journal of small business and enterprise development	Outcomes	Acting for entrepreneurship

Table A1 Papers included in the review and their classification across themes

Author	Year	Title	Journal	Classification	Typology
Nicholls-Nixon, CL; Maxheimer, MM	2022	How coaching services help early stage entrepreneurs: an exploration of gender differences	Journal of Small Business and Enterprise Development	Variety, Outcomes	Knowing about entrepreneurship
Passaro, R; Quinto, I; Thomas, A	2017	Start-up competitions as learning environment to foster the entrepreneurial process	International Journal of Entrepreneurial Behavior & Research	Variety, Outcomes	Knowing about entrepreneurship
Passaro, R; Scandurra, G; Thomas, A	2017	The Emergence of Innovative Entrepreneurship: Beyond the Intention - Investigating the Participants in an Academic SUC	International Journal of Innovation and Technology Management	Outcomes	Knowing about entrepreneurship
Patton, D; Marlow, S	2011	University technology business incubators: helping new entrepreneurial firms to learn to grow	Environment and Planning C: Government and Policy	Variety, Outcomes	Knowing about entrepreneurship
Pique, JM; Berbegal-Mirabent, J; Etzkowitz, H	2020	The Role of Universities in Shaping the Evolution of Silicon Valley's Ecosystem of Innovation	Triple Helix	Antecedents, Variety	Knowing about entrepreneurship
Preedy, S; Jones, P	2015	An investigation into university extra-curricular enterprise support provision	Education + Training	Variety	Knowing about entrepreneurship
Redondo, M; Camarero, C	2017	Dominant logics and the manager's role in university business incubators	Journal of Business & Industrial Marketing	Outcomes	Knowing about entrepreneurship
Santamaria, S; Abolfathi, N; Mahmood, IP	2023	Demand pull versus resource push training approaches to entrepreneurship: A field experiment	Strategic Management Journal	Variety	Knowing about entrepreneurship
Secundo, G; Mele, G; Passiante, G; Albergo, F	2023	University business idea incubation and stakeholders' engagement: closing the gap between theory and practice	European Journal of Innovation Management	Antecedents, Variety, Outcomes	Knowing about entrepreneurship
Secundo, G; Mele, G; Sansone, G; Paolucci, E	2021	Entrepreneurship Education Centres in universities: evidence and insights from Italian Contamination Lab cases	International Journal of Entrepreneurial Behavior & Research	Variety, Outcomes	Knowing about entrepreneurship
Seet, PS; Jones, J; Oppelaar, L; de Zubielqui, GC	2018	Beyond know-what' and know-how' to know-who': enhancing human capital with social capital in an Australian start-up accelerator	Asia Pacific Business Review	Variety	Navigating through entrepreneurship

Table A1 Papers included in the review and their classification across themes

Author	Year	Title	Journal	Classification	Typology
Shekhar, H; Satyanarayana, K; Chandrashekar, D	2023	Role and contributions of an incubator in academic intrapreneurship-An examination	Technovation	Outcomes	Knowing about entrepreneurship
Stephens, S; Lyons, R; Cunningham, I	2021	The Decision-Making Environment for the Entrepreneurial Student	Journal of Enterprising Culture	Variety, Outcomes	Knowing about entrepreneurship
Tang, MF; Huang, H; Walsh, G; Guerrero, M	2023	The impact of entrepreneurial overconfidence on incubator effectiveness	Journal of Technology Transfer	Outcomes	Acting for entrepreneurship
Ting, SX; Feng, L; Qin, W	2017	The effect of entrepreneur mentoring and its determinants in the Chinese context	Management Decision	Antecedents, Variety, Outcomes	Knowing about entrepreneurship
Tripathi, N; Oivo, M; Liukkunen, K; Markkula, J	2019	Startup ecosystem effect on minimum viable product development in software startups	Information and Software Technology	Antecedents, Variety, Outcomes	Acting for entrepreneurship
van Stijn, N; van Rijnsoever, FJ; van Veelen, M	2018	Exploring the motives and practices of university-start-up interaction: evidence from Route 128	The Journal of Technology Transfer	Variety	Knowing about entrepreneurship
Williams Middleton, K; Donnellon, A	2014	Personalizing Entrepreneurial Learning: A Pedagogy for Facilitating the Know Why	Entrepreneurship Research Journal	Antecedents, Variety	Knowing about entrepreneurship
Wolf, G	2017	Entrepreneurial university: a case study at Stony Brook University	Journal of Management Development	Antecedents, Variety, Outcomes	Knowing about entrepreneurship
Wright, M; Siegel, DS; Mustar, P	2017	An emerging ecosystem for student start-ups	The Journal of Technology Transfer	Variety	Knowing about entrepreneurship
Yasin, N; Gilani, SAM	2023	Assessing the current state of university-based business incubators in Canada	Industry and Higher Education	Variety, Outcomes	Acting for entrepreneurship
Yusubova, A; Andries, P; Clarysse, B	2019	The role of incubators in overcoming technology ventures' resource gaps at different development stages	R&D Management	Outcomes	Acting for entrepreneurship
Zhao, YB; Zhao, XZ; Shi, JY; Du, HP; Marjerison, RK; Peng, CY	2022	Impact of entrepreneurship education in colleges and universities on entrepreneurial entry and performance	Economic Research-Ekonomska Istraživanja	Variety	Knowing about entrepreneurship

Table A1 Papers included in the review and their classification across themes

Author	Year	Title	Journal	Classification	Typology
Zheng, WZ; Xu, MM; Chen, XC; Dong, Y	2017	Who is shaping entrepreneurial experience? A multiple case study of Chinese entrepreneurial learning	Management Decision	Variety, Outcomes	Acting for entrepreneurship

Author contributions G.S. and D.B. proceeded to the planning stage. G.S. wrote the main text of the manuscript and prepared all figures. D.B. and R.G. revised the manuscript and contributed to discussion and conclusions. All authors reviewed the manuscript.

Data availability No datasets were generated or analysed during the current study.

Declarations

Competing interests The authors declare no competing interests.

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