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Italian incubated startups and CDP accelerators:
an exploratory analysis of the current scenario

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Introduction

Entrepreneurship is a global phenomenon that has significant economic and social impact. It creates job opportunities, promotes innovation, and drives economic and social development, as pointed out by Sansone et al. (2020). Policymakers and business leaders have increasingly recognized the potential of entrepreneurship to create sustainable and inclusive economic growth. In Italy, the public sector played a crucial role in developing incubators, particularly in their early stages, creating an environment conducive to the growth of innovative startups and establishing a tradition of entrepreneurship support and business incubation (Auricchio et al., 2014).

Entrepreneurship is vital today because it provides individuals with a way to pursue their passions and dreams while contributing to the development of their communities and societies. Incubators and accelerators are mechanisms that have been developed over time to encourage latent entrepreneurial activity at many levels. They can decrease the failure rate of startups, stimulate innovation, entrepreneurship, and regional development, and transform local economies through the establishment of startup technology clusters and the creation of an entrepreneurial ecosystem (Hochberg and Fehder, 2015; Sansone et al., 2020).

According to Pauwels et al. (2016), over the past decades, a wide variety of incubation mechanisms have been introduced into society by different actors aiming at supporting and accelerating the creation of successful entrepreneurial companies. Bruneel et al. (2012) highlight the constant evolution and development of new models of incubation mechanisms. Despite the recurrent insertion of these mechanisms into society, only some research has paid close attention to the results provided by them. In the context of Italy, the Social Innovation Monitor (SIM) was established to understand and support the development of innovative solutions to social and environmental challenges. SIM conducts research, provides training and support to entrepreneurs and innovators, and works to create a supportive ecosystem for social innovation.

This present thesis carries out the stratification of activities in the entrepreneurial sector, based on the research conducted by SIM in 2022 (base year 2021), as part of the yearly analysis developed by SIM since 2017 of entrepreneurial organizations. Besides looking

at the characteristics of the incubated startups by Italian incubators, it also considers the 16 established accelerators by the CDP (*Cassa Depositi e Prestiti*), the Italian National Promotional Institution.

This work is divided into four sections. The first section discusses the state of the art of the entrepreneurial sector with a focus on its organizations such as incubators and accelerators. It begins by presenting recent ideas about incubators, which contribute to understanding the historical context, the main definitions, and the diffusion of incubators in the USA and Europe. It also describes the development of the concept over time, the services provided, their costs and revenues, and their categorization. The categorization mainly focuses on three types of incubators: corporate, university, and social incubators. The literature review also discusses some related topics, such as technology incubators, academic entrepreneurship and spin-offs, corporate social responsibility, and open innovation. Finally, the benefits of incubation activities are presented.

The section then moves on to discuss another type of entrepreneurial organization: accelerators. It describes the definitions and historical context of accelerators, the services offered, the resources provided, the development of the concept, the business model, the value proposition, and the benefits. The most common form of accelerator, the corporate accelerator, is also discussed. The section concludes by comparing incubators and accelerators, drawing on the main ideas provided by experts in the field.

To provide context for the analysis, the section ends by presenting the history of entrepreneurship activities in Italy, the characterization of the Social Innovation Monitor (SIM), the CDP (*Cassa Depositi e Prestiti*), and its subsidiary *CDP Venture Capital SGR*.

The second section discusses the methodology used to develop the research. It highlights some characteristics of the external database (AIDA), the survey submitted to the incubators, the preparation of the data to obtain the startup list, the population of accelerators, and the characteristics of the data analysis.

The third section elaborates on the analysis of the incubated startups and the CDP accelerators. Regarding the incubated startups, the results of the geographical distribution, legal form, foundation year, ATECO sectors, employees working in these startups, and some financial metrics are presented. For the accelerators, the focus is on the distribution of total funding per sector, the social impact, their geographical

distribution in Italian territory, as well as their establishment year, program duration, and the startups accelerated in these programs.

Finally, the fourth section reports the conclusions drawn from the analysis, the limitations of this research, and opportunities for further research in the same field.

1. Literature Review

1.1. Incubators and accelerators

1.1.1. Incubators

According to Ayatse et al. (2017), the objective of business incubation is achieved through business incubators, which provide affordable office space, offering targeted support services with the sole purpose of nurturing small fledgling firms into healthy businesses. The general idea of what research scholars see as business incubators is that they create an environment that helps startups deal with the challenges of entrepreneurial pursuit, with a strong emphasis on knowledge agglomeration, resource sharing, innovativeness, and competitiveness. Bringing a network dimension to the concept, some scholars view incubators as inter-organizational or social partnership organizations that are concerned with addressing "socially-relevant" purposes by harnessing the strength of diverse organizations. Still, according to the authors, other scholars promote the concept of a network incubator "based on territorial synergy, physical proximity, relational symbiosis, and economies of scale" with the overall aim of leveraging entrepreneurial initiative and know-how in creating and operating successful companies.

1.1.1.1. Historical context

Aernoudt (2004) brings historical context to the incubator concept and its development over time. At first, the author argues that it has roots in ancient Roman and Greek practices where people would go to a temple to have visionary dreams. Later, the concept was applied to the medical field, where incubators were used to care for prematurely born infants in controlled conditions.

Linking the application of the concept in the business world: the incubator nurtures young firms, helping them to survive and prosper during the startup period when they are most vulnerable (Aernoudt, 2004). Still, nowadays the concept of incubation is being used to encourage entrepreneurship and support startups.

Throughout time, different authors brought different definitions to business incubators and their main activities.

1.1.1.2. Definitions

The literature on incubation focuses on the different types of incubators and their effects on the environment. There are different classifications of incubators depending on the author's perspective, with examples such as business, university, technology, network, and virtual incubators. Different authors provide varying classifications of incubators, and even studies of incubators in the same country reflect differing connotations and perspectives (Becker and Gassmann, 2006).

Still, Bruneel et al. (2012) come to the same argument provided by VonZedwitz and Grimaldi (2006): despite the relative maturity of business incubations at a practice and research field level, a consensual definition of them is yet to be found.

Summing up the definitions provided by different authors, a common point between all of the incubation activities approaches was reached: the sustainment of early-stage firms in their scaling up (Mian et al., 2016). However, some other definitions can be taken into consideration.

A variety of authors bring different approaches ranging from a focus on shared office space facilities to an emphasis on the role of incubators as a popular tool aiming at accelerating the successful development of entrepreneurial companies (Bruneel et al., 2012).

According to Ayatse et al. (2017), business incubation is a process that aims to increase the survival and growth of firms by developing mechanisms that will ensure the early identification of those firms that have great potential for success but are constrained by resources. The concept of business incubation is founded on the premise of creating innovative firms that are competitive, profitable, and sustainable. The incubation

phenomenon is, therefore, considered an enabling technology that capacitates the functionality of critical and possibly strategic technologies.

Analyzing the dynamicity of the incubation process and alleging how a good incubator should offer services beyond just office space, Aernoudt (2004) is one of the main authors that discuss its concept and how it has become more polysemic as different approaches are associated with the business activities.

Along with the different approaches, Aernoudt (2004) warns about non-accurate evaluations of the impact of incubators if different types of incubators are not considered. The idea of incubation categories will be discussed later in his respective topic.

Still, bringing the concept itself, Aernoudt (2004) defines business incubators as a tool designed to nurture young firms and support them during the startup period when they are most vulnerable. For him, a true incubator is not just an office space, but rather a dynamic process of business enterprise development that involves hands-on management, access to finance, legal advice, operational know-how, and access to new markets, which works as a tool for bridging the entrepreneurial gap and can contribute to the development of a virtuous circle for the (regional) economy in which they are embedded.

Similar to Aenoudt's definition, Hackett and Dilts (2004) allege that a business incubator is a shared office space facility that provides incubatees with a strategic, value-adding intervention system of monitoring and business assistance.

It is also possible to mention other main definitions from different authors that have been widely referred to in the incubation literature.

From an organization perspective, the National Business Incubation Association (NBIA, 2007) says that business incubators are entities that accelerate the successful development of entrepreneurial companies through a range of business support resources and services. Accordingly, looking at the organizational level, the United Kingdom Business Incubation (UKBI, 2007) alleges that business incubation is a unique and highly flexible combination of business development processes, infrastructure, and people, designed to nurture and grow new and small businesses by supporting them through the early stages of development and change.

Additionally, the European Commission (EC, 2002) defines a business incubator as an

organization that helps new businesses succeed by providing them with a comprehensive range of support, including incubator space, business support services, and networking opportunities. By offering these services in one place and allowing businesses to share costs, incubators can significantly improve the survival and growth prospects of new startups. A successful incubator should generate a steady flow of new businesses with a high potential for job and wealth creation. Differences in stakeholder objectives, admission, and exit criteria, knowledge intensity of projects, and the specific facilities and services offered can distinguish one type of business incubator from another.

According to the Organisation for Economic Co-operation and Development (OECD, 1997), technology incubators are a specific type of business incubator that provides property-based services to entrepreneurs and startups. These services may include physical infrastructure such as office space and laboratories, management support for business planning, training, and marketing, technical support such as access to researchers and databases, access to financing through venture capital funds and business angel networks, legal assistance for licensing and intellectual property, and networking opportunities with other incubators and government services.

Still, Sherman and Chappell (1998) affirm that business incubators are economic development tools designed to help create new businesses in a community. They provide support services, flexible space, shared equipment, and administrative services. Hausberg and Korreck (2020) build on this approach, alleging that business incubating-organizations (in a broader sense) support the foundation and/or growth of new businesses. Business incubators (in a narrower sense) are business-incubating organizations that support the establishment and growth of new businesses with tangible and intangible resources during a flexible period.

Lastly, López-Claros et al. (2010), focusing on the processual side, affirm that business incubation is a process aimed at assisting the development and expansion of early-stage, growth-oriented businesses.

The concepts were developed and spread through time according to the diffusion of the incubation activities in different regions.

1.1.1.3. Incubators' diffusion

Looking at the diffusion timeline, it is possible to identify the concept of incubation spreading through two main regions of the globe: America (USA) and Europe.

Adkins (2002) alleges that the main idea of the incubator was established in the USA in the 1950s. However, in a time frame of circa 30 years, the concept started being diffused to the rest of the world in a variety of forms (Bruneel et al., 2012; EC, 2002).

1.1.1.3.1. USA

As aforementioned, Adkins (2002) alleges that the first business incubators and their conceptual definition were born in the USA in the1950s. This observation goes with the idea of Hackett and Dilts (2004), which identified the Batavia Industrial Center as the first incubator in the USA, founded in Batavia, New York, in 1959. The founder of Batavia Industrial Centre, Joseph Mancuso, is credited with first using the term 'incubator': it is alleged that he bought a giant property, which was rented to lots of tenants. These tenants, besides renting it, started getting business advice and assistance from the landlord aiming at raising their capital and configuring in an incubation process.

From the 1950s onwards, the rapid growth of the first US science parks, such as the Stanford Research Park and the Research Triangle Park was identified by Storey and Tether (1998).

Also, Zehner et al. (2014) compare the growth of the US business incubation to the growth of the US high-technology industry. In 2014, business incubation programs were increasing in areas that foster innovation and creativity. The authors also mention that innovative sectors have recognized business incubators as a practical and cost-effective way to connect entrepreneurs with the necessary intellectual, managerial, and financial resources needed to establish successful new businesses.

In 2012, the National Business Incubation Association (NBIA, 2012) estimated that approximately 1400 business incubation programs were operating in North America in 2011, up from 1100 incubators in 2006 (Zehner et al., 2014; Knopp, 2012).

1.1.1.3.2. Europe

In Europe, Colombo and Delmastro (2002) mention that the history of business incubation can be traced back to the 1960s and 1970s when the first Science Parks (SPs) and Business Innovation Centers (BICs) were established.

Auricchio et al. (2014) describe four stages of the diffusion of incubation in Europe, putting the incubators in charge of fostering regional development through competition and the birth of new firms (Aernoudt, 2004).

The first stage happened during a transition from a traditional industry to a new model based on Information and Communications Technology (ICT). According to Auricchio et al. (2014), in the 1970s, the development of Business Innovation Centers was established in the UK, following the establishment of the Cambridge Science Park in the same region. Colombo and Delmastro (2002) allege that these centers were the result of collaboration between national and local institutions, private firms, and universities, and were meant to replicate the success of the early business incubators in the United States.

In this decade, the Sophia Antipolis Park was established in France, at the same time as the incubation activities in Germany. Auricchio et al. (2004) mention that in France the activities were initially led by office space providers, followed by the establishment of *Centres d'Entreprises et d'Innovations* (CEIs), which contributed to regional development. While in Germany, there was a rise in incubation activities due to the support of the government, local institutions, banks, and real estate companies, with a focus on promoting growth in the eastern side of the country after the fall of the Berlin Wall.

The second stage described by Auricchio et al. (2014) was characterized by the growth of incubators in response to macroeconomic changes. The authors support a relationship between the European incubators' development activities and the regional economy, alleging that the incubators were established during a period of transition from a traditional industrial economy to a new information and communication technology-based economy. This way, the incubation activities gained momentum as the number of initiatives increased and more actors, such as governments and academic institutions, started funding them. This was also the period when the European Business Innovation

Centre was established, to promote the growth of new firms and facilitate regional development (Aernoudt, 2004; Auricchio et al., 2014).

The third stage was described as the rise of sector-specific incubators in biomedical and ICT. According to the author, in the 1990s and 2000s, sector-specific incubators focusing on biomedical, and information and communication technologies emerged. Lastly, the fourth stage was described as focusing on the shift towards private sector-specific incubators, which were a hybrid between sector-specific incubators and venture capital funds (Auricchio et al. 2014).

Besides looking at the time frame, Auricchio et al. (2014) state that the nature of incubators in Europe varies depending on the regional context and its evolution, and it is not possible to identify a single incubation model that applies to all regions. However, Aernoudt (2004) identifies a major barrier to the development of incubators in Europe, which is the lack of entrepreneurship and the underdevelopment of seed financing and business angel networks

1.1.1.4. Development of the concept

Throughout time, created as a means of revitalizing declining manufacturing areas, incubators have evolved to focus on regional development and the promotion of technology-based firms (Aernoudt, 2004). Hence, some types of incubators have been developed according to the ambient they have their activities. Their characteristics are continuously evolving especially in terms of services offered and their impact on tenants (Sansone et al., 2020).

Although Pauwels et al. (2016) affirm that research on this evolution is still needed, the main types of incubators that are quoted by studies and authors nowadays will be taken into consideration in this analysis. Aernoudt (2004) alleges that different incubator types have different missions. When evaluating it or introducing quality standards, the type of incubators influences the results, as well as the regional context that it is inserted and its evolution (Auricchio et al., 2014).

Concerning its basic mechanisms, Pauwels et al. (2016) define the incubator's categorization as how an incubation entity provides support to startups, aiming at improving the probability of survival of the portfolio companies (tenants) and

accelerating their development. As aforementioned, incubation models have evolved since the establishment of the first incubators, science parks, and innovation centers. Also, academic research has continuously provided a variety of studies focusing on different types and characteristics of incubation models over time, facilitating technology transfer from research to industry. Sansone et al. (2020) say that an incubation model describes how the incubator works. This way, it is possible to analyze and compare how these organizations can capture, create, and deliver value to tenants and markets.

According to Ayatse et al. (2017), business incubators are institutions concerned with speeding up the growth, financial and operational stability of entrepreneurial startups by offering them targeted services and support. They are major actors in the entrepreneurial ecosystem by linking talent, technology, capital, and know-how. However, there are definitional challenges that exist on what constitutes business incubators or business incubation, which arise from the confusion of virtual incubators with traditional incubators that provide in-house tenancy, the inability to properly define the incubation process, or define it but fail to identify with whom the incubation process occurs and the use of terms such as science parks, technology centers, etc. interchangeably.

Peters et al. (2004) reinforce the need for a multi-model approach, highlighting the challenges for young enterprises and entrepreneurial firms to create or pick the best resources and build barriers to their mobility and inimitability. Social network theory plays a significant role in many facets of organizational emergence.

In addition, new types of incubators have emerged, such as social and research incubators. According to Aernoudt (2004), social incubators are designed to provide support to businesses that hire individuals from underprivileged segments of society. Research incubators, on the other hand, attempt to apply incubator principles to research-based endeavors, with the primary objective of creating intellectual property that can be leased or commercialized through spin-off firms.

Bruneel et al. (2012) examine the value propositions of Business Incubations, organizing it into three different business incubation generations. Also, the authors compare the infrastructure, business support, and network access provided by BIs, as well as discuss their selection criteria and exit policies. Hence, it is possible to summarize the main idea of the generations over time.

The first generation of incubators (around the 1980s) focused on providing physical space, infrastructure, and basic services to startups. This included office space, basic utilities, and access to shared resources such as meeting rooms and administrative support. The main objective was to provide low-cost office space, focusing on the core activities of the business, and not needing to work on resource management and planning. Adkins (2002) adds up to the concept provided by Bruneel et al. (2012) mentioning that in the US in the 1980s, the incubators being larger suppliers of shared office space and infrastructure allowed small startups to benefit from economies of scale.

The second generation of incubators (the 1980s-1990s), in response to the high unemployment rate in the tech sector, added a focus on business support services, such as coaching and training to help new-tech based firms overcome the lack of management of skills and experience, leading to a faster learning process and improved performance. These incubators aimed to provide a more comprehensive support system for startups and help them develop into successful businesses. Also, Lewis (2001) affirms that in this generation, incubators have become a very important instrument for sponsoring new tech firms.

The third generation of incubators (the 1990s-2000s) takes a more holistic approach, incorporating elements from the first two generations and adding a focus on community building and creating an entrepreneurial ecosystem. These incubators aim to provide and facilitate access to external resources through a supportive and collaborative environment for startups, connecting them with other entrepreneurs, investors, and other key stakeholders, together with the expertise, legitimacy and being more industry-specific, targeting specific industries such as high-tech and Information and Communications Technology (ICT). Aerts et al. (2007) brought the idea of new technology-based firms being targeted in this generation, shifting the core activities from physical space and intangible services to external networks, providing learning opportunities, and increasing the chance of survival. Also, Bruneel et al. (2012), bring the idea of networking with other organizations allowing startups to access financial resources and develop knowledge capabilities, increasing their chances of success.

Therefore, according to Bruneel et al. (2012), the evolution of incubators has been characterized by a shift from providing basic physical space and infrastructure to offering

a comprehensive support system that helps startups grow and succeed. Today, incubators offer a range of services, including office space, business support, mentorship, training, access to networks, and community building, to help startups navigate the challenges of starting and growing a business.

1.1.1.5. Service offered

Aernoudt (2004) affirms that at first, the main objective of incubators was to promote a more diversified base for regional economies. Later, it became a tool for improving regional competitiveness stimulating the increase and development of technology-based firms, consequently straightening contact with higher educational and public research institutions.

Still, looking at its physical aspect, Aernoudt (2004) also says that a true incubator cannot be considered only office space with a shared secretary and an ordinary fax machine. It is needed to go deeper: besides accommodation, it should offer services such as hands-on management, access to finance (linking seed capital funds or business angels), legal advice, operational know-how, and access to new markets.

Peters et al. (2004) analyze the impact of services offered by incubators in the entrepreneurial process, although nowadays the landscape of incubators is quite homogeneous in the portfolio of services offered (Bruneel et al., 2012).

Aiming at understanding the role of incubators in facilitating entrepreneurship, with a focus on the impact of services offered, such as infrastructure, coaching, and networks, some authors bring different approaches concerning the grouping of services offered in different socio-economic scenarios. Still, Bruneel et al. (2012) allege that the exact mix of services offered by incubators can vary depending on the socioeconomic context in which they operate.

Auricchio et al. (2014) use the Italian scenario as the basis to group the services offered into several categories, including managerial support, physical spaces and shared services, entrepreneurial and managerial education, access to finance, administrative and legal services, intellectual property (IP) management support, and networking.

Still, Sansone et al. (2020) explore the services offered by social incubators that support

startups with significant social impacts in Italy. Their study shows that social incubators prioritize social impact measurement and training/consulting on business ethics and corporate social responsibility (CSR) as important services compared to other incubator types.

Moreover, Vanderstraeten and Matthyssens (2012) discuss the necessary organizational components concerning the tenant service expectations and the incubator differentiation options to differentiate themselves in the market through customer value creation and ensure internal and external alignment for each differentiation alternative. The authors bring the idea between high and low value-creating services and suggest two service-based differentiation options for incubators: generalists and specialists, identifying necessary organizational aspects for each strategy alternative.

Incubators offer these services to help startups overcome challenges that arise in the early stages of their development, such as lack of financial resources, lack of managerial skills, and lack of access to key networks. Concerning managerial activities, the study conducted by Peters et al. (2004) finds that the presence or absence of coaching and access to networks are the services that distinguish the success of incubators.

Munna (2022) summarizes the portfolio of services offered by incubators:

- Managerial Support: includes business plan creation, business model definition, market identification, strategy identification, and helping to gather the right entrepreneurial team.
- Physical Spaces and Shared Services: includes the provision of office space and shared assets at an affordable price, meeting rooms, reception, private parking, laboratory, and research equipment.
- Entrepreneurial and Managerial Education: includes coaching and training programs to teach tenants entrepreneurial and managerial behavioral skills, relationship management with corporate partners, and discovering new market opportunities.
- Access to Finance: includes supporting financial decisions, acting as a bridge between tenants and investors, and sometimes acting as investors by financially contributing to business idea development.
- Administrative and Legal Services: includes supporting the incubated firms/teams

in being compliant with regulation and legislation at a regional, national, and international level, sometimes directly solving the legal issues incurred, particularly when related to company creation.

- Intellectual Property (IP) Management Support: includes protecting intellectual property when dealing with new technologies and innovation development.
- Networking: this includes allowing firms to have preferential access to clients, suppliers, tech partners, and investors, reducing the searching costs for tenants, and developing knowledge and capabilities.
- Technology Development and Scouting Support: includes engaging new technologies in their activities or commercializing innovative ideas through services and products.
- Social Impact Measurement Services: includes providing tenants tools, knowledge, and support in quantifying benefits and welfare to the society.
- Training/Consulting on Business Ethics and Corporate Social Responsibility (CSR): includes educating new ventures on business ethics and CSR, which can positively impact workers' engagement in the corporation and morale.

1.1.1.6. Costs and revenues

Business incubators are often funded by public resources, as privately funded incubators require "deep pockets" to survive potentially long periods (Cheng and Schaeffer, 2011). Still, the authors mention that the lack of financial independence and heavy reliance on public funds force incubator management to constantly demonstrate success to justify the continued need for subsidies and other public support, as there is a lack of financial independence and heavy reliance on public funds (Hackett and Dilts, 2004).

Cheng and Schaeffer (2011) allege that prior research has concentrated on the overall effects of incubators in a specific location, intending to compare their cost efficiency to other economic development methods within a given geographical region. Moreover, the authors believe that incubators may not be able to become economically self-sustainable due to the long time needed to achieve the breakeven point and the high risk associated with new ventures. They argue that incubators would need a wider startup portfolio to reach autonomy.

Munna (2022) alleges that researchers believe that the growing value of tenants and revenue-sharing strategies can contribute to this, while others believe that a wider startup portfolio is needed to reach autonomy. Although, to analyze the cost efficiency of incubators, it is needed to identify the costs and revenue streams.

The sources of revenue for incubators, as defined by Social Innovation Monitor (SIM, 2021), include rent, services delivered to supported teams and organizations, investments in the supported firms, subsidies and funding, donations, and other sources such as education and consulting services.

SIM (2021) also lists the costs associated with running an incubator, including building management costs, entrepreneurial accompaniment services, and technicians, education of incubated teams and organizations, and other services offered to teams and organizations.

1.1.2. Incubators' categories

Aernoudt (2004) discusses how incubators' definitions have become more polysemic as different approaches are associated with it. When considering the different scenarios where the incubations activities happen, there are several different ways to differentiate incubators based on various factors such as revenue source, services offered, specialization, and their *'raison d'être'*. These ways, in which the main idea was developed by several authors, can play an important role to distinguish the incubation activities developed nowadays.

Aernoudt (2004) has considered five different types of organizations according to their purpose of existence -which the author calls their *raison d'être*-, such as mixed, economic development, technology, social, and business research incubators. When considering that incubators have a focus on a specific area of development or innovation, we can summarize the author's idea as:

- Mixed-type incubators aim to bridge business gaps and promote the creation of startups and jobs, involving all sectors.
- Economic development incubators are designed to address regional or local disparities, with the primary goal of promoting regional development and secondarily, business creation in all sectors.

- Technology incubators focus on the entrepreneurial gap, with the primary objective being to promote entrepreneurship and secondarily, stimulate innovation, technology startups, and graduates. Their main focus is on technology.
- Social incubators seek to fill the social gap by integrating social categories, with the primary objective being social integration and secondarily, employment creation, focusing on non-profit sectors. This idea was discussed by the Social Innovation Monitor (SIM, 2021) on the idea developed by Sansone et al. (2020), where the authors focus on the tenants' profiles and characteristics.
- Basic research incubators address the discovery gap and aim to promote *bleu-sky* research, with the secondary objective of creating spin-offs in the high-tech sector.

Later, Grimaldi and Grandi (2005) proposed four different categories of incubators, each with its unique focus and characteristics. These categories of incubators provide various types of support and resources to entrepreneurs and startups, ranging from basic infrastructure and financial support to specialized research and industry-specific expertise. Summarizing the authors' idea:

- Business Innovation Centres (BICs): These incubators offer basic services such as space, infrastructure, communication channels, and information about external financial alternatives to startups.
- University Business Incubators (UBIs): These incubators are affiliated with universities and focus on promoting research that leads to patentable inventions, spin-offs, and technology transfers, thereby making significant contributions to local economies.
- Independent Private Incubators (IPIs): These are private entities that invest their own money to help entrepreneurs start and build their businesses.
- Corporate Private Incubators (CPIs): These are owned and operated by major corporations with the primary objective of assisting the formation of new independent company units, also known as corporate spin-offs. They may also be able to accommodate more generic startups.

Additionally, Dee et al. (2015) proposed two different bases for distinguishing between types of incubators:

- Based on the stage of the tenant in their life cycle/incubation process, such as the

ideation stage, pre-seed stage, seed stage, growth stage, and expansion stage.

- Based on a revenue stream, where the categorization happens over the way incubators earn money, with three types being distinguished:

  o Growth-driven: these incubators focus on the revenue stream coming from the startup's earnings, or from attracting business angels and venture capitalists.

  o Fee-driven: these incubators base their earnings on the fees paid by tenants for using the services offered.

  o Independent programs: these incubators' main streams of revenue come from outside the incubator's program itself, such as attracting interest from corporations and public sponsorship.

Moreover, according to the Social Innovation Monitor analysis (SIM, 2021) and the summary developed by Munna (2022), the incubators can also be classified based on their juridical nature and the kind of firms they incubate. The following are the classifications based on juridical nature:

- Public incubators: organizations that are entirely managed by public administrations or entities, often through the creation of "in-house" companies.
- Public-private incubators: organizations' corporate structure that comprises both public and private entities.
- Private incubators: organizations that are entirely managed by private actors.

These classifications based on juridical nature provide insight into the ownership and governance structure of the incubators and the potential sources of funding and support they may have. It can also provide an understanding of the level of involvement of public and private entities in promoting entrepreneurship and economic development.

In addition to these classifications, SIM (2021) research also classified incubators based on the kind of firms they incubate, including technology-based startups, social enterprises, cultural and creative startups, and high-growth potential startups. This further highlights the diversity of incubators and the varying focus and support they offer to different types of startups.

Lastly, as aforementioned, Sansone et al. (2020) developed an idea discussed by the SIM (2021), where it was introduced a classification system for incubators based on the

percentage of social companies they incubate.

Still, according to the authors, social companies are those that introduce social innovation and generate benefits for society as a whole, and are defined as "a novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals" (Phills et al., 2008). The classification system includes:

- Business Incubators incubate 0% of organizations with significant social impact out of the total.
- Mixed Incubators, which incubate between 1-50% of such organizations.
- Social Incubators incubate more than 50% of organizations with significant social impact out of the total.

In this analysis, three main types of incubators categories will be taken into consideration as well as being explained deeper in their respective sections: Corporate (business and technology-related), University (academic- and basic research-related), and Social (socioeconomic-related). The reasoning for getting deeper into this categorization comes from the idea of these types of incubators being widely spread nowadays (Sansone et al, 2020).

1.1.2.1. Corporate incubators

Becker and Gassmann (2006) define corporate incubators as for-profit organizations that operate as professional services firms with the objective of enhancing a corporation's technology development. Additionally, Moschner et al. (2019) define corporate incubators as programs that are directly operated or funded by one or more firms that are actively involved in the startup process.

Still, according to Becker and Gassmann (2006), despite the number of incubator typologies, there is still no real description of non-profit and for-profit incubators. The authors bring a definition to the organization's literature by alleging that for-profit incubators focus on financial returns for their owners, while non-profit incubators have a social purpose, such as supporting community development, often with government subsidies. Also, according to the authors, for-profit incubators generate positive returns through service fees and equity stakes in new ventures in the medium to long term.

Based on exploratory research, Becker and Gassmann (2006) discussed four types of corporate incubators:

- Fast-profit incubators: aim to gain financial returns by spinning out non-core technology units or growing external startups.
- Leveraging incubators: create breakthrough technology by acting as matchmakers between central R&D and marketing units.
- Insourcing incubators: scan the environment for emerging technologies and invest in startups' disruptive technologies for potential later spin-in.
- Market incubators: support the development of complementary technology to increase demand for the parent company's product.

According to Becker and Gassmann (2006), corporate incubators can source technology internally or externally, and core technologies are strategically important for the corporation from the perspective of substitution technologies, customers, or competitors. All corporate incubator types manage corporate technology assets to enhance company growth by leveraging or acquiring new technologies.

A similar idea comes from the Social Innovation Monitor (SIM, 2021), which alleges that corporate incubation programs are becoming popular among companies seeking to foster innovation and entrepreneurial spirit within their organizations. These programs have goals of acquisitions, synergies, and the dissemination of entrepreneurial culture within the organization. Also, they are a step ahead of other initiatives such as scouting activities, hackathons, and startup competitions as they involve establishing dedicated units within the company to identify and support new business opportunities.

The SIM (2021) also makes a comparison between corporate incubation and traditional incubation activities. Besides corporate incubators acting as intermediaries between companies and entrepreneurs, it is alleged that it differs from traditional incubation activities in that they are managed by corporations with their business model, and the programs are geared towards developing external ideas/startups or internal company ideas related to the main sector of the company developing the program. Corporate incubator programs are produced by corporate divisions responsible for discovering and developing new entrepreneurial prospects (Colombo and Delmastro, 2002).

This way, corporate incubators might be a viable option when a company wishes to pursue

innovation in an entrepreneurial manner or take an intrapreneurship approach, operating as professional services firms that serve in the best interests of their parent companies, exploiting their knowledge and resources and attempting to speed the development of new technologies and processes via the use of both tangible and intangible resources (Becker and Gassmann, 2006). Although, Crichton (2014) mentions that incentives between businesses and startups may not be aligned. Also, being attached to a major corporation might limit a startup's flexibility, restraining its progress. Intimate relationships with the incubator firm may discourage entrepreneurs from exploring competing collaborations or building competing products that might challenge the incubator company. Kohler (2016) goes with the same idea, suggesting that close relationships between startups and their incubator firms may hinder the startups' ability to explore collaborations or build products that compete with the incubator company.

According to the SIM (2021), corporate incubation programs not only promote Open Innovation, which is considered a good strategy for confirmed firms interested in innovation (Chesbrough, 2003) but also facilitate intrapreneurship, which is defined as entrepreneurship within an existing organization, using purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation (Burström and Wilson, 2015). Similarly, Urbano and Turró (2013) mention the non-intrapreneurial organization, which is primarily concerned with the management of existing resources and having the decision-making process based on those resources, hence allowing a strategy to be ineffective when rapidly changing industries and marketplaces.

Startups, which are described as pillars of open innovation strategies by Moschner et al. (2019), are a key tool in pursuing open innovation strategies due to their innovativeness and adaptability (Gassmann et al., 2010). Blank and Dorf (2012) consider startups as growth-oriented businesses seeking a repeatable and scalable business strategy, having organizational agility, and a willingness to take risks in addition to prospective ideas (Weiblen and Chesbrough, 2015).

Corporate incubation programs are a useful tool for companies looking to innovate and stay ahead of the competition. Wolcott and Lippitz (2007) allege that a corporation's processes are designed to maximize the execution of the current business model, which

may restrict the activities necessary to discover innovation outside of the core business. By fostering an entrepreneurial culture within the organization and supporting the development of new ideas and startups, companies can position themselves for long-term success in a rapidly changing business landscape.

1.1.2.1.1. Tech incubators

As already mentioned, Aernoudt (2004) presents a categorization of different types of incubators based on their primary goals. Considering the purpose of the existence of technology incubators, it is possible to define this type of organization as having a focus on the technology sector, aiming to solve the entrepreneurial gap, with the primary objective being to promote entrepreneurship and secondarily, stimulate innovation, technology startups, and graduates.

Aernoudt's study shows that technology incubators have a higher survival rate and employment rate compared to social and basic research incubators. This success is attributed to the strong network between tenants and graduates within the incubator.

On the other hand, Colombo and Delmastro (2001) examine the relationship between innovation and job creation in the economic system and highlight the importance of new technology-based firms (NTBFs) in fostering this connection considering the Italian scenario. They also mention the problem of capital market constraints that negatively impact entrepreneurs, making it difficult for NTBFs to access financial aid.

To address this issue, Colombo and Delmastro (2001) suggest implementing policy measures to support the development of NTBFs and the creation of Science Parks (SPs) and Business Innovation Centers (BICs). The authors suggest that SPs and BICs are an important element of a technology policy in favor of NTBFs, have been successful in attracting entrepreneurs with high-quality human capital and playing a positive role in supporting the establishment and post-entry development of new technology-based firms (NTBFs), especially in countries that have a weak national innovation system.

Moreover, according to Colombo and Delmastro (2001), these organizations, established through partnerships between government, private firms, and universities, provide business services to support innovative firms, facilitating the transfer of research into commercial applications. The proximity between organizations, including universities

and research centers, allows for easier access to public subsidies, promoting growth. This, in turn, leads to an increase in entrepreneurial activity and a positive cycle of growth, as noted by Aernoudt (2004).

Löfsten and Lindelöf (2002) also support this idea and state that technology-based firms within incubators show better performance in terms of employment and sales growth. Moreover, according to Colombo and Delmastro (2001), the presence of technology incubators is a crucial factor to nurture the formation and growth of NTBFs.

1.1.2.2. University Incubators

A university incubator is a key player in the ecosystem of academic entrepreneurship and is designed to contribute to economic and regional development by transferring knowledge and technology from the research field to the industry (Secundo et al., 2017; Romano et al., 2014).

Similarly, Becker and Gassmann (2006) suggest that university incubators are a potential vehicle with which the commercialization of research can be supported. Concerning their environment, the authors also suggest that universities are large-scale R&D departments and institutes driving technology push by conducting cutting-edge research and producing numerous patents. However, their technological insights are often not linked to a strategic long-term agenda nor a structured process of fast market customization of research. The commercialization rate of patents developed by academics alone is low, with the exception being the commercialization of breakthrough technology based on a technology push paradigm.

University incubators offer a range of services and resources, such as faculty consultants, student employees, R&D laboratories, and access to university knowledge and infrastructure at an advantageous price (Hackett and Dilts, 2004; Mian, 1996).

The SIM (2021) has a different idea when defining a university incubator, taking into account when a university has a position of control over the incubator. Munna (2022) summarizes the idea presented by the SIM (2021), considering the percentage of the social structure owned by the university, being:

- Over 50% of the social structure is owned by the university.

- The university exerts control over the majority of the shareholders' meetings in the incubator, either through agreements or laws.
- The incubator's board of directors is under the direct or indirect control of the university.
- The university has the power to choose the chairman of the incubator.

Also, according to Becker and Gassmann (2006), university incubators can play a significant role in supporting the commercialization of research by providing new ventures with physical and intangible resources. They are usually non-profit organizations that receive public funding and have a social purpose. To increase the efficiency and effectiveness of university incubators, four key elements should be defined, including a clear mission, a structure that defines the outside advisory board, a process of entrepreneurial activities to support the new venture, and defining resources and how to make the best use of them.

Sansone et al. (2020) allege that the university plays a crucial role in providing legitimacy and resources to new ventures, contributing to economic growth by introducing innovations, increasing the productivity of regions, and creating new jobs.

Secundo et al. (2017) propose an intellectual capital framework to help universities better understand and evaluate their performance, which is based on three interrelated areas such as research, teaching, and social engagement, to measure the third mission's activities of universities, which are related to the use, application, and exploitation of knowledge with external stakeholders and society. Although the assessment of these activities is considered a relatively new field of study, there is still a lack of consensus on which measures are most suitable for assessing the performance and impact. According to the author, the third mission comprises technology transfer and innovation, continuing education, and social engagement. The final idea is that universities have evolved to take on a leading role in economic growth and regional development through their third mission activities, needing universities to align their strategies with other actors in the region to facilitate technological and economic specialization on the regional level.

Additionally, university incubators can learn from corporate incubators, which can offer lessons on how to enhance the scope of university research's technology utilization, increase the commercialization rate of technology, and increase the quantity and quality

of entrepreneurial activities. A structured incubation process can also support new ventures and increase their chances of success. University incubators can serve as a focal point for entrepreneurial activities and encourage both faculty and students to pursue venturing activities (Becker and Gassmann, 2006). Universities need to transcend their traditional mission by advancing innovation and transferring technologies, as well as improving or implementing performance measurement, management, and reporting systems (Secundo et al., 2017).

When evaluating the advantages and disadvantages of this mechanism, Becker and Gassmann (2006) consider the advantages including the enhancement of the scope of university research's technology utilization, increasing the quantity and quality of entrepreneurial activities at universities, increasing the success rate of startups for business implementation, and overcoming failures in the technology market and reducing transaction problems. However, the disadvantages include good entrepreneurs not needing incubators, the university incubator's protected environment setting the wrong focus and incentive structure for entrepreneurial researchers, and the university incubator's staff having less experience in business management than venture capitalists.

Lastly, tenants of university incubators benefit from a higher level of legitimacy, connectivity, and resources compared to non-university incubated firms. These advantages can confirm the benefits of university incubation, leading to higher job and sales growth, as well as higher survival rates for incubated firms (Lasrado et al, 2016).

1.1.2.2.1. Academic Entrepreneurship and Spin-offs

Rippa and Secundo (2019) refer to the term academic entrepreneurship as universities engaging in various activities such as research collaborations with industry, patent applications, and entrepreneurial education of highly skilled individuals. According to the authors, studies have shown that universities have a considerable impact on new business creation, knowledge transfer, and the influx of well-educated people into the region.

Siegel and Wright (2015) assert that academic entrepreneurship has distinctive features compared to traditional entrepreneurship, particularly the emergence of entrepreneurial ventures from non-commercial contexts and the ownership of intellectual property that usually lies, at least in part, with the university. Also, Rippa and Secundo (2019) allege

that academic entrepreneurship is seen as an important element in the movement to become a knowledge society, attracting attention within the academic literature and the policy community.

O'Shea et al. (2004) discuss the importance of the commercialization of knowledge created in universities and its relationship with the spin-off of new venture companies, often led by faculty or staff. Along with the authors, Sansone et al. (2020) explore the relationship between Entrepreneurship Education (EE) in the creation of academic spin-offs.

Mihali et al. (2022) discuss the concept of academic spin-offs, which are defined as independent companies established with the purpose of exploiting commercially patented inventions or intellectual property generated from university research. Still, some advantages are considered, such as job creation, diversification of businesses, and technological development. Moreover, the authors suggest that academic spin-offs are one of the best ways to achieve sustainable development at a regional level and to have a real social impact on society.

Ndonzuau et al. (2002) suggest four stages of the global spin-off process, such as:

- Stage 1: to generate business ideas from research.
- Stage 2: to finalize new venture projects out of ideas.
- Stage 3: to launch spin-off firms from projects.
- Stage 4: to strengthen the creation of economic value by spin-off firms.

Still, according to the authors, the four stages serve distinct roles in the overall spin-off process. During the first stage, ideas are generated and evaluated for potential commercialization. In the second stage, these ideas are examined and transformed into actual entrepreneurial ventures, focusing on the most promising ones. The third stage involves the establishment of new spin-off companies to bring the best projects to fruition. Finally, the fourth stage involves enhancing and fortifying the economic value produced by these new firms.

O'Shea et al. (2004) identify the determinants of spin-off activity and suggest that the literature can be categorized into six separate streams, such as studies that focus on the individual, organizational configuration, socio-cultural development, external environmental influences, measuring the performance of spin-offs, and measuring the

economic impact of spin-off activity.

Still, according to the authors, there has been a substantial rise in the commercialization of science and other forms of university technology transfer since the enactment of the Bayh-Dole Act in the USA in 1980. Similarly, Sansone et al. (2020) allege that Entrepreneurship Education is positively related to the number of new academic spinoffs, and offering more practical courses rather than more theoretical ones favors the development of more academic spinoffs by a university, which has become more strategic in their approach to academic entrepreneurship, as more stakeholders have become involved, and universities have only recently integrated academic entrepreneurship into their economic development mission (O'Shea et al., 2004).

1.1.2.3. Social Incubators

Aernoudt (2004) was the first author that addressed a term for the social incubation process. The definition was that social incubators offer the same services as traditional incubators but with the aim of supporting startups that employ disadvantaged people. Over time, some other definitions were suggested by different authors, mainly expanding the concept and including organizations that support social entrepreneurs and social tech startups.

Phills et al. (2008) discuss the idea of social innovation, referring to it as the creation of a new solution that addresses a social issue in a way that is more efficient, effective, sustainable, or equitable than current solutions. Additionally, the benefits of this solution should primarily benefit society as a whole rather than just a select few individuals.

Similarly, Casasnovas and Bruno (2013) define social entrepreneurship as the tool that fills the gap when companies, charities, and governments fail to correct social dysfunction and position it at the intersection of social mission, market orientation, and innovation, highlighting the importance of scaling up the social impact of new ventures. Also, according to the authors, social incubators and accelerators have become essential players in scaling social ventures and developing the social entrepreneurship industry. The programs have gained popularity worldwide in recent years, taking various forms to promote social innovation and enterprise.

Still, the definitions have broadened in a more empirical and quantitative sense, being

distinguished from other types of organizations such as Business Incubators and Mixed Incubators, based on the number of tenants in the social sector (Sansone et al., 2020). The authors gave a quantitative approach to define a Social Incubator: an incubator that supports more than 50% of startups that aim to introduce a positive social impact. Still, Social Incubators are different from other incubators and have a unique focus on social startups, providing human capital training on social innovation and advanced knowledge of social innovation.

The classification system suggested by Sansone et al. (2020), as aforementioned, consists in dividing the incubators into three types. The social incubator, the business incubator, which incubates 0% of organizations with significant social impact, and the mixed incubator, which incubates between 1-50% of such organizations. The authors also found that Social Incubators give more importance to sustainability and social themes such as Corporate Social Responsibility, and consider managerial and entrepreneurial education as more important than Business Incubators do.

Moreover, Sansone et al. (2020) study showed that Social Incubators are as efficient as traditional incubators in terms of tenants' growth, offering services related to sustainability and social themes, while mixed and social incubators place more importance on managerial and entrepreneurial education than business incubators.

1.1.2.3.1. Corporate social responsibility

According to Tai and Chuang (2014), Corporate Social Responsibility (CSR) refers to the process of acknowledging responsibility for a company's actions and promoting a beneficial impact through its activities on various aspects, including the environment, consumers, employees, communities, stakeholders, and the general public at worldwide level. This approach involves considering all parties who may be affected by the company's actions and who have a stake in its success.

Similarly, McWilliams et al. (2006) discuss the concept of CSR and its strategic implications. The authors define CSR as actions taken by a company that goes beyond what is required by law and appears to further some social good. However, the authors also mention that there are many different definitions of CSR, making theoretical development and measurement difficult.

Although still according to McWilliams et al. (2006), there is growing interest among managers in the antecedents and consequences of CSR particularly at the multi-national level, however, the analysis is still in its early stages.

Wang and Sarkis (2017) suggest that whether companies successfully implement CSR governance to generate good CSR outcomes plays an important role in influencing their financial performance. This idea goes with the idea of Sansone et al. (2020) where the authors suggest social incubators activities perform as well as traditional ones in economic-related terms, having great outcomes that are not only focused on financial performance but social as well. The authors also support the idea that governments should reinforce the activities of social incubation to foster local and national economies while pursuing social solutions.

1.1.2.4. Benefits arising from incubation activities

The concept of firm performance measurement aims to determine how well an organization is functioning and being managed, with effectiveness and efficiency being fundamental dimensions. Traditionally, performance measurement has been based on financial criteria such as annual sales, annual profit, and growth. However, contemporary systems include both financial and non-financial criteria (Ayatse et al., 2017).

Still according to the authors, in business incubation literature, there is no single accepted measure of performance, leading researchers to use different performance measures such as revenues, finance, venture capital funds, firm survival, networking activity, innovative firms, and job creation. Hence, the effects of incubation activities on firms can be positive or negative, depending on various factors such as the context and methodology used in the research.

While some studies in the literature attempt to downplay the benefits of incubation activities, the majority of research indicates that incubators have positive effects on the firms that participate in them. Studies by Mian et al. (2016) and Sansone et al. (2020) support this view.

Ayatse et al. (2017) bring the importance of business incubation in supporting the survival and growth of businesses, providing a positive impact on firm performance, with firm survival, revenue growth, employment or job creation, venture funding, and networking

and alliance building being the most important measures. Hence, the authors recommend that all tiers of government should promote the establishment of incubators and build their capacity to support emerging and new ventures.

Gibson and Naquin (2011) allege that government subsidies for incubation programs are seen as an investment in local and regional economies. The benefits of incubation activities extend to various economic and socio-economic policy needs, including employment and wealth creation, support for small high-growth firms, and the promotion of entrepreneurship and innovation (SUPER – Start-Up Promotion for Entrepreneurial Resilience, 2018).

Still, Hytti and Maki's (2007) findings suggest that relatively young firms benefit the most from incubators if they have not extended their stay for over two years, and that innovative, internationally focused, and growth-oriented firms frequently use the incubator services.

Colombo and Delmastro (2002) found that incubated firms had a founders' higher level of education, higher responsibility-intensive roles for founders with previous work experience, higher growth rates, and higher participation in EU projects compared to non-incubated firms.

European governments are putting efforts and resources into supporting incubators due to their positive externalities on economies, employment, wealth creation, and socio-economic policy needs. The Organisation for Economic Co-operation and Development Small and Medium-sized Enterprises and Entrepreneurship (OECD SME, 2019) explores the benefits of incubators and accelerators, alleging they offer intensive support to entrepreneurs and new business startups to increase the chances of business survival, improve access to finance, and support business development and growth, possibly also being cost-effective and offering opportunities to offset some of the program costs.

In conclusion, business incubation is viewed as an excellent instrument for promoting entrepreneurship and nurturing businesses with growth potential.

1.1.3. Other pro-incubator-development activity

1.1.3.1. Open innovation

Open innovation, a term first presented by Chesbrough (2003), argues that firms must look beyond their typical boundaries and internal R&D routines to innovate and compete successfully. It should also take into consideration the usage of both internal and external ideas, and paths to market to advance the technology.

Moreover, the author argues that firms cannot remain competitive with centralized, internal R&D processes, due to a series of erosion factors, including increasing availability and mobility of skilled workers, a venture capital market, and external suppliers.

In a study conducted in Norway, Clausen and Rasmussen (2011) explore the relevance of open innovation in fostering innovation and entrepreneurship from a policymaker's perspective. The authors evaluate a publicly co-sponsored incubator program that uses ideas from open innovation and conclude that open innovation policies can be implemented through a hands-on approach, which retains and transfers knowledge that has an economic value to society, but which large corporations choose not to exploit. The incubators act as intermediaries, transferring knowledge from large firms to society, and provide high additionality, meaning that most of these activities would not have taken place without the incubators.

Also, the authors suggest that such open innovation policies, as reflected in the incubator program, may stimulate more innovation and entrepreneurship, and be an important instrument in public policy. Incubators can promote open innovation by creating networks of mentors, investors, and industry experts who can provide guidance and support to entrepreneurs and startups. These networks can help entrepreneurs access new markets, identify potential partners and collaborators, and navigate complex regulatory environments.

Still, incubation can be a powerful tool for promoting open innovation, as it provides an environment that is conducive to collaboration, experimentation, and the exchange of ideas.

Spender et al. (2017) allege that startup companies represent a powerful engine of open innovation (OI) processes. Besides other tools, the authors look at the incubators as an actor interacting with startups in open innovation processes. Incubators provide access to resources such as funding, workspace, and equipment, which can help reduce the barriers to entry for startups and enable them to focus on innovation and experimentation. By providing access to these resources, incubators can foster an environment of collaboration and innovation, and help entrepreneurs develop and refine their ideas.

As a result, incubators play an important role in promoting open innovation by providing a platform for collaboration and experimentation, connecting entrepreneurs with resources and expertise, and helping to create a supportive ecosystem for innovation and entrepreneurship.

1.1.4. Accelerators

1.1.4.1. Definitions and historical context

Accelerators are identified as a distinct organizational form that provides time-limited intensive support to startups, with a focus on business development (Crisan et al., 2021). Yang and Aldrich (2012) argue that accelerators provide a unique opportunity to observe early-stage entrepreneurship.

Likewise, Leitão et al. (2022) allege that business accelerators are organizations that provide funding, resources, and working space to startups to help them launch their products or services, connect with customers, secure investment, and hire employees. To be effective and avoid failure, startups in business accelerator programs must have an open innovation attitude, according to research.

Cohen et al. (2019) define accelerators as "a fixed-term, cohort-based program for startups, including mentorship and/or educational components, that culminates in a graduation event".

Similarly, Drori and Wright (2018) argue that accelerators are a distinct form of innovation intermediaries and have had a dramatic impact on developing entrepreneurial ecosystems and fostering communities of innovation. Pauwels et al. (2016) recognize accelerators as a distinct organizational form characterized by a distinct set of features

depending on the services they provide to their startup users. Gliedt et al. (2018) and Hausberg and Korreck (2018) consider accelerators a special form of incubators.

Still, according to Crisan et al. (2021), despite significant growth in accelerators research, there is still a lack of understanding of how different forms of accelerators operate, and what outcomes they produce across different contexts, mainly aiming at the role they play in supporting entrepreneurship.

Being a recent phenomenon, the first accelerator was founded in 2005 by Paul Graham in the U.S. (Cohen, 2013). Called the 'Y Combinator', it was considered a distinct form of innovation intermediary supporting startups. Also, in 2007, it was quickly followed by other programs, such as Techstars, also in the U.S. (Hochberg, 2016; Crisan et al., 2021). Since its founding, the Y Combinator has funded over 450 startups with a cumulative valuation of more than $7.8 billion (Cohen, 2013).

Focusing on diffusion, Hochberg (2016) conducted an assessment that identified 160 U.S. accelerator programs in 2016, while Cohen and Hochberg (2014) estimated that there were up to 2,000 such programs globally. Crisan et al. (2021) report that by 2018, accelerators had provided funding to over 7,000 startups. Also, Tom (2016) reported that a third of all startups receiving venture capital in 2015 had been through an accelerator program.

According to Hochberg (2016), the number of accelerators was growing rapidly, as the accelerators are responsible for providing key resources, such as a small amount of seed capital, co-working space, and a plethora of networking, educational and mentorship opportunities, being a unique opportunity for startups to be exposed to potential investors.

Miller and Bound (2011) allege that in the same way accelerator programs have experienced rapid growth in the US, this trend is also being replicated in Europe, where the number of programs has risen from just one in 2007 to over ten in 2011. For instance, Seedcamp, founded in 2007 and which has grown to be a pan-European program receiving over 2,000 startup applications annually, was launched in London by Saul Klein and Reshma Sohoni. Accelerator programs have already produced several high-profile startup successes.

As suggested by Crisan et al. (2021) and Cohen and Hochberg (2014), as there are different forms in which accelerators operate, and what outcomes they produce across

different contexts, different features, and different services offered to tenants, some divergences can be seen in the research literature regarding the acceleration program results.

1.1.4.2. Services offered and resources provided

Accelerators offer a range of services to help early-stage startups grow and succeed. Miller and Bound (2011) note that accelerators are not designed to provide physical resources or office space over a long period of time for startups and aim to encourage business development through the provision of intensive time-limited support.

According to the literature, once founded, some of the most common services offered and resources provided by accelerators include:

- **Cohorts:** Accelerators admit startups in cohorts, which helps to attract resources such as mentors and investors. According to Cohen et al. (2019), accelerators have introduced the cohort structure as an essential design innovation for admitting startups. This structure enables accelerators to pool resources and entice key stakeholders to participate more actively. The benefit of this model is that it attracts startups, mentors who can interact with several startups during one visit, and investors who can review multiple deals with ease. The selection frequency happens in a competitive and cyclical way (Cohen and Hochberg, 2014). Accelerator managers can choose how many startups are in each cohort, what types of startups they accept, and at what stage of development those startups should be. The cohort size affects how much attention each startup can get, how well they work together as a group, and how many resources are needed. Cohorts can also be focused on specific industries or types of founders, or they can be more diverse. But most of the startups accepted are at an early stage of development.

- **Funding and Equity:** Many accelerators offer funding to startups in exchange for equity. This can help startups get the funding they need to build their businesses and reach their goals. Cohen et al. (2019) allege that accelerators have different models for providing capital to startups, which also vary in the amount of equity they take in return for funding. It usually includes a small amount of

money for basic expenses during the program or milestone-based funding. Still, according to the authors, these differences impact the types of startups that apply and the accelerator's long-term survival strategy. For-profit accelerators must provide favorable returns to investors, while not-for-profit accelerators continuously seek outside funding from corporations, foundations, and governments.

- **Mentorship:** Accelerators typically provide startups with access to experienced mentors who can provide guidance and advice on everything from product development to fundraising. It also provides technical and business feedback, advice, and social support. According to Yitshaki and Drori (2018), mentorship may be provided by internal advisors or external mentors, or a combination of both. While most accelerators provide advisors and mentors, the choice of including external mentors in the formal, required portion of the accelerator program varies. There is variation in how mentors and firms are matched, the number of mentors provided, as well as the structure of the mentorship and advisory function, including the frequency of updating and check-ins provided by the firms to their mentors and the accelerator management team.

- **Formal education:** Accelerators may offer workshops, seminars, and other educational opportunities to help startups learn new skills and gain the knowledge they need to succeed. According to Cohen et al. (2019), the objective is to provide startups with a homogeneous background of business knowledge. Providing formal or tailored educational programs, address deficits in startup founders' understanding of the technical aspects of running a high-growth business. Dutt et al. (2016) suggest that intermediaries play a key role in connecting startups to the knowledge and resources they need to succeed. Also, some accelerators have a standard curriculum that begins before and extends throughout the program, while others provide frequent speakers and allow startups to decide which programs to attend. Some take a hybrid approach and tailor the curriculum requirements based on each startup's business and technical backgrounds.

- **Workspace:** Accelerators often provide startups with workspace, which is usually an open floor plan co-working space, allowing for collaboration among teams and efficient provision of advice from managing directors. According to a

study conducted by Cohen et al. (2019), 77% of accelerators provide workspace for their startups. Although, some accelerators, such as 'Y Combinator', intentionally do not provide space to allow startups to develop their own unique identity and avoid co-dependencies.

- **Networking:** Accelerators provide startups with access to a network of other entrepreneurs, investors, and industry experts. This can help startups make important connections and build relationships that can be valuable in the long run. Armanios et al. (2017) suggest that intermediaries support startups by connecting them to different types of actors in the ecosystem, such as investors, mentors, and customers. The incentives and motivations of the accelerator's sponsors can impact the decision-making of the founders regarding which startups to accept, how to conduct their programs, and what kind of resources to provide. Hence, increasing the possibility of overcoming resource constraints and creating valuable connections to other actors in the ecosystem (Amezcua et al., 2013).

- **Graduation Event ('Demo Day') and length of the program**: According to a study conducted by Cohen et al. (2019), the length of the program typically lasts for 16.32 weeks, ranging from a minimum of 4 weeks to a maximum of 52 weeks. The duration of the program is tailored to the specific industries it serves, considering the varying time and resources required for young companies to reduce risk and secure further investment. Moreover, longer programs necessitate more substantial commitments from external partners. At the end of an accelerator program, startups often participate in a 'Demo Day', where they showcase their products or services to investors and other potential partners. Although the scale and tone of these events can differ widely, these events aim to help graduates secure follow-on investment and promote entrepreneurship to a broader audience.

- **Resources**: Accelerators may provide startups with access to a range of resources, including legal and accounting services, marketing, public relations support, and technology and development resources.

1.1.4.3. Development of the concept

The accelerator concept has developed over time as a response to changes in the startup ecosystem and the needs of entrepreneurs. Although the development of the concept was

always discussed by authors such as Pauwels et al. (2016), Hochberg (2016), Cohen et al. (2019), and Leitão et al. (2022) use years as a reference, it is possible to summarize the acceleration model in four different generations.

The first generation of accelerators emerged in the mid-2000s in the U.S. These programs were modeled after startup incubators and focused primarily on providing resources such as office space, mentorship, and funding to early-stage startups. As already mentioned in the past chapter, some notable first-generation accelerators include Y Combinator, Techstars, and 500 Startups. These programs were designed to provide a structured program of support to early-stage startups, including funding, mentorship, and networking opportunities. The goal was to help startups grow quickly and prepare them for future investment. Miller and Bound (2011) suggest that accelerator programs have become more popular due to the changing economics of starting a tech startup. During the 2000s, the costs associated with early-stage tech startups have decreased, which has created an opportunity in the market for innovation to invest in digital businesses with small amounts of money (£10,000-£50,000), unlike previous eras of investment.

Still, according to Miller and Bound (2011), accelerators had a wide international catchment area, and founders were willing to relocate for three months, even across the world or Europe, depending on visa status. However, there was a high demand for accelerator programs that exceeded their supply. Hence, the growth of accelerators might be limited due to factors such as a shortage of high-quality mentors, opportunities for acquisition by large companies or stock market flotation, and competition for startup talent with other professions.

The second generation of accelerators began to emerge in the early 2010s and focused more heavily on providing mentorship and hands-on support to startups. These programs often had a specific focus or niche, such as social entrepreneurship or hardware startups. Some notable second-generation accelerators include Impact Hub, Startupbootcamp, and MassChallenge. As the startup ecosystem continued to evolve, the accelerator model became more popular, with new programs launching around the world. Some programs, such as Startupbootcamp, have focused on specific industries or regions. The concept of the 'Demo Day' also emerged during this time, with accelerators hosting events where startups could pitch their ideas to investors and other stakeholders (Cohen, 2013).

Likewise, Hochberg (2016) identified some trends that emerged during this period in his research, such as:

- **Vertical specialization and diversification of startup type:** there has been a shift towards industry-specialization in the accelerator space, with a focus on specialized knowledge or regulation such as healthcare and energy. However, there has also been an emergence of groups focused on hardware or physical products, which may provide new resources and bargaining power for these verticals.

- **Accelerators network:** franchising of programs to multiple locations with different managing directors and mentors, which allowed accelerators to expand their reach and connect with startups in different regions.

- **Vertical integration into seed funds:** established accelerator programs such as 500 Startups and Techstars have expanded beyond the accelerator model and added seed funds to their portfolios, investing not only in their accelerator graduates but also in other seed-stage companies.

The third generation of accelerators began to emerge in the late 2010s and early 2020s and focused on providing specialized support to startups in specific industries or sectors. These programs often had close partnerships with corporate sponsors or industry experts, and aimed to help startups navigate the unique challenges of their chosen industry. Some notable third-generation accelerators include Plug and Play, Startup Health, and FinTech Innovation Lab. As the startup ecosystem matured, corporations began launching their own accelerators to tap into startup innovation.

Still, Hochberg (2016) identified some trends that emerged during this period in his research, such as:

- **Corporate accelerators:** the emergence of corporate accelerators has arisen to bring corporations closer to innovation and gain access to emerging technology. Corporations could participate in accelerator activities in many ways, including joining existing private accelerators as mentors or investors, contracting with others to run an accelerator for them, creating their own internally-run accelerators, partnering with other companies to create a jointly-run accelerator, or attempting to accelerate their own internal product teams.

- **Transition into incubators:** some accelerator groups have shifted from the accelerator model to a business incubation model. For instance, some have changed their business models to incubation, admitting companies for undefined lengths of time instead of following the fixed-term, cohort-based approach of an accelerator.
- **University accelerators:** university-affiliated accelerators were a new type of accelerator that required applicants to have an affiliation with the educational institution. They often focused on educational opportunities rather than future profitability potential and typically run during the summer months.
- **Development of international presence:** the expansion of established US-based accelerator networks into the international arena.

The fourth generation of accelerators emerged in the 2020s and is still emerging, but is characterized by a focus on providing personalized, data-driven support to startups. These programs use advanced analytics and machine learning algorithms to identify the specific needs of each startup and tailor their support accordingly. Some notable fourth-generation accelerators include Founder Institute, Seedcamp, and Leap Ventures. Accelerators have become more specialized, with programs focusing on areas such as social impact or sustainability. Virtual accelerators have also become more common, allowing startups to participate remotely. Some accelerators are also offering longer programs and providing more funding to startups. Vanaelst et al. (2018) discuss some related initiatives putting the EU up to strengthen entrepreneurial activity with a main focus on accelerator activities, such as the development of policies towards accelerators to build and sustain global competitiveness by stimulating entrepreneurship, primarily science and technology-based.

Each generation of accelerators has played an important role in helping startups grow and succeed, and the development of new accelerator models continues to evolve to meet the changing needs of the entrepreneurial ecosystem. The accelerator model has become an important part of the startup ecosystem, providing support and resources to entrepreneurs as they work to bring their ideas to market. As the startup ecosystem continues to evolve, the accelerator model will likely continue to adapt and change to meet the needs of the next generation of startups.

1.1.4.4. Business model, value proposition, and acceleration benefits

Dempwolf et al. (2014) suggest that the accelerator's business model outlines how it achieves its objectives, how it sets prices for its offerings, and how it generates revenue, and potential profit.

Still, Miller and Bound (2011) discuss how the falling cost of technology, easier access to customers, and better forms of monetization have led to new economics for startups. The costs of technology have fallen drastically, and open-source software has made it easier for developers to find help and feedback. Customer acquisition costs have also fallen, and there are now platforms available to target specific customers and measure the effectiveness of advertising. Dempwolf et al. (2014) go with this idea alleging that most existing accelerators have operated in software or mobile applications, characterized by low capital requirements and short prototyping durations.

Moreover, Miller and Bound (2011) suggest that there are now better routes to monetization, particularly through direct payments in the form of transactions, app stores, and subscription models. These changes mean that consumer-facing startups have easier ways to make money from day one than in the past. The authors also suggest that while the costs of starting a business have decreased, venture capital has struggled to adapt to these changes, particularly in Europe.

Similarly, Dempwolf et al. (2014) suggest that the accelerator's revenue assumptions are built around rapid growth and large-scale markets, allowing for sessions that last approximately three months, modest-sized cohorts, and relatively modest equity percentages. The focus on technology is a key factor that distinguishes accelerators from incubators and other startup assistance organizations. Accelerators must reconcile their value proposition and business model to create value for customers and profitability for the accelerator's founder. Founders motivated by profit achieve value through a technology focus in which they have experience and current networks. Differences in founders' motivations drive significant differences in the accelerator's value proposition, influencing the level of support offered, the equity stake required, and the functional characteristics that emerge.

Concerning the U.S. scenario, Hoffman and Radojevich-Kelley (2012) discuss the

emergence of seed-capital and accelerator companies as alternative sources of funding for entrepreneurs, due to limited access to traditional funding sources after the 2008 economic crisis. Before the crisis, most high-growth firms relied on banks for funding, but after the recession, startups had to look elsewhere for capital. The paper provides a conceptual basis for this shift in funding sources.

Dempwolf et al. (2014) discuss the value proposition for accelerators, which includes the products, services, requirements, and costs associated with the seed capital provided to startups. Also, it explains the aspects of the business that create value for the customer, how customers experience that value, and what alternatives they have in the marketplace. The value proposition has five parts which are customer market, activities, rewards, value experience, alternatives, and differentiation.

- **Customer market:** accelerators focus on a stage of new product development from invention to commercial product, and they serve three markets concurrently:
    - o New and potential startup businesses with rapid growth potential.
    - o Venture capitalists and other investors that are interested in funding startups after the early stages of invention.
    - o Existing firms looking for new products or firms to acquire for their business strategies.
- **Activities:** accelerators provide bundled services to their customer markets. For startups, these services are offered in exchange for equity stakes and include brokerage services, mentoring and technical assistance services, and a combination of cash and in-kind contributions.
- **Rewards:** accelerators offer potential rewards to startups, including the acquisition of specialized knowledge through the mentoring process, additional seed capital to proceed to the next stage of development, or even an initial public offering (IPO) and ongoing proof of their concept throughout the accelerator experience.
- **Value experience:** accelerators deliver a different value experience to each of their three markets, but they are linked through the accelerators' brokerage function, which unites parties from each market. Thus, the value is an emergent and unpredictable reward based on the social capital created among the parties. However, the value experience is intentionally enhanced by factors such as the

brand effect and cohort design of the accelerators.

- **Alternatives and differentiation:** accelerators are a specialized type of institution that offers a combination of brokerage, mentoring, and funding services to startups, venture capitalists, and established firms in the transition from invention to commercial product. There are few established alternatives to accelerators, although there are other institutional alternatives that provide a more limited set of services. These include business incubators, Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Phase I grants, and angel and venture investment clubs. Accelerators are differentiated from each other by the technology industries they specialize in, the unique combination of services they offer, and the valuable experience they deliver.

Still, looking at the revenues stream, according to Miller and Bound (2011), accelerators have traditionally relied on startups being acquired by larger firms as their primary route to profitability. This model allows accelerators to make money by investing in startups that have the potential to become "medium exits", where smaller sums of money change hands. Accelerators usually take equity in startups and hope to make a return on those shares. The structure of accelerator programs varies between different legal jurisdictions and within countries. Accelerators create new deal-flow for venture capital funds, and their success depends on the startups they invest in being successful. While the economic benefits of accelerator programs aren't just to the direct investors, the wider benefits of accelerator programs justify interest from other players.

Hoffman and Radojevich-Kelley (2012) go with the same idea provided by Miller and Bound (2011), where they allege that seed capital or accelerator companies are typically early-stage investors that provide capital to startups in exchange for equity. These firms may also provide guidance and support to entrepreneurs, helping them to develop their businesses and navigate the challenges of the early stages of growth. Seed capital firms and accelerators may offer a range of funding options, from small investments to larger funding rounds, depending on the needs of the startup. One of the key advantages of seed capital firms and accelerators is that they can provide funding and support to startups that may not have access to traditional sources of funding, such as banks, friends, family, or angel investors. This is particularly important for new technology firms, which often require significant investment in research and development before they can bring their

products or services to market.

However, it is also needed to understand the other side of the spectrum: the costs that are tied up to the business model. It is possible to make a parallel concerning the operating costs incurred to incubation activities in case the services are also provided by accelerators, such as building management costs, entrepreneurial accompaniment services, technicians, education of accelerated startups teams and organizations, and other services offered to teams and organizations (SIM, 2021).

Also, Hoffman and Radojevich-Kelly (2012) research identified three related ideas concerning the costs incurred by the accelerators, such as:

- **Seed-money:** it is the initial capital provided to a startup to get it off the ground. Accelerators are organizations that support early-stage companies, providing them with resources, mentorship, and sometimes funding. All accelerators offer some form of seed money, typically ranging from $18,000 to $20,000. However, some accelerators offer funding above $20,000 in the form of conventional loans of up to $250,000. This loan converts to equity during a subsequent round of funding at a 20% discount. This approach of providing more substantial seed funding can be advantageous for startups that need a higher initial investment to achieve their goals. However, accelerators may charge startups a fee to participate in the program, which can range from several thousand dollars to tens of thousands of dollars depending on the length of the program and the level of support provided.

- **Equity versus control:** as already mentioned, accelerator companies typically take a 5 to 6 percent equity stake in the startups they fund, in exchange for the seed money and other support provided during the accelerator program. Hochberg (2016) agrees on the percentage, suggesting that the equity stake received in the portfolio company in return is typically 5-7%. Also, while they do take an equity stake, most accelerator companies do not seek to control the startup's operations or decision-making. This equity stake is usually subject to an increased equity requirement in subsequent funding rounds from angel investors or venture capitalists. By taking an equity stake, accelerators align their interests with those of the startup and stand to benefit if the startup is successful.

- **Early-stage funding and assistance**: accelerator companies provide value to startups through early-stage funding and intensive mentorship. While the funding amount is not massive, it is enough to support startups attending boot-camp style accelerator programs. These programs provide entrepreneurs with an opportunity to learn from experts in their field, who work with them throughout the program to provide advice and feedback. This type of mentorship is considered by accelerator companies to be the key ingredient for a successful startup. As a result of their hands-on approach, accelerator companies are extremely selective in choosing their participants, based on the viability of the company's idea and whether mentorship is available to help the firm. The overarching goal of accelerators is to foster the entrepreneurial ecosystem, aid in opportunity generation, and help with sustainment.

Concerning the benefits that could arise from acceleration activities, Hallen et al. (2020) suggest that some top-tier accelerator programs can accelerate the time it takes for startups to reach key milestones through broad, intensive, and paced consultation with external individuals such as mentors, peer venture founders, and customers.

Moreover, Miller and Bound (2011) allege that accelerator programs are valuable to founders for several reasons. Besides offering funding – which the authors do not necessarily consider as the most important factor -, accelerators also offer business and product advice, as well as the chance to meet with people in the tech industry, which can be difficult to replicate outside the accelerator program. Additionally, accelerators offer founders connections to future investment, validation, a peer support group, and pressure and discipline. The benefits of accelerator programs are often difficult to obtain elsewhere, which is why so many founders are interested in participating in them. However, it is important to remember that an accelerator program is not the only option for founders, and there are other paths they can take to grow their businesses.

Additionally, according to Hoffman and Radojevich-Kelley (2012), as there is no guarantee of success, many startups that receive seed funding may still fail to achieve long-term growth or profitability. Nonetheless, seed capital firms and accelerators play an important role in the early-stage funding landscape, providing capital and support to entrepreneurs who are working to bring their innovative ideas to life.

1.1.5. Accelerators' categories

Dempwolf et al. (2014) developed a taxonomy study concerning accelerators' categories. The authors define taxonomy as classifications of items based on shared characteristics, which can be applied broadly. They are useful for differentiating among startup assistance organizations. Also, it helps identify observable characteristics of accelerators, separating and classifying them from similar organizations aiming to understand the marketplace for accelerator services.

The authors allege that these organizations can be differentiated by their value proposition and business model, not only based on attributes such as for-profit or nonprofit status. The business model determines how the accelerator is structured and the value proposition determines what it offers to startups. As the business model of accelerators and their value proposition has been already discussed in the last chapter, it is possible to briefly discuss some categories of accelerators.

A lot of categories of accelerators have been discussed lately such as pre-seed, industry-specific, regional, virtual, university, and social accelerators. In the research developed by Dempwolf et al. (2014), the authors discuss six types of organizations that offer services similar to accelerators to startups such as incubators, venture development organizations, university accelerators, proof-of-concept centers, corporate, and innovation accelerators. However, in this literature review, we will only take into consideration one main type of startup support organization that was discussed by the authors, the corporate accelerators.

Moreover, it is provided a brief discussion of other types of accelerators, such as:

- **Pre-Seed Accelerators:** These programs are designed to provide early-stage startups with resources, mentorship, and funding to help them get off the ground. They often focus on validating the startup's concept, building an initial team, and preparing for seed funding.
- **Industry-specific accelerators:** These programs are tailored to the specific needs of startups in a particular industry. They often provide industry-specific mentorship, networking opportunities, and resources that can help startups gain traction and grow more quickly.

- **Regional or city-based accelerators:** These programs are focused on supporting startups in a specific geographical region. They often provide startups with access to local resources, mentorship, and networking opportunities, and can help them build relationships with investors and customers in their region.

- **Virtual or remote accelerators:** These programs are conducted entirely online, which allows startups from anywhere in the world to participate. They often provide startups with access to mentorship, resources, and networking opportunities through virtual platforms.

- **University accelerators:** These programs are educational nonprofits that help accelerate the development of student entrepreneurs and innovation at universities. Unlike for-profit accelerators, they do not take equity stakes in student-founded companies, and they usually provide seed grants. They offer a range of services like mentoring, technical assistance, use of facilities, and networking, and some also extend services to faculty and alumni. Also, 'Demo Day' is typically included.

- **Social accelerators:** A type of accelerator that have a mix of motivations that bridge public and private goods. These accelerators seek profit while accommodating objectives that advance the public good or accelerate nonprofit and social enterprise startups while adopting features that promote accelerator profit. Also, these programs are designed to support startups that are working to create positive social or environmental impact. They often provide startups with resources, mentorship, and funding that are specifically tailored to the needs of social impact businesses.

- **Innovation accelerators:** A type of accelerator for-profit ventures that invest in promising startups in exchange for equity and engage in activities to accelerate their growth and obtain next-stage funding. Their primary goal is to make a substantial profit when these companies are acquired or have successful IPOs. Cohort size drives a probability model that allows accelerators to balance their investments and expected return on investment. They have emerged as a response to the need to provide startups with a set of well-defined services and network opportunities to reduce their costs in time and resources during the commercialization process.

1.1.5.1. Corporate accelerators

Moschner et al. (2019) define corporate accelerators as accelerator programs sponsored or managed by established firms to support startups through mentorship, funding, and other resources. The aim is to help startups overcome the risks and challenges they face in their early stages of development.

Similarly, Dempwolf et al. (2014) define corporate accelerators as providers of seed capital, mentoring, technical assistance, networking, and facilities to entrepreneurs and startup teams to advance certain goals of the corporate parent. The aim is to accelerate innovation and gain a competitive advantage. Kohler (2016) mentions that corporate accelerators offer a potent approach to nurturing innovations from entrepreneurial ventures.

Lastly, Kanbach and Stubner (2016) allege that these programs provide financial support and comprehensive startup support models to external startups. They have diverse objectives, such as supporting entrepreneurs, developing new business ideas, and supporting digital transformation, and are present in various industries and international locations.

Dempwolf et al. (2014) also allege that corporate accelerators have different objectives, such as finding next-generation products, creating an ecosystem of users and customers, and driving innovation at a faster pace. The business models of corporate accelerators differ from those of other accelerators, but they generally work with technologies at the same stage of development and offer similar services to startups.

Moreover, Moschner et al. (2019) suggest that these programs have become more prevalent in recent years, highlighting the need to differentiate between different types of corporate accelerators based on their objectives and characteristics. Kanbach and Stubner (2016) also mention that the programs have become increasingly popular in recent years, with more than 65 active programs in 25 countries by early 2016.

Moschner et al. (2019) categorize corporate accelerators into four models based on their management structure and the number of participants, being:

- **In-house accelerator:** a type of accelerator program created and operated internally by firms. While it is not the most prevalent model, large corporate

organizations listed on the stock market, use this model predominantly. The objective of this approach is to tap into external startups' knowledge and innovativeness to solve internal problems or for growth opportunities. In addition to open innovation collaboration, some companies expect positive branding effects from their accelerator program. Other in-house accelerators also reported similar positive employer branding effects as a result of their participation in job fairs for graduates.

- **Hybrid accelerator:** a type of accelerator program that combines an outside-in approach with an intrapreneurship approach. It is an extension of the in-house accelerator and is designed for firms that want to develop and push promising internal ideas. In addition to working with external startups, the hybrid accelerator complements its batches with internal innovation projects run by corporate employees. This program speeds up the development of internal projects and external startups are allowed to exchange ideas and learn from each other. It is important to note that the hybrid character of this accelerator program is not communicated to external startups before the program starts.

- **Powered by accelerator:** a corporate accelerator model in which an independent accelerator manages the program on behalf of a single corporate organization. Companies aiming to primarily invest in startups use this model to evaluate startups at an early stage and make investment decisions earlier than possible with a traditional corporate venturing unit. Since many firms lack expertise in the startup field, they collaborate with an external accelerator provider that offers professional assistance with building and supporting startups. The 'powered by accelerator model' is relatively rare but well-known globally.

- **Consortium accelerator:** an external accelerator provider that offers its services to multiple corporate organizations. This model offers companies two major services, such as professionalizing the startup by bundling activities like providing workshops on setting up a business plan and establishing a relationship between the incumbent and the startup, often in the form of a joint pilot project. Companies participating in these programs obtain access to external innovations as well as portray a more innovative image.

Lastly, Kanbach and Stuber (2016) also identify four specific types of corporate

accelerators categorized to financial or strategic aims as well as using as a basis the program focus and organization. However, they diverge concerning the study provided by Moschner et al. (2019):

- **Listening post:** These programs have a purely strategic orientation and do not involve equity involvement from the parent company. The goal of these accelerators is to gain a window into new technologies and developments that may become relevant for the parent company or disrupt the industry. The programs focus on exploration-oriented external startups and frequently admit startups in very early stages. The accelerators are integrated into the parent company organization and offer mentorship, training, and networking opportunities.

- **Value chain investor:** These programs aim to identify and develop startups that can benefit the parent company along its value chain. The authors consider equity involvement in startups as obligatory in this accelerator type, and the objective is to maintain strong relationships with successful startups beyond the program's duration. These programs are typically run by the parent organization in departments focusing on digital businesses and innovation, with the support of external accelerator specialists.

- **Test laboratory:** A type of corporate accelerator that provides a protected environment for testing promising new business ideas, including internal business ideas as well as external startups. Equity involvement is obligatory in this accelerator type, and two different ways of involvement in external startups can be identified. Business ideas that go through this accelerator are at least minimally and often strongly related to the parent company's business or industry. From an organizational perspective, these accelerators are established as independent organizations in the form of independent legal entities acting as 100% subsidiaries of the parent company.

- **Unicorn hunter:** A type of corporate accelerator that focuses mainly on financial objectives. Its main goal is to earn a financial premium on minority investments in startups and to identify potential future unicorns, companies valued at more than $1 billion, by investing in numerous promising companies to increase their value significantly. Equity involvement can be conducted in two different ways: equity can be transferred directly in fixed terms or the form of a convertible loan.

Unlike other accelerator types, the unicorn hunter corporate accelerator follows a mainly exploitative logic as it attempts to make the companies more valuable by leveraging their assets, such as technologies, networks, competencies, or knowledge. The startups are frequently not related to the core business of the parent company but are chosen if they will most likely benefit from the parent company´s assets.

1.1.6. Comparing accelerators and incubators

Looking at the terminology differentiation, although nowadays some authors bring incubators and accelerators in interchangeable ways if we examine their basic definitions deeply, some discrepancies can be pointed out.

At first, looking at the general idea and bringing all the discussions already developed, it is possible to affirm that both incubators and accelerators provide startup aid in the form of advice and services. They enable linkages to help new businesses survive, scale up, and grow (Stagars, 2015; Mian, 2016). Also, some of them are now focusing on supporting startups that have the aim of introducing a positive social impact, aiming to realize both social and environmental, and financial returns (Sansone et al., 2020).

Aiming at standing out the main differences between them from a macro point of view, it is possible to affirm that the point of convergence reflects the phases when these entities are perceived in the business scenario, mainly at the moment or phase of the enterprise life in which they offer their services and also depending on the time-limit support provided by them. Bruneel et al. (2012) affirm that incubators have time-limited support lower than accelerators. Also, accelerators enter at a later stage of life of the new business, while Incubators give support at the startup and early venture moment (SUPER – Start-Up Promotion for Entrepreneurial Resilience, 2018).

Focusing on the differences from a micro point of view, according to Miller and Bound (2011), the wave of accelerator programs had distinct characteristics that differentiated them from existing incubators and other startup support programs. Previously, these programs were primarily driven by private investors and focused on the web and mobile sectors. However, five primary features define and group them, such as an open but competitive application process, offering pre-seed investment in exchange for equity,

focusing on small teams rather than individuals, providing time-limited support with programmed events and intensive mentoring, and supporting startups in cohort batches or "classes".

Moreover, Cohen (2013) brings a similar idea, highlighting the key differences between them, such as duration, cohorts, business model, selection, education, mentorship, and network development.

Concerning duration, the author alleges that accelerators focus on speeding up market interactions to help nascent ventures adapt quickly, while incubators buffer nascent ventures from the environment to give them room to grow. Also, accelerators typically have a limited duration of three months while incubators can last anywhere from one to five years. Due to the acceleration's limited duration, the firms are forced to get a lot done in a short period which reduces codependency. Firms have to address market selection mechanisms quickly, leading to quicker growth or quicker failure. The limited duration also focuses the founders' attention.

Also, when looking at the way the organizations enter and exit accelerator programs, the author alleges that it happens in cohorts or batches, leading to strong bonds and communal identity between founders. Accelerator directors who are investors in the firms they are helping have incentives more closely aligned with the ventures than professional incubator managers.

Still, according to Cohen (2013), usually, accelerators are typically privately owned and take equity stakes in participating ventures, while incubators are mostly publicly owned and managed by professionals who do not have investment funds. The best outcome for an incubator might be slower growth, which delays graduation and prolongs the venture's tenant status. Accelerators want growth that leads to a positive exit.

Lastly, according to the author, accelerator programs offer intense mentorship and education as cornerstones of their programs and are often a primary reason that ventures participate, while incubator tenants rarely take full advantage of available advice. Seminars teach entrepreneurs about a plethora of entrepreneurial topics, and mentorship is frequently cited as a valuable aspect of accelerator programs.

Overall, as already deeply discussed in the past chapters, Mian et al. (2016) allege that incubators are property-based initiatives providing tenant firms with a portfolio of new

venture support infrastructure, which includes business services, networking, access to professional services, university resources, and capital through an organization's startup early stage. Similarly, Bruneel et al. (2012) and Pauwels et al. (2016) allege that an incubator differs from an accelerator in that it focuses more on providing office space and in-house help, as well as a lengthier incubation time.

Hochberg (2016) affirms that accelerators are more recent phenomena that provide services through a highly selective, cohort-based program of limited duration, including services as assistance in developing the business plan, investor pitch deck, prototypes, and initial market testing, mainly guiding the organizations through the early to a later stage. In addition, renters in accelerators start their programs concurrently, but tenants in incubators do not (Cohen and Hochberg, 2014).

1.2. Italian scenario

Italy has followed the global trend in supporting the creation of an infrastructure specifically devoted to technology transfer, such as science and technology parks (Salvador and Rolfo, 2011). According to SUPER (2018), Italy has a strong tradition of supporting entrepreneurship and business incubation.

Auricchio et al. (2014) highlight that the development of incubators in Italy in the 1980s was mainly due to the intervention of the public sector, specifically the *Società per la Promozione e lo Sviluppo Internazionale* (Society for Promotion and International Development). The main objective of the incubators was to support the development of depressed areas and promote the creation and growth of innovative SMEs.

The authors also mention that the Italian government created several policies and initiatives to support the development of incubators, such as the establishment of the Ministry of Productive Activities and the implementation of the "*Polo Tecnologico*" (Technological Pole) program in the late 1980s. These policies aimed to create synergies between universities, research centers, and businesses, and promote the transfer of knowledge and technology to support the creation of innovative startups.

The first incubation activities were established in SPs (scientific parks) and BICs (business incubation centers) in the early 1980s to promote the development of innovation and Small and Medium Enterprises (SMEs). In the country's economy, SMEs are the

backbone of Italian GDP and employment (SUPER – Start-Up Promotion for Entrepreneurial Resilience, 2018).

Still, according to Auricchio et al. (2014), while SPs focused on high-tech firms, BICs were geared toward low-tech firms and were less innovative with weaker linkage to academics. However, the promotion of these initiatives in Italy was relatively late compared to the rest of Europe. The first scientific park, the Area science park of Trieste, was built in 1982, and its diffusion was initially weak, with only four structures counted in 1990. The number of SPs and BICs grew from 1990, with 12 SPs present on the Italian scene by 1995. Public funding initiatives supported the development of both BICs and SPs.

Colombo and Delmastro (2002) allege that in the late 1980s, the first Business Innovation Centers (BICs) were established in Italy, and despite being a bit late compared to scientific parks, they spread more quickly. By the end of the 1980s, there were already ten BICs in Italy. While the majority of the scientific parks were located in the north with most of the services provided being technical and scientific services, BICs had a more homogeneous context, being less focused on innovation and offering more financial, and marketing services, as well as legal advice.

The concentration of tenants in scientific parks was very high, with the four largest parks hosting more than 50% of tenants. Similarly, the two largest parks accounted for 50% of the total workforce. However, BICs had fewer employees than scientific parks, as they preferred to outsource some of their activities to third parties (Colombo and Delmastro, 2002).

In addition to BICs and SPs, new types of incubators emerged in Italy towards the end of the 1990s. One of these is university incubators, which provide services similar to those offered by BICs and SPs but with a stronger focus on transferring scientific and technological knowledge from the academic world. Private incubators, on the other hand, began to appear more prominently in the early 2000s and were initially specialized in the Internet sector, and some also acted as venture capitalists (Munna, 2022).

Auricchio et al. (2014) suggest that the public sector played a crucial role in the development of incubators in Italy, particularly in their early stages. The government's support and initiatives created an environment that was conducive to the creation and

growth of innovative startups and contributed to the establishment of a tradition of entrepreneurship support and business incubation in Italy.

It is possible to associate the division of entrepreneurial activities per region in Italy with the NUTS framework, using as a basis the development of SPs mainly in the north and the BICs being more uniform. Eurostat (2021) has established a hierarchical framework for allocating the economic territory of the European Union and the United Kingdom, which serves several purposes such as collecting, developing, and harmonizing regional statistics within Europe, and conducting socio-economic analyses of the various regions. The major socio-economic regions are classified under NUTS 1, while NUTS 2 identifies basic regions for implementing regional policies. NUTS 3, on the other hand, categorizes smaller regions for specific diagnoses.

In 2012, the Italian Government approved the "Decreto Crescita 2.0", Decree Law no. 179/2012, which can be translated into English to 'Growth Decree 2.0'. Its objective was to provide urgent measures for the growth of the country. It included the definition of innovative startups and certified incubators, which were identified and enhanced as structures that offer incubation services effectively.

The MISE (*Ministero delle Imprese e del Made in Italy*, 2022) defines innovative startups as young enterprises, with high technological content, with strong growth potential and for this reason, represent one of the key points of Italian industrial policy.

Also, according to the MISE (2022), companies that meet the requirements can become certified incubators by obtaining self-certification from their legal representative.

Once certified, innovative startups and certified incubators can take advantage of various benefits, such as exemption from fees and stamp duty, as well as tax credits for hiring highly qualified personnel. This law also fostered the trend toward the privatization of incubation activities.

1.2.1. SIM

According to SIM (2023), the Social Innovation Monitor is an interdisciplinary group that aims to understand and support the development of innovative solutions to social and environmental challenges.

The team is composed of researchers and professors from different universities and research centers who share a common interest in innovation and entrepreneurship, with a focus on social and environmental impact.

The group is headquartered at the Politecnico di Torino, in Turin, Italy, where it is coordinated by Professor Paolo Landoni, an expert in entrepreneurship and innovation.

The main objective of SIM is to promote the development of innovative solutions that can have a positive impact on society. To achieve this, SIM conducts research, provides training and support to entrepreneurs and innovators, and works to create a supportive ecosystem for social innovation. The team also collaborates with other organizations, such as governments, NGOs, and businesses, to help create new partnerships and networks that can advance the development of social innovation.

1.2.2. CDP

Cassa Depositi e Prestiti (CDP) is the Italian National Promotional Institution that has been serving Italy since 1850. The company is committed to promoting Italy's sustainable development and achieving significant economic, social, and environmental impacts (CDP, 2023).

The institution is also responsible for financing infrastructure and investments of public administrations, promoting eco-sustainable infrastructure, and supporting the development of the Italian entrepreneurial fabric.

CDP is a publicly controlled joint-stock company, with the Ministry for the Economy and Finance as its majority shareholder, and the Foundations of banking origin as its minority shareholder. CDP has played a substantial role in supporting the Italian economy throughout history and responding to the challenges of development.

CDP's strategic plan for 2022-2024 aims to address Italy's challenges and contribute to the country's growth and sustainable development. The plan involves mobilizing resources of €65bn from CDP, attracting a further €63bn from third parties, for a total of €128bn of resources directed towards Italy. Moreover, CDP's investments will be guided by Environmental, Social, and Governance (ESG) principles.

1.2.2.1. CDP Venture Capital SGR

The *Cassa Depositi e Prestiti Venture Capital Società di Gestione del Risparmio* - Italian Innovation Fund, which is 70% owned by CDP Equity and 30% by Invitalia, is building a National Accelerators Network in Italy through the *Fondo Acceleratori*, which focuses on vertical sectors to create a connected network of specialized accelerators.

The program aims to encourage the exchange between startups and corporates, creating a unique ecosystem of expertise and human capital. The network will include 20 accelerators over the next two years and aggregate the ecosystem players through coordination, creating a single national network of accelerators that represents an important opportunity to combine specialization and sharing between businesses from different sectors (CDP Venture Capital, 2021).

2.   Methodology

As stated previously, this study aims to investigate organizations that have been incubated by Italian incubators and CDP accelerators programs. The study examined certain characteristics of the incubators, as well as the progress of the organizations that were incubated, which was done in conjunction with the Social Innovation Monitor's (SIM) yearly entrepreneurship research efforts in Italy. This research was conducted as part of the SIM team's ongoing efforts to enhance the value of its research collection.

While the analysis of incubation activities has followed a consistent pattern since 2017, this year's research includes, for the first time, an examination of accelerators supported by the *Fondo Acceleratori* of the CDP Venture Capital SGR.

The research was conducted in two distinct phases. The first phase involved data collection through a survey followed by data analysis and focused on incubators and their incubated organizations. The second phase concentrated on accelerator programs and consisted of research on published data by CDP, which was also followed by data analysis.
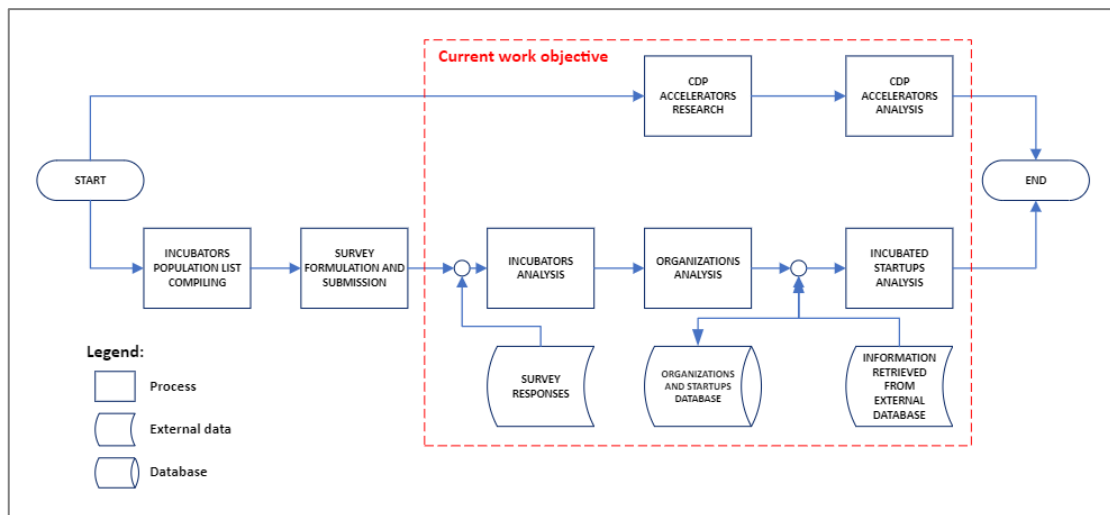
Figure 1 – Research and analysis flowchart

Figure 1 depicts the information flow that was used to conduct the entire research, with the red-dashed square indicating the specific processes that were carried out for this present work.

The Social Innovation Monitor (SIM) first compiled a list of 237 Italian incubators as part of the initial step. A survey was then created and distributed to these incubators, and 43 of them responded with a list of their tenants. The collected data was organized into a virtual datasheet. In the previous year's research, 41 incubators provided their tenants.

The research then proceeded to the next phase, which was divided into two streams: incubator classification and organization compilation.

The primary aim of the first data stream was to categorize the incubators that had submitted their tenant list, which included the following information:

- An email reference code, ranging from 1 to 43, to identify each incubator's response;
- Name of the incubator;
- Business name of the incubator;
- Tax code (VAT number) of the incubator;
- Type of incubator, which could be Business, Mixed, or Social, based on Sansone et al.'s (2020) calculation method;
- Institutional categorization of the incubator;
- Geographical distribution of the incubator according to the NUTS 1;

- Teams/organizations declared as incubated by the incubator;
- Social impact number of teams/organizations declared to have a social impact aim.

The primary objective of the incubator classification stream was to analyze the characteristics of the 43 incubators that provided their incubated organizations list, which will be presented in the analysis. It should be noted that some of the collected information was not utilized in the analysis.

The second data stream aimed to compile a comprehensive list of all of the 991 incubated teams and organizations submitted by the incubators, with details provided in separate columns. These columns contained information such as:

- Source code, ranging from 1 to 43, to link the incubated organization to its respective incubator;
- Reference code, ranging from 1 to 991, to identify the incubated organizations;
- Name of the organization;
- Tax code (VAT number) of the organization;
- Name of the incubator responsible for the organization;
- Status of the organization, such as Incorporated, Unincorporated, Duplicated, or Abroad organization. Being:
    o Incorporated if it already has a tax code;
    o Unincorporated if it still does not have a tax code;
    o Duplicated if it is incubated by two or more different incubators;
    o Abroad organization if it is incubated by an Italian Incubator, but was incorporated in a different country.

After completing the previous phases, a data cleaning process was carried out to define the final database sample. This involved eliminating organizations classified as "Duplicated" in their second or third appearances, as well as all organizations categorized as "Abroad organization". Once the sample database was created and validated by the SIM team, the research using an external database could begin.

A similar structure was followed for the accelerators research, except that no survey was required. Instead, the list of accelerators was obtained directly from the CDP and then analyzed.

The research was conducted using several tools, including AIDA databases, Survey Monkey for designing and submitting questionnaires, and Microsoft Excel for data analysis. For the data that was not provided by the incubator, search engines like Google were used to retrieve public information.

2.1. AIDA Database

AIDA Database is a comprehensive database owned by Bureau Van Dijk that provides information on companies in Italy, with up to ten years of history.

It contains various modules to evaluate financial strength, probability of default, and micro-enterprises assessment. Users can search and analyze company information using hundreds of criteria, create custom indicators and reports, analyze market trends and benchmarking, and monitor companies using the alert system.

Aida is useful for credit analysis and risk management, procurement management, corporate finance, M&A and advisory firms, sales and marketing developments, academic research and libraries, and transfer pricing analysis. The database covers approximately 1 million companies in Italy (AIDA, 2023).

In this research, AIDA was extensively employed as a source of information, supplying the content needed to conduct analysis.

2.2. Survey

Figure 1 illustrates that the SIM team began the research process by conducting a survey of incubators using a questionnaire that was based on a similar survey conducted in previous years. The questionnaire was developed and refined with input from an advisory board and the team's own experience. Only minor changes were made to ensure continuity and comparison with previous years' results.

To ensure accuracy, a data monitoring process was implemented, and outliers were identified and confirmed by respondents. Incubator managers were also solicited to increase the response rate, resulting in a sample size of 89 fitting answers that were available for analysis.

However, in the development of this research, the primary focus was to analyze the

incubated organizations provided by the incubators when submitting their response to the survey. Although the fitting answers were composed of 89 incubators, only 43 of them submitted their incubated organizations list, which were taken into consideration for analysis.

2.3. Startups list

As previously mentioned, out of the 237 Italian incubators surveyed, only 43 provided a list of startups that were incubated in 2021, or in previous years but still attending their program. The list initially contained 991 organizations, but some of them were not startups, and a preliminary search was conducted to gather relevant information.

The AIDA database was then used to obtain further information on the startups through their business names and tax codes (Value-Added Tax numbers). Those without a tax code were not considered in the startup list, as they are considered entrepreneurial teams. According to the SIM (2021), entrepreneurial teams are defined as ideas and entrepreneurial projects that do not yet have a legal entity.

Moreover, 'Duplicates' and 'Companies incorporated outside Italy' were not also considered in the list, as mentioned in the methodology section. This led to a dataset of 775 companies.

Additionally, only organizations founded within the last 5 years (2017-2021) were considered for analysis, which resulted in a final dataset of 613 startups.

To identify social startups, following the content provided in the literature review, all startups incubated by Business Incubators were excluded, and those incubated by Social and Mixed Incubators were analyzed in detail using search engines and social networks.

Still, startups were considered to have a significant social impact if they met one of the following conditions: they were Innovative Start-ups with a Social Vocation (SIaVS), a B. Corp (those that obtained a B Corporation certification), a Benefit Company (*Società Benefit*), or focused on introducing at least one social innovation.

2.4. Accelerators population

The CDP Venture Capital SGR provided all the necessary information required to retrieve

data on the acceleration programs they support.

As mentioned in the literature review, the CDP group has been promoting the exchange of startups and corporates since 2021 and aims to establish 20 accelerators in various sectors by 2023.

The research was conducted until January 18, 2023, and identified a total of 16 acceleration programs established by the company. The accelerators were then categorized based on their main sector of operation, establishment year, location within Italy (NUTS), social and environmental focus, funding amount, duration of the program, and the number of startups that will be accelerated during the three years mentioned.

2.5. Data analysis

The ownership of all the data belongs to the SIM team, and it pertains to the research conducted in 2022, which focused on the 2021 scenario. The data analysis for both incubators and accelerators was conducted from December 08th, 2022, to January 30th, 2023.

Some results were based on a sample of 89 survey respondents, while others considered only the 43 incubators that provided their incubated organizations.

Still, some incubators were not considered due to various reasons mentioned in previous chapters, such as the incubated organizations no longer being a startup, being incubated by multiple incubators, or not being incubated in Italy. The specific sample used for each analysis will be indicated as necessary.

3. Analysis

The analysis is structured into three distinct stages. In the first stage, the analysis provides a brief, but comprehensive overview of the Italian incubators involved in the analysis of incubated startups.

Moving on to the second stage, aiming at stratifying the main characteristics of the entrepreneurial environment, the analysis provides a detailed examination of the incubated organizations and startups of the incubators that submitted their list.

Lastly, the third stage of the analysis focuses on the 16 accelerator programs offered by CDP. This stage of the analysis highlights the main characteristics of these programs, which can include factors such as their focus areas, funding opportunities, and potential social impact.

3.1. General overview – Survey responses and startups scenario in Italy

According to the SIM database, in 2021 there were 237 identified incubators located in Italy. Out of these 237, only 89 incubators responded to the survey questionnaire, which represents 37.55% of the total identified incubators. The representation of these 89 incubators can be seen in Figure 2, where the 237 incubators represent the population, and the 89 that responded represent the first sample (Sample 1).
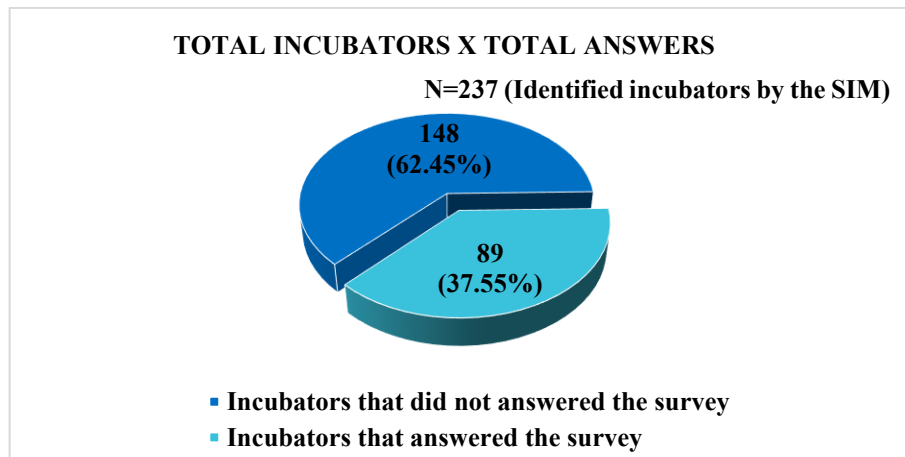

Figure 2 – Total identified incubators (Population) x Total answers (Sample 1)
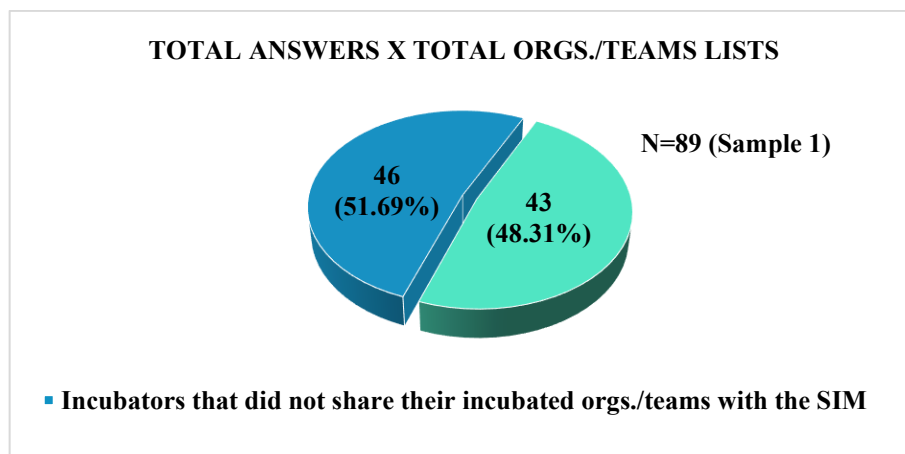

Figure 3 – Sample 1 x Incubators that shared their list (Sample 2)

Out of the 89 incubators in Sample 1, 43 of them (48.31%) provided their incubated

organizations and entrepreneurial teams list to the SIM (Figure 3). These 43 incubators will be referred to as Sample 2.

In terms of certified incubators, the Italian government certified 46 incubators in Italy until December 31, 2021. Out of the 89 incubators in Sample 1, 31 of them (34.83%) were certified incubators, and out of the 43 incubators in Sample 2, 13 of them (30.23%) were certified incubators as well, as shown in Figure 4.

Sample 2 (N=43) is a suitable representation for the statistical analyses performed on institutional categorization (Public, Public-Private, and Private), typology (Business, Mixed, and Social), and geographical distribution, using a 95% confidence t-test.
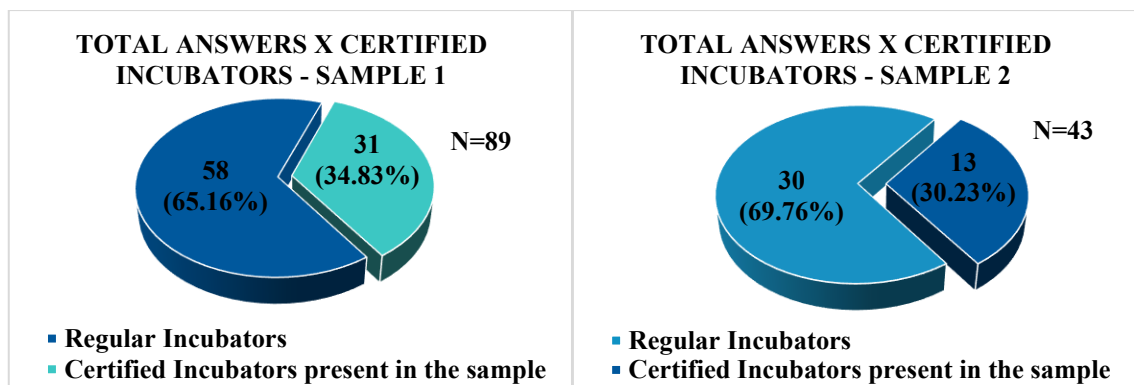

Figure 4 – Sample 1 and 2 x Certified Incubators

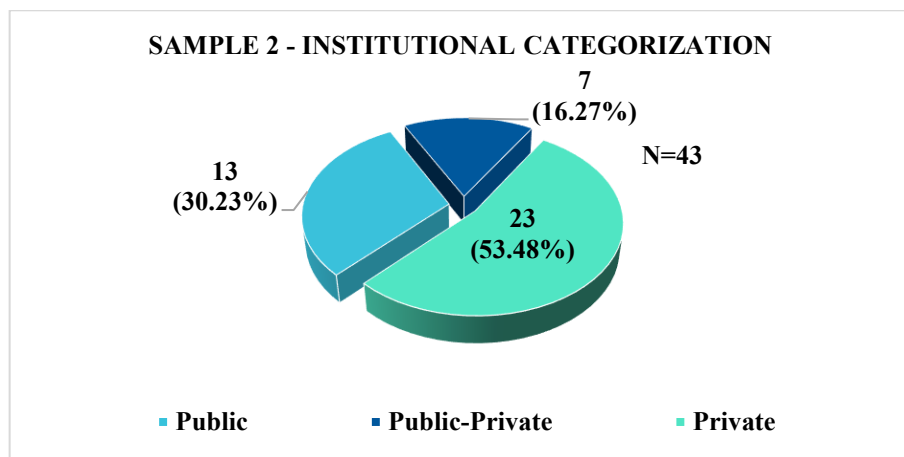Figure 5 displays the results of the analysis performed on institutional categorization.

Figure 5 – Institutional categorization (Sample 2)

Private institutions constitute the majority of incubators (23 out of the total), while public institutions account for 30.23% of the sample.

Figure 6 depicts the distribution of Business, Mixed, and Social Incubators present in the second sample. The calculation for their categorization, based on the approach of Sansone et al. (2020), was explained both in the literature review and in the methodology section. The sample consists of 20 Business Incubators (46.51%), 15 Mixed Incubators (34.88%), and 8 Social Incubators (18.60%).
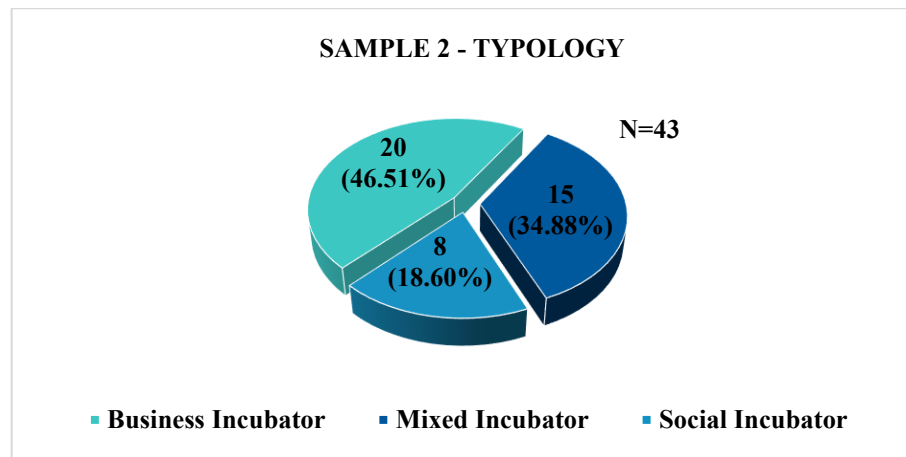
Figure 6 – Incubators' typology (Sample 2)

The geographical distribution of the incubators in the sample is shown in Figure 7, based on the NUTS classification. The majority of incubators (27 out of the total) are located in Northern Italy (62.79%), while both Middle, South, and Islands regions have 8 incubators each.

Figure 7 – Geographical distribution of Incubators (Sample 2)

Table 1 provides an estimation of the number of startups in Italy per sample, with a focus

on the startups incubated by these incubators.

Incubators	Quantity	Certified Incubators	Average number of startups incubated | Median	Nº of startups incubated
SAMPLE 1	89	31	32.12 | 16	2,859
SAMPLE 2	43	13	29.48 | 19	1268

Table 1 – Initial analysis to define the samples

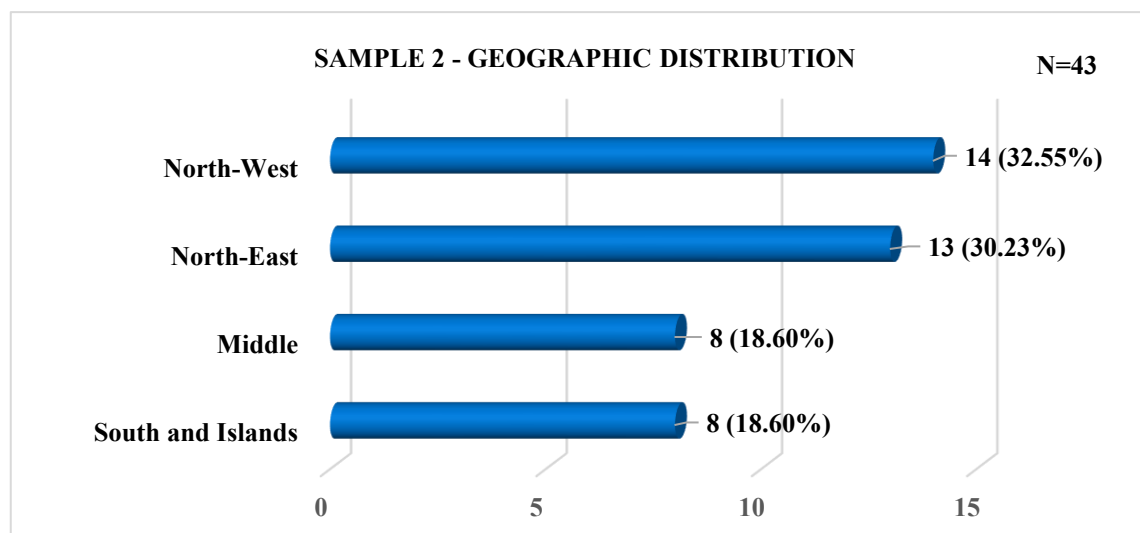The average number of startups incubated was calculated by adding up all the organizations incubated by the incubators provided in the questionnaire and dividing this value by their respective number of incubators.

Looking at Sample 1 and assuming an estimation of 2,859 startups in Italy, Table 2 provides interesting correlations.

Data	Value	Measurement Unit	Average
Area of Italy[1]	302,073	Km²	~ 106 km²/Startup
Population[2]	59,257,566	Habitant	~ 21,000 Habitant/Startup
Innovative Startups[3]	13,999	Unity	~ 20% of total Startups
Estimation of total startups in Italy	2,859	Unity	-

Table 2 – Startups per km², per population, and % of Innovative Startups

For example, it shows that approximately one startup is developed in Italy for every 106 km² of Italian territory and every approximately 21,000 inhabitants. Additionally, the ratio of innovative startups is around 20% or one in five of the total startups developed in Italy.

Upon reviewing the estimates from previous years, Table 3 illustrates the progression of the estimation analysis.

	2019	2020	Δ%	2021	Δ%
Estimation of incubated startups in Italy	3.064	3.670	+19.78%	2.859	-22.10%

Table 3 – Estimation of the incubated startups in the past years

While there was an increase of approximately 20% in the estimated number of startups

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[1] Source: EC (European Commission), 2023.
[2] Source: EC (European Commission), 2023.
[3] Source: MISE (*Ministero delle Imprese e del Made in Italy*), 2021.

incubated in Italian territory in 2020 compared to 2019, the research conducted in 2021 indicated a decline of 22% in this metric.

3.2. Defining samples

With a better understanding of the incubators involved in the analysis, it is now possible to stratify the startups they have incubated. This analysis pertains to sample 2, which consists of N=43.

Initially, when examining the data provided by the incubators regarding their list of tenants, 991 organizations and entrepreneurial teams were identified. At this point, it was unclear whether these entities were organizations (those with a VAT number), entrepreneurial teams (those with ideas and entrepreneurial projects but lacking a legal entity), or startups (those developed between 2017 and 2021). Definitions for these terms can be found in the methodology section.

Although sample 2 comprises 43 incubators and 991 incubated organizations, some were excluded for different reasons: their tenants were already being incubated by another incubator and were classified as "duplicate", or their incubated organizations had a legal entity outside Italy (Figure 8).
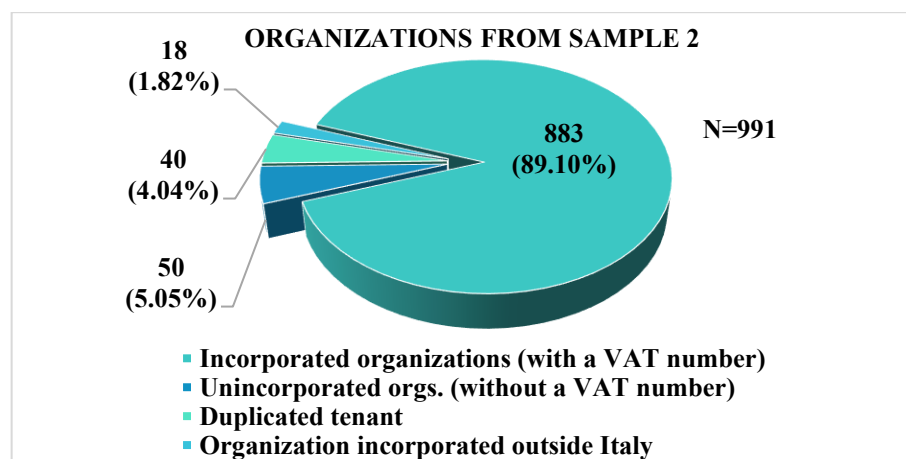

Figure 8 – Categorization of organizations (Sample 2)

Approximately 90% of the organizations included in the sample were incorporated within Italian territory and hold a VAT number. Unincorporated organizations represent 5% of the sample, while duplicated tenants and organizations incorporated outside Italy account for almost 6%.

As mentioned in the methodology, the AIDA database was used as the source of official information for Italian organizations. Among the 883 incorporated organizations in the sample, 775 organizations had their data present in AIDA, representing 87.77% of the sample (Figure 9).
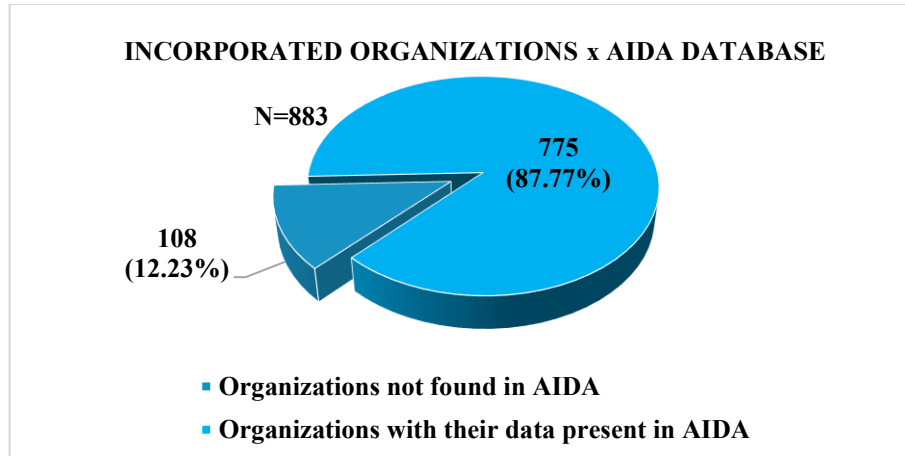
Figure 9 – Incorporated organizations in the AIDA database

For the remaining 108 organizations not present in the AIDA database, external research was conducted to identify their year of incorporation to determine if they could be considered as startups, i.e., if their incorporation occurred between 2017 and 2021.

Figure 10 – Year of incorporation – Organizations not found in AIDA

Figure 10 shows the distribution and results of the external analysis, which identified 55 organizations as startups and 3 as entrepreneurial teams. The remaining 50 organizations (46.30%) were discharged from the analysis since they were incorporated during or before 2016, or their year of incorporation was not found.

To determine the final count of startups and entrepreneurial teams, two sequential approaches were taken into consideration.

First, only considering the 775 organizations present in the AIDA database, Figure 11 shows that 558 organizations were identified 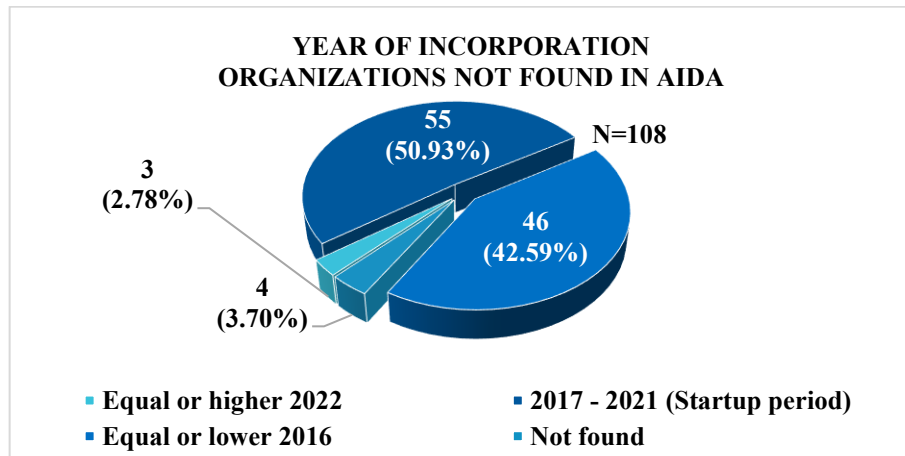as startups, 22 were categorized as entrepreneurial teams, and 195 were discharged from the analysis due to their incorporation during or before 2016.
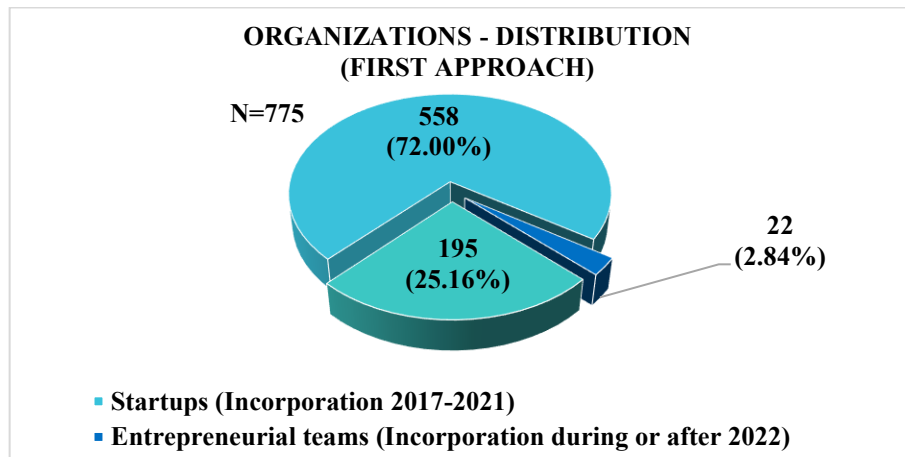
Figure 11 – First approach: distribution of organizations

The second approach considered startups that were not on AIDA but were incorporated during 2017-2021 and were thus not included in the initial analysis.
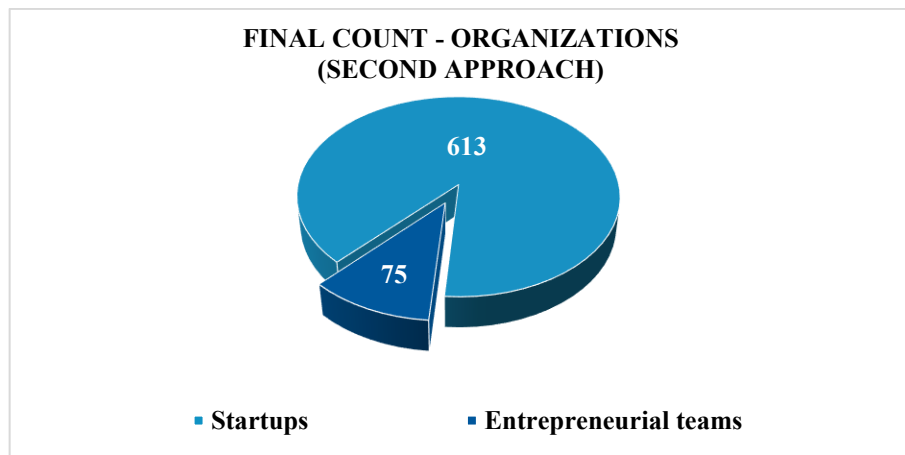
Figure 12 – Final count of organizations

To count the total startups, these organizations were added to the 558 previously identified, bringing the total to 613. For entrepreneurial teams, 50 organizations without a VAT number were considered unincorporated at the beginning of the analysis (Figure

8), and 3 of them were established during or after 2022. These organizations were added to the 22 identified in the first approach, bringing the total count of entrepreneurial teams to 75.

Table 4 presents the final count of startups that will be utilized in the analysis.

Type	Quantity	Related-Incubators	Average
Organizations	775	41	**~19 organizations/incubator**
Startups	558	40	**~14 startups/incubator**

Table 4 – Defining the final count of startups

3.3. Incubated startups

In the previous chapter, it was determined that out of the 558 startups identified, 40 incubators were responsible for their incubation. This means that on average, each incubator incubated around 14 startups.

In this chapter, the aim is to analyze the social and non-social scope of the incubated startups, as well as if they are considered innovative.

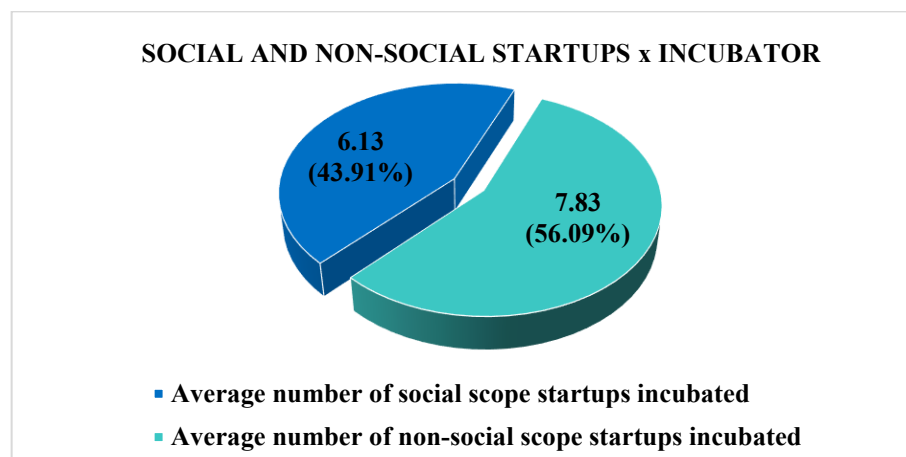Figure 13 – Social and non-social startups average per incubator

Figure 13 illustrates the average number of social and non-social startups incubated by the incubators. It shows that out of every 14 startups, approximately 6 have a social scope, while 8 do not.

When considering innovative startups (Figure 14), there is a significant difference between the averages. Innovative startups account for almost 84% of the startups

incubated (approximately 12 out of 14), while non-innovative startups account for only 2 out of 14.

INNOVATIVE STARTUPS x INCUBATOR

11.68 (83.69%)

2.28 (16.31%)

- Average number of innovative startups incubated
- Average number of non-innovative startups incubated
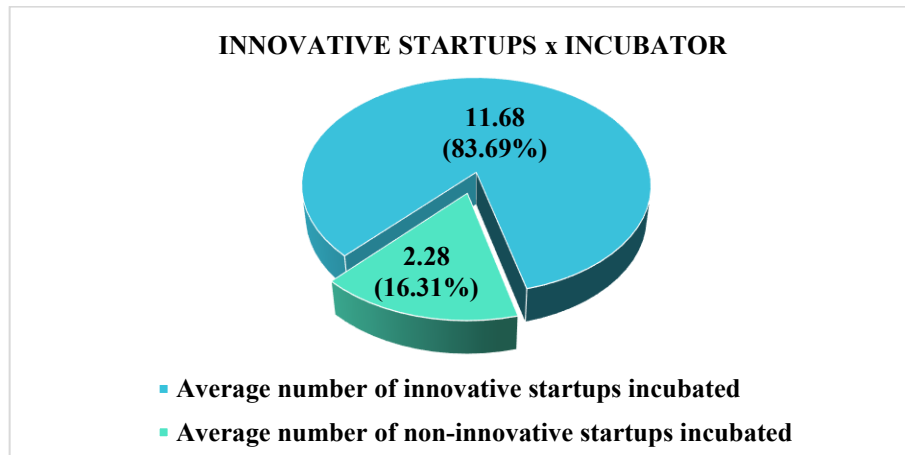
Figure 14 – Innovative and non-innovative startups average per incubator

When combining both social scope and innovation characteristics (Figure 15), it is found that out of the average of 6 social scope startups incubated per incubator, approximately 5 are innovative (82.86%) while only 1 is non-innovative (17.14%).

SOCIAL SCOPE STARTUPS + INNOVATIVE AND NON-INNOVATIVE STARTUPS x INCUBATOR

5.08 (82.86%)

1.05 (17.14%)

- Average number of social scope with innovative startups incubated
- Average number of social scope with non-innovative startups incubated
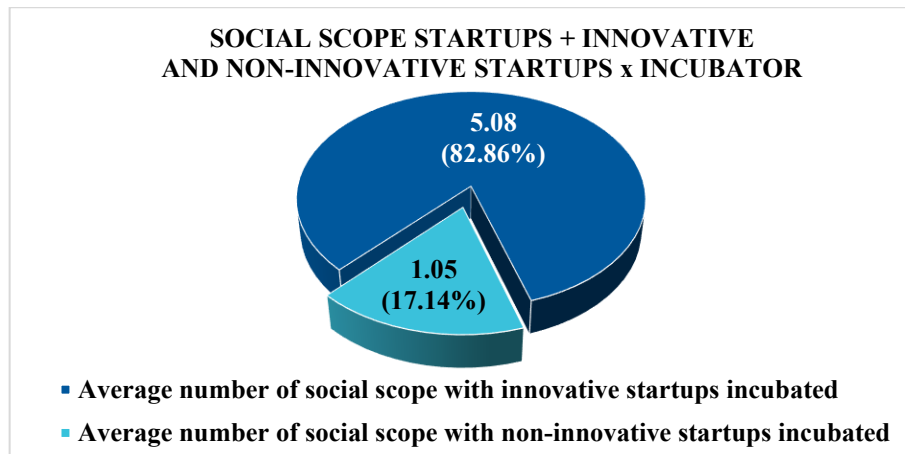
Figure 15 – Social scope + Innovative startups x Incubator

Similarly, for the average of 8 non-social scope startups incubated per incubator (Figure 16), approximately 7 are innovative (84.35%) while only 1 is non-innovative (15.65%).
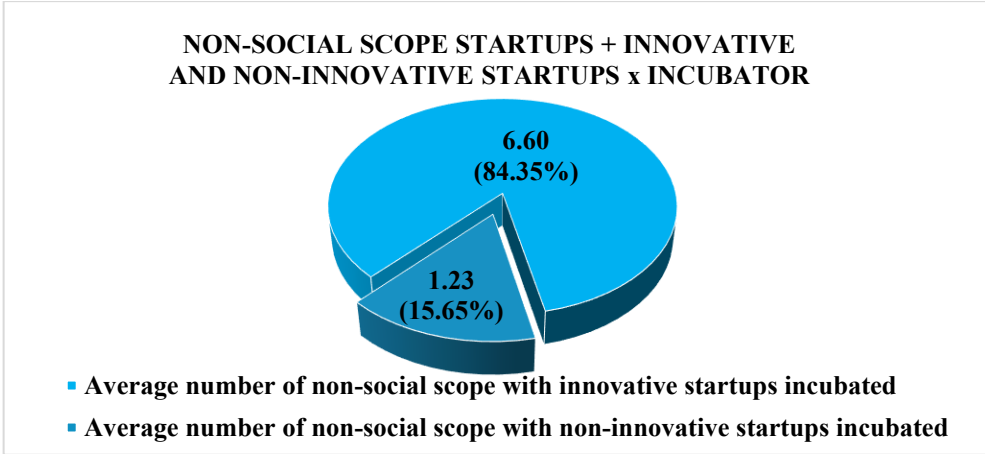
Figure 16 – Non-social scope + Innovative startups x Incubator

3.3.1. Geographical distribution

The geographical distribution of incubated startups was analyzed through two different approaches. The first approach used a general distribution between Italian regions (Figure 17 and Table 5), while the second approach used the NUTS 1 division. In both cases, the sample size was N=558.
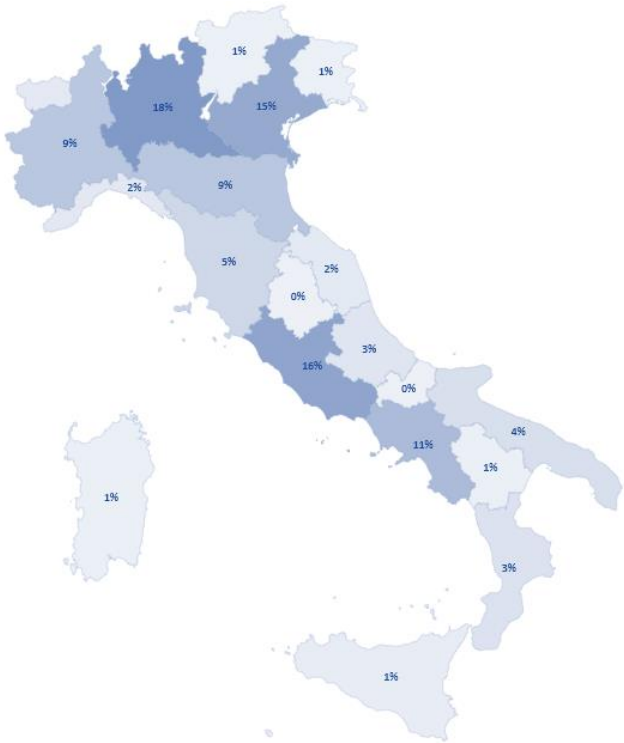
Figure 17 – Geographical distribution – Italian regions

Region	Sample	Percentage
Lombardia	**99**	18%
Veneto	**81**	15%
Piemonte	**49**	9%
Toscana	**29**	5%
Emilia-Romagna	**49**	9%
Liguria	**12**	2%
Lazio	**87**	16%
Puglia	**21**	4%
Sardegna	**5**	1%
Calabria	**18**	3%
Trentino-Alto Adige	**3**	1%
Campania	**62**	11%
Friuli-Venezia Giulia	**3**	1%
Sicilia	**7**	1%
Marche	**10**	2%
Basilicata	**5**	1%
Molise	**2**	0%
Abruzzo	**14**	3%
Umbria	**2**	0%

Table 5 – Geographical distribution – Italian regions

Considering the NUTS approach (Figure 18 and Table 6):
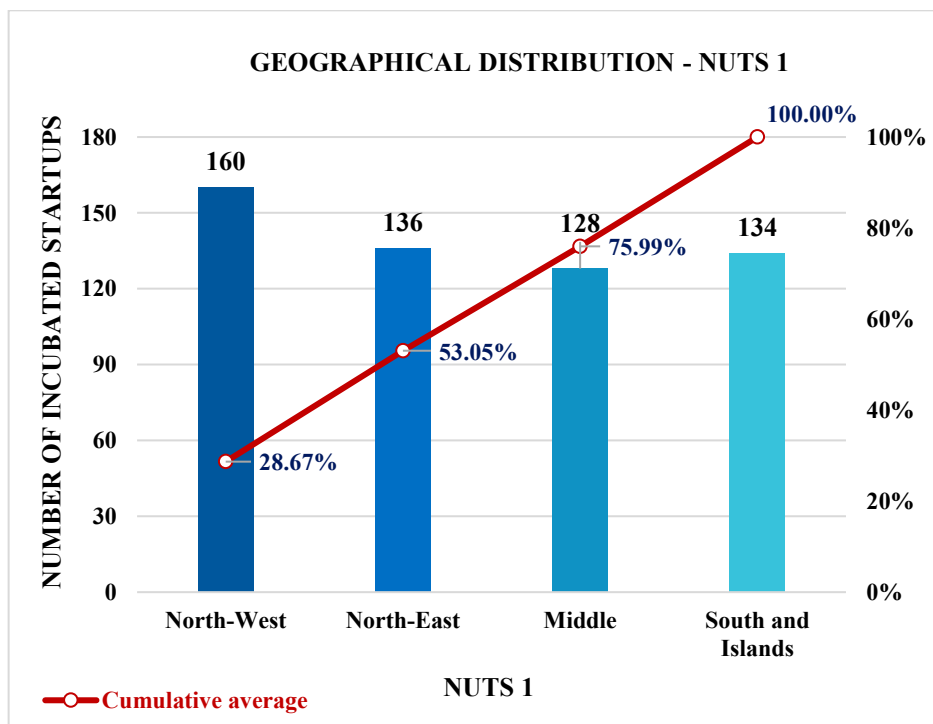
Figure 18 – Geographical distribution – NUTS 1 (Italy)

Regions	Sample	Percentage
North	296	53%
Middle	128	23%
South and Islands	134	24%

Table 6 – Geographical distribution (Italy)

When using the NUTS approach, it was observed that there is a trend of startups being incubated in the northern part of Italy, accounting for approximately 53% of the total startups. This aligns with the pattern seen in the incubator's geographical distribution (Sample 2, Figure 7).

Also, we can analyze the distribution of incubated startups by comparing this year's research to last year's, as shown in Table 7. The data reveals a significant decline in the number of incubated startups in the northern region (averaging -16%) and central regions (averaging -12%) of the country. However, in the southern region and islands, there was a substantial increase of around 118%.

Region	2020	2021	Δ%
North-West	34%	29%	-15%
North-East	29%	24%	-17%
Middle	26%	23%	-12%
South and Islands	11%	24%	+118%

Table 7 – Comparison of geographical distribution between the years

Table 8 shows the relationship between NUTS distribution and social scope. Although social scope incubated startups have a higher sample in the northwest of Italy, the Middle, South and Islands are well represented, accounting for approximately 47% of the total incubated startups. The same scenario can be observed for the non-social scope incubated startups.

NUTS 1	Social scope	Percentage	Non-social scope	Percentage
North-West	89	36%	71	23%
North-East	41	17%	95	30%
Middle	53	22%	75	24%
South and Islands	62	25%	72	23%

Table 8 – NUTS and social/non-social incubated startups

Table 9 illustrates the same characteristics for innovative startups. The northern part of Italy accounts for approximately 55% of the total incubated startups, while the non-innovative startups have a higher presence rate in the Middle, South, and Islands, accounting for 60% of the sample.

NUTS 1	Innovative startups	Percentage	Non-innovative startups	Percentage
North-West	**143**	31%	**17**	19%
North-East	**116**	25%	**20**	22%
Middle	**101**	22%	**27**	30%
South and Islands	**107**	23%	**27**	30%

Table 9 – NUTS and innovative/non-innovative incubated startups

It should be noted that of the 558 incubated startups, 83.69% (or 467 startups) are classified as innovative, making them more representative than the non-innovative ones.

3.3.2. Legal form

In the incubated startups, four different legal forms were identified, namely:

- S.R.L.: *Società a Responsabilità Limitata* (Private company limited by shares);
- S.R.L.S.: *Società a Responsabilità Limitata Semplificata* (Simplified private company limited by shares);
- S.P.A.: *Società Per Azioni* (Joint-stock company);
- S.C.A.R.L.P.A.: *Società Consortile a Responsabilità Limitata e Per Azioni* (Consortium company limited by shares and joint-stock).

According to CNN (Consiglio Nazionale del Notariato, 2023), the S.R.L. is the most common legal form for carrying out a business. It provides organizational flexibility, perfect capital freedom, and limits the personal liability of shareholders for the company's debts. On the other hand, the S.R.L.S. has the same purpose, but it can only have individual shareholders, and the initial share capital cannot exceed 10,000 €.

The S.P.A. is suitable for large investments, requires a minimum capital of €50,000, and has the key features of limited liability for all shareholders and the division of capital into shares.

Finally, the S.C.A.R.L.P.A. works as a mix of the previous two legal forms and is applied to consortiums, and is often found in the non-profit sector.
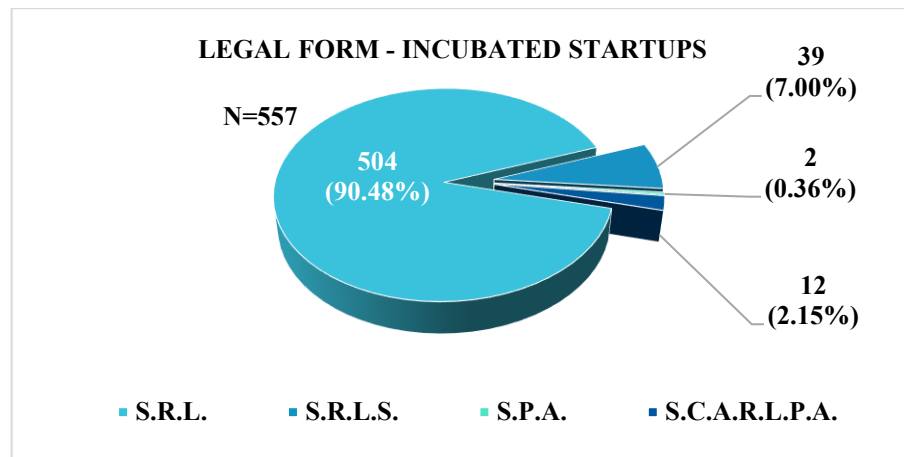
Figure 19 – Legal forms of the incubated startups

Out of 557 incubated startups, 97% (or 543) have an S.R.L. legal form, as expected due to its popularity and simplicity. The S.P.A. accounts for 0.36% (2 organizations) and the S.C.A.R.L.P.A. for 2.15% (12 startups) of the sample (N=557, Figure 19).

NUTS 1	S.R.L.	Percentage	S.R.L.S.	Percentage
North-West	144	29%	12	31%
North-East	129	26%	5	13%
Middle	113	22%	11	28%
South and Islands	118	23%	11	28%

Table 10 – S.R.L. and S.R.L.S legal forms distribution

The distribution of S.R.L. legal forms regarding the NUTS regions can be seen in Table 10 (N=543), which shows a well-distributed scenario with a lower variance. The Northern part of Italy accounts for 54% of the incubated startups with S.R.L. legal form.

NUTS 1	Social scope	%	Non-social scope	%
North-West	85	36%	71	23%
North-East	39	17%	95	31%
Middle	50	21%	74	24%
South and Islands	59	25%	70	23%
	Innovative	%	Non-innovative	%
North-West	143	31%	13	16%
North-East	115	25%	19	24%
Middle	100	22%	24	30%
South and Islands	105	23%	24	30%

Table 11 – S.L.R. per NUTS, social scope, and innovative startups

Moreover, Table 11 (N=543) allows for a comparison of the S.R.L. legal forms to the NUTS regions, social scope incubated startups, and innovative startups. The table adds

the values of S.R.L. and S.R.L.S.

The results show that incubated startups with S.R.L. legal forms tend to be incubated in the Northern part of Italy, accounting for 53% and 56% in the case of social scope and innovative startups, respectively. Additionally, the same region represents 54% of non-social scope incubated startups.

3.3.3. Foundation year

Figure 20 displays the number of incubated startups founded annually (N=558) during the five years from 2017 to 2021.

Despite a period of global economic downturn due to the COVID-19 pandemic, the analysis indicates that the number of incubated startups per year increased at an average rate of 18.63% since 2017. For instance, in 2021, 142 startups were established, which is a 94.52% increase from 2017.
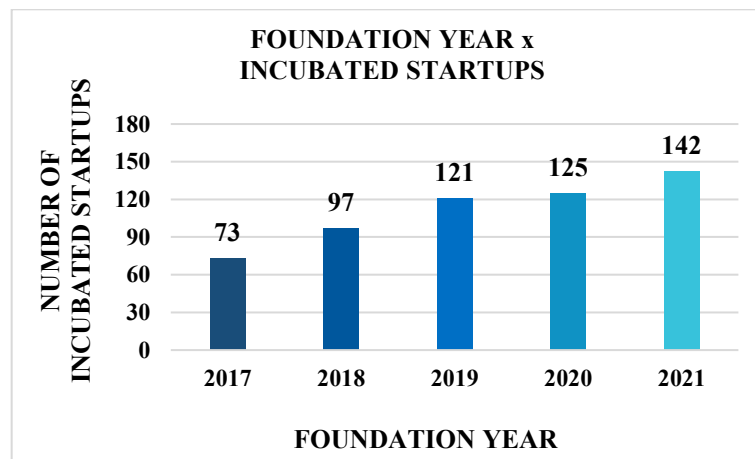
Figure 20 – Foundation year per incubated startup

Table 12 allows for the examination of different scenarios, such as the localization according to the NUTS regions, social scope impact on the startup's founding year, and innovative attributes.

The northern part of Italy demonstrated a steady increase in the number of startups incubated from 2017 until 2021. Although the central region of Italy followed the same trend, the South and Islands regions had a higher rate of startup incubation throughout the years.

NUTS 1	2017	%	2018	%	2019	%	2020	%	2021	%
North-West	27	37%	30	31%	37	31%	31	25%	35	25%
North-East	18	25%	21	22%	31	26%	37	30%	29	20%
Middle	13	18%	26	27%	27	22%	26	21%	36	25%
South and Islands	15	21%	20	21%	26	21%	31	25%	42	30%

Table 12 – Incubated startups per year of foundation and per region

When comparing the year of foundation to the social scope and innovative feature, Table 13 revealed that social and non-social scope incubated startups followed the rising pattern observed in Figure 20, where the number of general startups incubated increased steadily over the years. An interesting point is that in 2021, although the number of startups was significantly higher than at the beginning of the period, non-social scope startups had a more significant impact in absolute and percentage values than social scope ones.

The same trend applies to the innovative feature of startups. Although there was a higher increase in non-innovative startups in 2021, as previously mentioned, the sample is too small to be representative.

Year of foundation	Social scope	%	Non-social scope	%
2017	32	13%	41	13%
2018	43	18%	54	17%
2019	54	22%	67	21%
2020	59	24%	66	21%
2021	57	23%	85	27%
	Innovative	%	Non-innovative	%
2017	60	13%	13	14%
2018	73	16%	24	26%
2019	105	22%	16	18%
2020	112	24%	13	14%
2021	117	25%	25	27%

Table 13 – Startups per foundation year, social scope, and innovative feature

3.3.4. ATECO 2007 sectors

ATECO 2007 (*Attività Economiche*) is a nomenclature of Economic Activities version 2007 created by Eurostat (Statistical Office of the European Union) and adapted by ISTAT (*Istituto Nazionale di Statistica*), the National Institute of Statistics, to suit the specific characteristics of the Italian economic system (ISTAT, 2015). Moreover, it is used to determine the economic category of a business activity, which has implications

for statistical, contributory, and fiscal purposes.

It is an alphanumeric code that consists of a letter indicating the reference economic macro-sector, followed by two to six numbers indicating the divisions, groups, classes, categories, and sub-categories within that macro-sector.

The incubated startups, consisting of N=558, were divided into 15 macro-sectors based on their characteristics (Table 14).

Macro-sectors	ATECO 2007 Code	Incubated Startups	Percentage
Information and communication	J	258	46%
Professional, scientific, and technical activities	M	132	24%
Manufacturing	C	80	14%
Administrative and support service activities	N	27	5%
Wholesale and retail trade; Repair of motor vehicles	G	15	3%
Education	P	10	2%
Arts, entertainment, and recreation	R	7	1%
Accommodation and food service activities	I	6	1%
Human health and social work activities	Q	5	1%
Agriculture, forestry, and fishing	A	4	1%
Real estate activities	L	4	1%
Transportation and storage	H	3	1%
Other service activities	S	3	1%
Water supply; Waste management and remediation	E	2	0%
Financial and insurance activities	K	2	0%

Table 14 – Incubated startups and their ATECO 2007 macro-sectors

Approximately 46% of the incubated startup activities are from the Information and Communication macro-sector, which mainly comprises software development and technology consultancy activities. Professional, scientific, and technical activities account for 24% of the activities, mainly composed of research and development in engineering fields, biotechnology, and technical business consultancy activities. The distribution follows the same pattern as in the previous year's research for the first three sectors, which accounts for 470 incubated startups or 84.22% of the total sample.

Figure 21 shows the distribution of ATECO 2007 per NUTS regions. Out of the total sample (N=529 or 94.80%), code J (which represents the Information and Communication sector) has a high development in central Italy (161 incubated startups), followed by the northwest (68 appearances). Code M (Professional, scientific, and technical activities) has a higher development in the northeast, while code C

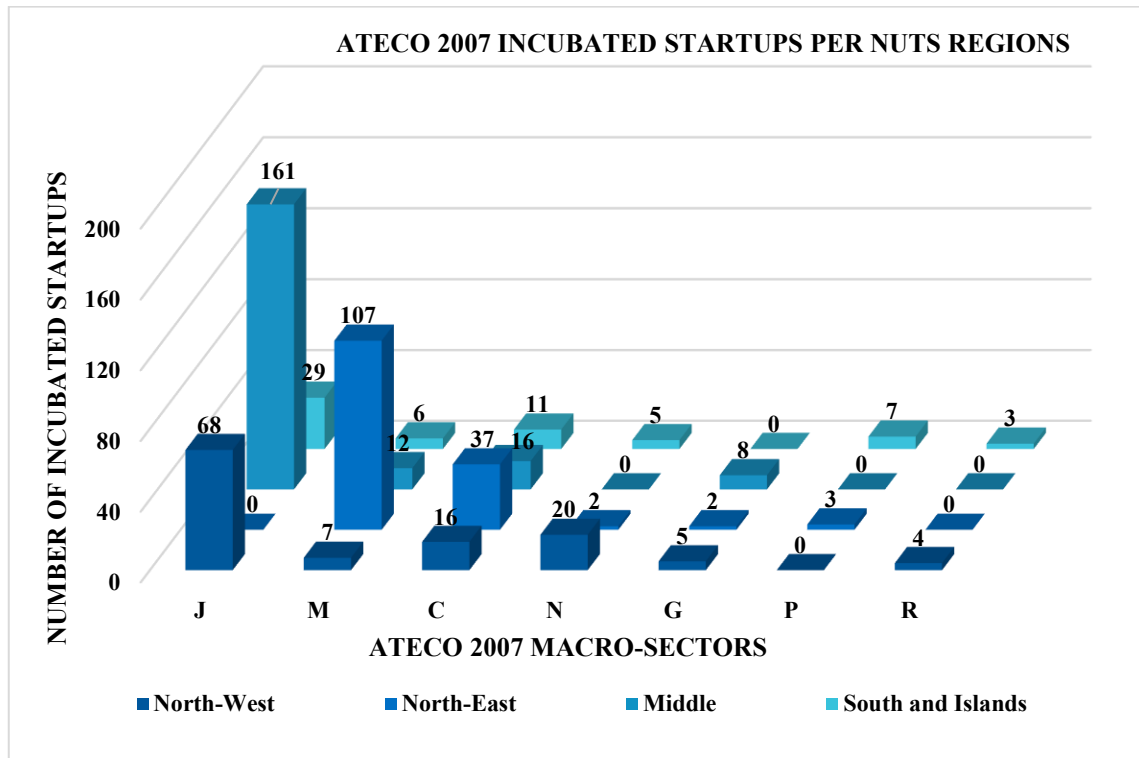(Manufacturing) has a moderate incubation rate of startups, also in the northeast region of the country.

Figure 21 – ATECO 2007 macro-sectors per NUTS regions

3.3.5. Employees

The analysis of employees takes into account the number of incubated startups per quantity of employees. Based on Figure 22, the sample consists of 464 incubated startups, the average being 2 employees/startup, and the median being 0 employees/startup. The sample corresponds to 83.15% of the total sample (558 incubated startups) since not all of them had this data available.

Notably, approximately 58% of the incubated startups have 0 employees, possibly because the startup founders are not considered employees, or the startup contributors are not classified as such in the AIDA database. Additionally, 93.11% of the incubated startups have five or fewer registered employees, while 4.00% have 10 or more registered employees.
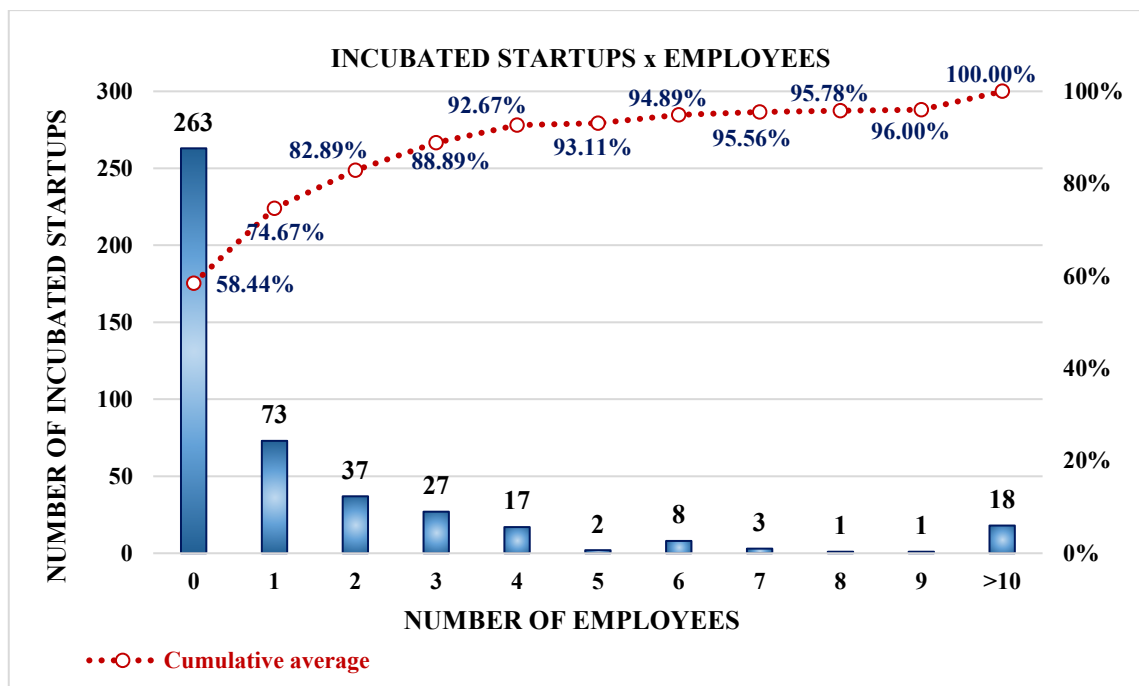
INCUBATED STARTUPS x EMPLOYEES

Figure 22 – Number of incubated startups per number of employees

Table 15 illustrates that the average number of employees per startup is higher in the northwest region of the country (2.65 employees/startup) than in other regions. The lowest average values were found in the North-East and Middle regions of Italy.

Concerning the social scope and innovative features of incubated startups, the averages for all cases are very similar, ranging from 1.65 to 1.77 employees/startup.

NUTS 1	Average number of employees	Incubated Startups
North-West	2.65	133
North-East	1.14	111
Middle	1.15	104
South and Islands	1.52	102

Scope/Feature	Average number of employees	Incubated Startups
Social Scope	1.70	202
Non-Social Scope	1.65	248
Innovative feature	1.65	379
Non-Innovative feature	1.77	71

Table 15 – Employees per NUTS regions, social scope, and innovative feature

3.3.6. Revenues from sales

The analysis of sales revenues will be conducted in two steps. The first step, depicted in

Figure 23, considers revenues ranging from 0 € to over 500,000 €, which applies to 459 incubated startups, accounting for 94.25% of the total sample (N=487). The second step (Figure 24) includes higher amounts from 500,000 € to 5,500,000 € and accounts for 28 incubated startups (5.74% of the total sample). The reason behind this decision is to expand the data range, allowing for the stratification of incubated startups that earned higher amounts. N=487 is considered, as not all incubated startups had their sales revenues available in the AIDA database, and all values are presented in thousands of €.

Incubated startups with sales revenues ranging from 0 € to 25,000 € represent about 55% of the sample (268 organizations). If this range is extended to 200,000 €, 421 incubated startups (or 86.45% of the sample) fall within it. However, a notable finding is that 28 incubated startups earned equal to or more than 500,000 €. The overall average equals 133,000 € and the median equals 18,000 €.
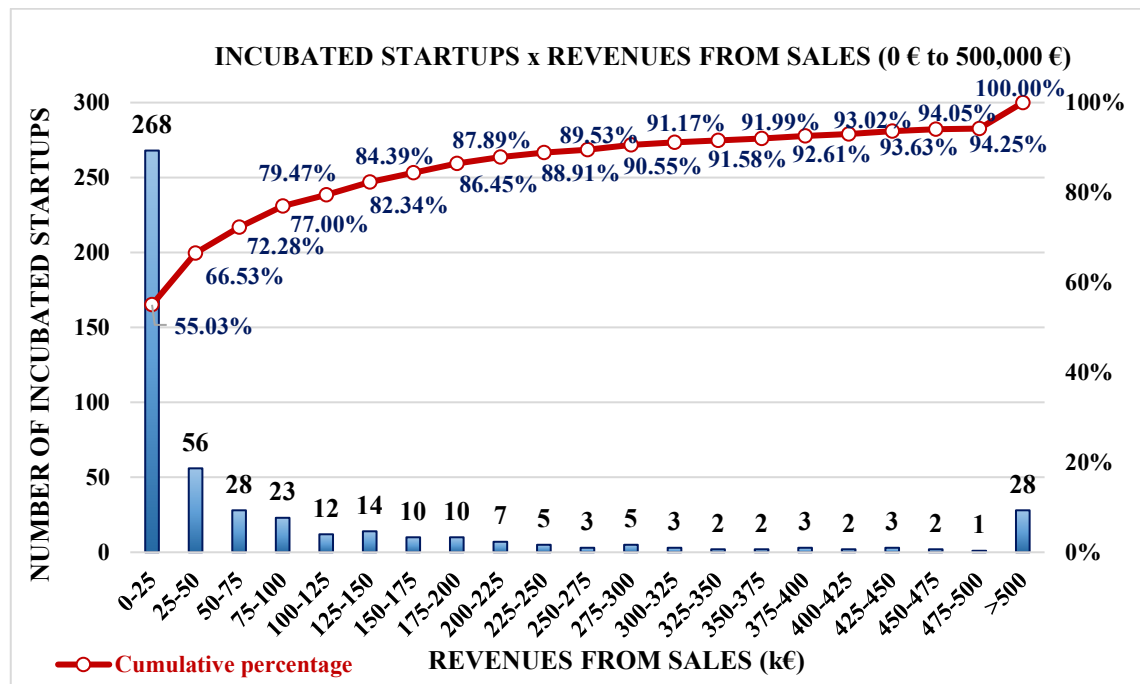

Figure 23 – Incubated startups and their revenues (0€-500,000€)

When stratifying the data, 50% of the 28 incubated startups had revenues from 500,000 € to 1,000,000 €, followed by 8 incubated startups that had revenues from 1,000,000 € to 1,500,000 €. These two ranges accounted for 78.57% of the startups that earned more than 500,000 €.
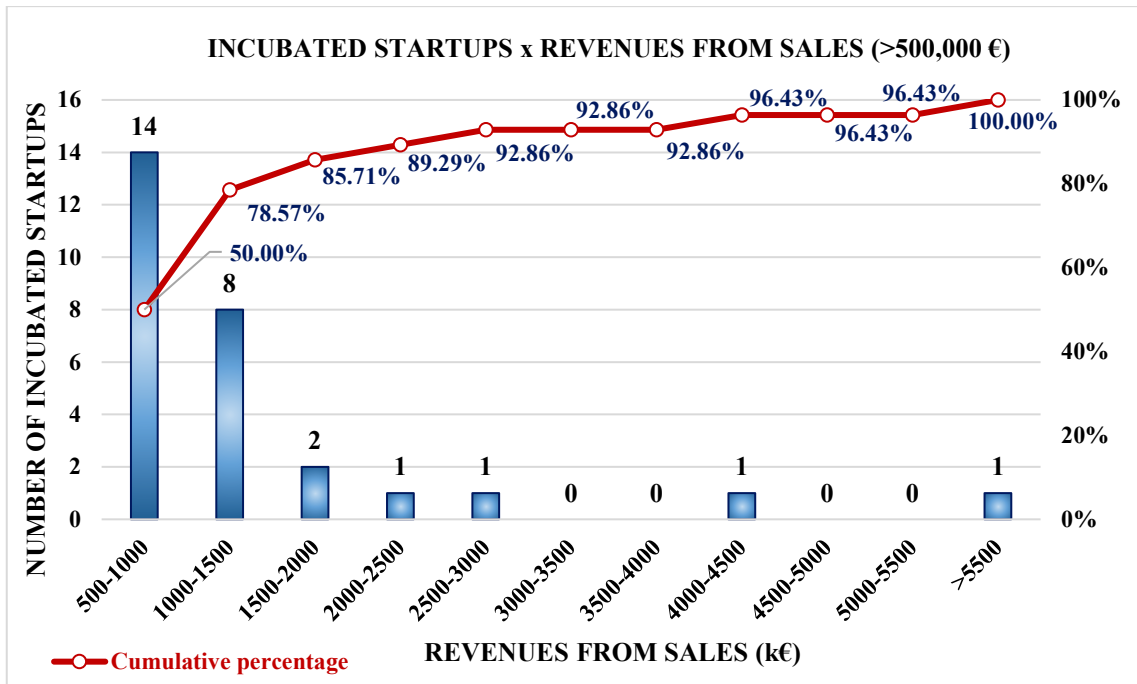
Figure 24 – Incubated startups and their revenues (>500,000 €)

The revenues of incubated startups were compared based on NUTS regions, social scope, and innovative features. As the most representative sample was within the range of 0 € to 200,000 € (N=421), the startups in this range were considered for this analysis.

Figure 25 – Incubated startups, revenues, and NUTS regions

Figure 25 shows that all regions had a similar result concerning revenues, with 62 to 72 startups/region in the most expressive revenue range (0€ to 25,000€).

Figure 26 – Incubated startups, revenues, social scope, and innovation

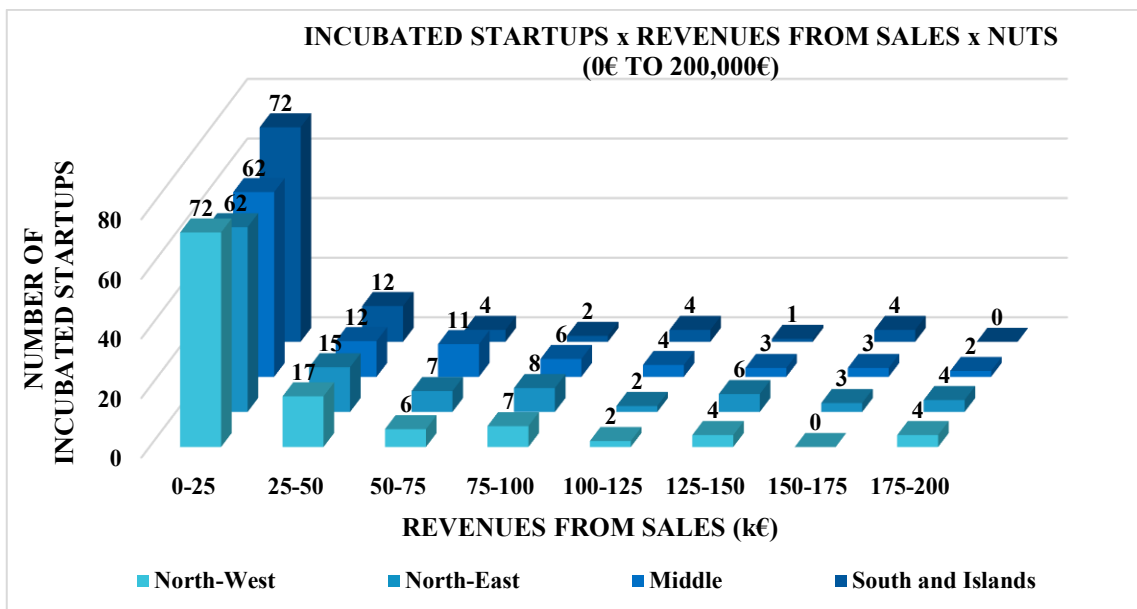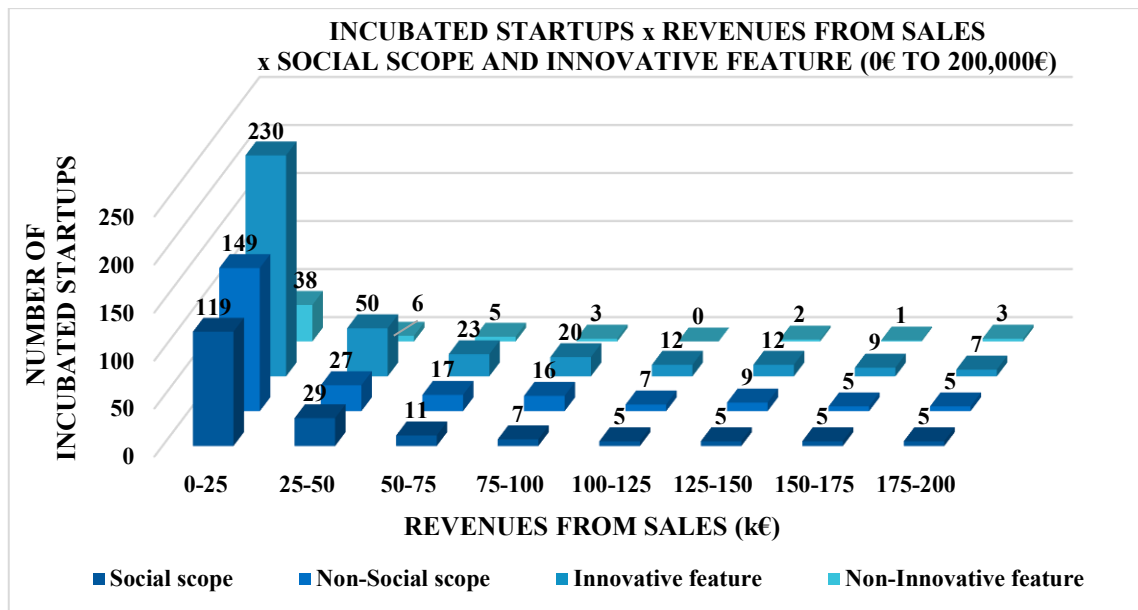Regarding the social scope, Figure 26 illustrates that non-social scope incubated startups had higher sales revenues, with 149 startups earning 0€ to 25,000€, compared to social scope ones (119 startups). The same difference is observed until revenues of 150,000 €. The only exception is in the second range, where social-scope startups had a higher revenue (29 x 27 incubated startups). In terms of values, the average revenue from sales for a social-scope startup is 134,000 € (median: 19,000€), while for non-social-scope startups, it is 132,000 € (median: 17,000€).

Concerning the innovative feature, as previously mentioned, there was a significant discrepancy between the total number of the two types of startups, resulting in innovative startups having much higher revenues than non-innovative ones.

3.3.7. Total assets

The total assets of the incubated startups represent the sum of the book values of all assets owned by the company. Figure 27 (N=487) shows the number of incubated startups per total assets, categorized into different ranges: first from 0 € to 100,000 €, with 10,000 € intervals, and later from 100,000 € to over 1,000,000 € with 100,000 € intervals. The average value is 352,000 €, and the median value is 94,000 €.

Observing the first range from 0 € to 100,000 €, it is clear that a higher number of incubated startups have values between 0 € and 40,000 € (151 startups, representing

31.00% of the total sample).
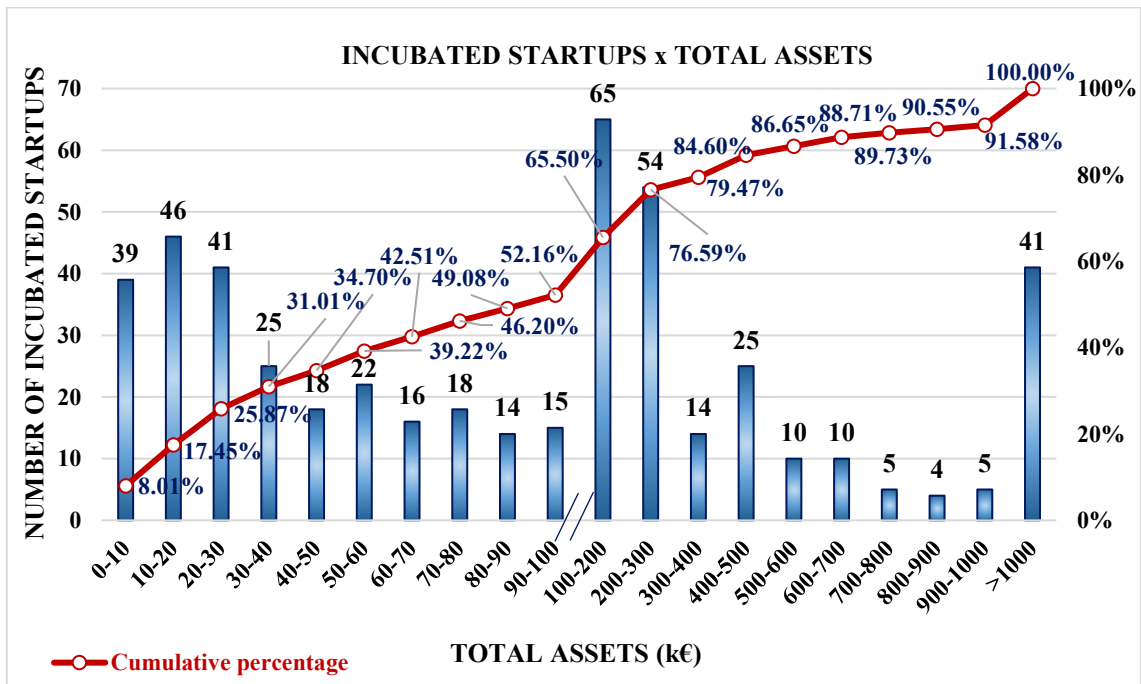
Figure 27 – Incubated startups per total assets

However, if we consider the full range, higher values are present between 100,000 € and 300,000 € (119 startups, representing 24.43% of the total sample). Finally, a peak can be observed in incubated startups with total assets exceeding 1,000,000 € (41 companies, or 8.41% of the total sample).

Figure 28 – Incubated startups, total assets, and NUTS regions

A different perspective can be achieved by comparing the total assets owned by the

companies with the NUTS regions (Figure 28). This analysis utilizes a range value from 0 € to over 1,000,000 € but with a single interval of 100,000 € each.

The highest representation occurs in the first range (0 € to 100,000 €), having a similar result regarding the NUTS regions. However, in the second and third ranges, there is a higher discrepancy between the total assets of the incubated startups present in the northern part of Italy when compared to the middle, south and islands. Still, concerning the total assets exceeding 1,000,000 €, the northwest region of the country is responsible for 19 incubated startups, whereas the other regions have results ranging from 7 to 8.
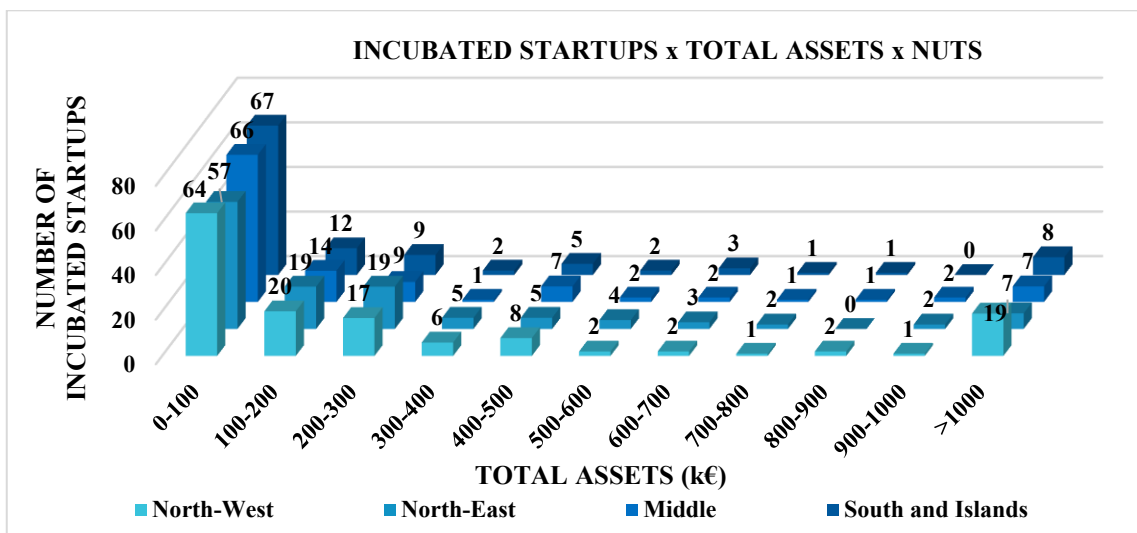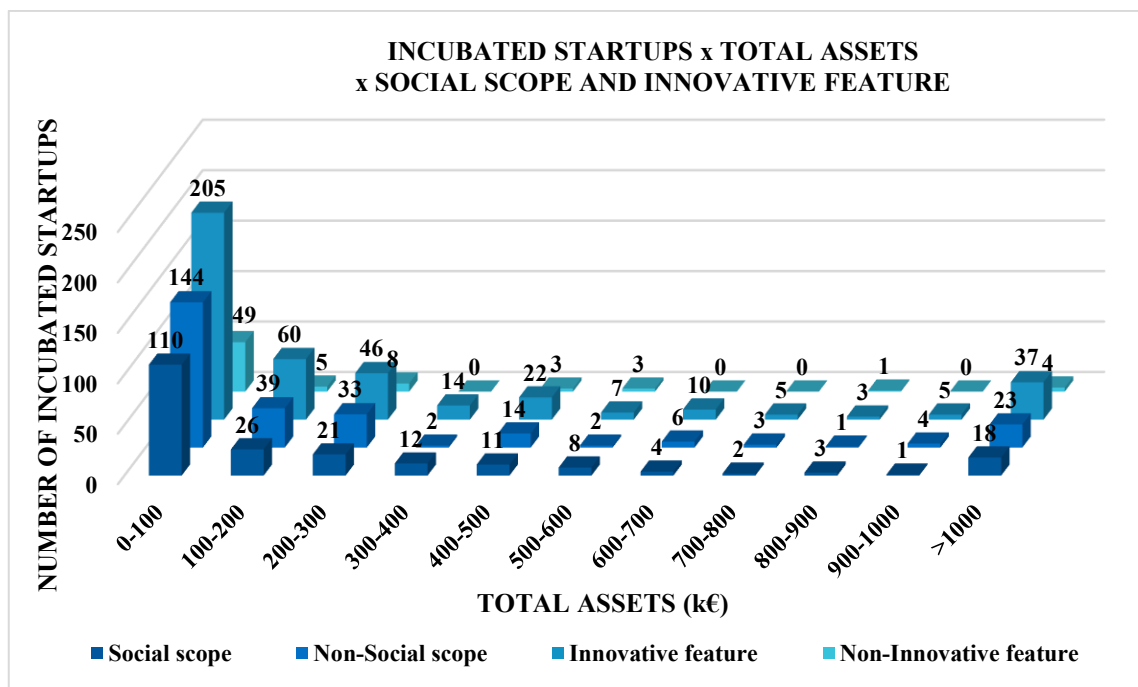

Figure 29 – Incubated startups, total assets, social scope, and innovation

Lastly, the total assets owned by the incubated startups can be compared with their social scope and innovative features (Figure 29).

In the range from 0 € to 300,000 €, non-social scope type organizations have higher asset values than social scope ones, meaning that their assets values are higher [216 non-social scope (44.35% of the total sample) vs. 157 social scope (32.24% of the total sample)].

Regarding innovative startups, it is possible to observe that they have way higher total assets than non-innovative ones. In the first three ranges, 311 startups (which represents 63.86%) own assets from 0 € to 300,000 €.

3.3.8. Capital stock

The capital stock of a company is the maximum number of common and preferred shares that can be issued according to its corporate charter. It represents ownership shares of a company's equity that are sold to investors to raise capital for business operations.

Similar to the analysis for total assets, the same methodology can be applied here. The sample size is N=487, with an average of 31,000 € and a median of 10,000 €. However, the range intervals in the horizontal graph differ. For the range from 0 € to 100,000 €, the intervals are 10,000 € each, while for the range from 100,000 € to greater than 1,000,000 €, the intervals are 100,000 € each.
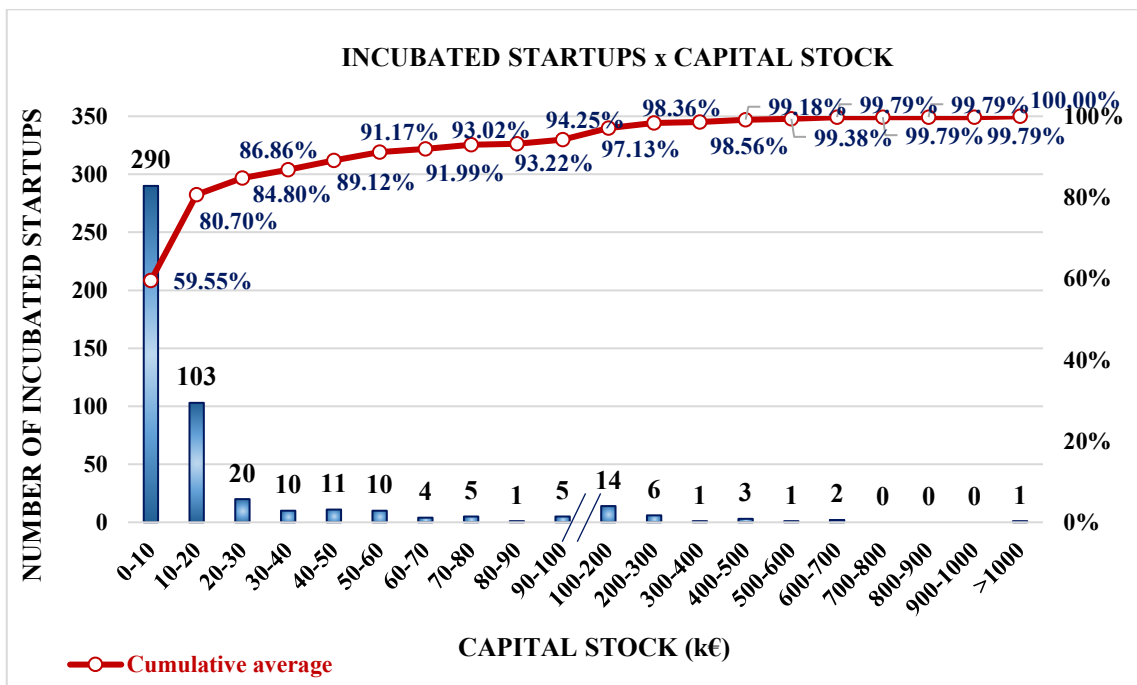
Figure 30 – Number of incubated startups per capital stock

Figure 30 displays the relationship between the number of incubated startups and their capital stock. The first range shows that 290 incubated startups, or 59.55% of the total sample, have a capital stock of 0 € to 10,000 €.

Considering the range from 0 € to 100,000 €, 459 incubated startups are present, representing 94.25% of the total sample. Furthermore, a peak exists in the range of 100,000 € to 200,000 €, with 14 startups present.
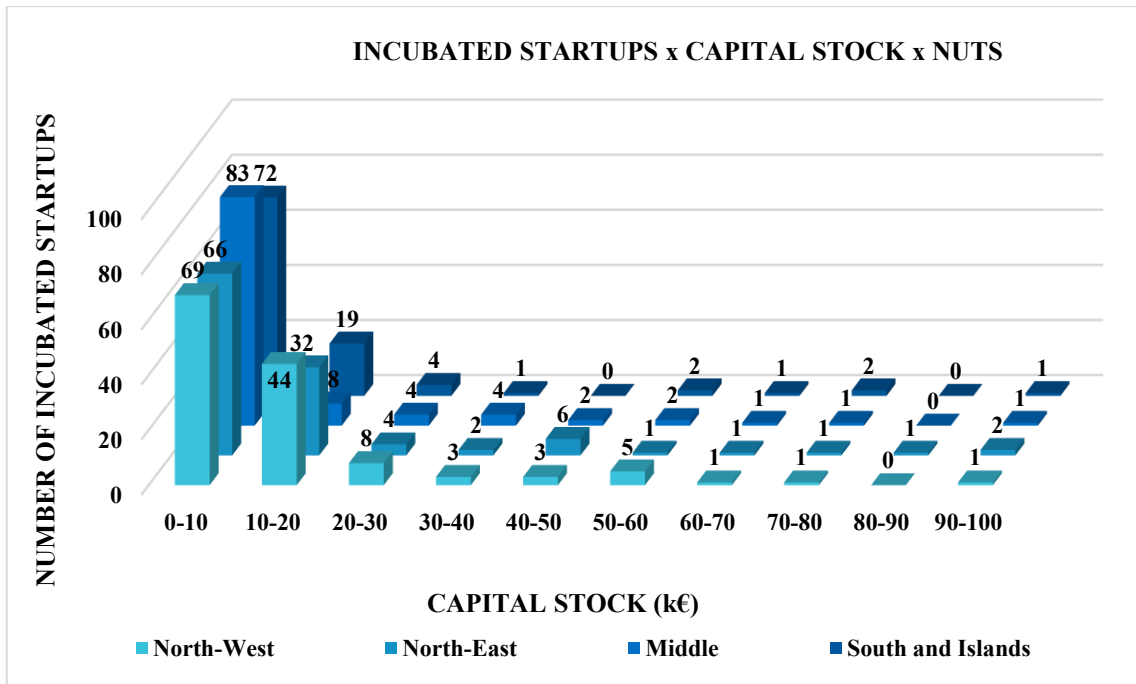
Figure 31 – Incubated startups, capital stock, and NUTS regions

Regarding the NUTS regions (Figure 31), the highest number of startups is present in the northern part of Italy. However, the central region of the country is also noteworthy, with 83 incubated startups present in the range from 0 € to 10,000€. Additionally, the south and islands alone have a greater number of incubated startups than the northern regions individually. For future analysis concerning capital stock, a representative sample size of N=459 will be used, as it represents 94.25% of the total sample.

Finally, Figure 32 shows the relationship between capital stock and the social scope and innovative features of incubated startups. Non-social scope incubated startups have a more significant presence in the ranges from 0 € to 30,000 €, with 233 incubated startups representing 50.76% of the total sample, compared to 180 startups representing 39.21% of the total sample with social scope.

Concerning the innovative feature, the analysis shows that innovative startups have a much higher capital stock than non-innovative ones. In the first three ranges, 347 incubated startups, which represent 75.59% of the total sample, own a capital stock ranging from 0 € to 30,000 €.
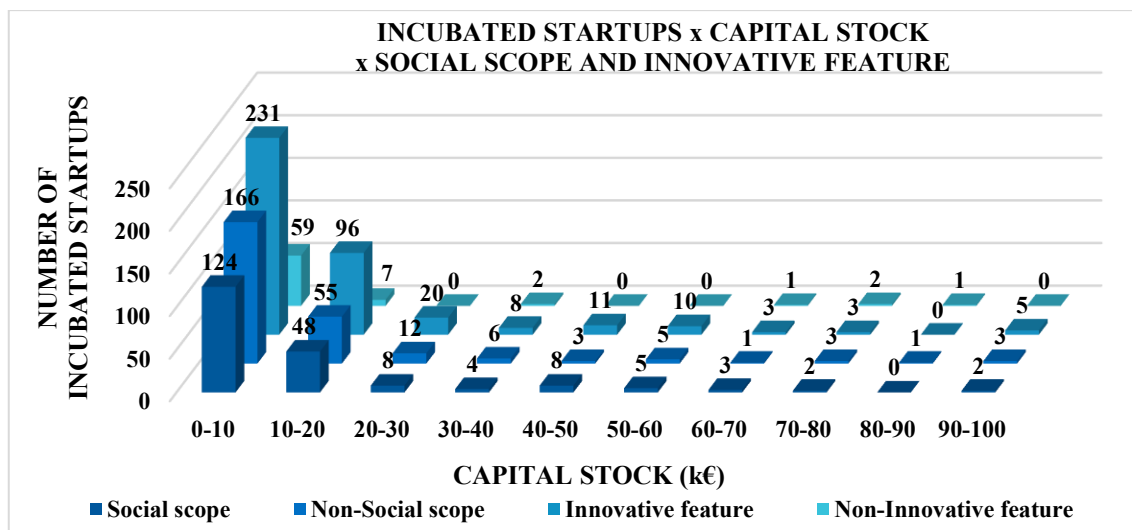
Figure 32 – Incubated startups, capital stock, social scope, and innovation

3.4. CDP Accelerators

A comparative analysis was conducted to investigate the characteristics of the 16 CDP accelerators that have been established as of January 2023. Information about each accelerator's traits such as their area of operation, year of establishment, pre-seed funding, total funding, and geographical location are presented in Table 16.

CDP Accelerator	Sector	Year	Pre-seed funding (k€)	Total funding (k€)	Region
ARGO	Tourism and Hospitality	2022	75	4,500	Veneto
PERSONAE	Welfare	2022	100	6,100	Piemonte
HABISMART	Real Estate	2022	115	5,750	Lombardia
VITA	Digital health	2022	110	6,350	Lazio
TAKEOFF	Aerospace and advanced hardware	2022	120	21,000	Piemonte
NEXT AGE	Silver economy	2022	252	5,460	Marche
TERRA NEXT	Bioeconomy	2022	75	5,100	Campania
MAGIC SPECTRUM	5G and the Internet of Things	2022	75	4,550	Lombardia
FORWARD FACTORY	Manufacturing	2022	165	8,640	Emilia-Romagna
FAROS	Blue economy	2021	65	4,000	Puglia
FIN+TECH	Financial	2021	48	6,200	Lombardia
FUTURED	Education	2021	90	3,000	Veneto
CYBERXCELERATOR	Cybersecurity and Artificial Intelligence	2021	78	5,100	Calabria
MOTOR VALLEY	Automotive	2021	100	20,000	Emilia-Romagna
ZERO	Sustainability	2021	80	4,600	Lazio
WE SPORT UP	Sport and Wellness	2020	110	1,200	Lazio

Table 16 – CDP Accelerators

3.4.1. Distribution of total funding per sector

It can be observed that although some incubators were established in the same year and region, each of them belongs to a distinct area of operation.

The total funding for the 16 different programs and sectors amounts to 111,550,000 €. On average, each sector and program receives 6,971,875 €, and the median is 5,280,000 €. The difference between the average and median is due to the significantly higher funding allocated to two accelerators - aerospace and advanced hardware, and automotive - compared to the other 14 programs.
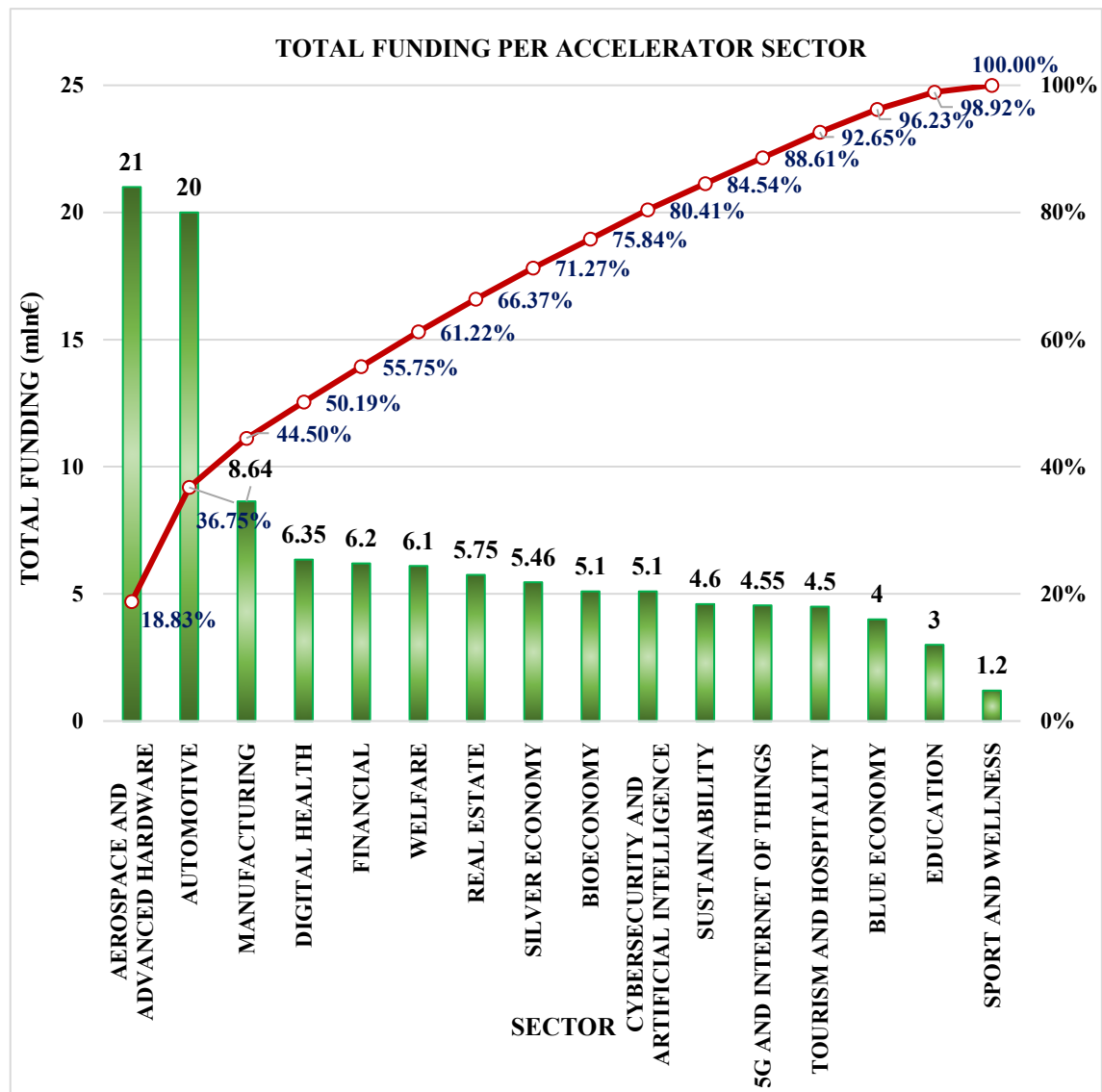
Figure 33 – Total funding per accelerator and sector

Figure 33 illustrates that 36.75% of the total funding (or 41,000,000 €) is distributed only

to these two sectors. Excluding these two sectors from the analysis, the funding distributed to the other sectors is relatively equal, except for education and sport and wellness, which receive lower amounts.

3.4.2. Social scope

To determine whether these accelerator programs have a social impact, they can be classified as either having a social scope or not (Figure 34, N=16). The methodology used to make this classification was similar to that employed in analyzing the incubated startups in the first part of the analysis. Specifically, a thorough investigation was conducted into the accelerator's objectives.
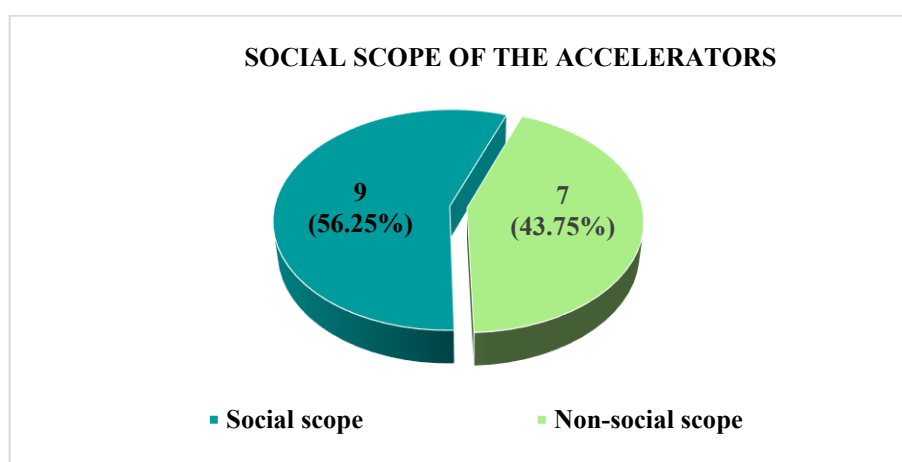
Figure 34 – Social scope of the accelerators

Out of the 16 accelerators, 9 of them (56.25%) have a social scope. This information will be particularly useful in the subsequent chapters, as certain analyses will take this into account.

For example, the distribution of funding between accelerators with social scopes and those without can be analyzed (Table 17).

Accelerator type	Pre-seed funding (k€)	%	Total funding (k€)	%
Social scope	1,007	60.72%	42,060	37.71%
Non-social scope	651.50	39.28%	69,490	62.29%

Table 17 – Funding between social and non-social scope accelerators

Although social scope accelerators receive a higher percentage of pre-seed funding (60.72% compared to 39.28%), the total funding allocated to non-social scope

accelerators is significantly greater in absolute terms, amounting to 27,430,000 € more than social scope accelerators and accounting for 62.29% of the total funding.

3.4.3. Geographical distribution

The distribution of CDP accelerators throughout the Italian territory can be analyzed using the NUTS 1 region hierarchy (N=16, as shown in Figure 35). When viewed separately, the northeast and central regions have an equal number of accelerators (4 each). However, when considering the northern part of the country, it is evident that it accounts for 56.25% of the total accelerators (or 9 programs), while the south and islands have only 3 programs.
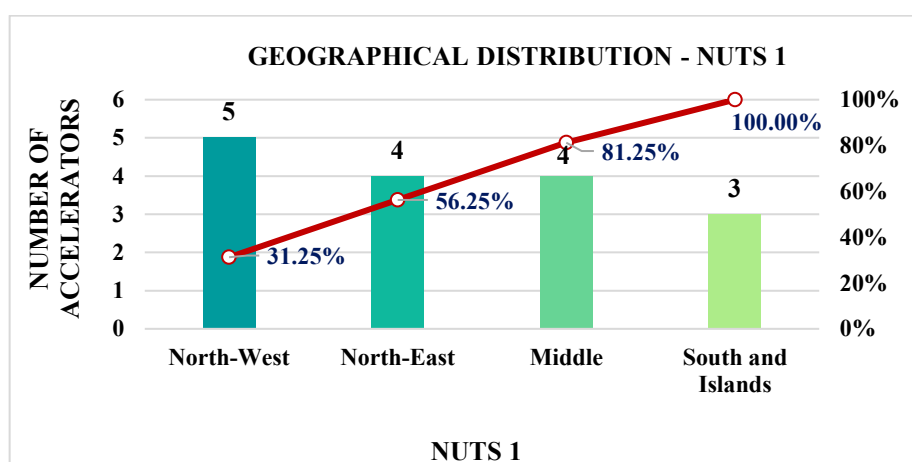
Figure 35 – Geographical distribution – NUTS 1 (CDP Accelerators)

Table 18 shows the presence of social and non-social scope accelerators in the NUTS regions.

NUTS 1	Social scope accelerators	%	Non-social scope accelerators	%
North-West	2	12.50%	3	18.75%
North-East	2	12.50%	2	12.50%
Middle	4	25.00%	0	0.00%
South and Islands	1	6.25%	2	12.50%

Table 18 – Social and non-social scope accelerators per region

When considering regions individually, central Italy has the highest number of social accelerators, accounting for 25.00% of the total sample (N=16). If we combine the northern regions into one, their number equals that of central Italy. The south and islands have only 1 social scope accelerator (6.25% of the total sample).

Non-social scope accelerators are primarily located in northern regions (5 of them, accounting for approximately 31.25% of the sample). No non-social scope accelerators were found in central Italy. The south and islands account for 2 organizations.

An analysis of funding per region for social and non-social scope accelerators can be developed, as shown in Table 19.

NUTS 1	Social scope Pre-seed funding (k€)	%	Social scope Total funding (k€)	%
North-West	215	12.96%	11,850	10.62%
North-East	165	9.95%	7,500	6.72%
Middle	552	33.28%	17,610	15.79%
South and Islands	75	4.52%	5,100	4.57%
NUTS 1	Non-social scope Pre-seed funding (k€)		Non-social scope Total funding (k€)	
North-West	243,5	14.68%	31,750	28.46%
North-East	265	15.98%	28,640	25.67%
Middle	-	0.00%	-	0.00%
South and Islands	143	8.62%	9,100	8.16%

Table 19 – Funding per NUTS regions and accelerators' social scope

Central Italy is responsible for the highest amount of pre-seed funding in social scope accelerators, accounting for 552,000 € in accelerator programs (or 33.28%). As previously noted, no non-social scope accelerators were found in central Italy, resulting in no distribution of funding for this region in this type of accelerator.

The total funding for non-social scope accelerators is significantly higher in the northern part of the country compared to social scope ones, accounting for 54.14% of the total funding (or 60,390,000 €).

3.4.4. Establishment year

The CDP accelerators were established within a relatively short timeframe of approximately three years, from 2021 to 2023. Although one accelerator (We Sport Up) was founded in December 2020, its first acceleration program did not commence until 2021. Figure 36 displays the distribution of accelerators established each year.

The distribution of accelerators established per year is nearly equal between 2021 and 2022, with seven and eight accelerators founded, respectively. Additionally, four new

accelerators are expected to be established in 2023, bringing the total to 20 organizations to be developed by the CDP Venture Capital SGR.
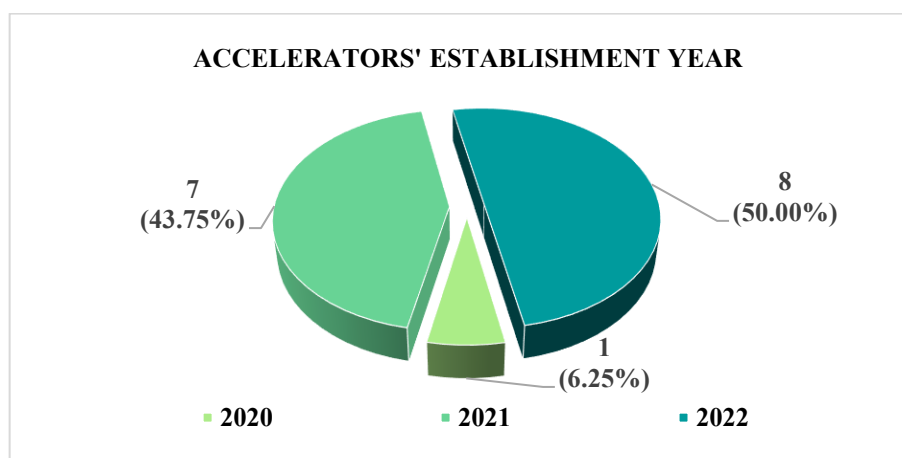
Figure 36 – Accelerators' establishment year

Table 20 presents the correlation between the establishment year of the accelerator and its pre-seed and total funding amounts.

Establishment year	Pre-seed funding (k€)	%	Total funding (k€)	%
2020	110	6.63%	1,200	1.08%
2021	626,5	37.78%	51,540	46.20%
2022	922	55.59%	58,810	52.72%

Table 20 – Establish year, pre-seed, and total funding

Funding was found to be higher in 2022 for both pre-seed and total funding when compared to 2021. However, the distribution between pre-seed and total funding remains similar across the years.

Table 21 shows the establishment of social and non-social scope accelerators per year.

Establishment year	Social scope	%	Non-social scope	%
2020	1	6.25%	-	0.00%
2021	2	12.50%	5	31.25%
2022	6	37.50%	2	12.50%

Table 21 – Establishment of social and non-social accelerators per year

In 2022, six social scope accelerators were established, representing 37.50% of the total sample (N=16). On the other hand, 2021 had the highest establishment of non-social scope accelerators, accounting for five organizations or 31.25% of the sample.

Table 22 presents the establishment year, accelerator type, and funding provided. The highest pre-seed funding for social scope accelerators was provided in 2022, accounting

for 727,000 € (or 43.83% of the total pre-seed funding sample). In contrast, the highest total funding for non-social scope accelerators was provided in 2021, accounting for 43,940,000 € or 39.39% of the total funding sample. This value alone exceeds the total funding provided to all social scope accelerators in the three years.

Establishment year	Social scope Pre-seed funding (k€)	%	Social scope Total funding (k€)	%
2020	110	6.63%	1,200	1.08%
2021	170	10.25%	7,600	6.81%
2022	727	43.83%	33,260	29.82%
Establishment year	Non-social scope Pre-seed funding (k€)		Non-social scope Total funding (k€)	
2020	-	0.00%	-	0.00%
2021	456.5	27.52%	43,940	39.39%
2022	195	11.76%	25,550	22.90%

Table 22 – Establishment year, social and non-social scope, and funding

3.4.5. Program duration and total startups accelerated

As discussed in the literature review, there are no established standards for the duration of accelerator programs. However, their characteristics can be analyzed based on factors such as the year of establishment and the type of accelerator, as shown in Table 23.

Establishment year	Average duration (months)	Social scope average duration (months)	Non-social scope average duration (months)
2020	3.00	3.00	-
2021	4.93	4.50	5.10
2022	4.31	4.17	4.75

Table 23 – Average duration of accelerators' programs

For instance, in 2021, the average duration of accelerator programs was about 5 months. Nevertheless, non-social scope accelerators have more weeks in their program compared to social scope accelerators. The same pattern can be observed in 2022, with non-social scope accelerators averaging 4.75 months, and social scope accelerators averaging 4.17 months.

Another interesting aspect of CDP accelerators is that while they were established in a 3-year timeframe starting in 2021, startups can benefit from them in different years since the acceleration program is based yearly (Table 24).

Average of startups accelerated per year	Total startups accelerated per year	Average programs lifetime (years)	Total startups accelerated in lifetime
10.12	162	3.00	486

Table 24 – Average startups accelerated per year and in programs lifetime

Although there seems to be a quasi-pattern in the number of startups accelerated (10 per year for 3 years), totaling 30 startups per program, the programs have different characteristics depending on the accelerator type, especially regarding the total number of startups accelerated after a 3-year program, as depicted in Table 25.

Startups accelerated after 3 years program	Social scope	Non-social scope
Average	30	31
Total	270	216

Table 25 – After 3 years program: average and total startups accelerated

Social scope accelerators tend to accelerate more startups than non-social ones. For instance, after 3 years of acceleration programs, social scope accelerators would have accelerated 270 startups, while non-social scope accelerators would have accelerated 216 startups.

4. Conclusion

The conclusion will rely on two different approaches. The first approach will present the results obtained from the analysis of startups incubated by Italian incubators in 2021, while the second approach will discuss the results based on the CDP accelerators. The aim is to examine the Italian entrepreneurial landscape through the lens of two different types of organizations.

Regarding the incubated startups in Italy in 2021, the current research differs from the previous year's study, which mainly focused on incubators and not the startups themselves. However, this research still provides valuable insights into the Italian entrepreneurial scenario.

The estimated number of startups incubated in Italy in 2021 was 2,859, a decrease from 3,670 in 2020. This decline can be attributed to the impact of the COVID-19 pandemic. The study also identified 558 incubated startups in 40 different incubators, resulting in an

average of 14 startups per incubator.

Of the 558 startups, 43.91% were social-oriented, while 56.09% were non-social. When considering the average of 14 startups per incubator, approximately six have a social scope, while eight do not. Recent literature and definitions from the Italian government, such as innovative startups, were also taken into consideration.

Innovative startups accounted for 84% of the sample, while non-innovative ones accounted for 16%. In terms of the average number of startups per incubator, innovative ones represented approximately 12 out of 14 startups, while non-innovative ones accounted for only two. However, it is worth noting that startups can be both innovative and social-oriented.

Geographically, 53% of the startups were located in the northern part of the country, while 23% were in central Italy, and 24% were in the south and islands. The northern part of the country had the highest number of startups, but there was a decline of -16% in 2021, together with a decrease of -12% in central Italy. The south and islands, however, saw a substantial increase in the number of incubated startups of around 118%.

Social-oriented startups were mainly present in the northern part of the country (53%), as were non-social ones (53%). Innovative startups were mostly located in the north (56%), while non-innovative ones were mainly in the middle (30%) and south and islands (30%). The sample of non-innovative startups was not representative, accounting for only 16% of the total startups (91 out of 558 startups).

Regarding the legal structure of incubated startups, the S.R.L. accounts for 90.48% of the total, and if we include the simplified version of the S.R.L., the number increases to 97.48%. This was expected as the S.R.L. legal form is the most common and straightforward to operate. In terms of geographic distribution, there is a well-distributed scenario with lower variance across all NUTS 1 regions. The northern part of the country, which includes the northwest and northeast, accounts for 54% of the incubated startups, while the middle represents 22% and the south and islands represent 23%.

Despite the COVID-19 pandemic, the average rate of incubated startups increased by 18.63% from 2017 to 2021. The highest distribution of incubated startups was in the northern part of the country, which accounted for 62% of the incubations in 2017 and 45% in 2021. Although the number of incubated startups decreased in this region over

the years, the average of incubation activities in the northern part of the country accounted for 54% in the five-year period.

In terms of social scope and innovation, 2020 had the highest number of incubated social-scope startups (24% of the sample), while 2021 had the highest number of incubated non-social scope startups (27%). In 2021, 25% of the innovative startups were developed, while non-innovative ones accounted for 27% of the sample.

To understand the economic services and activities provided by the startups, the ATECO 2007 was used to analyze the main areas. The majority of the startups (46% of the sample) were in information and communication, followed by professional, scientific, and technical activities (24%), and manufacturing (14%). This year's research showed the same pattern as last year's, with almost the same distribution.

Regarding the geographical distribution of these activities, information and communication activities were mainly developed in central Italy and the northwest part of the country, while professional, scientific, and technical activities were mainly developed in the northeast region, along with manufacturing activities.

The average number of employees working in these startups was 2. While 58% of the incubated startups had an average of 0 employees working, the second most representative reference was that 93.11% of the incubated startups had five or fewer registered employees. The highest ratio of employees per startup was seen in the northwest region, with 2.65 employees per startup, while the northeast and central Italy represented 1.14 and 1.15, respectively. The average number of employees working for social scope organizations was 1.70, and 1.65 for non-social scope. For the innovative feature, the average number of employees working for innovative startups was 1.65, and 1.77 for the non-innovative ones.

From a financial perspective, three different analyses were carried out to evaluate incubated startups. The first analysis looked at the revenues generated from sales of the startups, and it was found that 55% of the sample had revenues ranging from 0 € to 25,000 €, while 86.45% of the sample had revenues ranging from 0 € to 200,000 €. Additionally, 28 incubated startups earned equal to or more than 500,000 €, and the average revenue per startup was 133,000 €.

In terms of location, the range of 0€ to 25,000 € was the most common among incubated

startups in all four regions, with 72 incubated startups in the northwest, 62 in the northeast and middle, and 72 in the south and islands.

The second financial metric analyzed was the total assets owned by the startups, with an average of 352,000 € per startup. The highest amounts of assets were found in the range from 0 € to 40,000 €, with 31.00% of the sample, and between 100,000 € and 300,000 €, accounting for 24.43% of the sample. The highest representation of startups owning assets occurred in the range of 0 € to 100,000 €, with similar results across NUTS 1 regions. However, the northern part of Italy had a higher discrepancy in the total assets of incubated startups when compared to the middle, south, and islands.

The third financial metric was the capital stock, with an average of 31,000 € per incubated startup. Approximately 60% of the startups present in the sample had a capital stock ranging from 0 € to 10,000 €, and almost 95% of the startups had a capital stock ranging from 0 € to 100,000 €. The northern part of the country had the highest number of startups with capital stock, but central Italy, the south and islands also had a significant number of startups when considering the regions separately.

Regarding social and innovative aspects, non-social incubated startups had higher revenues for almost all cases from 0 € to 150,000 €. Similarly, non-social scope type of organizations had higher asset values than social scope ones. Innovative startups had much higher revenues and a higher capital stock than non-innovative ones. For the same range of 0 € to 30,000 €, innovative startups represented approximately 76% of the sample.

Upon examining the second approach and analyzing other entrepreneurial organizations, the 16 CDP accelerators produced varying outcomes depending on their focus. Despite the total funding for all 16 programs being €111,550,000, each sector and program received an average of nearly €7,000,000. However, the median, which was €5,280,000, suggests a discrepancy between the two metrics. This is because two of the programs (aerospace and advanced hardware, and automotive) received around 37% of the total funding (€41,000,000).

Additionally, an analysis was conducted to determine if the accelerators' goals could be classified as either social or non-social. Of the 16 accelerators, 9 were categorized as social, and 7 were not. Non-social accelerators received roughly 62% of the total funding.

Their distribution across Italian regions was similar, with five accelerators in the northwest, four in the northeast and middle, and three in the south and islands. However, when considering social scope, central Italy had the most social accelerators (4 out of 9), while the northwest had the most non-social accelerators (3 out of 7).

Regarding funding by region and accelerator type, social scope accelerators in central Italy received the most funding (15.79% of the total), while the northwest had the most funding for non-social scope accelerators (28.46%). The accelerators' establishment year was also considered, with the most representative years being 2021 and 2022. Seven accelerators were established in 2021, and eight were established in 2022. The funding distribution mainly occurred in 2022 (52.72% of the total funding), while social scope organizations were mainly established in 2022 (6 out of 9).

The highest funding for social scope accelerators occurred in 2020, representing 29.82% of the total funding, while 2021 represented the highest amount for non-social scope ones, with 39.39% of the total. Finally, in terms of program duration and total startups accelerated, the average acceleration program duration was highest in 2021, at nearly 5 months. The highest value for both social and non-social scope accelerators occurred in the same year (4.50 and 5.10 months, respectively).

Given that the accelerators were established over a 3-year period starting in 2021, more startups can benefit from the programs, with at least three different programs occurring throughout this period. On average, each accelerator accelerated 10.12 startups per year, for a total of 162 startups per year. Over three years, this value changes to 486 startups. As there are more social scope accelerators than non-social ones, social scope accelerators tend to accelerate more startups (270) than non-social ones (216) when considering the 3 years.

4.1. Limits and future research

Like any research study, the present one has limitations. It is worth noting that while the SIM team has done exceptional work on the Italian entrepreneurial landscape in recent years, the research project itself has only been ongoing for a relatively short time. To produce reliable results, it is important to continue this work and expand the scope of the study, allowing researchers to analyze a larger sample size and, in turn, forecast potential

entrepreneurial trends.

Regarding the research findings, it is important to acknowledge that the results only represent a portion of the Italian entrepreneurial landscape. However, the ongoing identification of incubators is a positive step that will yield more answers to SIM's surveys and provide greater insight into Italy's entrepreneurial behavior. Furthermore, the COVID-19 pandemic has had a significant impact on the economy in recent years, potentially distorting patterns that will only become clear in the years to come.

Future research projects should aim to explore alternative approaches, such as compiling all research conducted on entrepreneurship in Italy over the years to better understand patterns and reaching out to international research teams to compare results across countries. For example, examining the financial behavior of incubated startups in Italy, such as metrics like Return on Assets, Return on Equity, and EBITDA, could provide more insights into the incentives driving entrepreneurship in the country. Moreover, comparing the results of different entrepreneurial organizations, such as startup studios, venture capital firms, business angels, and incubators, could provide a clearer understanding of the current situation.

Finally, exploring public policies aimed at promoting entrepreneurship and comparing results with other studies could yield valuable insights.

With regards to accelerators, this research project is the first to analyze these organizations. However, at the time of completion, only 16 of the 20 accelerators recognized by the CDP were operating in Italy. An update of this research project could include the remaining four accelerators and compare the results with those of Italian incubators.

Following the completion of CDP programs across Italy in three years, there will be 486 accelerated startups whose data could be analyzed and compared to incubated ones.

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