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**Understanding the new generation of
accelerator programs: The
Accelerator Programs for Analog
Firms - APAFs**

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*Alla mia Famiglia:
a Papà Paolo e Mamma Carla,
a mia Sorella Michelle, Alberto e al futuro condiviso,
a Nonna Giulia, Maria e Nonno Lidio,
a tutti gli Zii e Cugini.*

*Ai Professori:
dell'ITIS Euganeo di Este,
di Economia & Management di Padova,
e del Dipartimento di Management di Venezia.*

*Alla mia seconda Famiglia:
gli Amici.*

*Mi avete reso la persona che sono oggi,
e vi dedico questo.*

“think big, but start small”

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Introduction

The last decade has been characterized by strong changes for any industrial sectors. The companies have faced what the *The Economist* in 2012 called “the Third Industrial Revolution”. It's not easy to perfectly delineate this phenomenon because of its wide heterogeneity. However it's clear to see the strong influence this change is bringing in the way we manufacture products, the way we market these products, the way we promote them and finally the way we interact with objects. We are referring to new technologies such as “automation of knowledge work”, “the Internet of things and smart objects”, “the 3d printing” or “cloud technology” that are applied to production processes as well as more and more to everyday life. According to the McKinsey Global Institute these technologies will have an impact on the real economy on the order of 14 trillion to \$ 33 trillion per year in 2025 (Manyika et al. 2013).

In this tumultuous context and with the advent of the Internet and digital entrepreneurship, new ways of starting a business were born. Indeed, Y-Combinator, established in 2005 in USA, is the pioneer of the new generation of incubation models for new businesses also known as "accelerator programs" (Pauwels et al. 2016). Specifically, accelerator programs are fixed-term, cohort-based program, including mentorship and educational components for new digital ventures, that culminates in a public pitch event or demo-day aimed to fundraising (Cohen 2014).

However, times quickly change and these accelerator programs are evolving in these last five years. After a comprehensive review on the literature on Incubators and Accelerators, we observe that new types of acceleration programs are emerging: The Accelerator Programs for Analog Firms (APAFs) or accelerator programs for non-internet oriented firms. In other words, acceleration programs for businesses in which the hardware component is fundamental, in which digital and analogue are combined to create unique products. “Artigenous” or Makers who exploit digital and traditional tools in order to propose innovative products to the market. These new accelerators possess a diversified revenue model, often

focus on a specific vertical, integrate themselves more into the ecosystem, and work closely with governments and corporations.

The challenge, however, is to understand their distinctive characteristics and profiles oriented towards reinforcing business start-ups both analog and digital. How do accelerators for non-internet startup operate as a new generation incubation model and how do they differ from existing traditional accelerator programs? This inductive study investigates 5 accelerators across Europe, Asia and U.S.A and adopts a design lens to identify the APAFs main distinctive characteristics.

We contribute to the incubation and acceleration literature by extending recognition of the heterogeneity of acceleration programs, by delineating the “Accelerator Programs for Analog Firms” as a distinctive accelerator program if compared with the first generation that we called “Traditional Accelerator Programs”.

Finally, by considering the worldwide best practices we propose an APAF framework that allows companies to adapt to “The Third Industrial Revolution” and hopefully to increase the employment specifically for the Italian context. Italy is characterized by a large number of small medium enterprises that are mainly specialized in food, fashion, design industries as well as high-precision machine manufacturing and broadly speaking “Artisanship” that for many years have driven the Italian Economy. But the context is changing and even these companies need to innovate and look beyond their borders. In an increasingly global and fast market, we offer our perspective based on the three guidelines identified in “Fare è Innovare” (Micelli 2016): Internationalization, Design and Education. We have tried to implement the three guidelines in something that could have a real impact in the economy of a territory. Therefore, this research is mainly directed at the policy maker, trade associations and in general, all institutions that want to support the development of a territory by leveraging “analog enterprises” through the new generation of accelerator programs: The Accelerator Programs for Analog Firms.

1. *The Accelerator Programs: a new incubation model*

"If everything seems under control, you're just not going fast enough"
Mario Andretti – Formula 1 pilot

In this chapter, an overview of the incubation mechanism history will be made, which dates back to 1951, the founding date of the first incubator in the world: The "Stanford Research Park" in the USA. However, only in the 80s, the incubation mechanisms have received attention by scholars, which were intrigued by this phenomenon and they began to study its characteristics. Moreover, the main literature on the subject will be covered, which explains the progression from the "Stanford Research Park" to the latest types of incubation mechanisms born in 2005, such as the Accelerator programs. What is an "business incubator"? What is an "accelerator program" and why Accelerator is considered a new incubation model? What are its main characteristics and how has it evolved over time? And above all which are their limits? these are some of the questions will be answered in this chapter, in which the concept of accelerator program will be deeply analyzed and a wide review of the literature on this topic will be make.

In the first instance, the paragraph one and two will describe the general characteristic of an incubator according to its three levels of analysis: *community level, Incubator level and incubate level*. Subsequently, the following paragraphs will describe the "new incubation model" by giving the accelerator program's definition and by presenting its main features. Later, a review of the most important acceleration programs in the world will be made with a particular focus for the US and European market. Why accelerator programs are considered the "new incubation model" will be analyzed by contextualizing the phenomenon in

history and literature of incubator-incubation models. We will present how the objectives and types of incubation models have evolved over time by highlighting the 3 macro "waves" of incubation models that have occurred in the last 30 years: pre1980s "First Wave" models, 1980s-1990s "Second Wave" models, 2000s-2017 "Third Wave" model. Later, the substantial differences between an accelerator and a business incubator will be deeply explained, after describing the five key ingredients and the three main types of accelerator programs. At the end of paragraph three, the effectiveness of acceleration programs will be analyzed by presenting the major studies in this field. We will first analyze the impact of an incubator by presenting the main "impact-measures" proposed by the literature. Then, we will present the key findings of the research on the accelerators' effectiveness. We will conclude this chapter by presenting the main critics about accelerator programs. In this chapter, we aim to give the reader the theoretical tools that will be the basis for the analysis of the subsequent chapters.

1 What is a Business Incubator?

To better understand what an acceleration program is, it is useful to step back and analyze the concept of business incubation and incubation model. In fact, over the past decades, a broad variety of incubation mechanisms have been introduced by policy makers, private investors, corporates, universities, research institutes etc. to support and accelerate the creation of successful entrepreneurial companies.

The incubation mechanisms, also called incubation models, have evolved and they are still changing, so it's important to observe, get insights and understand how these mechanisms evolve over time and, ultimately, what impact they have on incubated businesses (Barbero et al., 2012).

Using a Romantic metaphor, the concept of "incubation" refers to the well-known field of maternity. In fact, incubators are used by doctors to allow a newborn, lacking the resources needed to grow, to reach a vital state necessary to breath. The same concept can be applied to the business world.

According InfoDev¹:

“Business incubation is a public and/or private, entrepreneurial, economic and social development process designed to nurture businesses from idea generation to start-up companies and, through a comprehensive business support program, help them establish and accelerate their growth and success. In other words The business incubator is a physical space or facility that accommodates a business incubation process” (InfoDev & The World Bank 2013).

This definition is the simplest, most generic and inclusive one, the result of a long process of discussion between some 30 business incubation associations and should be considered as the reference even though some national business incubation associations have their own business incubation definition.

Indeed, The National Business Incubation Association² (NBIA) of the United States of America use the following definition:

“Business incubators nurture the development of entrepreneurial companies, helping them survive and grow during the start-up period, when they are most vulnerable. Their programs provide client companies with business support services and resources tailored to young firms. The most common goals of incubation programs are creating jobs in a community, enhancing a community’s entrepreneurial climate, retaining

¹ InfoDev is a World Bank Group program that supports high-growth entrepreneurs in developing economies. The program is part of the Innovation and Entrepreneurship Unit of the World Bank Group's Trade and Competitiveness Global Practice. InfoDev connects entrepreneurs with knowledge, funding and mentors through a global network of business incubators. And it's supported by the International Finance Corporation, Ministry for Foreign Affairs of Finland and Canadian International Development Agency (InfoDev & The World Bank 2013).

² The National Business Incubation Association (NBIA), founded in 1985, is a nonprofit organization comprised of business incubator developers and managers, corporate joint venture partners, venture capital investors, and economic development professionals. The association seeks to promote the growth of new business and educate the business and investor community about the benefits of incubators (NBIA 2015).

businesses in a community, building or accelerating growth in a local industry and diversifying local economies.”

Literature provides different business incubator’s definitions. Hackett & Dilts in 2004 made a literature review of all incubator studies, and the definitions collected from 1985 to 2004 are plentiful. For instance:

“A small business incubator is a facility that aids the early-stage growth of companies by providing rental space, share office services and business consulting assistance.” (Plosila and Allen, 1985)

“Business incubators...nurture and grow start-ups in the Internet economy. They offer fledgling companies, office space, funding, and basic services such as recruiting, accounting, and legal; usually in exchange for equity stakes” (Rice, 2002)

Often the *technological component* in the business incubators is prevalent, and therefore it talks about Technology Business Incubators (TBIs).

In 1986, Smilor and Gill for the first time defines a TBIs. Subsequently they contribute to describing and defining the phenomenon Sherman and Chappell, 1998; S.Mian, 1996; Bergek and Norrman, 2008; Aernoudt, 2004; until we get a synthesis that we find in the S.Mian (2016).

“Technology Business Incubators (TBIs) are recognized by different names such as technology/business incubators, innovation/technology centers, science/research/technology parks, and business/seed accelerators. The terminology reflects scope of function as well as location. TBIs offering a link between: technology, know-how, entrepreneurial talent, and capital. TBIs are property-based initiatives providing tenant firms with a portfolio of new venture support infrastructure, including: business services, networking, access to professional services, university resources and capital. The intent is to help start-ups by providing enabling linkages to help the new businesses survive, scale up, and grow” (Mian et al. 2016).

The literature makes no distinction between “TBIs” and “Business Incubator” and it often uses these two terminologies indifferently, which essentially refer to the same concept (Hackett & Dilts 2014). In this study, we use the word “Business Incubator” or simply “Incubator”.

1.1 Incubator as an activity system linked to its environment

The incubator is a system of interdependent activities that surpasses the physical boundary of the company. In other words, the incubator is activity system that is related to the surrounding environment. An activity system is a set of interdependent organizational activities centered on a focal firm, including those conducted by the focal firm, its partners, vendors or customers, etc. The firm's activity system can transcend the focal firm and span its boundaries (Zott & Amit 2010).

This concept refers to *Sean M. Hackett's corollary*, which provides a great insight into how to think of an incubator. Corollary: The incubator is an activity system that is related to the surrounding environment.

“When discussing the incubator, it is important to keep in mind the totality of the incubator. Specifically, much as a firm is not just an office building, infrastructure and articles of incorporation, the incubator is not simply a shared-space office facility, infrastructure and mission statement. Rather, the incubator is also a network of individuals and organizations including the incubator manager and staff, incubator advisory board, incubatee companies and employees, local universities and university community members, industry contacts, and professional services providers such as lawyers, accountants, consultants, marketing specialists, venture capitalists, angel investors, and volunteers” (Hackett & Dilts 2014).

According to this corollary he stratified incubators into three different units of analysis that it will be used later in this chapter: community³ unit, incubator unit and incubatee unit (Figure 1.1).

³ The term 'community' refers to the business environment surrounding the incubator (Dee et al. 2011).

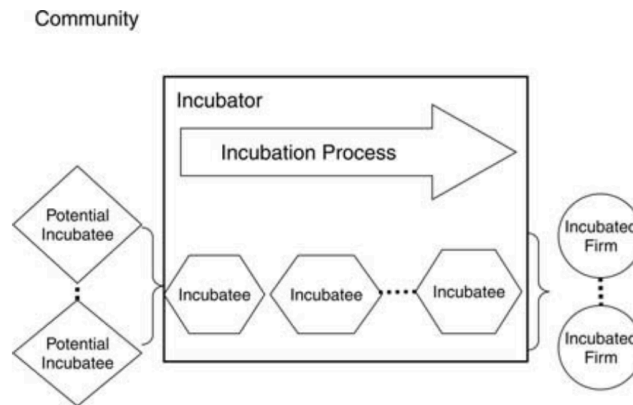


Figure 1.1: Incubator - Incubation concept map. Source (Hackett & Dilts 2014)

1.2 Historical context of Incubators development

Since the birth of the first two pioneering business incubators, *The Stanford Research Park* (California), established in 1951 and *The Industrial Center of Batavia*⁴ (New York), established in 1959, scholars have been interested in this phenomenon (Mian et al. 2016). In the next paragraphs, it will present and discuss some of the major findings in Business Incubation's research, starting from the historical development of the Incubators.

According to a study conducted by Mian in 2016, it's possible to cluster and classify the evolution of Business Incubators into three great "waves" here below explained.

⁴ On the other hand, some studies claim that the first incubator was established as the Batavia Industrial Center in 1959 at Batavia, New York. A local real estate developer acquired an 850,000 ft² building left vacant after a large corporation exited the area. Unable to find a tenant capable of leasing the entire facility, the developer opted to sublet subdivided partitions of the building to a variety of tenants, some of whom requested business advice and/or assistance with raising capital. Thus was the first business incubator established (Hackett & Dilts 2014; Dee et al. 2011).

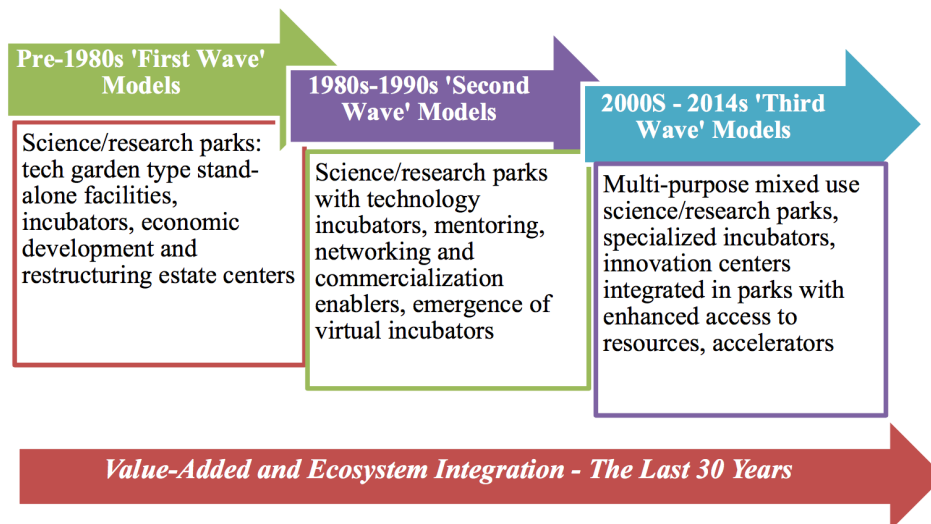


Figure 1.2: The Evolution of the Business Incubation Models (Mian et al. 2016)

- Pre-1980s “First Wave Models”: The first wave of incubator programs aimed at economic restructuring and job creation (Figure 1.2). By 1980, there were 20 research parks and 11 business incubators in the United States. The First Wave Models provided affordable space and shared services (e.g. research/science parks). If we consider Europe, The United Kingdom and Sweden were the first to established science parks in the 1960s. In the 1970s, 50 science parks were established in over a dozen countries, including: France, Germany, Belgium, Japan, Korea, and Taiwan (Lindholm 2003).
- 1980s-1990s “Second Wave Models”: Incubators are no longer oasis in the desert. In fact, the research/science park model evolved from a stand-alone technology garden to a networked commercialization enabler. Furthermore the second wave of incubation programs offered a more complete menu of value-adding services, including: counselling, skills enhancement and networking. Services that were scarcely offered in the first wave. In 1992 Science Parks were globally distributed (Figure 1.3).

This growth has been possible thanks to targeted economic policies. In this decade, the number of incubators has risen rapidly thanks to several US government initiatives aimed to foster publicly funded research and protect invention through intellectual property rights. In this environment, the researchers began to study the phenomenon; the first academic articles and non-academic reports were published (Hackett & Dilts 2014).

Always in these years a new incubation model was born: The Internet-based virtual incubation models⁵. The frantic enthusiasm for the internet-based start-ups has led to the emergence of virtual incubation platforms such as “Idealab”, which was founded in 1996 by Bill Gross. The enthusiasm for this for-profit internet-based model was soon dampened after the tech-stock crash in April 2000.

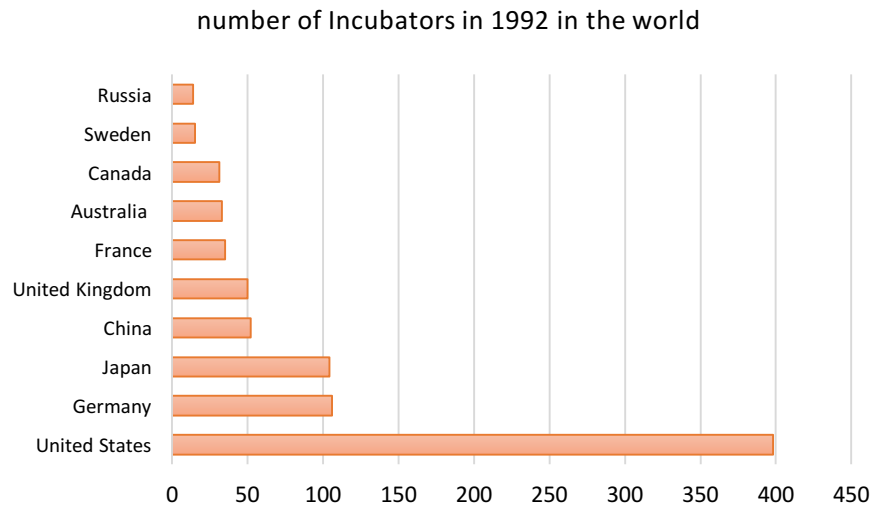


Figure 1.3: The global distribution of incubators in 1992 (Lindholm 2003)

- *2000s – Present “Third Wave Models”*: Since the new millennium, research parks have moved towards a mixed-use science park equipped with a technology incubator. In some cases, the facility cohabits with commercial and residential facilities. Currently, there are over 1,250 incubators programs in the United States and there are 7,000 worldwide (Figure 1.4).

⁵ Virtual incubators (also referred to as “incubators without walls”) that endeavor to deliver business assistance services to incubatees who are not co-located within the incubator (Hackett & Dilts 2014).

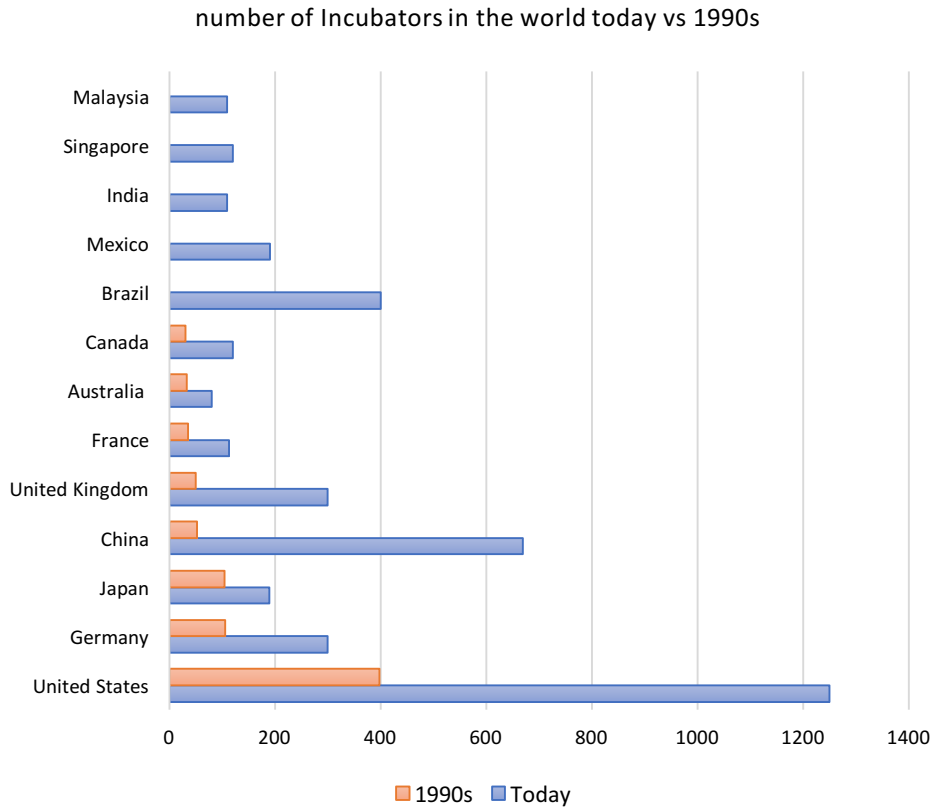


Figure 1.4: The global distribution of incubators today (Mian et al. 2016)

In conclusion, the digital economy has given rise to a new form of incubation mechanism, “The Accelerators” which we will deeply explore later.

2 The state of the art on incubation literature

In 2004, Hackett & Dilts revised the literature on business incubation and business incubator. They revised publications written in English between 1984 and early 2002 and published in the journals with the highest impact factor. They identified 5 research orientations: Incubator development studies, Incubator configuration studies, Incubatee development studies, Incubator-incubation impact studies, theorizing about incubators-incubation (Table 1.1). In the next paragraphs, we will deepen the concepts by presenting the key findings for each orientation. These themes are addressed below.

Research streams	Incubator development studies	Incubator configuration studies	Incubatee development studies	Incubator-incubation impact studies	Studies theorizing about incubators-incubation
Characteristics					
Research period	1984–1987	1987–1990	1987–1988	1990–1999	1996–2000
Main topics	<ul style="list-style-type: none"> • Definitions • Taxonomies • Policy prescriptions 	<ul style="list-style-type: none"> • Conceptual frameworks • Incubatee selection 	<ul style="list-style-type: none"> • New venture development • Impact of planning on development 	<ul style="list-style-type: none"> • Levels and units of analysis • Outcomes and measures of success 	<ul style="list-style-type: none"> • Explicit and implicit use of formal theories (transaction cost economics, network theory, entrepreneurship, economic development through entrepreneurship)
Research question(s)	<ul style="list-style-type: none"> • What is an incubator? • How do we develop an incubator? • What life cycle model can be extracted from analysis of business incubators? 	<ul style="list-style-type: none"> • What are the critical success factors for incubators-incubation? • How does the incubator-incubation concept work in practice? • How do incubators select incubatees? 	<ul style="list-style-type: none"> • What is the process of new venture development in an incubator context? • What is the role of planning and the business incubator manager? 	<ul style="list-style-type: none"> • Do incubators achieve what their stakeholders assert they do? • How can business incubation program outcomes be evaluated? • Have business incubators impacted new venture survival rates, job creation rates, industrial innovation rates? • What are the economic and fiscal impacts of an incubator? 	<ul style="list-style-type: none"> • What is the significance of relationships and how do they influence entrepreneurship? • What are the critical connection factors to success, e.g., settings, networks, founder characteristics, group membership, co-production value, and creation process?" • What constitutes a model for a virtual incubator? • Is the network the location of the incubation process?

Table 1.1: Incubator-Incubation literature overview (Hackett & Dilts 2014)

2.1 Incubator development studies

Between 1984 and 1987 the earliest research focused on describing this phenomenon. These studies are characterized by efforts to define the incubator-incubation concept, to create taxonomic categories for comparison, and to provide policy guidelines for operating an incubator (Hackett & Dilts 2014). The first research path was focused on one level, the Incubator level, excluding the other two levels; Community level and Incubatee level. In fact, the main research questions were “What is an incubator?”, to which it has given a broad response in the preceding paragraphs, “which types of incubators exist and which are their goals?” and “What is the life cycle of an incubator?”. At this point it’s interesting to introduce the different incubator categories that scholars have identified to make comparison. And finally, it will be analyzed the life cycle of an incubator.

2.1.1 Four types of incubators and their objectives

In 1990, Allen and McCluskey distinguished 4 types of incubators that were distributed along a value-adding continuum. From most value-adding to least value-adding, these incubator types include: For-Profit Seed Capital Incubators, Academic Incubators, Non-Profit Development Corporation Incubators and For-

Profit Property Development Incubators. For each type of incubator, primary and secondary objectives are indicated (Figure 1.5).

	Real Estate For-Profit Property Development Incubators	Value-Added Through Non-Profit Development Corporation Incubators	Academic Incubators	Business Development For-Profit Seed Capital Incubators
PRIMARY OBJECTIVE	Real estate appreciation Sell proprietary services to tenant	Job creation Positive statement of entrepreneurial potential	Faculty-Industry collaboration Commercialize university research	Capitalize investment opportunity
SECONDARY OBJECTIVE	Create opportunity for technology transfer Create investment opportunity	Generate sustainable income for the organization Diversify economic base Bolster tax base Complement existing programs Utilize vacant facilities	Strengthen service and instructional mission Capitalize investment opportunity Create good will between institution and community	Product development

Figure 1.5: Typologies and Objectives of Incubators (Allen and McCluskey, 1990)

According to Allen and Rahman (1985) *“the universal purpose of an incubator is to increase the chances of an incubate firm surviving its formative years”*. In fact, theoretically, the incubator should impact an individual tenant through improving its growth path, as illustrated in Figure 1.6 (Dee et al. 2011).

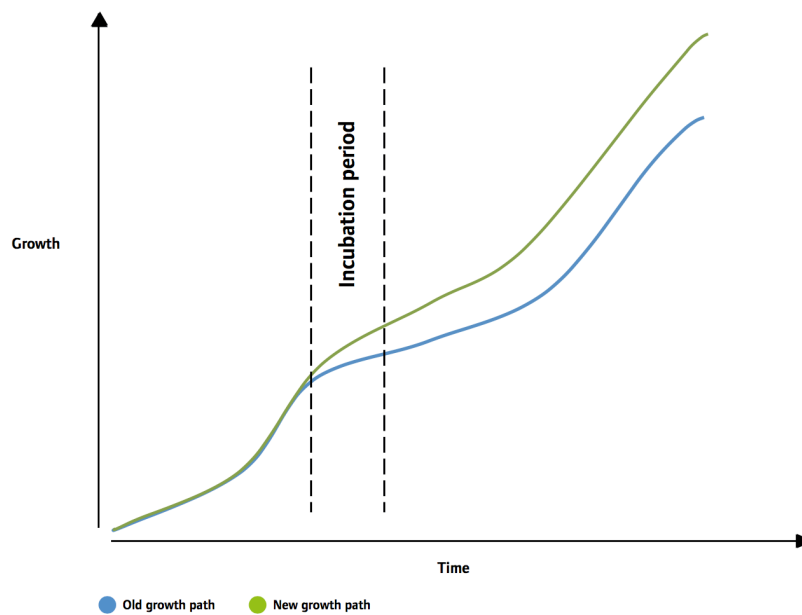


Figure 1.6: Theoretical impact of an incubator on the irregular growth path of an individual tenant (Dee et al. 2011)

However, on the other hand, the diverse objectives between types of incubator represented in the figure 1.5 above may have little to say regarding the objectives of incubates that could not match the incubator’s objectives at all.

2.1.2 The incubator life cycle

During the first search path, which aimed to describe the phenomenon, it was attempted to understand the life cycle of an incubator. The concept that the incubator itself is an enterprise with its own developmental life cycle is an important advancement to better understand the phenomenon. According the literature the life cycle of an incubator is a four-stage process and it starts when its establishment is proposed and ends once the incubator has reached full occupancy (Allen 1988). Indeed, once built, the incubator aspires to achieve full occupancy and stable demand for rented space that is one of the main source of revenue for an incubator (Dee et al. 2011). Initially a newborn incubator is more likely to undergo insufficient demand for its services and fail to reach a critical mass of its target clients (Dee et al. 2011). As an incubator becomes more embedded and known, the recruitment of new tenants should become easier and the relations with local business should increase (Aaboen 2009). After the stage of stability in which the incubator has integrated into the territory and the community, it passes to the last stage. The maturity stage is the incapacity of the incubator to meet the incubation demand. In other words, as indicated in Figure 1.7 the demand for incubation exceeds supply (Allen 1988).

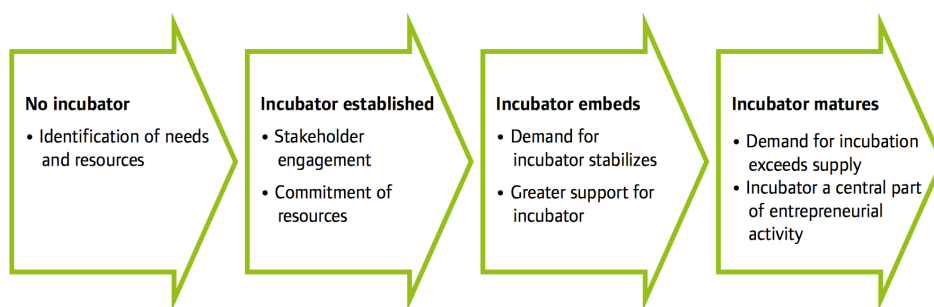


Figure 1.7: the Incubator life cycle (Dee et al. 2011)

2.2 Incubator configuration studies

Between 1987 and 1990, the literature focused on analyzing the design of an incubator. Compared to the previous one, the second path of research focused on

two levels, Incubators and Incubates' levels. First and foremost, the researchers deeply explored the first Incubator's level, analyzing the configuration of an incubator and trying to conceptualize the discoveries through new frameworks. Secondly, researchers had for the first time analyzed the relationship between two levels (incubators and incubators) by studying the incubatee selection process conducted by an incubator. Below we present the main findings.

2.2.1 The incubator's configuration frameworks

Campbell et al. (1985) suggest four areas where incubators create value for their incubates: the diagnosis of business needs, the selection and monitored application of business services, the provision of capital investment, and the provision of access to the incubator network. Implicitly, with this framework, Campbell et al. have defined the incubation process (Figure 1.8). For the first time, scholars have highlighted the internal process of transforming a business idea into a business ready for the market.

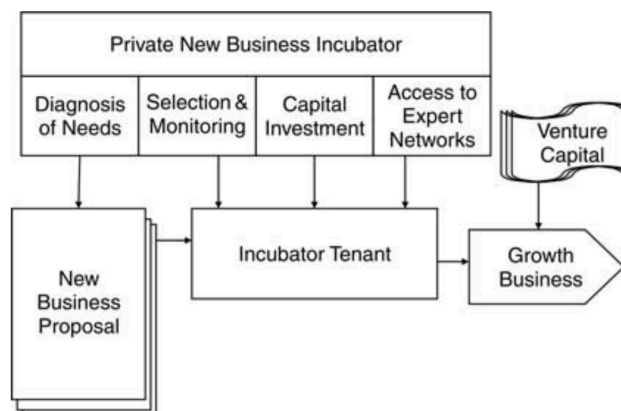


Figure 1.8: The configuration of an incubator. The first conceptualization (Campbell 1985)

The criticisms of this model mainly refer to the fact that the model assumes the success of all its tenants and that only one type of incubator of the four (Figure 1.5) is represented: the private incubator, or for-profit capital seed incubator, according to Allen and McCluskey.

Other authors have highlighted other aspects of the incubator configuration, giving less importance to the internal development process. Smilor, for example, has focused on the incubator as a system, widening the view to the community level (Figure 1.1). Basically, this framework considers, the previously mentioned, corollary *Sean M. Hackett's corollary*. The research has identified four key areas, which are directly controlled by the incubator, that are aimed to support the

business idea's development: Secretarial, Administrative, Business experience and facilities. In addition, the incubators attempt to extend the networking capabilities of the entrepreneur through affiliations with private sectors, universities, government and non-profit institutions. The outcomes of these ingredients are viable tenants that produce economic growth, tech development, job creation, product and successful product (Smilor 1987).

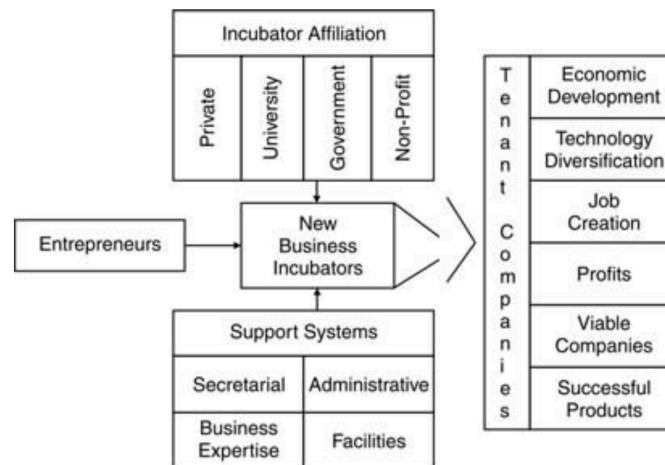


Figure 1.9 Smilor Framework (Smilor 1987)

Although not exhaustive, it gives important clues as to which are the main areas where an incubator operates. Furthermore, this model does not consider the internal process of an incubator, and this is the main criticism of the Smilor's model. So, in conclusion, it emerges from the literature that a mix of the two models can give a broad perspective on the configuration of an incubator.

2.2.2 Selection process

Unexpectedly, beyond Campbell et al.'s implicit definition of the incubation process, previously mentioned, and specification of the general configurations of incubators, little effort has been devoted to "unpacking the variables associated with the incubation process". In other words, according Hackett & Dilts there is a need to shift focus from incubator configurations to explanations of how and why the components work together. What work has been done in this area is generally limited to examining the process of selecting incubates (Hackett & Dilts 2014).

Other scholars found out that the kind of selection criteria used by a university based business incubator in Kenya has a significance impact (79.6%) on entrepreneurship growth (Wachira & Ngugi 2017). The selection criteria into these

incubators has become a key focus point. Furthermore, they argued that University based business incubators should continuously enrich their selection criteria to attract and incubate only the very potential incubatees.

Finally, the main hint we can assume from the selecting incubates studies is that: “all the scholars stress the importance of having a good fit between incubatee needs and the business assistance services that the incubator is capable of providing”. This match between the services offered by the incubator and the needs of the incubator is a discriminating factor for the success of an incubator (Kuratko 1987) and in Europe 97 per cent of incubators use a set of screening factors to evaluate potential tenants in order to enabling a better fitting.

2.2.3 The relevance of the “customization” to the incubatee needs

According Dee et al. 2011, incubatee seem to become dissatisfied with incubator support when the incubators programme is predetermined rather than customized depending on the specificity and needs of incubatee. A predefined strategy enforced through rigid monitoring can erode the ability to rapidly pivoting of an enterprise which a fundamental peculiarity for new ventures as Eric Reis well explain in his book “The Lean Startup”. In other words a critical function of incubators seems to be the ability to learn and adapt to the changing needs of their tenants:

‘It is important for us to stress the usefulness of a variety of different incubators adhering to different incubating models, whose rationale lies behind the existence of companies with different business models and with different requirements.’ (Grimaldi and Grandi 2005)

2.2.4 The four selection strategies

According Bergek et al. 2008 the selection processes can be divided into two general approaches: those focused primarily on the idea or those focused primarily on the entrepreneur or team. Considering idea-focused approach, the incubator management team should have profound business knowledge of which are the most profitable market trends. On the other hand, the entrepreneur-focused approach requires the ability to assess the personality and entrepreneurial attitudes of a potential incubatee.

Bergek also distinguish between other two basic approaches: “the picking-the-winner” approach and “survival-of-the-first” approach. In the “picking-the-

winners” approach, incubator managers try to identify a few potentially successful ventures ex ante. When this approach is taken to its extreme, incubators seem like private venture capital firms. In the “survival-of-the-fittest” approach, incubator managers apply less rigid selection criteria, take on a larger number of firms and rely on markets to provide the selection processes that over time will separate winners from losers (Bergek et al. 2008). If we combine these four types of approaches, we get four “selection strategies”, which are schematized in Table 1.2 or in Dee et al. 2011.

Selection strategies	Survival-of-the-fittest	The picking-the-winner
Idea-focused selection	The portfolio will presumably consist of a quite large number of idea owners (or upcoming entrepreneurs) with immature ideas related to a broad spectrum of fields	Results in a highly niched portfolio of thoroughly screened ideas within a quite narrow technological area—often sprung from the research of highly ranked universities.
Entrepreneur-focused selection	The resulting portfolio will be diversified, and consist of entrepreneurs/teams with strong driving forces representing a broad set of ventures.	The portfolio consists of a few handpicked and carefully evaluated entrepreneurs, commonly with ideas coupled to the research areas of a nearby university.

Table 1.2 the four selection process strategies

The result of the different selection strategies leads to a different composition of the incubated portfolio.

3 Incubatee development studies

In the last decade a flood of literature about entrepreneurship studies and new ventures’ development has been conducted (Kuratko 2016). But little has been said about the entrepreneur's development path within an incubator. In the late 80's some scholars conducted the first and last “incubatee development studies”. What emerges is that incubated companies, compared to non-incubated companies, have a clearer view of how to manage resources and time in launching a new product (Scherer 1988). Moreover, Fry has stated that incubatees are “more active planners” than non-incubatees and he has argued that incubator’s

managers should actively encourage planning activities among incubates (Fry 1987). According Hackett & Dilts Incubatee development studies are underdeveloped and probably will remain so due to the difficulty of obtaining data from early stage ventures regardless of whether the venture is located within an incubator. Key findings from this area of research include the importance of “mentorship” by providing effective, dynamic feedback to incubatees, assisting incubatees with business planning, and encouraging incubatees to introduce control systems during the early stages of incubatee development (Hackett & Dilts 2014). However, it has also been argued that mentorship should be different based on the seniority of the entrepreneur. In other words, companies without start-up experience seek the most support with functional skills e.g. marketing, IT, legal and government regulations in addition to market and opportunity understanding. Companies with start-up experience seek the most support in strategic information e.g. market and opportunities, customers, PR in addition to access to related R&D activity (Dee et al. 2011).

3.1 Incubator-incubation impact studies

For all 90s, researchers sought to understand the impact and effectiveness of incubation mechanisms. The main research questions were: “Do incubators achieve what their stakeholders assert they do? How can business incubation program outcomes be evaluated? Have business incubators impacted new venture survival rates, job creation rates, industrial innovation rates? What are the economic and fiscal impacts of an incubator?”. There is no standard methodology for measuring incubator performance, which makes comparisons between studies challenging. It is also difficult to distinguish between firm growth that would occur in the absence of incubation, and additional growth because of incubation. Furthermore, making sense of such findings requires scrutiny of the research designs employed and their limitations. As a result many findings have limited generalizability (Dee et al. 2011). The key findings for the three levels of analysis are summarized in Table 1.2 and they are explained below.

Key findings	Literature
<i>Community level</i> <ul style="list-style-type: none"> Incubators are more cost-effective than corporate relocations programs. 	(Campbell and Allen, 1987) (Knopp 2007) (CSES 2002)

<ul style="list-style-type: none"> It is unclear whether incubators are good job creators. There are conflicting studies. The latest claims that incubators are good job creator and that they create positive externalities effect on the community 	
<p><i>Incubator level</i></p> <ul style="list-style-type: none"> There are conflicting results. Some quantitative studies say that incubators positively impact on the success of a new venture others advocate the opposite 	<p>(Allen and McCluskey, 1990) (Lindelof and Lofsten, 2002) (Rothaermel and Thursby, 2005) (Chen, 2009)</p>
<p><i>Incubatee level</i></p> <ul style="list-style-type: none"> Benefits to incubatee: network effects, credibility, faster learning curve and quicker problem solving 	<p>(Dee et al. 2011)</p>

Table 1.3: Key findings Incubator's effectiveness studies. Author's own work based on Hackett & Dilts 2014 and Dee et al. 2011.

Findings at community level

First, incubators represent a lower cost means to job creation than cost-sharing corporate relocation programs. Empirical research suggests that incubators and their incubatees are not very good job creators (Campbell and Allen, 1987). However, business incubators have been found to be more cost-effective economic development tools than programs to attract firms to local regions⁶. On the other hand, more recent studies deny the Campbell's findings. In fact, in 2005 the NBIA estimated that North American incubators assisted more than 27,000 start-up companies that provided full-time employment for more than 100,000 workers and generated annual revenue of more than \$17 billion (Knopp 2007). In

⁶ The US EDA, evaluated the cost of jobs in various industries, and concluded that business incubation was the most cost effective job creation mechanism. Again, we recommend examining the methodology. The Economic Development Administration (EDA) is an agency in the United States Department of Commerce that provides grants and technical assistance to economically distressed communities in order to generate new employment.

Europe, it is estimated that every year about 40,000 new (net) jobs are generated by incubators (CSES 2002).

Findings at incubator level

Second, the level of incubator development and the number of incubatees are positively related with incubatee survival. One of the biggest clue is that the age of an incubator (which is a proxy on the development of an incubator) and the number of incubators, positively affect the success of an incubator. In other words, incubated enterprises in large incubators are most likely to succeed than the enterprises incubated in the smaller incubators (Allen and McCluskey, 1990). On the other hand, a study of Taiwanese incubators found no direct effect on new venture performance because of incubation (Chen, 2009), while in contrast Rothaermel and Thursby (2005) showed incubated firms were significantly less likely to experience a direct failure. Lindelof and Lofsten (2002) discovered no difference in profitability between on- and off-park firms, but the off-park sample had significantly lower growth in employment and revenues.

Findings at Incubatee level

Incubators provide benefits to their incubatee along four dimension: access to an entrepreneurial network, development of credibility and reducing the liabilities of newness, shortening of the entrepreneurial learning curve, quicker solution of problems.

1. Access to an entrepreneurial network:

The incubator often acts as a broker between the entrepreneur and other resources and networks. According Hite and Hesterly (2001) networks play a central role in the emergence and growth of successful firms. In addition, the access to qualified network through the incubator, allows the new ventures to gain credibility among their stakeholders and to reduce the “liabilities of newness”.

2. Development of credibility and reducing the liabilities of newness.

3. Shortening of the entrepreneurial learning curve:

The empirical evidence would suggest that incubatees who interact with the incubator have faster learning (Scillitoe and Chakrabarti 2010). But faster learning sometimes means fail sooner, or positively, quicker learning (Reis, 2011). In fact, Amezuca (2010) argued that incubated firms outperform their peers in terms of

employment and sales growth, but fail sooner (Amezcuca 2010). Few studies explore post-incubator performance, and yet '*graduation is easy, post-graduation survival may not be*' (Schwartz 2010). In fact, Schwartz in 2009 reported that 20% of incubatees after graduation⁷ do not survive within 3 years (Schwartz 2009).

4. *Quicker solution of problems:*

In his study, Rice indicated that better performing incubators had proactive crisis intervention and proactive development intervention rather than an episodic reactive, as a type of counselling (Rice 2002). In other words, a proactive intervention in incubatees generates more positive results. On the other hand other studies suggest the 'best' incubatees (which were linked to high-growth episodes) were also those least likely to demand help from the business incubator (Dee et al. 2011).

As it can be seen the main clue to these studies is that there are no studies that generalize the results. According to literature, I strongly believe that a generalization will never be possible, because of the territoriality and specific nature of the phenomenon⁸. Moreover, what it has understood so far is that the area of incubator-incubation impact research is surprisingly understudied and represents fertile ground for future research (Hackett & Dilts 2014).

3.1.1 The ultimate Incubator's Impact Measures

According to Hackett & Dilts (2014) many success' measures⁹ of the incubation mechanism has been proposed in literature, but they have never been verified

⁷ Incubate graduation occurs when an incubated firm exit from the incubator because it's old enough to "breathe" on its own. The new venture is theoretically ready for the market.

⁸ An in-depth and up-to-date review of all incubator impact studies and their methodological limits can be found in the Appendix B of Dee et al. (2011) research.

⁹ *Incubator success*: is the creation of a responsive business consulting network, participation of financial intermediaries in incubatee capitalization, the point at which a majority of tenants are start-up firms as opposed to previously existing small businesses, and the synergism that occurs when incubatees develop trade relations with one another such as subcontracting and joint purchasing (Campbell and Allen, 1987, p. 189).

empirically, because of the huge difficulty to obtain relevant data. Among the measures, we can find:

- The degree of “harmony” between incubator and community. In other words, how much the incubator can create bonds with the surrounding environment.
- The number of “graduates” per year. That is the number of incubatee that every year exit from the incubator because they are old enough to “breathe” on their own.
- The number of jobs created by the incubator and revenues generated by the incubated enterprises. An exhaustive summary of measures used to assess the performance of incubators are indicated in *Appendix A* at the end of the chapter.

3.1.2 The relevance of the “fitting” with the community: the Italian example

In recent years, incubators and venture capitals have been used as policy tools for regional development, especially the fostering of innovation or the commercialization of research (Dee et al. 2011). In Italy, for example, the Veneto Region (a Government entity) in 2014 became a shareholder of one of the major Italian incubators; H-Farm (IlSole24ore 2014). The Italian Governor's comment was: "This is a strategic alliance to fuel start-up projects and their goals, new businesses able to boost both job creation and competitiveness of the region". This statement finds its foundations also in the literature (Hackett & Dilts 2014; Dee et al. 2011; Smilor 1987). In contrast, the effective execution of such affirmation is another story.

In the above-mentioned Italian case, the literature points out that the Veneto Region investment is a non-virtuous example of execution, although it is a Paretian improvement. It is a Paretian improvement because in any case there is a marginal return from investment in terms of employment compared to the condition "not investing in an incubator". But literature suggests that it could do more, in terms of investment efficiency, with the same amount. If H-farm is based on the American incubation model (H-farm Spa 2014) then the incubator clearly does not fit the specificity of the Italian ecosystem which is completely different from the American one. In fact, the “Sile-con Valley”¹⁰, the area where H-farm is located,

¹⁰ Sile-con Valley because from the toponymic point of view, H-farm rise in the valley of the Sile River, in the province of Treviso (Business Insider 2017).

and more generally Italy, do not clearly have the characteristics of the Silicon Valley (Venture Beat 2017) and for this reason an incubation model that was designed to work in Silicon Valley, according to literature, is not intended to work in the Italian context, if replicated without taking into account the territorial specificity (Dee et al. 2011; Hackett & Dilts 2014; Smilor 1987). In fact, when establishing incubators, it is important to take account of regional differences. For example while many try and emulate incubation strategies from Boston or Southern California (US) or Cambridge (UK), these regions are also considered atypical and likened to their “regional incubators” owing to the amount of entrepreneurial activity and infrastructure (Dee et al. 2011).

Clearly, investment in incubators that do not adapt to the surrounding area will produce inefficiencies and are economically unsustainable if not periodically funded. According to literature, the Veneto Region is a very little virtuous example of execution by the policy maker who wants to promote the development of a territory. Moreover, in the case of the Veneto Region, according to literature, the investment is not intended to achieve the best results because the investment did not consider the importance of the compatibility between the incubator and the territory and probably it's going to fail. The first rumors that something does not work in the “copy-paste model”, proposed by Italian incubators, floats in the air according to many articles (La Repubblica 2017; Venture Beat 2017). Veneto Region is not the only one. In fact, the key policy question among policy maker is whether public sector venture capital or incubators is an effective means of achieving regional development. Emerging evidence is not encouraging (Hackett & Dilts 2014). It has to be said that public investments in incubation mechanisms involve dimensions and dynamics at political level, such as government branding, which go beyond our treaty.

Moreover, according to Mason and Perrakis (2009) *“public sector venture capital is unable to create entrepreneurial regions and [...] a regionally-based model of public sector venture capital is ineffective because it lacks scale. A new approach for venture capital-deficient regions is therefore required which gives greater emphasis to the demand side”*. The key concept is *“emphasis on the demand side”*. This means starting from the needs of the surrounding area to build an incubation mechanism that allows a real development of the territory. Metaphorically, there are several development tools, within the toolbox of each country. The goal of the

policy makers is to understand what tools are available in their toolbox, in order to design an incubation mechanism that perfectly suits the territory, and then simply turn on the engine of development. Creating an incubation mechanism that responds to the needs of the territory does not only mean creating partnerships with companies in the surrounding area, but rather using a holistic strategy that considers in each activity the specificity of the context in which the incubator is inserted. In other words, facilitate the uniqueness of the context in which incubator is embedded for the development of the region.

Brazil, in this case, can be taken as a virtuous example. In fact, it's an example of a country that has been able to pick up from its tool box the right instruments to draw an incubation mechanism for economic development. Brazilian industry associations utilized the incubators to expand clusters of low-tech firms while municipalities, universities and industrial associations combined the objectives of the high- and low-tech incubators in a mixed format. Public universities and political groups with social objective invented the incubator for cooperatives as a means of combating poverty (Etzkowitz, 2005).

On the other hand, placing an incubator in a region does not guarantee it will have suitable tenants to incubate nor attract sufficient support or resources from the local business environment. Neither venture funds nor business incubators on their own can create an entrepreneurial or innovative ecosystem. To be successful they must work with a wide range of other actors, from research institutions to entrepreneurs to specialist advisers, grant-providers, angel investors and many more. Even within an entrepreneurial region it can take time for incubators to become embedded in the local business environment (Dee et al. 2011; Hackett & Dilts 2014).

3.2 Theorizing about incubators-incubation

Little attention has been devoted to theory-building. In fact, researcher have focused in descriptive and explanatory approaches rather than theory-building approaches. There are several key findings related to studies theorizing about the incubator- incubation concept and here below are summarized:

- First, incubators are a systematic approach to controlling resources and reducing costs during the early stages of a venture's development, from a transaction cost economics and market failure perspective (Williamson, 1978; Brooks 1986)

- Second, as we broadly argued, the incubator configuration must meet local needs and norms. Structural contingency theory provides a theoretical structure for the often-asserted need for the incubator to be tailored to meet community needs. In fact, the primary assumption of structural contingency theory is that the configuration of an organization and the external environment must achieve “fit” to obtain “success” (Ketchen et al., 1993)
- Third. Rice in 2002 tells us that in addition to “fit” between the community and the incubator it serves the “fit” between the services offered by the incubator and the ability of incubatee to understand incubator’s counseling:

“It suggests that the time intensity of business assistance interventions must be strategically allocated by the incubator manager to the incubatees, and that incubatees must be properly prepared to utilize the advice and insights resulting from the intervention”(Hackett & Dilts 2014)

This perspective is important because shifts the attention from the incubator facility toward the incubation process.
- Fourth, network relationships and institutionalized knowledge transfers enhance the likelihood of incubation success (Hackett & Dilts 2014)

3.3 Concluding remarks

According to literature, research on incubators is a relatively recent research that has evolved since the 1980s. There has been a development from “the mere description of the phenomenon” to the measures of its impact, moving through the incubator's configuration studies to the incubatee’s development researches. Moreover, there are many contrasting studies and it is difficult to generalize the results. What emerges most is that:

- It is important that there is the fit between community and incubator (*At community level*);
- It is important that there is the fit between the needs of the incubatee and the offer of the incubator (*At incubator level*);
- Access to qualified network is a powerful tool for business growth (*At incubator level*);
- The incubator accelerates incubatee learning for better or worse (*At incubatee level*).

Furthermore, what emerges is that there is still a lot to be done and there are several paths to go through, especially regarding the empirical verification of

performance measures. According to Hackett & Dilts 2014 the main research needs to satisfy (a.k.a. research gaps) in the incubator-incubation research field are:

- Need to obtain greater definitional and conceptual convergence in future research;
- Need to shift focus from incubator configurations to explanations of how and why the components work together;
- Need to develop a process model to explain how and why the incubation process facilitates incubatee development;
- Need to conduct research that addresses whether incubators-incubation impact new venture survival rates;
- Need to develop explicit theory of business incubation.

In the preceding paragraphs, we have made an excursus on the theories and researches of incubation mechanism, but something is changing. In the recent years, a new incubation mechanism was born: *The Accelerator program*. And in the next paragraphs we will try to better understand this new incubation phenomenon.

4 From Incubator to Acceleration programs: a new perspective

According to literature, the digital economy has given rise to a new form of incubation mechanism, the accelerator (Wise 2014; Pauwels et al. 2016).

Exist several definitions of “Accelerator program”:

“Broadly speaking, Accelerators help new ventures define and build their initial products, identify promising customer segments, and secure resources, including capital and employees. More specifically, accelerator programs are limited-duration programs—lasting roughly three months—that help cohorts of ventures with the new venture process.

They usually provide a small amount of seed capital, plus working space. They also offer a plethora of networking, educational and mentorship opportunities, with both peer ventures and mentors, who might be successful entrepreneurs, program graduates, venture capitalists, angel investors, or even corporate executives. Finally, most programs end with a

grand event, usually a “demo day” where ventures pitch to a large audience of qualified investors” (Cohen 2013).

Other authors stated:

“Accelerators are fixed-term, cohort-based TBIs providing education and mentoring for start-up founders. Additionally exposing new venture teams to former entrepreneurs, venture capitalists, angel investors, and corporate executives. Thereby, preparing founders for public pitch events in which graduates pitch their businesses to large groups of potential investors. In practice, accelerator programs combine distinct services and functions that are difficult and costly for an entrepreneur to find and obtain” (Hochberg 2015).

But the more exhaustive is the following definition:

“Accelerator programs are fixed-term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event or demo-day” (Cohen 2014).

Moreover, scholars have severely argued that in the last five years have seen the emergence of hundreds of groups titling themselves ‘accelerator.’ But not all such programs meet the definition of accelerator, and even for those that do, there are often significant differences in program structure and goals (Cohen & Hochberg 2017).

4.1 Why Accelerator is a new incubation model?

The accelerator model has several specific features that sets it apart from existing incubation models (Isabelle, 2013; Pauwels et al. 2016). Basically, there are five reasons that make accelerator programs unique:

- First, they are not primarily designed to provide physical spaces or office support services over a long period of time;
- Second, they typically offer pre-seed investment, in exchange for equity;
- Third, they are focused on business angels and small-scale investors rather than venture capitalists as a next step of finance. One of the reason is that the accelerator programs are focused on early-stage tech start-ups that are significantly grow in term of quantity in the last decade. Usually, after the validation of their business model through an acceleration programs (Reis 2011), they are neither mature enough to reach the interest of a Venture Capital nor financially independent to approach the market alone (Davis

2013). So, they need the help of a “mid-level investor” such as business angels that invest smaller amount if compared to venture capitalist;

- Fourth, accelerators emphasize business development through mentorships, seminars, networking events, and mutual peer support;
- Fifth, the accelerator model concerns time-limited support (on average 3–6 months), focused on intense interaction, monitoring and education to enable rapid progress.

4.1.1 Business Incubator Vs Accelerator Programs

According (Cohen 2013) “accelerators help fledging nascent ventures. Philosophically, incubators tend to nurture nascent ventures by buffering them from the environment to give them room to grow. In contrast, whereas accelerators speed up market interactions in order to help nascent ventures adapt quickly and learn”. Practically, incubators and accelerators differ in four key ways: duration, cohort, business model, selection process, education, mentorship and network development.

Duration: the duration of an acceleration program ranges from 3 to 6 months. The purpose is to force participants in the program to stay focused in order to boost their learning. In contrast, whereas research on incubators suggests that firms graduate from incubators anywhere from one to five years after they begin.

Cohort: another fundamental characteristic of limited-duration programs is that new ventures enter and exit the programs in groups, known as cohorts or batches. In incubators, this don’t happen. The cohort allows participants to exchange feedback on their business idea, to help each other. Often the batches live under a single roof and therefore this allow to establish strong ties. This allows entrepreneur to always stay focus on their project and to exchange ideas 24 hours a day.

Business model: most of the original accelerators are privately owned and take an equity stake in the ventures participating in the programs but sometimes their aims may go beyond the profit (Pauwels et al. 2016). Programmes usually provide a minimum of €10,000 and a maximum of €150,000 investment during the first three months. This can be in the form of a convertible note¹¹ or an equity

¹¹ Convertible note offers a discount on stock should the company raise further funding (Miller & Kirsten 2011)

investment (Miller & Kirsten 2011). On the other hand, the incubator's main revenues source comes from the spaces' rent (Dee et al. 2011).

Selection process: another characteristic of the accelerator programs is that they accept ventures in batches, usually once or twice a year, while incubators accept and graduate new ventures on an ongoing basis (Miller & Kirsten 2011). Moreover, accelerators are focused on small teams not individuals. As the Y Combinator, the most important accelerator program in the world, argued in its website "A startup is too much work for one person."

Education, mentorship and network development: Accelerators during the acceleration period they offer training programs in the most disruptive business topics. From marketing to finance, passing through digital marketing. On the other hand, Incubators support incubatee through administrative services (Hackett & Dilts 2014). Incubator's mentorship is minimal and it's offered by professional for a competitive price to all incubatee. In contrast, whereas accelerators' mentorship is intense and it's fostered by network effects. In Table 1.4 it has been summarized the differences.

	<i>Incubators</i>	<i>Accelerators</i>
<i>Duration</i>	<i>1-5 years</i>	<i>3-6 months</i>
<i>Cohort</i>	<i>No</i>	<i>Yes</i>
<i>Business model</i>	<i>Rent office space; Sometimes non-profit</i>	<i>Equity investment; Sometimes non-profit</i>
<i>Selection process</i>	<i>Non-competitive and ongoing basis</i>	<i>Competitive and usually Twice cohort per year</i>
<i>Venture stage</i>	<i>Early or Late</i>	<i>Early</i>
<i>Education</i>	<i>Ad hoc, Human resources, legal, etc</i>	<i>Regular basis seminars</i>
<i>Mentorship</i>	<i>Minimal and offered for a fee by professional</i>	<i>Intense and for "free"</i>
<i>Venture location</i>	<i>On site; On-line</i>	<i>On site</i>

Table 1.4: Differences among Incubators and Accelerator (Cohen 2013)

4.2 The main Accelerator programs in the world

According literature the first accelerator, Y Combinator, was established by Paul Graham in 2005 in Cambridge, Massachusetts, and soon moved and established itself in Silicon Valley (Cohen & Hochberg 2014; Pauwels et al. 2016; Mian et al. 2016). In 2007, David Cohen and Brad Feld, two start-up investors, set up TechStars in Boulder, Colorado, hoping to transform its start-up ecosystem through the accelerator model. According the “global accelerator report 2015” The U.S. and Canada reign as leaders of the accelerator industry with a total of 111 accelerators investing \$90.3M in 2,968 startups. Europe, with a total of 113 accelerators investing \$41.0M in 2,574 startups. The accelerator industry is also expanding rapidly in unexpected regions such as Latin America. In other word over 380 accelerators were reported worldwide supporting about 8,800 new ventures and a total of US\$191 million has been invested all over the world in 2015 in order to support early stage startup (Gust 2015). The TechStars program and its affiliates now operate in 17 cities, and the Global Accelerator Network (a.k.a. GAN), a network of the most respected accelerators around the world, counts 70+ accelerators in 106 cities across six continents and continue to grow.

Susan Cohen and Yael Hochberg scholars with the greatest impact factor in accelerator research field have established the Seed accelerator ranking projects (SARP), a project that aims to better understand seed accelerator programs and encourage a larger conversation and research on the seed accelerator phenomenon. The “SARP” annually establish a ranking of the best acceleration programs in the US, ranking them among *platinum plus*, *platinum*, *gold*, *silver* and *bronze*. The metrics used for the evaluation are: qualified Financing Activity of an accelerator, qualified Exits, reputation with leading VCs, alumni network, equity taken and stipend. In figure 1.10, the 2017 ranking:



Figure 1.10: US Accelerator programs ranking 2017 (Cohen & Hochberg 2017)

Other scholars have drawn up the ranking that includes the best acceleration programs globally (Gust 2015). And the top 10 incubators measured according to the amount of invested capital are: 500startup (US \$ 18.7mil); TechStars (US \$ 17.8mil); PlugAndPlay (US \$ 8 mil); StartUp Chile (Chile \$ 7mil); AngelPad (US \$ 7 mil); NXTP Labs (Latin America - \$ 6.5 million); Energy Accelerator (US- \$ 5 mil);

Accelerace (US \$ 4.5 million); Wayra (Worldwide - \$ 3.6 million); Alacrity (Canada - \$ 3.6 million).

As far as Europe is concerned, one of the most up-to-date charts was established in 2016; Alphagamma had taken the research conducted by (Miller & Kirsten 2011) and had drawn up an updated list of all accelerators that “were delivering results for their startup”. Although it’s unclear which were the evaluation criteria, the Alphagamma contribution give a good snapshot of the overall situation in the European accelerators’ scene. For Italy, H-Farm was listed, while the country that secured the highest number of accelerators in the list is UK (Table 1.5).

Programme	Location	Investment	Duration
33entrepreneurs	Bordeaux, France	€ 15,000	3 Months
Axel Springer Plug and Play	Berlin, Germany	€ 25,000	3 Months
Barclays Accelerator	London, UK	up to \$ 120,000	13 Weeks
Bethnal Green Ventures	London, USA	£ 15,000	3 Months
Distill Ventures	London, UK	£ 150,000	6 Months
Dotforge Accelerator	Sheffield, UK	£ 15,000	13 Weeks
Emerge Education 2017	London, UK	£ 15,000	3 Months
Entrepreneur First	London, UK	£ 17,500	6 Months
GameFounders	Tallinn, Estonia	€ 15,000	3 Months
H-Camp (H-Farm Seed Ventures)	Roncade, Italy	€ 20,000	3 Months
Healthbox	London, UK	\$ 50,000	16 Weeks
Indiebio	Cork, Ireland	€ 50,000	3 Months
LAUNCHub	Sofia, Bulgaria	€ 30,000	6 Months
Microsoft Accelerator	Berlin, Germany	Mentoring & coaching	4-6 Months
NDRC LaunchPad	Dublin, Ireland	€ 30,000	12 Weeks
Nextstars	Paris, France	€ 10,000	4 Months
ProSiebenSat.1Accelerator	Berlin, Germany	€ 25,000	3 Months

Rockstart Accelerator (Smart Energy Program)	Amsterdam, Netherlands	€ 20,000	6 Months
Rockstart Accelerator (Web/Mobile Program)	Amsterdam, Netherlands	€ 15,000	12 Weeks
Seedcamp	London, UK	€ 50,000	12 Months
SeedRocket	Barcelona, Spain	€ 150,000	3 Months
Startup Reykjavik	Reykjavik, Iceland	\$ 16,000	10 Weeks
Startup Sauna	Helsinki, Finland	Mentoring & coaching	7 Weeks
Startup Wise Guys	Tallinn, Estonia	€ 30,000	12 Weeks
Startupbootcamp Smart City Amsterdam	Amsterdam, Netherlands	€ 15,000	3 Months
Startupbootcamp Berlin	Berlin, Germany	€ 15,000	3 Months
Startupbootcamp Internet of Things and Big Data Barcelona	Barcelona, Spain	€ 15,000	3 Months
Startupbootcamp HighTechXL	Eindhoven, Netherlands	€ 15,000	3 Months
Startupbootcamp Singapore	Singapore	€ 15,000	3 Months
Startupbootcamp Istanbul	Istanbul, Turkey	€ 15,000	3 Months
Startupbootcamp Insurance London	London, UK	€ 15,000	3 Months
StartupHighway	Vilnius, Lithuania	€25,000	13 Weeks
Techstars London	London, UK	€ 15,000	3 Months
Yunus Social Business Albania Accelerator	Tirana, Albania	€ 1,000	4 Months

Table 1.5: Best Accelerator programmes in Europe (Alphagamma 2016)

4.3 The key ingredients for an Accelerator program

A great contribution in defining the key components of an acceleration program, comes from the study of Pauwels et al. (2016). Pauwels et al. have used the design lenses provided by Zott and Amit (2012) for an incubation mechanism in order to describe the “configuration” of an acceleration program (Hackett & Dilts 2014). This branch of research introduces the concept of an organization’s activity system (see paragraph 1.1 - Incubators as an activity system linked to its environment). In fact, Zott and Amit, in their studies, suggests two sets of design parameters that should be considered when choosing the appropriate “model” or “template” for

the activity system to perform its activities: design elements and design themes. *Design elements* are the key building blocks of the activity system's model, which separate it from other models. *Design themes* represent the common theme that horizontally orchestrates and connects the different elements into a particular model and they define the several typologies of an activity system. The activity system design perspective is a conceptual toolbox to identify the design themes and elements which are particularly relevant to study a new generation incubation model (Pauwels et al. 2016; Zott & Amit 2010; Zott & Amit 2007; Amit, Raphael; Zott 2012). According to Pauwels et al. (2016) it's possible to observe five design elements and five Design themes in an acceleration program.

4.3.1 The Five Design elements

The five design elements, which constitute an acceleration program are: program package, strategic focus, selection process, funding structure and alumni relations (Figure 1.11).

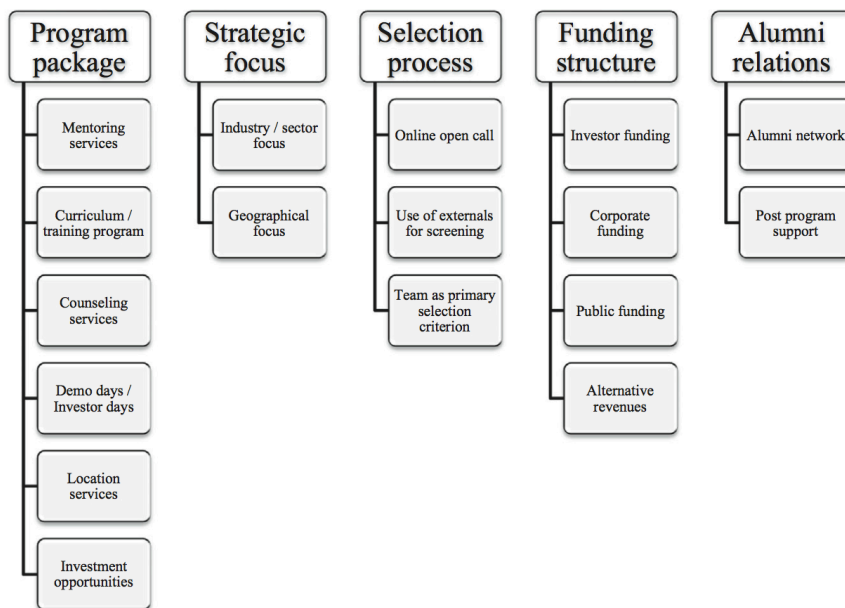


Figure 1.11: Design elements and construct (Pauwels et al. 2016)

1. *Program package*: all services the accelerator offers to its portfolio ventures.

Construct	What
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<i>Mentoring services</i>	Mentors are typically experienced entrepreneurs, which are heavily vetted before being included in the accelerator program.
<i>Curriculum/Training program</i>	An accelerator's program package most often also includes a curriculum or training program, covering a variety of topics such as finance, marketing and management, which the new ventures have to go through when entering the accelerator program.
<i>Consulting services</i>	Mentorship given by professional and entrepreneur in the network
<i>Demo Days/Investor Days</i>	Demo days is for customers and investors. During these days, customers and/or investors are invited to visit the accelerator and attend portfolio companies' presentations, followed by formal and informal networking opportunities.
<i>Location services</i>	Location services are also part of the accelerator program package, but are limited to co-location in a shared open office space, with the aim to encourage collaboration and peer-to-peer learning.
<i>Investment opportunities</i>	Investment opportunities. As already said most programs follow the traditional accelerator model of offering a small amount of funding in exchange for equity

2. *Strategic focus*: the strategic focus concerns the accelerator's strategic choices regarding industry, sector and geographical focus.

Construct	What
<i>Industry/sector focus</i>	Initially, many accelerator programs were generalist, accepting entrepreneurs whose businesses were directed at a variety of different industry verticals. Today, accelerator programs have also diversified into industry-vertical focused programs, such as Surge (Houston, TX) which focuses on acceleration of energy start-ups, Kaplan EdTech (New York, NY) which focuses on education-related start-ups, and Healthbox (Chicago and Boston) and Rock Health (San Francisco and Cambridge), which focus on acceleration of healthcare-related start-ups (Cohen 2014).
<i>Geographical focus of the accelerator</i>	Some accelerator programs are focused on a particular area.

3. *Selection process*: accelerators make use of a rigorous, multi-staged selection process.

Selection process	What
<i>Online Open call</i>	Usually, an open call is organized for a period of time, during which portfolio companies can register and apply online on a software platform such as F6S.com, Fundacity or Angel.co.
<i>Use of external for screening</i>	Then, a standardized screening process is organized in which external stakeholders tend to participate.
<i>Team as primary selection criterion</i>	Many accelerators have argued: "We have a focus when we look at selection: team, team, team and opportunity"

4. *Funding structure of accelerator: who are the main investor.*

Funding structure of accelerator	What
<i>Investor funding</i>	"We are privately funded mostly by business angels and a couple of VC's"
<i>Corporate funding</i>	"There is no partner funding, so this is all Microsoft funded. There is no partnership with any organisation. I am a 100% Microsoft employee, this building is financed by Microsoft"
<i>Public funding</i>	"It is a non-profit association and it is a sponsorship. So we receive some money and we allocate it, this money, to our events and our place"
<i>Alternative revenue</i>	"Actually we have a very profitable event business. We are organising a lot of events and people like our events. So we know how to sell tickets online, it is a good way to gain money, the event business is an incredible business with capital"

5. *Alumni relations: it concerns the relationship between accelerators and their alumni.*

Alumni relations	What
<i>Alumni network</i>	Accelerators usually run alumni events quite often in which alumni are invited back. So we create a lot of opportunities for them"
<i>Post program support</i>	Usually Accelerators continue to make introductions and continue to support their companies also after the conclusion of the program. Sometimes they continue offer office space.

4.3.2 The Three Design themes

Pauwels et al. has identified three different themes that can horizontally cut the accelerator's elements. In other words, the three accelerator's typologies are: *the company "ecosystem builder", the "deal-flow maker", the "welfare stimulator"*

1. **The company "ecosystem builder"**: is an accelerator typically set up by corporate companies that wish to develop an ecosystem of customers and stakeholders around their company.
2. **The "deal-flow maker"**: is an accelerator receives funding from investors such as business angels, venture capital funds or corporate venture capital and has the primary aim to identify promising investment opportunities for these investors. This accelerator type resembles most of the original concepts of Y Combinator and Techstars developed in the US. Its objective is to bridge the equity gap between early-stage projects and investable businesses (Davis 2013).
3. **The "welfare stimulator"**: is accelerator typically has government agencies as a main stakeholder. The primary objective of this type of accelerators is to stimulate start-up activity and foster economic growth, either within a specific region or within a specific technological domain.

4.4 The latest theories about incubators-incubation

Pauwels et al. have given a great contribution in building the theory of incubation mechanisms (Hackett & Dilts 2014; Pauwels et al. 2016). Moreover, they supply the literature with a framework (a.k.a design lens) and a methodology to account for the heterogeneity among incubation models and keep track of the incubation mechanism evolution. The main implications that feed the incubators-incubation theory are explained below. To explain the implications, we will use the three levels proposed by Hackett & Dilts 2014 by including the "Accelerator programs" in the "Incubator level". To avoid misunderstanding, I decided to refer to this level with the term "Provider level"; replacing the term "incubator level". The provider level refers indiscriminately to the unit of analysis at which an entity (usually an incubator and an accelerator) provides a number of services to an organization.

4.4.1 New implications at "Provider level":

- Thanks to the classification of the three types of accelerators, Pauwels et al. further contribute to the request from incubation scholars to take

different types of incubation models and their specific features into account in order to assess performance. In other words, if you want to evaluate the performance of an incubator or an accelerator you should consider the different typologies of provider. In fact, accelerator programs adopt different ways of structuring and running their programs, and that this is largely determined by the objectives of their key shareholders. And therefore, the performance measures will vary according to the different objectives and type of provider;

- The three accelerator types differ in satisfying different shareholder needs highlight shareholder objectives as important design parameters to take into account. Precisely, Pauwels et al. theorize that differences in the objectives of shareholders supporting or financing the accelerator will lead to differences in the way accelerators run their programs;
- As we already said, the design lens offers a methodology to identify the key building blocks of the incubation model, enables classification of different incubation models, as well as allows heterogeneity within the model to be taken into account. Moreover, an additional advantage of this framework is that it allows accounting for hybrid models.

4.4.2 New implications at community level: the policy maker implications

The diversity of accelerators we have identified also has implications for policymakers in supporting different types of accelerators and evaluating their role. The fundamental question to ask when an organization wants to establish an incubator or an accelerator program is "which are the objectives do we want to reach?" (e.g. economic development of the territory, new jobs, pursuit of profit) From the answer to this question derives the structure of the acceleration program and its impact measures. Metaphorically, A.Einstein said "Everybody is a genius but if you judge a fish by its ability to climb a tree it'll live its whole life believing that it's stupid". By paraphrasing the well-known statement of A.Eistein every incubator and accelerator produces any positive result. It is all about measuring the right variable that translates into the numbers the provider's goal. If the measured variable is not consistent with the objective of the program, we are likely to draw misleading conclusions. In fact, Pauwels et al. argued that "Rather than evaluating the effectiveness of an accelerator using using a fixed set of criteria, there is a need to develop measures that take into account the different

objectives of different types of accelerators”. Policymakers typically have specific objectives, such as regional development and employment. Taking these objectives into account, policy-makers have to realize that the accelerators they finance might not necessarily be profitable in the short or even medium term (Hackett & Dilts 2014; Pauwels et al. 2016; Gust 2015). Given the results so far, it seems unlikely that accelerators will be profitable or even sustainable without continued financial support for several years. Only in those contexts in which the accelerator was conceived considering the peculiarities of the territory in which it is inserted seems to have a proven business model (e.g. Y combinator in Silicon Valley). Again, the “copy-paste” method of the successful business model of Valley’s Accelerator, seems to be unsuccessful if applied in contexts with different characteristics, as in the Italian case explained above (Venture Beat 2017). Moreover according literature, the initial advisors to early-stage ventures (e.g. government support agencies; university student and alumni entrepreneurship offices) should consider the different accelerator design elements and themes in order to orient nascent entrepreneurs towards particular types of accelerators that may best meet their needs (Pauwels et al. 2016).

4.5 The Accelerators’ programs effectiveness: a multidimensional phenomenon

While the growth of accelerator programs over the last few years has been rapid, very little has been revealed to date regarding their efficacy as intermediaries in the entrepreneurial ecosystem. With little information to inform decision-making processes, policy makers have struggled to determine how or if these programs should be supported or encouraged (Fehder & Hochberg 2015). In 2015 Fehder & Hochberg¹² provided some initial insights into the effect that accelerator programs can have on the entrepreneurial ecosystem, by exploring their effects on the

¹² As already mentioned, Dan Fehder, Yael Hochberg and Susan Cohen are the main scholars in literature about the Accelerator Programs. Together they founded the “Seed Accelerator Ranking Project ”(a.k.a. SARP). They are professors and they studied in the most influential Management schools in the world including: Harvard, MIT Sloan School of Management, University's Kellogg School of Management, and Stanford University's Graduate School of Business (SARP 2017).

entrepreneurial financing environment in the local region.

“The findings suggest that accelerators have regional impact on the entrepreneurial ecosystem. The local area in which an accelerator is established subsequently exhibit more seed and early stage entrepreneurial financing activity, and this activity appears to not be restricted to accelerated startups alone, but spills over to non-accelerated companies as well, as attracting VCs to accelerator activities (mentorship, demo day) may increase the exposure of non-accelerator companies in area to investors (Fehder & Hochberg 2015).”

The analysis was conducted in the US where the Accelerator model was born and therefore it fits perfectly to the characteristics of the American context. So, the result may be misleading if generalized in different contexts. Moreover, it would be interesting to apply the same quantitative analysis methodology to different regions and contexts. On the other hand, the strongest insight that we can grasp is that, if the incubation mechanism fits with the surrounding ecosystem as the American’s accelerator programs do, impressive results for the surrounding area can be reached.

In 2012 Dalziel et al. did a literature review about the effectiveness of the business incubators and accelerators. The most important finding on the impact of business incubation and business acceleration review, is that the impact is a multi-dimensional phenomenon. Basically, the multi-dimensionality refers to the several variables, in all the three levels of analysis, you should consider in order to fully assess the effectiveness of the phenomenon. In Table 1.6 the main findings in the academic literature are reported.

	Business Incubator and Business Accelerator	
Parameter measured	Studies for “No impact”	Studies for “Yes Impact”
<i>The effects of patent</i>	(Cumming & Fischer, 2012) (Wallstein, 2000)	(Rothmaermel & Thursby, 2005)
<i>The effect of assistance duration</i>	(Schwartz, 2010)	(Amezuca, 2010) (Cumming & Fischer, 2012) (Izushi, 2003)

<i>Impact on ventures growth rates</i>	(Rothmaermel & Thursby, 2005) (Wallstein, 2000) (Hartmann & Masten, 2000)	(Amezuca, 2010) (Cumming & Fischer, 2012) (Lerner, 1999) (Lofsten & Lindelof, 2002)
<i>Venture survival rates</i>	(Amezuca, 2010) (Schwartz, 2010)	(Amezuca, 2010)
<i>Regional impact on entrepreneurial ecosystem</i>		(Fehder & Hochberg 2015)
<i>Seed and early stage entrepreneurial financing activity in the region</i>		(Fehder & Hochberg 2015)

Table 1.6 Key Findings in business acceleration impact studies (Dalziel 2012)

4.5.1 The shift phenomenon: from investment in startup toward other revenue models

According to literature, acceleration programs and incubators who base their business model on offering pre-seed investment in exchange for equity, seems to be unsustainable, except for some cases¹³ (e.g. Y Combinator in Silicon Valley). In fact, most accelerators around the globe today are exploring new ways to generate revenue in order to assist accelerators in maintaining solvency prior to startup exits and support program operations (Gust 2015; Pauwels et al. 2016). In total, according to the Global Accelerator Report (2015), 91% of accelerators around the globe are reliant on these alternative revenue generation models in the short term while 75% plan to continue depending on them for the long term. These new business models include:

- Monetizing events, workshops, mentorship, and office space (Gust 2015).

¹³ Among the business ideas, that have become companies thanks to Y Combinator support, there are: AirBnb, Dropbox, Stripe and Reddit. There are over 1400 companies launched to date for a combined valuation of over 80 Billion (Y Combinator 2017). It's estimated that the Y Combinator valuation is over 1 Billion (Constine 2014). The corresponding in Italy, H-farm, has a market capitalization of 70 million (Bloomberg 2017) .

- Corporate partnerships¹⁴, which include running acceleration programs in partnership with or on behalf of corporations, as well as corporate sponsorship, have also been a key source of funding that supports accelerators before startup exits and are the principal source of revenue in some cases (Gust 2015).

On the other hand, in 2016 Pauwels argued: “Few of the accelerators we interviewed were able to get revenue from investments in the start-ups they support. This can also be because these programs are still relatively new and it will take some time before they have noticeable exits in their portfolio companies”. According to literature, I strongly believe that the shift phenomenon is mainly due to a lack of “fit” between the surrounding environment and the provider (incubator or accelerator). In other words, the shift phenomenon is a clear proof that a copy-paste model, from the US context, is not sustainable and therefore pushes providers to find alternatives to the “pre-seed investment in exchange for equity business model”.

4.5.2 Criticisms about Accelerator Programs: the internet is broken

The main criticisms on Accelerators are reported below (Miller & Bound 2011).

- *Accelerators divert talent from other high-growth startups.*
- *Good companies still fail after accelerator programmes.*
- *Accelerators exploit startup founders.*
- *Accelerators attract companies that are already struggling (a.k.a. B-grade companies).* It is often argued that if a business is attracted to an incubator or an accelerator it probably won't be as successful as a business that doesn't need support.
- *Accelerators're helping to create a bubble.*
- *Accelerators're just 'startup schools'.* Accelerator programmes as a reaction to shortcomings of the university education system in creating suitable technical and business founders (Geoffrey 2015).

¹⁴ For example, in 2015, the first Wellness Accelerator Program was launched in Italy. It's a startup acceleration program conceived and promoted by Technogym, a world leader in the fitness and wellness sectors, in collaboration with H-FARM, the first Italian Incubator (Technogym 2017; Miller & Bound 2011).

- *Accelerators build relatively small companies:*

This criticism could be solved by presenting some successful cases like Dropbox or Airbnb, but rightly “one swallow does not make a summer”. In fact, the question is “could an accelerator program create a company like Google or Facebook? Probably, not anymore, due to the market structure of internet startups. In fact, this market has ended up in fewer hands, therefore it has become an oligopoly controlled by a few big companies (including Google, Amazon and Facebook) so that a new venture has three possibilities:

1. to struggle and fail;
2. to be acquired;
3. to remain small.

Nowadays it’s harder for new tech ventures to growth exponentially as ten years ago, also in Silicon Valley; the cradle of tech-company. In fact, Silicon Valley is supposed to be a place where a couple of guys in a garage or a dorm room can start companies that change the world. It happened with Apple and Microsoft in the 1970s, AOL in the 1980s, Amazon, Yahoo, and Google in the 1990s, and Facebook in the 2000s. But the 2010s seem to be suffering from a startup drought. People are still starting startups, of course. But the last really big tech startup success, Facebook, is 13 years old (Lee 2017). In view of this, the right question is “Is internet broken?”. According to Evan Williams, founder of Twitter, the answer is “Yes, it is” (The New York Times 2017). But something is changing in the internet world.

As we can see from the literature, the accelerator finds its theoretical foundations in the incubator literature, and finds its actual origin in 2005 in US as an intermediary between entrepreneurs and early stage investors. Generally, the new ventures, supported by an accelerator, have a strong “technological DNA” and they are considered internet startup. Indeed, the entire literature on incubators and accelerators analyzed so far, only refers to providers that base their existence on the new economy. In other words, most of the literature is based on the study of incubation and acceleration mechanisms for tech-based companies. But as already said, something is changing in the internet world, therefore also in the way the accelerator programs are conceived. In the next chapter, we will deeply analyze the new kind of accelerator programs.

5 Appendix A: Incubator's Impact Measures

Summary of measures used to assess the performance and the impact of an incubators (Dee et al. 2011):

Measures	Organizational level		
	Community level	Incubator level	Incubatee level
Performance measures referring to the tenant company			
Tenant firms' survivability			
Tenant firms' sales growth (%)			
Tenant firms' employment growth (%)			
Tenant firms' profit growth (%)			
Tenant firms' profitability growth (%)			
Tenant firms' finance raised (\$)			
Tenant firms' taxes growth (%)			
Tenant firms' export growth (%)			
Tenant firms innovative capability			
Tenant firms' number of scientists and engineers			
Tenant firms' R&D expenditure (\$)			
Tenant firms number of patents			
Tenant firms number of copyrights			
Tenant firms' number of products/services launched (per year)			
Incubatee outcome state			
The incubatee is surviving and growing profitably			
The incubatee is surviving and is growing and is on path			

towards profitability			
The incubatee is surviving but is not growing and is not profitable or is only marginally profitable			
Incubatee operations were terminated while still in the incubator but losses were minimised			
Incubatee operations were terminated while still in the incubator and losses were large			
Performance measures referring to the incubator (Programme)			
Incubator space Incubator occupancy rate			
Average length of tenancy			
Average capital investment cost			
Proportion of revenue from public subsidies			
Number of incubator tenants			
Presence of a complementing research park facility (yes/no)			
Share of operational budget supported through internal sources			
Level of funding received from key donors including state, industry, university			
Development of incubator in life cycle Graduation rate (graduates per year)			
New firms created (per year)			
Proportion of management time advising clients			
Cost per job (gross)			
Ratio of incubator staff: tenants			
Other Performance Measures (Associated with the Surrounding Region/University etc.)			
Saliency of technology-based clientele (%)			
Impact on university's teaching and research (positive/negative)			

Training in entrepreneurial skills – student, faculty (#)			
Students/graduates hired by tenants as employees (#)			
Consulting relationships between university faculty and tenants (#)			
Impact on university's prestige/public image			
Impact on enrollments, donations, property value, equity/royalty income (#, \$)			
Entrepreneurs originating from the university community (#)			
Entrepreneurs serving as faculty researchers (#)			

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2. *Accelerator Programs for analogue firms: a new paradigm*

“I think we shouldn’t consider ourselves as masters of what we have, but only guardians; so, we have to take care of what surrounds us and return it to the future”

Brunello Cucinelli – Italian Entrepreneur
& Global Economy Prize Winner

In this chapter, we will introduce for the first time in literature the concept of Acceleration Program for Analog Firms - APAFs. In other words, acceleration programs for businesses in which the hardware component is very important, in which digital and analogue are combined to create unique products. We will give an overview of the context in which these new forms of Accelerator Programs have arisen, by presenting the three macro trends we have identified: the straight-A student revolution, the third industrial revolution and the change of Internet paradigm. Three major trends that are changing the way we work and how to do business. In addition, an overview of the major APAFs in the world has been done.

In conclusion, we will present the two research gaps in the literature we want to fill. In light of this, the hypothesis we want to test in this study will be stated at the end of the chapter.

1 Times are changing: the 3 macro-trends

Times are changing. For the purposes of our discussion, we have identified three major trends that are changing the way we work and how to do business: The straight-A Student Revolution, The Third Industrial Revolution and the Change of Internet Paradigm.

1.1 The straight-A Student Revolution: Makers and Artigenous

First, we have an ever-increasing percentage of high-educated student who drop out of the multinational career and start their own business linked to a physical product or artifact. These new entrepreneurs combine the tradition of craftsmanship with the innovation and digital tools that have been emerged from “the net-economy”. In England, these new kinds of entrepreneur are called “Makers” in Italy they call them “Artigeni”, from here “Artigenous”¹⁵, and in France they say, “Better to be a hipster pastry rather than working for a big corporation”. This is about “the straight-A student revolution” (Miller 2017). “The straight-A student revolution”¹⁶ is a brilliant snapshot of many young graduates in the prestigious schools, such as “Écoles de Commerce” in France, that decide to take the road of the new craftsmanship by giving quality to city spaces. They want “to give a different meaning to their work,” according to Le Monde, and the offices in a big corporation are “no longer a great attraction” (Miller 2017). Giampaolo Colletti, an Italian journalist and a collaborator of Bocconi University, has very clear ideas about how the world of work is changing; especially he understood how and in what terms the digital revolution has changed the most diverse professional dynamics. He described the following transformations in a book that tells the 150 stories of Italian craftsmen, or artisans and workers who have been able to exploit the new technologies to create new virtuous ventures by combining the tradition with innovation. According Coletti “Internet is the best ally for those artisans who

¹⁵ The word “Artigeni” has never been translated in English. But we can translate as “Artigenous”. “Artisan” to remember the craftsmanship of their work, plus “Indigenous” to remember the necessity to return to the origins.

¹⁶ “*La Révolte des premiers de la classe*” is a book in which the author (Jean-Laurent Cassely) explains the shift of the job market in France, from the big corporation to the atelier.

want to do business today”. It has been demonstrated by the Sardinian shepherds who take advantage of e-commerce in order to sell their products, or by the owners of an Emilian dairy who sell Parmesan cheese to the world by means of the web (Colletti 2017). Broadly speaking, According to Financial Times, a host of craftsmen ready to launch new products on the market is becoming more and more frequent. The value of craft has proved a pervasive issue. Reasonably, makers tend to concentrate on manipulating materials rather than spreadsheets. But they have to generate revenues, or even acquire the minimum financial skill to build a company. So “*what is the turning point between learning the techniques to make things, and making a living from them?*” (Foyle 2017). This “vivid army of Artigenous” often needs to be trained and prepared to face the stormy market. Therefore, creativity is not enough to build a company.

1.2 The Third Industrial Revolution

The era of Digital Manufacturing has just begun. The Era, which was called by The Economist, “*The Third Industrial Revolution*”. In the late 18th century, the first industrial revolution began in Britain, with the industrialization of the textile industry. Tasks previously done laboriously by hand in hundreds of houses were brought together in a single cotton mill, and the factory was born. In the early 20th century we had the second industrial revolution, when Henry Ford mastered the car production and led to the age of mass production. The first two industrial revolutions made people richer and more urban. Now a third revolution is taking place. Manufacturing is going digital. (The Economist 2012). Now a product can be designed on a computer and “printed” on a 3D printer, these machines may be able to make almost anything, anywhere; from your garage to an African village. According to a pool of researcher of McKinsey & co, the 3D printing could generate an economic impact of \$230 billion to \$550 billion per year by 2025 in the applications they have sized. The largest source of potential impact among sized applications would be from consumer uses, followed by direct manufacturing and the use of 3D printing to create tools and molds (Manyika et al. 2013). 3D printing could become an increasingly common approach for highly complex, low-volume, highly customizable parts. If used in this way, they estimate that 3D printing could

generate \$100 billion to \$200 billion in economic impact per year by 2025 from direct manufacturing of parts¹⁷.

Moreover, thanks to new generation sensors applied to physical products today we talk about the “Internet of Things”. Where products, connected to the network, communicate with each other, and with our devices, producing valuable information. In other words, the Internet of Things refers to the use of sensors, actuators, and data communications technology built into physical objects—from clothes to the tables¹⁸—that enable those objects to be tracked, coordinated, or controlled across a data network or the Internet (Manyika et al. 2013). According to McKinsey & co, the potential economic impact of the Internet of Things will be \$2.7 trillion to \$6.2 trillion per year by 2025. The largest impacts among sized applications would be, again, in manufacturing (Manyika et al. 2013). What is emerging from the “Third Industrial Revolution” is that new business models are taking place, democratizing the production of goods that are increasingly tailored to the needs of the person.

1.3 The end of internet startup: the quality content dilemma and the oligopoly of internet

In March 2017, Evan Williams, the founder of Twitter, Blogger and Medium, has launched a wake-up call in an interview on New York Times. He said: “the Internet is broken”. Williams indicates the risk that web architecture is not done to support quality content but content in quantity. In fact, the "Advertising-based systems"

¹⁷ McKinsey has drawn up a ranking of technologies that will have a real impact on the economy. As regards, the twelve potentially economically disruptive technologies are: Mobile Internet (3.7 to 10.8 trillion); Automation of knowledge work (5.6 to 6.7 trillion); The Internet of Things (2.7 to 6.2 trillion); Cloud technology (1.7 to 6.2 trillion); Advanced robotics (1.7 to 4.5 trillion); Autonomous and near-autonomous vehicles (0.2 to 1.9 trillion); Next-generation genomics (0.7 to 1.6 trillion); Energy storage (0.1 to 0.6 trillion); 3D printing (0.2 to 0.6 trillion); Advanced materials (0.2 to 0.5 trillion); Advanced oil and gas exploration and recovery (0.1 to 0.5 trillion); Renewable energy (0.2 to 0.3 trillion) (Manyika et al. 2013).

¹⁸ The “talking furniture” based on Near Field Communication by Lago (Lago 2017) or the anti-counterfeiting system by Diesel (Alba 2017) are only few examples of “Internet of Things” actual applications.

he explained, "inevitably welcome the attention of many users" but they cannot reward the correct and quality answer. On the other hand, systems paid by consumers can reward the value of a content, but they cannot able to reach many users to make an "Advertising-based business model" economically sustainable. According to Evan the solution is one: people will have to pay for quality content (The New York Times 2017). Evan Williams has only put in writing what has long been the feeling in the internet world; that is, the "interruption-distribution business model"¹⁹, typical business model of the traditional media on which the major internet startups are based, is no longer economically sustainable. Except for some of the few favorites, including Amazon, Google, Facebook. In fact, the early internet pioneers grabbed the "low-hanging fruit," occupying lucrative niches like search, social networks, and e-commerce (Lee 2017). Times are also changing in the world of "net-economy". Indeed, as we have already said, in the last decade, we are witnessing a saturation of the internet startup market. Basically, the market is in the hands of a few big corporation and therefore companies like Google, Facebook, Amazon have locked down the most important niches. So that a new venture has three possibilities: to struggle and fail; to be acquired; or to remain small. Today's technology giants have become more astute about anticipating and prevent threats to their dominance, therefore they acquire early and often. On the other hand, the tech companies that remain independent face a severe competition (e.g. Snapchat vs Facebook). In addition, nowadays, companies have to spend millions to attract customers and therefore the modern consumer technology startups need massive funding in order to be competitive if compared to the past.

According to Lee (2017), in the 1980s, great companies like Microsoft, Adobe, and Intuit were founded to make software for PCs. Those companies still make plenty of money, just like Intel does, but there isn't a lot of room for desktop PC software startups today. We may be reaching a similar point with apps and online services. This does not mean that Silicon Valley innovation is over. But it might look a lot different than the innovation we've seen over the last 20 years. We've gotten used

¹⁹ It is based on creating attention through a content and then stopping to distribute the promotional message .

to thinking of Silicon Valley, the internet, and innovation as interchangeable, but the next wave of innovation might look very different from what we're used to. Indeed, innovation could shift in completely different directions; from autonomous vehicles to delivery drones and energy storage start-up. In other words, it seems that the next-generation innovation will be firms where the hardware component is high, rather than app smartphones.

In accordance with Lee (2017) Tesla could be considered an avant-gardist and the greatest representative of this shift in the internet world. In fact, Tesla, at first glance, could be considered a classic Silicon Valley company. It's based in Palo Alto and employs an army of programmers to design everything from its touchscreen interface to its self-driving software. But on the other hand, Tesla represents a separation from the Silicon Valley norm. While Apple manufactures iPhones in China, Tesla operates its car factory in Fremont, California. Where Uber and Airbnb have avoided owning the cars and houses, Tesla spent billions of dollars on a battery factory (a.k.a the Giga Factory). So, although incumbents like Amazon, Google and Facebook continue to dominate the market for online services, that doesn't mean they'll remain the leaders of technology innovation more broadly. In conclusion, the business model on which many internet startups are based seems to have become obsolete, except for the pioneers who made sure the most lucrative niches. The market seems to have become an oligopoly in the hands of a few big companies. In other words, the internet startup market is saturated and the space for new ventures is getting tighter. The internet world is changing and is moving towards businesses where analog and digital products will be heavily combined to give life startups based on the "tesla model".

In summary, times are changing for 3 reasons: the phenomenon of the "artigenous" is now gaining ground in Western countries, the third industrial revolution has begun and the "net-economy" model is now a "red ocean market" for those who want to start a business. What emerges is that the combination of old and new, between digital and analogue seems to be the "x-factor" of next-

generation companies. An army of fervent entrepreneurs are ready to take part of what we could call the third "new economy"²⁰.

2 The birth of acceleration programs for non-internet-oriented firms

In this stormy sea, a new form of accelerator program is emerging: the Accelerator Program for Analog Firms, from here APAFs. In other words, acceleration programs for businesses in which the hardware component is very important, in which digital and analogue are combined to create unique products. We are referring to new ventures that base their business model on a physical product that could be, for example, a smart and tailored rain jacket for outstanding performance in the most challenging urban and outdoor conditions, or a system for monitoring apiaries and bees activity remotely using an hardware and a cloud-based algorithm application that allows farmers to take better and cost-effective decisions (Industrio 2017).

Artigenous or Makers who exploit digital and traditional tools in order to propose innovative products to the market. The Accelerator Global report (2015) talks about "Accelerator 2.0". These new accelerators possess a diversified revenue model, often focus on a specific vertical, integrate themselves more into the ecosystem, and work closely with governments and corporations. An example of this new form of acceleration program is the "Hothouse" program of the Craft Council, the national development agency for contemporary craft in the United Kingdom, that has established its accelerators program for makers. Hothouse hosted 41 "maker businesses" in 2016. Several hundred applications are submitted every year, and those selected are offered mentoring and workshops for six months, providing them with advice, training and the chance to build networks (Foyle 2017).

²⁰ The two ages of Internet, before the "third new economy" are: The Internet before the dotcom bubble (from '96 to '01), The Internet 2.0 after the dotcom bubble (from '01 to '10).

Broadly speaking, there is empirical evidence that accelerators designed for the validation and launch of physical products are being developed all around the world. In table 2.1 some examples are reported:

Country	APAFs	Description
U.S.A	30weeks	“30 Weeks is a founders program that transforms designers into founders who are equipped with the entrepreneurial skills, knowledge and tech know-how to create products and start impactful companies. Our learn-by-launching structure gives designers a chance to build their products in an environment that’s as close to the real thing as possible”
UK	Hothouse	“Our Hothouse programme supports talented new makers at the start of their career”
Slovenia	DSGNFWD	“Design Forward Accelerator Program provides product, identity, ux, web, and brand design, as well as the launch support. Your product can be in physical or digital form or a service”
Portugal	Porto Design Accelerator	“Porto Design Accelerator is leading initiative to support innovation in the design based consumer goods industry through the entrepreneurial creation, launch and growth of design centric startups. The accelerator provides support to design-minded entrepreneurs by connecting them to the critical community, educators, mentors, experts and manufacturing and retailing partners needed to turn ideas into realities. We run a unique design centric start-up acceleration program to support the most promising design centric startups, as well as collaborating with the brightest minds in academic research”
India	DesignGild	“India's first design led startup ecosystem. Design led, people centered and tech enabled”
U.S.A	Creative Startup Accelerator	“Creative Startups is designed for creatives using creative technologies and meeting new and growing market opportunities. We built the accelerator

		from the bottom up with creative entrepreneurs in mind. We look for entrepreneurs who blur the lines between innovation, expression, and technology”
UK	Design Council Spark	“Design Council Spark is a support and funding programme designed to help you turn your bright idea into a commercially successful product. The programme offers a unique opportunity to connect with design industry experts to gain valuable knowledge and insights into all aspects of design, including product development, branding, manufacturing, marketing and business planning”
Germany	Hardware.co	“HARDWARE.co is a global community and accelerator for entrepreneurs, industry professionals and makers dedicated to the creation of innovative hardware products and companies”
Estonia	Buildit	“Buildit Accelerator's new intensified programme is specifically designed for creative industries and hardware startups from all over the world”
India	RevvX	“RevvX is an Hardware Accelerator based out of Bangalore and Shenzhen. We take startups from Prototypes to Funding, Mass manufacturing in India/China/Taiwan and Distribution in US, EU, India,China”
Netherlands	HighTech XL	“The HighTechXL Accelerator is an elite program designed exclusively for hardware entrepreneurs”
USA & China	Shenzen Valley Ventures	“SVV is a hardware startup accelerator that provides startups access to exclusive engineering and hardware testing equipment. Our program is designed to provide you with everything they need in order to successfully and rapidly manufacture your startup's product”
France	Le connected camp	“Le Connected Camp is a 9 months acceleration program for IoT startups. Our focus is to bring you qualified business leads with large corporations

		and secure the manufacturing process for your product. On top of that, make sure that you stay focus and go fast”
UK	Startupbootcamp	“Startupbootcamp IoT’s mission is to make the journey of building a connected hardware startup clearer, shorter, and more successful for entrepreneurs”
Hong Kong	Brinc	“We invest in founders from around the globe in the early stages of building connected hardware businesses”
US	NextFab's RAPID Hardware	“Our RAPID Hardware Accelerator is a twelve-week program focused on helping hardware entrepreneurs jump-start their business by providing them with hands-on technical and business consulting. In addition to access to state-of-the-art equipment, software, and training, NextFab will invest up to \$25,000 in each the four accepted teams”
Italy	Botteghe Digitali	“Botteghe Digitali has chosen several Artisan from different sectors, all with a specific goal: to grow by responding to the new market needs through digitalization”
Italy	Industrio	“We Fund and Build Hardware Startups”
US	Alpha lab gear	Alphalab Gear is a startup accelerator that provides physical product companies with investment, mentorship and connections. AlphaLab Gear focuses on hardware, robotics and manufactured product startups, using the same principles and methodologies as AlphaLab

Table 2.1: Accelerator programs for non-internet-oriented firms: an international overview
(Source: Gust, F6s and GAN)

3 What we have understood so far: the need of further analysis

Until now no author in the literature has studied and analyzed this new form of accelerators – the APAFs. In fact, the literature and the main findings concerning accelerators clearly refer to internet startup accelerators, which for the sake of

semantic convenience we will call Traditional Accelerator Programs - TAPs. This is most likely because this phenomenon was basically nonexistent or limited to a few irrelevant cases, at the time the studies were conducted (Cohen 2013; Miller & Bound 2011; Fehder & Hochberg 2015). But times are changing and this phenomenon is becoming increasingly intense and increasingly actual. With our study, we want for the first define and describe the characteristics of the APAFs. Below we reported the main research gap that we have identified through the literature and the hypotheses we want to verify.

3.1 The research gaps

According to Pauwels et al. 2016 research, in which the 5 design elements and the 3 design themes were identified for the first time, one of the limitation of the study is that the paper is based on accelerators located in the three leading accelerator regions in Europe: London, Paris and Berlin. However, these three regions may not be representative of all types of regions in Europe. Further research is needed to test their findings in different environments and context in general.

Research gap #1: The need to contextualize the Pauwels et al research in different Environments to Understand whether their findings are still valid.

Moreover, as we have already said in the literature there is no trace of the accelerators program for analog firms. Therefore, the second identified research gap is:

Research gap #2: The need to analyze and describe the new form of accelerator program – the APAFs. Therefore, understand if there are any substantial differences with the TAPs.

Our aim is to bridge these gaps and thus contribute to the literature on Accelerator Programs.

3.2 The Hypothesis we want to verify

In order to reduce the identified gaps, we want to verify 2 hypotheses:

Hypothesis 1: We hypothesize the existence of another type of accelerator programs whose “design theme” is not described by Pauwels et al (2016): the design theme of an APAFs. Therefore, we hypothesize that there are types of accelerator programs that have neither the primary goal of stimulating the welfare of a region nor ending an investment round nor building an ecosystem around a corporation.

Hypothesis 2: We hypothesize the existence of new design elements to be integrated with the design elements of Pauwels et al. framework (2016) which describe the characteristics of an APAFs.

By verifying these hypothesis, we could, on the one hand, verify whether exist a distinction between APAFs and TAPs. We will implicitly check whether the framework of Pauwels et al. (2016) fits in different economic contexts such as the context of analogue companies. On the one hand, for the first time, we could define and describe the characteristics of an APAF. In the next chapter we will explain the methodology we will use to test our hypotheses.

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3. *Understanding the new generation of accelerator programs*

“Measure what is measurable, and make measurable what is not so”
Galileo Galilei

In this chapter after having presented the research methodology, we will discuss the main findings. First, we will introduce how we identify the sample, how we collect the data and how we analyze them. In the second place, we will describe 5 accelerator programs which are specifically designed for analog firms between Europe and Asia. We found 5 very interesting case studies which represents a new generation of accelerator programs. We will discuss analogies, because this five programs do have profound similarities, but we will also highlight their differences with Traditional Accelerator Programs (TAPs) such as Y-Combinator, H-farm or Techstars. These new programs are not the same what we have experienced in the past and this change worth our attention. We will underline some of the key features of these Accelerators. In particular, we will stress for 4 main differences which in my perceptions they represent 4 assets that contribute to the competitiveness of these programs. We will define for the first time an “Accelerator Program for Analog Firms” which we called APAFs

At the end of the chapter we will discuss the implications of the study, especially for the policy maker and the public organizations appointed to revitalize a territory and foster its economy. In particular, we will concentrate our debate to the Italian worthwhile SME ecosystem. We will propose our ideal strategy for establishing an APAFs by taking in account “the context” which is a fundamental prerogative for the success of an accelerator. Moreover, in order to propose an effective perspective we will consider the worldwide best practices, in the hardware

acceleration field, resulting from our work. In the last paragraph, our research limitations and the future researches that can be conducted to contribute to the literature, will be highlighted afterwards.

1 Sample: 5 cases of APAFs

For the purpose of our study we have identified 5 APAFs that are scattered throughout the world: Porto Design Accelerator (Portugal), Brinc (Hong Kong), Le Connected (France), Botteghe Digitali (Italy), Industrio (Italy)²¹. These structures are interesting for our research because they focus on “analog companies”, on products that imply familiarity with words such as "production" of physical products, not just software production, retail distribution and supply chain management. Below we shortly describe the main characteristics of these 5 cases.



Porto Design Accelerator focused mainly on design consumer goods firms. The first edition was launched in 2017 in Porto, with the aim of involving university students in the world of hardware entrepreneurship. In fact, PDA is part of Porto Design Factory, an educational platform founded in 2015 and participated by the Polytechnic of Porto. The program has a duration of 6 months and does not require equity in exchange for seed funding (Porto Design Factory 2018).



Brinc is based in Hong Kong and is one of the most active hardware investor in the world. The first edition was launched in 2015. Moreover the program has a duration of 4 months and provides seed funding in exchange for equity (Brinc 2018).

²¹ In Box 3.1 dedicated to the methodology we also explained how we identified our sample.



Le Connected Camp is a 9 months acceleration program for IoT startups and it's based in the heart of the "IoT Valley", a unique IoT ecosystem created by entrepreneurs for entrepreneurs in the manufacturing pole at the gate of Toulouse. With over 40 startups and technical partners like Intel, EBV Elektronik, Sigfox. Their focus is to bring firms qualified business leads with large corporations and secure the manufacturing process for their products (LeConnected 2018).

Botteghe Digitali

A cohort of artisans from all sectors of Made in Italy begin a process of digital transformation that will lead them to be very different from how they are now thanks to the support of five digital coaches. Botteghe Digitali is the first acceleration program that tells how the excellence of Made in Italy craftsmanship can become 4.0 manufacture. The first edition was launch in 2016 (Botteghe Digitali 2018).



Industrio is an accelerator program focused on support hardware startups that are looking to grow and bring amazing products to market from Italy. Twice a year (in spring and autumn) they run a 6 months prototype-to-product program where they drive selected teams to achieve the most important things a hardware startup need to accomplish in the shorter time: business model, prototype, DFM, certification, go to market and fund raising. Industrio is based in Rovereto, in the north of Italy, at the gate of Pianura Padana (Industrio 2018).

In Table 3.1 we have summarized the key features of our 5 APAFs.

Country	APAfs name	Acronym	Founding date	Program Length	Contact name
Portugal	Porto Design Accelerator	PDA	2017	6 months	Diogo Ferreira Pinto
Hong Kong	Brinc	Brinc	2015	4 months	Bay McLaughlin
France	Le Connected	LeCon	2014	9 months	Simon Vacher
Italy	Botteghe Digitali	BotD	2016	7 months	Luca De Pietro
Italy	Industrio	Indu	2013	4 months	Jari Ognibene

Table 3.1: The Sample (Source: Gust, F6s and GAN and Crunchbase)

These structures are also interesting because they do represent gate keepers between global digital professionals and some industrial areas like southern china, Porto area or Lombardy and Pianura Padana. In their team, they all have people qualified with strong skills in manufacturing industries but at the same they have young talented brilliant programmers. Our perception is that this strong skills dichotomy once mixed can produce the perfect storm for the “Third Industrial Revolution” and economically improve the area in which the Accelerator is based. At first glance, if we analyze secondary data available in our sample websites, news and online podcast, we can say that these Accelerator programs have some similarities in what they offer, or even better, program package according to Pauwels et al. (2016). These accelerators usually focus on providing advice on issues related to production, specifically design for mass, business plan, and therefore communication and brand design, finance and distribution channel design (see Appendix at the end of the chapter).

After this brief introduction, I would like make an horizontal point emphasizing the differences between this new accelerator programs with the Traditional ones with the implicit aim to better understand this phenomenon.

In order to accomplish our scope, we conducted a qualitative research revisiting the methodology used by Pauwels et. al (2016). In Box 3.1 we have extensively described the methodology that brought us to uncover interesting insight, presented in paragraph 2.

BOX 1.1 Methods: sample, data collection and analysis

In this Box, we will present the methodology used to test the hypotheses identified in the previous chapter. To accomplish this, we will use the research methodology proposed by Pauwels et. al in 2016, adapting it to our purpose. Therefore, the sample, the data collection and analysis methodology will be highlighted in this section.

1) Sampling methodology

To identify our sample we used the snowball sampling approach (Yin 2009). In other words, we started our sampling by only focusing on cases that satisfy a predefined definition of Accelerator Program for Analog Firms - hence APAFs.

We used F6s.com Gust.com, and GAN.com as channels for identifying the research sample according to seven predefined characteristics, obtaining a dataset of 20 accelerators (See Table 2.1 in chapter 2). Specifically, in addition to having imposed the traditional "six characteristics" of an accelerator (Miller & Bound 2011; Pauwels et al. 2016) we have imposed a further characteristic that is "the accelerator is specialized in accelerating hardware companies such as Internet of Things solutions, design-based products and tech consumer goods". Among the 20 identified, we were able to contact the managing directors of 5 accelerators and all of them were agreed to participate in our study. Table 3.1 provides a final list of the 5 accelerators included in the study and their key characteristics.

2) Data collection

We used two data sources: primary data sources with interviews and secondary data sources with archival data.

The primary data source involved semi-structured interviews with the managing directors of the 5 accelerators selected, during December 2017 and January 2018, using the repertory grid method as a technique to structure the interviews (Pauwels et al. 2016). A repertory grid it's a form of structured interviewing, with ratings or without, which arrives at a precise description uncontaminated by the interviewer's own viewpoint, in other words it's an ideal way of conducting a pilot study before using more conventional survey

techniques (Jankowicz 2004). Interviews ranged from 40 minutes to 50 minutes and always involved one researchers. According to Pauwels et. al each interview was tape-recorded and transcribed, which resulted in 40 pages of total interview transcripts. To familiarize with the context, we used secondary data sources such as industry reports, web sites and news articles about APAFs. These secondary data sources were important sources of information to construct preliminary case histories for the engagement of each accelerator (see Appendix), as well as served as triangulation sources to validate emerging insights from the interviews.

3) Data analysis: 4 stages

Our data analysis includes four stages:

Stage1 - Repertory grid method;

Stage 2 – Questionnaire;

Stage 3 – Cross-case analysis and questionnaire evaluation;

Stage 4 - Validation.

We started with a preliminary case study in which we presented our study and the results of the literature reviewed. We then searched for the contacts of the managing directors through their website and where it was not possible through direct contact or via direct message on LinkedIn. We then formally contacted the managing directors of the accelerators through email to ask for an interview, with the preliminary case study attached, to increase response rates (Yin 2009). In other words, for each email, we have attached our preliminary study entitled "let's join our research" with the clear call to action to involve the managing director. The response rate was 100%. See Appendix to this chapter to see the full report we have attached to the engaging email.

Further communication through email and IM application was used to schedule interviews and validate the preliminary study. Below we present the 4 stages.

First stage: Repertory Grid method

During the interview, we followed the structure below:

1. *Brief Introduction* about the research
2. *First part*: discuss about the differences between accelerator program for analog firm and accelerator program for digital startup (*Stage 1*)
3. *Second part*: discuss about the strategies have been adopted with their three most successful company (*Stage 2*).

Let's start with analyzing the Stage 1.

Objective Stage 1:

1. *Highlight the differences between accelerator program for analog firms (APAFs) and the one for digital startup (Traditional Accelerator Programs or simply TAPs).*

To meet this goal, we use the Repertory grid method.

The Repertory grid method allowed to grasp the opinion regarding the object of the analysis, and to discover how the person thinks, what meanings s/he usually discerns, about that "topic" (= the difference between your Accelerator and Y Combinator). Finally, this method allowed to define the design elements and themes of an APAF and therefore describe it (= test hypothesis H1 and H2).

First, we defined Y-Combinator (the TAPs) and the interviewed APAF as "grid elements". An element is an example of, exemplar of, instance of, sampling of, or occurrence within, a particular topic (Pauwels et al. 2016; Jankowicz 2004).

Second, we used "diads" as technique to elicit "constructs". Our basic unit of description and analysis is called a construct, in other words constructs are qualities describing and differentiating elements. In Dyadic Elicitation two elements are presented and the interviewee is asked to indicate an important way in which they differ, or an important way in which they are alike (Jankowicz 2004).

As opposed to Pauwels et al, in our research we are interested in knowing the differences between the accelerators for digital startup described by Pauwels and our sample. That's why we chose to use a "dyad" rather than a "triad" as technique to elicit constructs. This will allow the interviewer to focus on the differences among APAFs and Y-Combinator; The

reference accelerator program for digital startup. During the first part of the interview we followed the 7 steps below (Jankowicz 2004):

1. Agreed the topic with the managing director;
2. Agreed a set of elements (Y-Combinator and Interviewed APAFs), and write these at the top of the grid sheet (see table 3.2);
3. Explained that we wish to find out how s/he thinks about the elements, and that we'll do this by asking him or her to compare them systematically;
4. Asked to the managing director: 'Which are the differences among your accelerator program and Y-Combinator? Can you tell me an important way in which they differ? We also provided assurance that we're not looking for a 'correct' answer, just how s/he sees the elements.

5. In the first row on the left side of the grid sheet we wrote down the sentence referred to the accelerator program for internet oriented firms; in the same row on the right of the grid sheet we wrote down the converse sentence referred to the APAF, making sure that we've obtained a truly bipolar expression – a pair of words or phrases which express a contrast. This is the person's construct. In this way, we have implicitly linked the element to the construct.
6. We checked that we understand what contrast was expressed by using the interviewee's words as much as possible;
7. Our task was to elicit as many different constructs as the person might hold about the topic. So, we repeated steps 4 to 6, asking for a fresh construct each time, until our respondent can't offer any new ones.

Traditional Accelerator Programs (<i>internet-oriented</i>)	Accelerator Programs For Analog Firms - APAFs (<i>non-internet-oriented</i>)
APAF name	
Construct 1 – sentence	Construct 1 - opposite sentence
Construct 2 – sentence	Construct 2- opposite sentence
Construct 3 – sentence	Construct 3- opposite sentence
Construct 4 – sentence	Construct 4- opposite sentence

Table 3.2: Grid sheet layout example

Second stage: Questionnaire

After discussing the differences between APAF and accelerators for internet-oriented startup, we moved on to the second part of the interview.

Objectives stage 2:

1. *Collect information about the "strategies" that have been adopted with APAFs three best accelerated companies;*
2. *Synthesize and propose an acceleration program for Italian manufacturing companies, considering the global best practices.*

The tool we used in this phase is a simple questionnaire, composed of the following 5 questions:

- Which are the three best companies you have accelerated?
- What strategies have you adopted to allow them to grow?
- What are the major issues you have encountered in accelerating these businesses? What solutions have you adopted?
- What do your entrepreneurs need before to enter your program? And how does your acceleration program meet their needs?
- What results have you achieved so far?

Third stage: Cross-case Analysis and Questionnaire evaluation

The third stage of our data analysis involved a cross-case analysis, that is especially appropriate in new topic areas. According to (Kathleen 1989), this is both the least codified part of the process and the most difficult one.

Indeed, as Huberman (1989) wrote *“One cannot ordinarily follow how a researcher got from 3600 pages of field notes to the final conclusions”* however, he argued, *“sprinkled with vivid quotes though they may be”*.

Specifically, several key features of analysis can be identified, in fact, we divided the cross-case analysis into two steps: Analysis within-case data and the search for cross-case patterns.

1. Analysis within-case data:

The general idea is to become closely familiar with each case as a stand-alone entity. This process allows the unique patterns for each case to emerge before we push to generalize pattern across cases. In addition, it gives a rich familiarity with each case which, in turn, accelerates cross-case comparison.

2. Searching for cross-case patterns:

The key to good cross-case comparison is by looking at the data in many divergent ways. By doing so, we avoided processing biases and therefore we avoided the leap to premature or false conclusions.

As suggested by (Kathleen 1989; Pauwels et al. 2016) we followed the two tactics below: The first tactic we adopted was to select categories or dimensions, and then we looked for within-group similarities coupled with intergroup differences. The categories and dimensions were suggested by the elements and constructs from the grids built up for each interview.

The second tactic we adopted, was to select a pair of cases and then to list the similarities and differences between each pair; all cases were replicated against one another.

Validation

Fourth and last step is the validation of the results. Specifically, the results obtained from cross-case analysis were later, after the interview, reviewed by the interview respondents at the end of January. As an additional feature of this research, we relied to an “insider-outsider approach” (Pauwels et al. 2016; Gioia et al. 2010) to give voice to a knowledgeable insider who could best articulate and understand the differences among APAFs and TAPs. In other words, we used this approach, to give both credibility to the findings and minimize the bias due to the interpretation of the results of the cross-case analysis, by using the knowledge of a second external researcher.

2 The differences among TAPs and APAFs: findings

This section reports the results from the repertory grid construction and cross-case analysis explained in the Box 3.1. We will discuss the differences between the APAFs and the TAPs, the new accelerator design elements and the new design theme that emerged from our findings.

In the first place, according to our elicited constructs, the Accelerator Program for Analog Firms have substantial differences if compared to the Traditional Accelerator Programs (e.g. Y-Combinator). As expected from our simple observation of the ecosystem of incubators and accelerators, extensively discussed in chapters 1 and 2, the phenomenon examined presents unique characteristics that distinguish it from the previous versions of Accelerator Programs.

First, we decided to present the results concerning the “Design elements” of an accelerator programs for analog firms, and afterwards we will talk about the findings related to design themes. Finally, for the first time in the literature, we will give the definition of an APAF.

2.1 Design Elements differences

Below, we present the 4 differences in the design elements that we have identified as the result of cross-case analysis. The four main differences are identified:

In the *Size & finance*;

In the *Program package*;

In the *Strategic focus*;

In the *Internationalization process*.

In table 3.3 we report the representative quotes that support our findings.

2.1.1 Size & Finance

Usually APAFs are smaller than TAPs. Both in terms of number of accelerated companies per year, and in terms of return on investment expectations. Indeed, what emerges from our interviews is that TAPs are looking for the unicorn; the next one-billion-dollar company. On the other hand, APAFs are “happy with little”. They look for companies that can have a positive impact and that can be “profitable from the day one”. This "profitable from the day one" model is clearly in contrast to the "reach millions of users and then let's see how to monetize" model that has characterized the internet-based startups for years (Zwilling 2014; The New York Times 2009). In other words, what emerges is that APAFs, usually, seek the economic sustainability of their companies since the beginning, unlike the traditional accelerator programs who usually aim to “bridge the equity gap between early-stage projects and investable businesses” and they don’t focus on sustainability in the short term. On the other hand, the initial investment you need to “start the engine” with an analog company is on average higher, because you need also to invest in raw materials for prototyping and test the physical product, not just human capital such as software engineers and business people. The initial costs are on average higher to “start the engine”.

2.1.2 Program package: two new constructs

As Brinc learned from its experience, as well as many others APAFs, while funding is important, they've learned that most often it's not the biggest hurdle for IoT founders, and broadly speaking for analog firms. Technical feasibility issues, inability to commercialize and unwisely spending cash in prototyping and R&D are where it has seen most hardware founders hitting the wall.

Therefore, dealing with physical products companies has consequences on the content of the accelerator program. What emerged during the interviews is that the hardware company entrepreneur's needs, implies different contents to deliver if compared to a TAP. Indeed, during these acceleration programs, thematic such as: how to approach the retail distribution channel, how to industrialize the

product or how to manage your supply chain, are the beating heart of all “curriculum/training programs” of an APAF (Pauwels et al. 2016).

Furthermore, besides confirming the presence of all the components or “constructs”, identified by Pauwels (2016)²² for the “program package” design element, we have elicited two new constructs to be attributed exclusively to APAFs “Program package”. These constructs are “Roadshows and events” and “Prototyping Lab” (Figure 3.1).

During the interviews, it emerged that each APAFs of the sample have a prototyping laboratory, which is equipped with tools such as CNC machines, basic raw materials like woods, work instruments and 3D prints. The presence or absence of these laboratories is a distinctive feature of an APAFs.

Moreover, one could erroneously equalize this construct to the “location services” elicited by Pauwels, but the last one refers to the desk spaces available into the accelerator²³.

Furthermore, based on the interviews, another new construct emerged; “The roadshow and fairs event” in which the accelerated companies participate cyclically. In fact, we find out that in the “Program package” of APAFs there is the possibility to attend trade fairs, outside the context of the accelerator, aimed at selling the product. These events are considered a sort of “graduation events” and they are not strictly linked to the “demo / investor days” which take place in different ways and for different purposes²⁴.

²² The design element “Program package” is composed by the following sub-elements: Mentoring services, Curriculum/training programs, Counseling services, Demo days/Investor days, Location services and Investment opportunities.

²³ Here the TAPs representative quotes from Pauwels (2016) research:

- “Free office space here, free Wi-Fi, free stunning view, free drinks”;
- “We ask them to come to London and we provide them with desk space and office space”.

²⁴ Here the TAPs representative quotes from Pauwels (2016) research:

- “Our Demo Day is slightly different. It is not about getting investors in the room, it is actually getting customers in the room for the companies”;
- “The majority of people we invite for the Investor Day are investors and they could be angel investors, VC’s, private equity investors”.

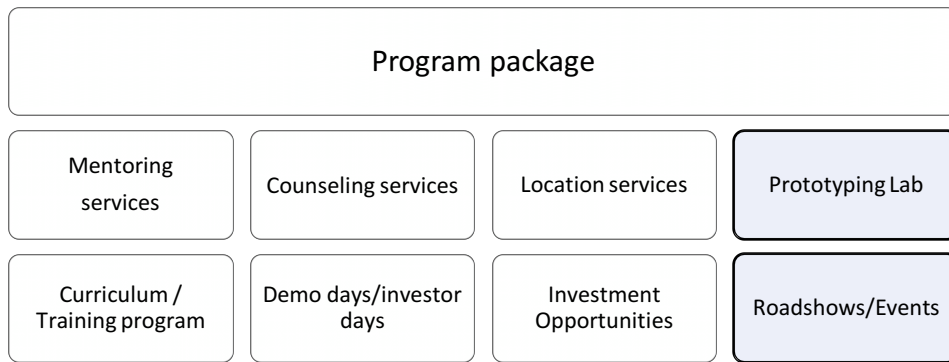


Figure 3.1: the two new constructs of the “Program package”

2.1.3 Strategic focus: Tech-product based vs Design-product based

Another great insight, deduced from the interviews, is the existence of two types of APAFs, according to their “strategic focus”²⁵.

Like a TAP, an APAF can have a strategic focus both on a given industry and in a specific geographic area. But our interviews uncovered something more. Specifically, what emerges is that the APAFs can have two distinct strategic focus, which imply different operations, curriculum/training programs, mentoring and counselling services. The two macro categories are:

- *The Tech-based product;*
- *The Design-based product APAFs.*

<i>Tech-based APAFs</i>	<i>Design-based APAFs</i>
For “Tech-based product APAFs” we mean accelerator programs for products like connected hardware, drones, robotics, and in general products in which the technology is inside the product. Examples of these APAFs are: Industrio, Brinc or Le Connected camp.	For “Design-based products APAFs” we mean accelerator programs for products such as jewelry, shoes, design objects and in general products where technology is hidden in the production process and not necessarily inside the product. Here the technology is a mean to produce an artifact. Examples of these APAFs are: Porto Design Accelerator, Botteghe Digitali, DSGNFWD.

²⁵ The strategic focus concerns the accelerator’s strategic choices regarding industry, sector and geographical focus (Pauwels et al. 2016).

Based on what said above, we propose to add two new construct to the design element "strategic focus" (see figure 3.2). These two new constructs, as for Pauwels et al. (2016), can coexist with each other.

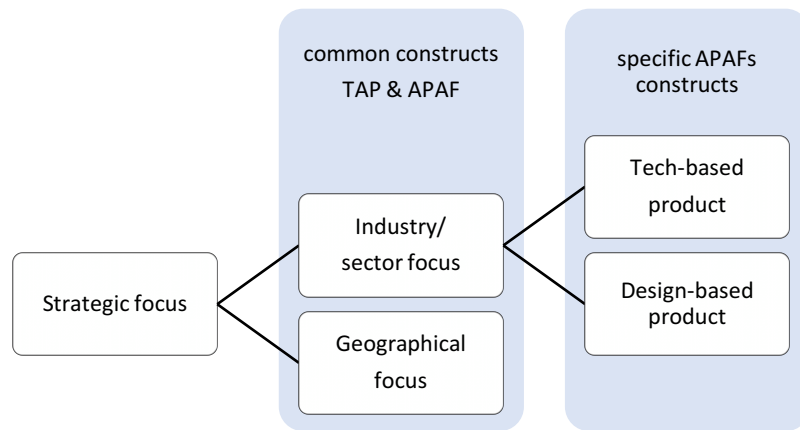


Figure 3.2: the APAFs strategic focus

2.1.4 Internationalization process: supplychain, speed and place

Another interesting difference between TAPs and APAFs lies in the process of internationalization of their accelerated companies. In the case of analog firms, you need to be “global from the day one”. In other words, from the beginning, the firm value-chain should be structured to be ready to the global market.

For example, let’s suppose you want to produce and distribute a smart device that “tells you when you should take the pills, to manage your medication” (Brian Heater 2016; PillDrill 2017), and you intend to sell it worldwide. In this case, you should organize your business from the beginning by taking in mind the internationalization objective.

Two relevant aspect here is the team and the supply chain management. At operational level, it means that the team needs to speak multiple languages and the production needs to be localized where the cost to produce a technological consumer goods is relatively low (e.g. Guangzhou or Shenzhen). On the other hand, if you are producing high-end shoes, you will most likely have to identify your supplier in the “Brenta footwear district” in Italy.

In the APAFs you deal with the production of a physical product whereas in the TAPs you have not to do that. Analog firms also deal with software, so they have to deal both with production software and also with production hardware. In the

analog companies if you want to talk to a distributor you have to move, if you want to talk to a supplier you have to move, if you want to produce high quality shoes you need to move to the place where they do it. Do you want to produce in large scale at an affordable price? You must go to China. Do you want to produce high quality design product? You must go to Italy (Future Brand 2015).

You cannot comfortably do it from your computer, at home.

What we are saying, in other words, is that in hardware companies if you want to be international you should organize a worldwide supply chain from “day one” more than a digital firm, in which you can easily scale your business from “day two”.

This difference in the internationalization process has effects on the content of the “curriculum / training programs”, the type of “counseling and mentoring” services offered.

For example, Porto Design Factory is part of the “SUGAR network”²⁶ an international network of Universities in which students move from one school to another in order to work together on design challenges provided by corporate partners. Brinc’s team is represented by 10 countries, and in their offices you can hear speaking 11 different languages. Industrio claims “design locally, and build globally”, in fact they have partners in China, Mexico, UK, Tunisia, USA and Japan. All the interviewed APAFs are physically in the route of supply chain.

Furthermore, the second construct deduced from the interviews is the different concept of “Speed” that occurs between TAP and APAFs. Indeed, being fast in hardware company means being fast with the supply chain.

“..[..]. The main challenge in hardware is speed. It’s not about money, it’s not about technology, it’s all about speed. And the problem, as a startup, is that you have less time on your hands if compared to the big corporation, they can enter later than you can, and they can wait longer (they already have engineer, they already have distribution, they already have

²⁶ Leading universities from all over the world, including Stanford university, are part of SUGAR Network. They enable students to form inter-cultural, multidisciplinary teams and work together on design challenges provided by corporate partners. Established in 2008, the SUGAR Network is growing and is currently supported by the strong bond of 16 universities (SUGAR Network 2018).

customers). Apple is a perfect example. So the challenge is hardware companies is about speed, you can still make the best IoT product in Poland, you can make the best product in Mexico...[...].But we do not go fast if you are not in the route of supply chain. Three weeks head up to become months, to become quarters, to years...[...].and if you make a mistake, by the time someone else bigger faster and stronger can make it at that time very quickly” - Brinc.

A critical factor for an effective supply chain management and speed, is where the APAF is located. Ecosystem really matter, even more for an APAFs and therefore for the analog firms. While for a digital startup, “manufacture” and distribute the product depends less and less on the physical place or ecosystem in which you are surrounded ²⁷, for an analog firm the story is different.

“you can run a successful design acceleration consumer good just to being in the region” – Porto Design Accelerator

Furthermore, the context allows you to acquire expertise on the product that you could not acquire elsewhere (e.g. the designer who wants to make glass objects that manufactures in Murano - Venice). As proof of this, Brinc has stabilized his accelerator in Hong Kong, near the gate to the “factory of the world”. Le Connected camp is located in the middle of the industrial hub of Toulouse and they called their ecosystem as “the IoT valley”. Porto Design Accelerator is located in the industrial pole of Porto, a region that alone contributes with 80% of the Portuguese overall exports.

²⁷ Online services such as Fiverr.com have decentralized the “manufacturing” of digital services/products. Nowadays, there is only one large district in the network in which every digital company can find their “raw material” (a piece of code, an engineer, a business person and so on) by searching on Google. However, the theme of the physical place/context/ecosystem, in the case of digital firms, is especially relevant for the “finance”. Indeed, physical world still matter for the opportunity that a digital firm has to find funding. It is no coincidence that many digital startups are established in Berlin, London, San Francisco or Boston (Crunchbase 2017).

Differences identified	Representative quotes
<p>Size & Finance</p>	<p><i>"For acceleration program you need to have seed money to allow them to try, you can't try for free in hardware" [PDA, Dec 2017]</i></p> <p><i>"We are not looking for a unicorn. We are looking for dozen. The number of closed deal are less (20-25 per year) and I think we will grow organically not like Y Combinator" [Brinc, Dec 2017]</i></p> <p><i>"We focused on profitability as soon as possible, we make sure they do not go through a mindset that in a market share mentality software silicon valley way of thinking which is not working in hardware" [Brinc, Dec 2017]</i></p> <p><i>"The first difference is scarcity of resources compared to Y combinator. Y combinator makes 50 companies per year while in our case we invest in 3 companies per year" [Indu, Jan 2018]</i></p> <p><i>"Our mantra has always been to get a 250K turnover the first year and so it was with all 10 companies" [Indu, Jan 2018]</i></p> <p><i>"the capital that enters has different risks and returns. Who makes digital will never have the same risk profile and return interest of those who invest in hw" [Indu, Jan 2018]</i></p> <p><i>"We also settle a « give back » model. It means that our startup will give back from 1 to 2% of their revenue to the IoT Valley in exchange of all the support they received" [LeCon, Jan 2018]</i></p>
<p>Program package: two new constructs</p>	<p><i>"we have laboratories for prototyping, with cnc, tools and raw material" [PDA, Dec 2017]</i></p> <p><i>"Our model has always been different from the others because we have the possibility to make a light prototyping in house but we also have a distributed network of facilities in the surrounding area to Industrio" [Indu, Jan 2018]</i></p> <p><i>"at the end of the program, accelerated companies participate at "Maker Fair", an event dedicated to makers that takes place in Rome every year"[BotD, Jan 2018]</i></p>
<p>Strategic focus: Tech-product based vs Design-product based</p>	<p><i>"One things that we are also learning is that we cannot put together technological based hardware product with design based consumer goods" [PDA, Dec 2017]</i></p> <p><i>"The accelerated cpmpanies is very very forward. It's for robotics and drones" [Brinc, Dec 2017]</i></p>

	<p><i>"The idea is to invest in IoT businesses. Therefore, products that have a strong IT component. Products that are not just design, so from here you can understand that we have never done fashion, furniture or design investment" [Indu, Jan 2018]</i></p> <p><i>"we focused our investments in IoT devices" [LeCon, Jan 2018]</i></p>
<p>Internationalization process: supplychain, speed and place</p>	<p><i>"Being fast means being fast with the supply chain". The main challenge in hardware is speed. It's not about money, it's not about technology, it's about timing" [Brinc, Dec 2017]</i></p> <p><i>"Less easy supply of raw materials .For the analogue world, supply involves time and cost of transport". For internet-based products, the supply is solved with a click (Cloud Services, Host Provider etc.)" [BotD, Jan 2018]</i></p> <p><i>"Place matters for competencies and cultural legitimacy:If you want to learn how to work the glass you have to go to Venice" [BotD, Jan 2018]</i></p> <p><i>"The context is important. Context is key. Like brinc is hong kong because is near shenzen and gounzou. Here if you want make design costumer good you need to be near the factory because they know the stuff. The context where you are is essential" [PDA, Dec 2017]</i></p> <p><i>Acceleration platform in which actually invest into companies (30 companies from 15 countries all around the world and we receive applications from 46 countries). Now we doing an additional 28 investment and we also be announcing our first fund in the middle east. [Brinc, Dec 2017]</i></p> <p><i>"The supply on the components is obviously international. In any case, for the first validation batches we basically rely on a more local supply chain. As the business grows, the supply chain must fundamentally become international through partnership" [Indu, Jan 2018]</i></p> <p><i>"Le Connected Camp is located in the heart of the IoT Valley, a unique IoT ecosystem created by entrepreneurs for entrepreneurs" [LeCon, Jan 2018]</i></p>

Table 3.3: Data structure supporting APAFs design elements

In the figure 3.3 we propose a review of Pauwels et al (2016) design elements scheme by including our findings.

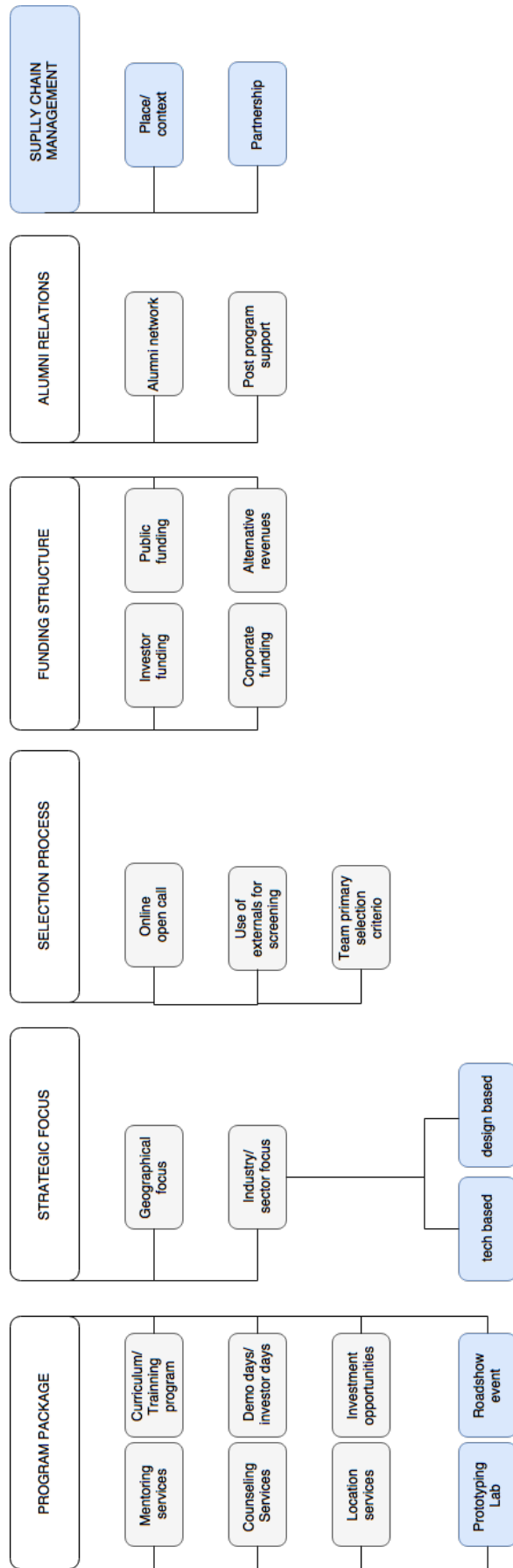


Figure 3.3: The new design elements and constructs

2.2 Design Themes differences: the new design theme

The accelerator's design theme is the common theme underlying a particular type of accelerator, orchestrating and connecting the different design elements (Pauwels et al. 2016). The accelerator design themes were identified through application of a further cross-case analysis, focused on revealing new themes cutting across cases.

According to Pauwels et. al (2016) there are 3 types of design themes: the ecosystem builder, the deal flow maker and the welfare stimulator.

Some APAFs can be classified under the design theme "Welfare stimulator" and this is the case of Porto Design Accelerator (PDA) whose ultimate goal is to train and develop entrepreneurs in the hardware world. PDA is part of Porto Design Factory²⁸ which is participated by a public organization, the "Politécnico do Porto". Among the interviewed APAFs, no one had the underlying design theme to build a "Corporate ecosystem".

What emerges from our interviews is that there are APAFs that cannot be identified with any of the themes described by Pauwels et al. (2016). We are talking about APAFs whose goal is to make economically sustainable the accelerated companies, since the beginning. In many Traditional Accelerator Programs this the idea that firms do obtain negative economic results in the first three four years of their life is widely accepted, this is because managers do expect these digital firms will obtain significant economic results afterwards. This idea, in manufacturing, that they have to lose money it is not acceptable and there are

²⁸ Porto Design Factory offer is divided into three macro areas: Education, Acceleration and Innovation.

Education: Porto Design Factory offers various educational programs in which interdisciplinary international teams work on innovation challenges settle by national and international companies.

Acceleration: The Port Design Factory acceleration phase is entirely vertical (thematic) and aims not only to introduce students into the world of entrepreneurship, but also to help aspiring entrepreneurs understand what it means to build a high growth startup and assess whether entrepreneurship is, in fact, the right way.

Innovation: Porto Design Factory seeks innovation through interdisciplinary co-creation. This often leads to disruptive proofs-of-concept that are co-created between companies and interdisciplinary teams (Porto Design Factory 2018)

methodologies that fully support this new entrepreneurs to identify new sources of revenues even at the early stage of their activities.

Specifically, according to what we observed we propose a fourth design theme that is the "Economic sustainability maker" accelerator. The "economic suitability maker" does not aim "to bridge the gap between early-stage projects and investable businesses" like a "deal-flow maker" (Pauwels et al. 2016), but rather to make the accelerated company a profitable business from day 1. This means that from day 1 the business manages to "walk alone" even without the help of funding, that are necessary for the maintenance of a digital business typically incubated in TAPs. Examples of "Economic sustainability maker" accelerator are Industrio, Brinc and Le Connected.

Like the "deal-flow maker", the "economic sustainability maker" accelerator provides some form of seed financing to the portfolio companies in exchange for equity. What differentiates "the economic sustainability maker" from "the deal-flow maker" is the substantial underlying need of the post-graduation investment. Precisely, in the case of an analog firm the post-graduation investment is only a means for the company growth. It would not be necessary for the "sustenance" of the company. On the other hand, in a TAP, the post-graduation investment is necessary for the life of the company. Both themes have in common an investment opportunity that is born with different perspective.

In the table 3.4 we propose a review of Pauwels et al (2016) design themes scheme by including the "Economic sustainability maker".

	Ecosystem Builder	Economic sustainability maker	Deal-flow maker	Welfare stimulator
Design themes	"Matching customers with start-ups and build corporate ecosystem"	"Make it profitable from day one"	"Identification of investment opportunities for investors"	"Stimulation of start-up activity and economic development"
Cases TAP	- Microsoft Ventures Accelerator		- Techstars London - TheFamily - Startupbootcamp Berlin - Plug and Play Accelerator	- Climate-KIC - Scientipôle Initiative - Le Camping

APAFs		<ul style="list-style-type: none"> - Industrio - LeConnected - Brinc 		<ul style="list-style-type: none"> - Porto Design Accelerator
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Table 3.4 the 4 design themes cutting across the design elements

2.3 The Definition of Accelerator Program for Analog Firms

According to what argued above we propose our definition of Accelerator Program for Analog Firms:

“An Accelerator program for analog Firms, or APAFs, is an Accelerator Program aimed to help new hardware ventures define and build their initial products, identify profitable customer segments, the right distribution channel, and secure resources, including working space, raw materials, technicians and prototyping laboratories. More specifically, accelerator programs are limited-duration programs—lasting roughly six months—that help cohorts of ventures with the new venture process.

Usually, unlike Traditional Accelerator Programs, or TAPs, APAFs have a lower number of accelerated ventures per year, they focus on supply chain management and therefore on making their enterprises profitable as soon as the program end.

Like any other TAPs, APAFs also offer networking, educational and mentorship opportunities, with both peer ventures and mentors. Finally, most programs end with a roadshow event, where the new ventures start to sell their products”

In other words, we can also simply say that:

“Accelerator programs for analog firm, or APAFs, are fixed-term, cohort-based program, including mentorship and educational components aimed to understand how to effectively manufacture and distribute hardware tech- products or design-based consumer goods”

3 Discussion & Implications

In chapter 2, after the review of the literature concerning the incubators and accelerators we have identified a research gap and therefore highlighted the following hypotheses:

Hypothesis H1 - We hypothesize the existence of another type of accelerator programs whose “design theme” is not described by Pauwels et al (2016): the design theme of an APAFs. Therefore, we hypothesize that there are types of accelerator programs that have neither the primary goal of stimulating the welfare of a region nor ending an investment round nor building an ecosystem around a corporation.

Hypothesis H2 - We hypothesize the existence of new design elements to be integrated with the design elements of Pauwels et al. framework (2016) which describe the characteristics of an APAFs.

T our study we can say that the hypotheses H1 and H2 have been verified and therefore:

1) Actually there are acceleration programs that are not described by Pauwels et al. (2016). We called them APAFs and a subset of these APAFs have objectives (= design themes) that have not been considered by Pauwels. Specifically, we have identified the presence of accelerators whose purpose is to make companies accelerate profitable starting from day 1, and we called them "economic sustainability maker" (see table 3.4).

2) APAFs have design elements common to TAPs, but also specific constructs that characterize them. Then the two constructs "prototyping lab" and "roadshow events" have been added to the program package. We have also updated the "strategic focus" by making the distinction between "tech-based APAFs" and "design-based APAFs".

And finally we introduced a new design element: the supply management with its two constructs, "place / context" and "partnership" (see figure 3.3).

3) We have contributed to the literature on incubators and accelerators by introducing a new macro categorization of acceleration programs, the difference between TAPs and APAFs never considered before and we have for the first time defined this new phenomenon.

3.1 The ultimate APAFs: the strategy for the Italian context

But we would like to do more with our study. We want to put into practice what we have learned and therefore propose our perspective on the strategy should be adopted to start an APAFs in Italy. After all, what we want to propose, is not just a "brick" to be added to the literature on incubators, but also translate everything we have said in this paper, into economic development and jobs. We know it sounds almost utopian, but in this paragraph, we will explain why it is not so impossible to believe the opposite.

From our review of the literature and from our study we have understood many things, but the strongest insight we have understood, is that if you want to create a successful incubator²⁹, the harmony with the territory and its stakeholders is essential. A strong synergy with the activities surrounding the accelerator, but in general with the qualities of a country are assets that contribute to the competitiveness of an accelerator. In other words, the copy-paste model of the American accelerator, designed for the US context, does not work in Italy. Since the birth of the first accelerator in Italy, almost a decade has passed, but there is not even a shadow of "the Italian Facebook". Except some extraordinary cases like Musixmatch or Depop, Yoox and few others which have achieved fair notable results so far (Donadio 2017; Sideri 2016).

In a country where investment in digital startups is struggling to take off and where "the new Facebook" will most likely never grow, we offer a new perspective (Venture Beat 2017).

We propose to start an APAFs that relies on what we already have. We know that, in Italy we are good especially in 5 sectors: Food & Beverage, Fashion, Design & Luxury, Automotive and Tourism (Future Brand 2015)

In Italy, there are over 70.000 little manufacturing firms that contribute to those sectors (ISTAT 2015b).

We propose to start the first APAF with the aim of accelerating these SMEs. We want to arm this army of SMEs to the third industrial revolution. We propose to mix young enthusiastic millennials with "analog entrepreneurs", usually people over 50 years old who have greatly contributed to creating the so-called "country

²⁹ Success measured as the % of accelerated firms that survive within the first year after the graduation.

of origin effect” in those 5 industries. But something is changing, and there is a strong need for these analog entrepreneurs to be introduced to the digital world. We are talking about an analog world that meets the digital one. Analog world that in the Italian case already exists, and it’s the result of hundreds years of culture and decades of economic development that led to the definition of more than 130 “made in Italy” districts located in the Italian territory (ISTAT 2015a). Specifically, we propose to target those companies that invoice around 1M€ belonging to the 3 leading sectors: Food & beverage, Fashion, Design. We aim to bring them to invoice from 1M€ to 4M€ euros in 4 years.

In order to accomplish that ambitious objective, we designed an APAFs that takes into consideration the worldwide best practices and mostly, the Italian heritage context.

3.1.1 The Design elements and theme proposal

Below we present our APAF proposal by first describing the design elements and the design theme we chose. Second, we will describe the business model and revenue model that we suggest to choose. Finally, at the end of the paragraph we will make an estimation of the economic impact this project could have.

Design elements	Italian APAF proposal
<i>Program package</i>	<p>The duration of the program will be 12 weeks. The program package, as usual, is made up of “mentoring” and “consulting services” to be held by experts in the field. Here, a critical aspect concerns the heterogeneity of the entrepreneurs needs. Usually, they have different backgrounds and they come from different industries. This implies different needs. Therefore, a fundamental characteristic of the "curriculum and training program" must be flexibility. According that, we propose to divide the training program into 4 major issues that cut across the program in its duration: the manufacturing issues, digital marketing issues, business development issues and team building issues. In this way, every week there will be 4 different modules, and in 12 weeks there will be 48 different modules that approach the most common problems in that specific fields. Precisely, there will be 12 for the manufacturing</p>

	<p>thematic, 12 for the digital marketing thematic, 12 for the team building thematic and 12 for the business development. In this way we can be flexible and offer a customized advice to the needs and speed of the individual company. To guide each company in its training path along the 48 modules there will be a "coach" who will have the objective of guiding the entrepreneur from week to week in the choice of the route, based on the need. The prototyping will take place in the accelerated company itself and part of the investments will be directed to allow the accelerated company to participate to roadshow/trade fair to promote the products.</p>
<i>Strategic focus</i>	<p>The industries to focus on are: Design, Fashion and Food companies. Therefore, analog companies based in the Italian territory that produce "design-based consumer goods". Our proposal is to establish an APAFs for design-based consumer goods.</p>
<i>Selection process</i>	<p>The selection process is a key activity. We propose to implement a traditional online application through channels such as the well-known F6s.com. The selection will have to consider, in addition to the turnover target (around € 1M), also the entrepreneur's wiliness to risk. It seems almost trivial, actually we are talking about people with a company already started, perhaps with a family and therefore it is certainly not straightforward that they want to risk with new projects. Indeed, Acceleration is a function of the "company's risk appetite" and entrepreneur's right mentality. The help of external experts who evaluate the applications will also be required. These experts must be senior figures, with experience in the target industries of the program, and with the right sensibility to understand the implications of the third industrial revolutions.</p>
<i>Funding structure</i>	<p>We propose a hybrid model in which there is, depending on the needs, both private and public participation. Also we propose</p>

	<p>a model of revenues that is untied to the traditional "equity-taken" of the American model. But we are proposing a model of revenues that is linked to the turnover of the first years of the project launched by the accelerated company. In other words royalties related to the product.</p>
<i>Alumni relations</i>	<p>It is important at the end of the program to monitor accelerated companies. Are they starting the project? Therefore, it will be important to define KPI, and at legal level define the post program relationship, to understand if the accelerated companies are keeping the project alive.</p>
<i>Supply chain management</i>	<p>Accelerator localization is important. We propose to position the accelerator in one of the 130 "made in Italy" districts and to create partnerships with key companies for production in the 3 key sectors.</p>
Design theme	<p>The theme we propose is the "economic sustainability maker" design theme. The value chain, therefore every single activity, must be aimed at allowing accelerated companies to be "profitable from the day one". And this concept is in harmony with the revenue model we proposed. In this way, the objective of the company matches with the accelerator objective, which is a desirable condition.</p>

Table 3.5 The design theme and elements of our proposal

3.1.2 The business model

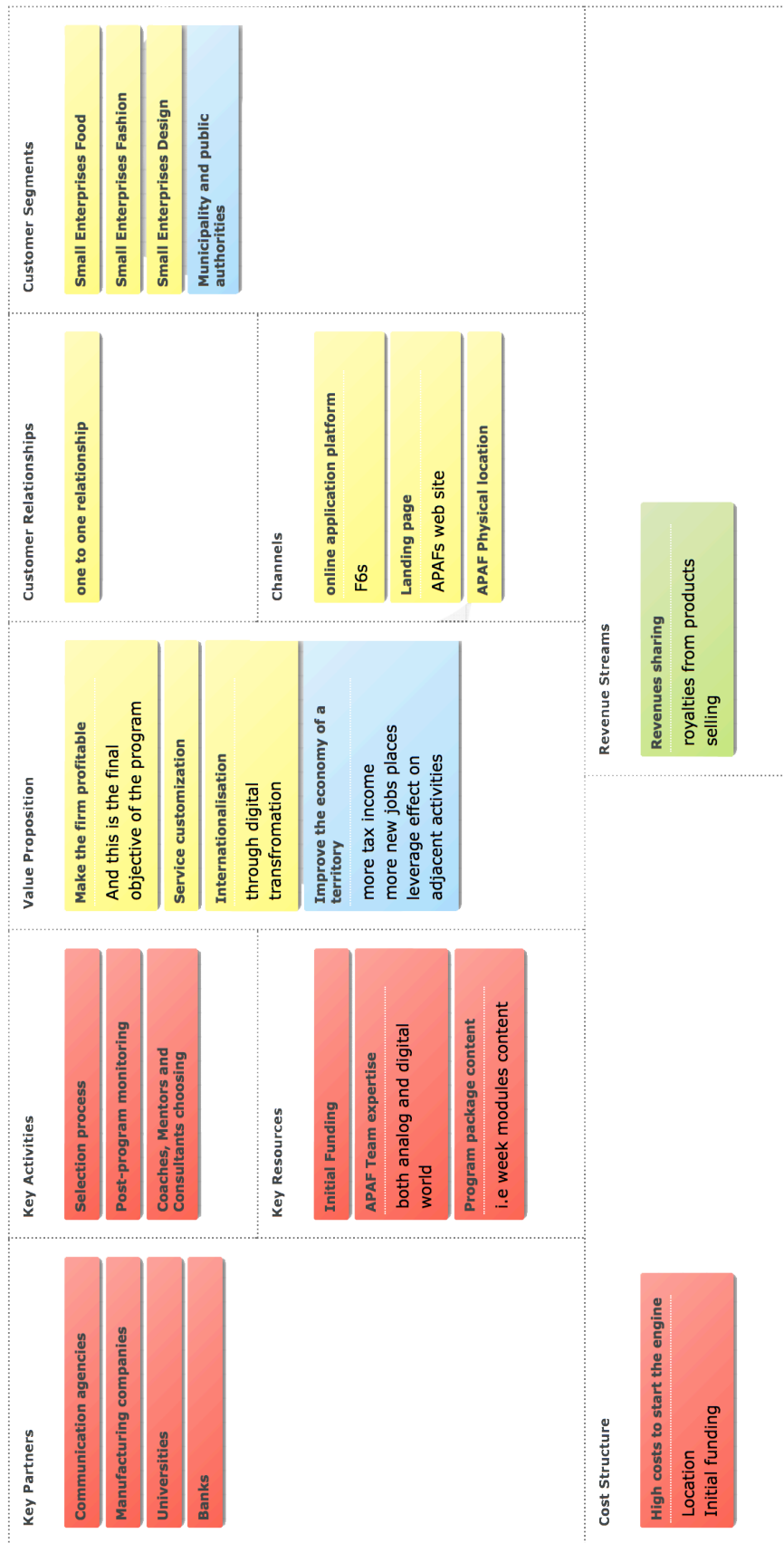


Figure 3.4: The business model of our APAF proposal

3.1.3 The impact on the Economy: a raw estimation

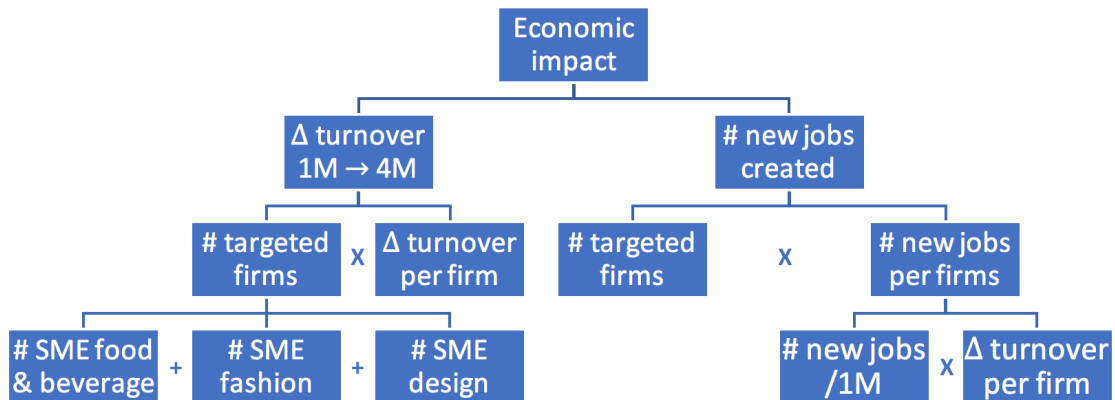


Figure 3.5: market size estimation schema

We roughly estimate that the use of APAFs for the Italian economy would yield 1B in 3 years and 2,000 new jobs. Now we will explain why.

We measured the Economic impact by considering two effects: the number of new jobs and the differential turnover directly attributable to the accelerated projects (see Figure 3.5).

As already said we want to bring the targeted companies (Food, Fashion, Design SMEs) from 1M€ to 4M€, so the delta turnover for every single firm is hypnotized to be 3M on average. The number of targeted firms is estimated to be around 70.000 (ISTAT 2015b). Among these potential eligible 70.000 analog firms, a portion of these will not be aware of the program, a portion will not be ready at motivational level and another portion will not meet the other selection criteria. So, we applied a conservative percentage of 1% that corresponds to the percentage of companies that are ready for the program, among the eligible 70.000. Therefore in 3 years, the Italian target companies will be 700. If we multiply 700 by 3M we get around 2B€ of additional turnover due to our project. Among the projects there will be a partition who will fail to reach the target turnover, or simply they will write off the project, therefore we assume that 50% will success to reach the target within 3 years. In conclusion, the potential additional turnover could be 1B along 3 years. A good number if we think that in the 2017 Budget law, the Italian government has allocated 7 billion euros to lower pensions and for the early retirement in 3 years (Nutti 2017).

On the other hands, there will be around 2.000 new jobs. We assumed that for every additional million, within the company, two additional people will be

needed. Therefore 6 people per company over 3 years. If we multiply 350 target companies by 6 people per company, we get 2,000 additional new jobs in 3 years. This estimation does not consider the benefits that an APAF would create in the neighboring areas.

3.2 Limitations and future research

As all studies, this study is not without limitations. One of the biggest limits of this research is the sample size. In the repertory grid method it is recommended to have a minimum number of 10-12 sample units (Jankowicz 2004). Therefore, our five cases may not be representative of all types of APAFs and we might have lost some relevant insights of this new phenomenon.

Future research is necessary to understand the effectiveness and economic sustainability of the APAF business model. In other words, the hypothesis to be verified could be: "Are APAFs economically sustainable and therefore, are APAFs more advantageous than the traditional ones (TAPs) in the European and/or Italian context?". At the quantitative level, to verify that hypothesis, it's necessary to analyze over time the trend of a predefined set of profitability KPIs. At a purely qualitative level we can make this argumentation. Companies that participate in APAFs are small enterprises that produce and distribute a physical product and they need to make their products known to the world. If the accelerated company will work then the APAFs will work (= economic sustainability).

If the likelihood of success of an analogue product is greater than a digital product (in the Italian context) then it is plausible to think that analog accelerators (in the Italian context) are more economically advantageous than TAPs. Why do I say that it is plausible to think so? For the "Country of origin" effect. The fact that the world knows us for Fashion Food and Design influence the choice of the consumer at the time of purchase (=Halo effect), placing the products "Made in Italy" in an advantageous position. This does not happen for the "Made in Italy" digital products.

Subsequent analyses might also be aimed to uncover insights by analyzing the relationship between an APAFs and the territory in which the APAF is established. Which are the relationships between an APAF and its surrounding area? Knowing this would allow the policy maker to make more informed and effective decisions.

3.3 Conclusion: Is Europe the new “Silicon Valley”?

For the first time in the literature we have described, defined and proposed a new type of acceleration model; the “Accelerator Programs for Analog Firms” and we called them APAFs. Prior research did not provide insight about this new phenomenon and therefore we decided to fill the gap.

Against a background of a wide prior research, this study has produced several interesting results about an APAF’s key design parameters that have new implications for the incubation and accelerator literature and practice. On the other hands, there is still a lot of work to run because this is a constantly evolving phenomenon. Obviously, because the phenomenon is so new, uncertainty still exists about the future success of APAFs. However, we have strong reasons to believe that this is only the beginning of a new accelerator model.

I think that a worthwhile source of competitiveness for Europe lies in these analog companies. Indeed, these firms can take advantage of years and years of cultural investment that, at the end of the day, distinguishes our “old continent”.

As we all know, Silicon Valley is considered the cradle of modern innovation: for how it was conceived to date. But it is the result of inestimable amount of private and public investment and therefore it is not an accident that Apple, Microsoft, Facebook or Twitter were born there. The US government has invested "billion of dollars" so that it has created the perfect habitat for the growth of a digital startup. There is a priceless accumulated capital that has created a virtuous circle in Silicon Valley such that it is much more likely that the “new facebook” may born there. Not in Europe. It is enough to compare the number of European Unicorns with the number of American Unicorns to make the situation clear (Financial Times 2016). But Innovation is changing. I believe the new Silicon Valley is in Europe; in exploiting the artisanal know-how found in the old continent. Just like Silicon Valley, over the centuries Europe has accumulated an unprecedented and inestimable manufacturing heritage that is now ready to be capitalized in the third industrial revolution. And we cannot miss this great opportunity to grow organically.

4 Apendix: The preliminary case study

In this section, we present the preliminary case study used to engage the managing directors of the APAFs. The structure and the content we followed for the presentation is neatly pointed below:

“Who we are”, in which we have presented the researcher involved in the study;

“The research – what we have done so far”, in which we have summarize the literature review;

“The research - what we have understood” in which we have presented the identified research gaps;

“The research – a list of some identified APAFs” in which we have listed some APAFs³⁰ and their main characteristics;

“Comparative analysis – the evaluation criteria” in which we have identified the criteria/dimensions to make a comparison between the identified APAFs. We’ve used secondary data sources such as APAF websites and online news. This was an important moment to get familiar with the context. The identified characteristics are the following and they have been divided into 5 macro categories, or *“design elements”* according to Pauwels et al (2016):

Funding structure characteristics

Hybrid business model-oriented;

Equity taken business model;

30

30weeks	30wk
Shenzhen Valley Ventures	SVV
DSGNFWD	FWD
Porto Design Accelerator	PDA
DesignGild	DGild
Le connected camp	LeCon
Botteghe Digitali	BotD
Industrio	Indu
NEXTFAB	NFAB

Strategic focus characteristics

Accelerator Programs for Analog Firms;

Traditional Accelerator Programs;

Program package characteristics

Approach the retail distribution channel;

Product Industrialization (supply side);

Demo Days/Investor relationship and funding;

Laboratories where you can prototype;

Roadshow event participation;

Location services (desks and work spaces);

Mentoring and counseling services

Brand and Identity Design

Communication Design

Business development Mentorship

Design for Mass services (DFM)

1 to 1 custom support

Patent and IP Protection services

Others characteristics

Online Open call

Alumni network &

Post program support

“Comparative analysis – the results” in which we have presented the results of the comparison. We have identified common characteristics and differential characteristics among APAFs by simply using a Pareto Rules (Sanders 1987). Below the results (Fig 3.6 and 3.7);

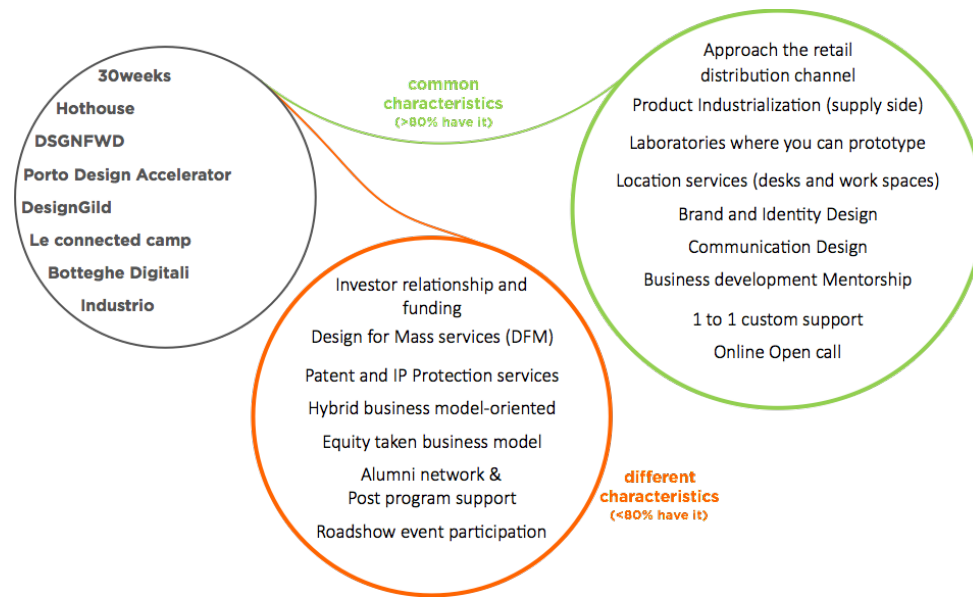


Figure 3.6: comparative analysis - summary results

		YES	NO	N/D	Accelerator Programs for Analog Firm							TAP
Design Elements	Characteristics	30wK	SVV	FWD	PDA	DGild	LeCon	BotD	Indu	NFAB	YComb	
Program Package <i>(curriculum training, demo days and location services)</i>	Approach the retail distribution channel											
	Product Industrialization (supply side)											
	Demo Days/Investor relationship and funding											
	Laboratories where you can prototype											
	Roadshow event participation											
	Location services (desks and work spaces)											
Program Package <i>(mentoring and counseling services)</i>	Brand and Identity Design											
	Communication Design											
	Business development											

	Mentorship	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Design for Mass services (DFM)	Orange	Green	Grey	Grey	Grey	Grey	Grey	Green	Grey	Orange	Green	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
	1 to 1 custom support	Green	Green	Orange	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Patent and IP Protection services	Orange	Grey	Green	Orange	Green	Grey	Grey	Green	Green	Grey	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Grey
Funding structure	Hybrid business model-oriented	Green	Green	Orange	Green	Orange	Green	Green	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
	Equity taken business model	Orange	Orange	Green	Orange	Green	Orange	Orange	Orange	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Others	Online Open call	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Alumni network & Post program support	Grey	Grey	Grey	Grey	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

Figure 3.7: comparative analysis – detailed results

“Are you ready to be part of our research?” in which we explicitly call to action the managing director;

“Our aim - have a real impact on the territory” in which we listed our main research objectives.

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