Doctoral Dissertation:

The Journey towards a Growing Diffusion of Entrepreneurship Learning and Culture in Society

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PhD Dissertation

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Acknowledgments

I wish to dedicate this work to Prof. Tullio De Mauro who many years ago believed in me and gave me the permission to add this challenge to the many I face every day as General Director of Fondazione Mondo Digitale.

The effort I have sustained for many years has been first of all for myself, to satisfy my desire to learn and improve all the time, but it has also been for my fifteen year old son Rodrigo, who is building his life and to whom I wish the power of remaining always curious, hungry for knowledge, and capable of working hard and sacrificing for his dreams.

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Abstract

The aim of this thesis is to cast light on the subject of its main research proposition, namely, the apparent trend towards a growing diffusion of an entrepreneurship culture and learning in society. It does so by dealing in considerable detail with the recent evolution and characteristics of startup accelerators, pre-accelerators, and other form of entrepreneurship support activities, including, an educationally-oriented inclusive entrepreneurship accelerator. For the sake of completeness, the research goes back in time to the historical origins of entrepreneurial programs in the form of the incubator around the late-1950. The chosen methodology of the study applies a mix of exploratory and descriptive research, with some element of quantification, mostly due to the recentness of the phenomenon and the rather unstructured condition of existing knowledge. This is reflected in the structure of the thesis that combines an extensive review of literature with the empirical research of three case studies of leading accelerators in three European countries (France, Israel and Italy), in addition to the case of the more recent experience of an educationally-oriented inclusive entrepreneurship accelerator, also in Italy. The overall combination generates, on the one hand, an overview of developments happening in the field under research and, on the other, an in-depth knowledge of how this is happening empirically in specific cases. Among other aspects, this helps reveal: (i) why and how the realm of entrepreneurship support structures has changed markedly in recent years, leading to a notable expansion of new entrepreneurship programs and instruments in society; (ii) the variety of new programs' mechanisms, learning approaches, business models, and their evolution in the face of sustainability challenges; and (iii) the challenges and conditions facilitating and/or blocking the development of accelerators. The results of the overall approach is reflected in the structure of the thesis in two Parts, the first, following the Introduction and including two chapters: Methodology and Review of Literature and, the second, containing six chapters with the four case studies, their comparative analysis and, also, the concluding chapter. The argument confirms the main proposition of the thesis, namely, the existence of a trend towards a growing diffusion on an entrepreneurship culture and learning in society. The results may be useful for

countries and regions facing increasing demand for entrepreneurial capacity to respond better to the entrepreneurial challenges of a complex and rapidly evolving society.

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Chapter 1 Introduction

This chapter presents an overview of the research problem addressed by this thesis, as well as the organization of the overall argument developed across its pages. It deals with the background and purpose of the study; it identifies research problems and specific research questions, and highlights the significance of the research. It also addresses expected outcomes, results and contributions, as well as the limitations of the research. Finally, the chapter structure of the whole work is presented. Let us start with the background and purpose of the study.

1.1 Background and Purpose of the Study – Main Research Problem

In recent years, the economic crisis affecting the Western economies, particularly in the South of Europe, has translated into massive societal challenges involving changes in all sectors of society, for instance, the financial and industrial sectors, the public sector, and the social sector. These changes have interacted with other large-scale phenomena such as the spread of globalization, rapid technological developments and global challenges such the environment, the growth of inequality and the large migrations of poor and desperate people towards more developed areas of the world. In Europe, this situation has brought into relief the need for growth, jobs, company creation, social programs and even the transformation of education to provide youngsters with the knowledge and skills to face successfully work and life in the 21st century. This has given rise to a great deal of social experimentation and innovation to create social capital in the form of structures aimed at supporting and stimulating the emergence and growth of startups and, more generally, the entrepreneurial capacity of people.

The best-known new entrepreneurship support programs are the *accelerators* of high-tech startups, commonly driven by investors and high-tech entrepreneurs and providing initial funding, support and mentoring normally in exchange for equity. More recently, startup accelerators have evolved into vertical and corporate accelerators and new types of programs have emerged on the scene, for instance, *pre-accelerators* and the *inclusive entrepreneurship accelerator. Pre-*

accelerators do not involve provision of funding and may be seen as programs aimed at preparing aspiring entrepreneurs to reach the funded accelerator stage. Other programs, however, are not necessarily attached to the aim of arriving to a startup phase and may last a weekend, several weeks or several months. A key point is that these phenomena are quite recent, if one considers that the acknowledged first startup accelerator, YCombinator, was created in Boston only about 15 years ago, in 2005.

Thus, looking at the proliferation of entrepreneurial support activity, it is possible to propose or hypothesize that **a trend towards a growing diffusion of an entrepreneurship culture[1] and learning in society** is under way. Such apparent trend constitutes an important area of research, first, to confirm whether or not such a trend actually exists and, second, if it does exist, to gain a detailed understanding of its evolution, particularly, drivers, processes, and mechanisms. Indeed, a deeper understanding of what is actually happening and how is important, since it may help countries and regions facing increasing demand for entrepreneurial capacity to respond better to the entrepreneurial challenges of a complex and rapidly evolving society. It is also an educational trend just beginning to reach school systems, in line with the promotion of 21st century life skills as critical educational components for life and work in this century.

The purpose of this thesis aims to cast light on the main research problem just identified, namely, the apparent trend towards a growing diffusion of and entrepreneurship culture and learning in society. It does so by dealing in considerable detail with the characteristics and evolution of startup accelerators, pre-accelerators, and other form of entrepreneurship support activities, including, the inclusive entrepreneurship accelerator. In fact, for the sake of completeness, the research goes back in time to the historical origins of entrepreneurial programs in the form of *the incubator* around the

[1] In this thesis, the term entrepreneurship is understood as the full or partial set of activities and processes aiming at identifying opportunities, defining solutions in the form of products/services, and creating startups or new ventures to exploit these products/services in order to create wealth. The inclusion of "partial set of activities and processes" is intended to encompass educationally-oriented activities that may reach the stage of prototyping in innovation projects. In turn, culture is understood as common practices and behaviour of people in society, including laws, norms, capabilities, habits, etc.

late-1950. The study combines extensive review of the literature with the empirical research of three case studies of leading accelerators in three European countries (France, Israel and Italy), in addition to the case of the more recent experience of inclusive entrepreneurship accelerator aiming at promoting an entrepreneurship culture and learning amongst young people in Italy. This last empirical case exemplifies the emergence of a specific type of accelerator in a context of major uncertainty and turbulence in the policy arena of a local authority (the Municipality of Rome). It is particularly important for my purpose in writing this thesis because the Fondazione Mondo Digitale (FMD), an organization I co-founded and currently direct, created it in Rome under the name of *Inclusive Phyrtual Accelerator (IPA)*. The rise and development of IPA is central to the strategic purpose and growth of the FMD. Overall, however, it will be seen that each of the accelerators studied in this thesis has its own distinctive origin that has plainly conditioned its path of development.

In short, the purpose of this thesis is to deepen the understanding of the historical conditions, characteristics and dynamics of the development of accelerators, pre-accelerators and other support programs that sustain the apparent trend towards a growing diffusion of an entrepreneurship culture and learning in society.

1.2 Specific Research Problems and Questions

A variety of more specific research problems are derived from the main research problem identified above. These more specific research problems are: first, to explain why and how the realm of entrepreneurship support structures has changed markedly in recent years, leading to a notable expansion of new entrepreneurship programmes and instruments in society; second, to reveal in detail the variety of new programmes' mechanisms of operation, learning approaches, business models, and the evolution towards diversification and, potentially, entrepreneurship support ecosystem; and third, cast light on the challenges and conditions facilitating and/or blocking the emergence and development of startup accelerators and, particularly, of the inclusive entrepreneurship accelerator, i.e., the FMD's accelerator for all conceived with the potential to propagate the learning and

experience of entrepreneurship further into the educational system and society.

These three problem areas have a number of specific research questions associated to them. For instance, the following are related to first research problem-area:

(i) What were the established entrepreneurship support structures before the rise of the new structures, first in the form of accelerators? What were their business/operational models?

(ii) What events and developments have led to the emergence of the new breed of entrepreneurship support programmes?

(iii) How has the new breed of support programmes grown quantitatively and geographically during a period of less than a decade and a half?

(iv) Do the new programmes represent a true discontinuity and new entrepreneurship learning models?

Important specific research questions related to second problem-area are:

(i) what are the blends of approaches, content, mechanisms and people making up the operation and dynamics of the new breed of programmes?

(ii) What types of business or sustainability models they implement? And how do they seek to measure their impact?

(iii) What are the benefits for the diverse stakeholders converging into these programmes?

(iv) How do these programmes evolve in time in terms of both diversification and changes in business or sustainability models?

(v) Are these programmes leading to the emergence of entrepreneurship support ecosystems reflecting a growing diffusion of an entrepreneurship culture and learning in society?

Specific research questions related to third problem-area:

(i) what are the main factors behind the emergence of an inclusive entrepreneurship accelerator in Italy: vision, reasons, motivations for both its setup and the shape of the specific programme being implemented?

(ii) What has been the role of the local conditions (Rome, Italy) in facilitating or hindering the development of the FMD's inclusive accelerator?

(iii) What have been the results and the evolution of the business or sustainability model of the initial experience of the FMD's inclusive accelerator?

(iv) What are the prospects, challenges and strategies for further development and growth in quantitative and qualitative terms?

(v) What are the lessons of the initial experience of the inclusive accelerator in Italy and how can this be enriched with insights from the experience of other new programmes in Europe?

1.3 Significance of the Research

As said earlier, the world has entered a period of rapid evolution of science and technology and global challenges. This is stimulating much innovation across society, including in industry, jobs and education. Education for the 21st century has come to identify creativity, innovation and entrepreneurship as important skills for life, work and organizations in this century. Herein lies the importance of the proposed research. It is seeking to study and document an apparent trend towards a wider diffusion of an entrepreneurship culture and learning in society by mixing, on the one hand, an extensive review of literature on the current state of development of both: old and new breed of entrepreneurship organizations and, on the other, an in-depth empirical study of four original experiences in Europe, including the experience of an inclusive entrepreneurship accelerator. The results are expected to illuminate what is actually happening in the evolution of new entrepreneurship support organizations and, potentially, ecosystems. In turn, this is expected to improve knowledge for better-informed action in the policy arena. In brief, the subject of the proposed research is both important and ambitious and has the potential to make a significant contribution to developments currently taking place in entrepreneurship support systems.

1.4 Expected Outcomes, Results and Contributions of the Research

The outcome, results and contribution of the research are expected to blend two major aspects:

- A better understanding of the current evolution of entrepreneurship support programs (e.g., accelerators and others), apparently moving gradually in the direction of a wider diffusion of an entrepreneurship culture and learning in society. This understanding includes a reflection on both: (i) the conditions facilitating the emergence and sustainability of entrepreneurship support programmes, and (ii) the blends of learning processes and mechanisms used by the programmes in relation to specific objective and contexts;
- A new model of inclusive entrepreneurship accelerator that opens to all the possibility to engage in entrepreneurship programmes, and not jut those with potentially winning startup ideas; this model has a full programme of experiential content and activities associated with it and, potentially, may offer a path to start facilitating and stimulating the adoption and adaptation of entrepreneurship content and activities in the school world.

1.5 Organization of the Thesis

The argument of the thesis is organized with a structure of two parts following this Introductory chapter. Part I is made up of two chapters: methodology and literature review, and Part II is made up of 6 chapters containing the empirical case-study research plus the conclusions. The detail list of chapters is as follows:

Chapter 1 is the present Introduction

Chapter 2. Research Design and Methodology

Chapter 3. Literature review

Chapter 4. Case study No.1 – NUMA (France)

Chapter 5. Case study No.2 – MinCET (Israel)

Chapter 6. Case study No.3 – H-Farm (Italy)

Chapter 7. Case study No.4 – Inclusive Phyrtual Accelerator (IPA) (Italy)

Chapter 8. Comparative Analysis of Case Studies

Chapter 9. Conclusions

PART I

Chapter 2. Research Design and Methodology

Chapter 3. Literature review

Chapter 2 Research Design and Methodology

The broad subject matter of the research is given by the apparent emergence of a trend towards a wider diffusion of an entrepreneurship culture and learning in society. The recentness of the phenomenon creates certain difficulties to its research. In fact, even considering the most developed phenomenon of accelerators, there is wide agreement in the literature that the field is at early stages of development showing a lot of variety, data-gathering difficulties and lack of theoretical common ground. Among the shortcoming identified in the literature, we find:

(1) there are significant problems to gather data from accelerators. Roberts *et al.* (2016) notes that "few studies have been able to leverage the data — both quantitative and qualitative — that these programs are generating to learn about what is and is not working." (p.7) One aspect of the problem is that most accelerators are small organizations with little structured data tracking, thus there is a general absence of large-scale representative data sets covering the programmes. (Fehder & Hochberg, 2014) The result is that "[r]esearchers have little visibility into program features, the identity of the companies that enter and exit the programs, or the population of startups that apply to such programs but are not admitted." (Ibid., p.9) Another problem is the short-term nature of accelerators' programs focused on the earliest stages of startup development. This makes it difficult to generate interpretations and generalizations on the long-term implications of acceleration. (Roberts et al., 2016) In summary, as Konczal (2013) points out, it is somehow ironic that an environment commonly using phrases like "value proposition" and "value-added," simultaneously shows such a dearth of detailed data demonstrating the real value of programs.

(2) a second research difficulty is that, in practice, accelerators do not apply a single standard model, they are a variegated specie operating in variegated contexts. Thus, they "may target different stages of entrepreneurs/startups, from the pre-launch idea stage to a company that is growing and generating revenue, thereby limiting comparability." (Konczal, 2013) Even when the basic intervention is in principle the same (e.g., mentoring and structured

educational component), the individual treatment of ventures will vary across accelerators, financially and programmatically. (Ibid) As Roberts *et al*. (2016) put it succinctly: "The main challenge faced when studying the effectiveness of accelerator programs is that different programs seek to accelerate different things." (p.10)

(3) consequently, the academic research on accelerator programs is still embryonic. Thus, "While accelerators, such as Y-Combinator in the USA, have caught the attention of media and policy makers by funding and supporting hundreds of successful digital start-ups, including Dropbox and Reddit, there has been surprisingly little academic research on the accelerator phenomenon." (Malek *et al*., 2014, p.26; see also Caley & Kula, 2013);

On the basis of the above, it is not surprising to find that, often, studies raise the need for more research on accelerators to help get a clearer picture about the various approaches, activities, their evolution in various contexts, results achieved, and so on.

It is not the purpose of this research to try to resolve these problems that are massive. It rather seeks to document the apparent trend towards a wider diffusion of entrepreneurship culture and learning in society; specifically, how this trend would be unfolding through the evolution of accelerators, pre-accelerators and other entrepreneurship-support activities. In this context, the study researches in detail the challenges that have faced the rise and evolution of three leading accelerators from three different European countries (France, Israel and Italy), as well as studying the emergent experience of the inclusive entrepreneurship accelerator of the Fondazione Mondo Digitale in Italy, in a context of major uncertainty and turbulence. In so doing, the research also explores an aspect that has received little explicit and systematic attention, namely, the learning processes, approaches, and results existing across diverse experiences. This is an aspect that this research explores empirically given the lack of research and results on the matter.

Given the embryonic state and the research difficulties of the chosen field of enquiry, the question is: What methodology or methodologies to use to achieve results that constitute a novel contribution and provide significant answers to the questions presented in this research.

2.1 Which Methodology: Qualitative, Quantitative or Mixed?

It is widely agreed that the nature of the research subject deeply influences the type of methodologies to be applied. At the broadest level, there is a choice between quantitative, qualitative and mixed methodologies.

According to Creswell (2003), for example, as seen in Table 1, the quantitative approach is best suited to problems involving (i) the identification of factors that influence an outcome, the utility of an intervention, or understanding the best predictors of outcomes, and also (ii) to test a theory or explanation. It uses close-ended questions, numeric data, and predetermined approaches; and the research practices see the researcher testing or verifying theories or explanations, identifying variables to study, relating variables to questions or hypotheses, observing and measuring information numerically, and other practices listed in Table 1. While the qualitative approach is best suited to gain an understanding of concepts or phenomena that have received little research attention. In this case, exploration is useful and required because it may be the case that: (i) the researcher does not know the important variables to examine, (ii) the topic is new, (iii) the topic has never been addressed with a certain sample or group of people, or (iv) existing theories do not apply with the particular sample or group under study. (p.22) Instead, the qualitative approach uses open-ended questions, emerging approaches, and text or image data, and the research practices see the researcher positioning himself or herself, collecting participants meanings, bringing personal values into the study, studying the context or setting of participants; making interpretation of the data, and other practices shown in Table 1. Finally, in the mixed methods approach the researcher tends to base knowledge claims on pragmatic grounds (e.g., consequence-oriented, problem-centered), employing inquiry strategies that collect data either simultaneously or sequentially to achieve the best understanding of research problems. Not surprisingly, the mixed approach blends method from both quantitative and qualitative approaches: open- and close-ended questions, emerging and predetermined approaches, and quantitative and qualitative data and analysis. Similarly, the research practices involve collecting quantitative and qualitative data, developing a rationale for mixing, integrating the data at different

stages of inquiry, and others. Table 1 illustrates the differences between these three approaches.

Table 1 Qualitative, Quantitative and Mixed Methods Approaches

Tend to or typically	*Qualitative Approaches*	*Quantitative Approaches*	*Mixed Methods Approaches*
Use these philosophical assumptions	Constructivist/Advocacy /Participatory knowledge claims	Postpositivist knowledge claims	Pragmatic knowledge claims
Employ these strategies of enquiry	Phenomenology, grounded theory, ethnography, case study, and narrative	Surveys & experiments	Sequential, concurrent, and transformative
Employ these methods	Open-ended questions, emerging approaches, text or image data	Close-ended questions, predetermined approaches, numeric data	Both open- and close-ended questions, both emerging and predetermined approaches, and both quantitative and qualitative data and analysis
Use these practices of research as the researcher	Positions himself or herself Collects participants meanings Focuses on a single concept or phenomenon Brings personal values into the study Studies the context or setting of participants Validates the accuracy of findings Makes interpretation of the data Creates and agenda for change or reform Collaborates with the participants	Test or verifies theories or explanations Identify variables to study Relates variables in questions or hypotheses Uses standards of validity and reliability Observes and measures information numerically Uses unbiased approaches Employs statistical procedures	Collects both quantitative and qualitative data Develops a rationale for mixing Integrates the data at different stages of inquiry Presents visual pictures of the procedures in the study Employs the practices of both quantitative and qualitative research

Source. Creswell (2003), p.19

Many other authors have addressed the theme of qualitative-quantitative research, mostly highlighting similar elements to those identified by Creswell (2003), or, adding various nuances. For instance, for Winter (2000) quantitative research limits itself to what can be measures or quantified, while qualitative research deals with the unquantifiable, personal, in depth, descriptive aspects of the world. For Punch (2014), the key is given by the type of data the social science researcher uses in empirical research directly experiencing or observing the world. This leads to two basic definitions: in quantitative research the data are in the form of numbers; in qualitative research the data are not in the form of numbers (most of the time, though not always, this means words). This basic feature,

however, is not the full picture differentiating qualitative and quantitative research, because both of them also include their own way of thinking, or approaches, and the design and methods used to represent this way of thinking, and to collect data.

Table 2 shows another comparison between qualitative and quantitative research made by Zikmund *et al.* (2010). Besides the similarities, this comparison draws attention to the element of sampling; pointing out that qualitative research tends to use small samples, often in natural settings, whereas quantitative research tends to use large samples to produce generalizable results. For these authors, "Qualitative research seldom involves samples with hundreds of respondents. Instead, a handful of people are usually the source of qualitative data. This is perfectly acceptable in discovery-oriented research." (Zikmund *et al.*, 2010, p.135)

Table 2 Comparing Qualitative and Quantitative Research

Qualitative Research	***Research Aspect***	***Quantitative Research***
Discover ideas. Used in exploratory research with general research objects	Common Purpose	Test hypotheses or specific research questions
Observe and interpret	Approach	Measure and test
Unstructured, free-form	Data Collection Approach	Structured response categories provided
Researcher is intimately involved. Results are subjective	Researcher Independence	Researcher uninvolved Observer. Results are objective
Small samples – Often in natural settings	Samples	Large samples to produce generalizable results (results that apply to other situations)
Exploratory research designs	Most Often Used	Descriptive and causal research designs

Source. Zikmund *et al*. (2010), p.136

Some studies point out that qualitative research is associated with certain weaknesses as compared with quantitative research. For instance, Blumberg et al. (2014) highlight the fact that qualitative research is "usually much less rigorously structured than quantitative research and, consequently, the researcher is more likely to miss some information. Even by taking the utmost care, the researchers will not be able to note down all the information available; rather, they will choose – subconsciously and deliberately- some of the information provided and neglect other parts of it."

(p.149) This underpins charges of subjectiveness, non-representativeness and non-systematic design. On the other hand, as already seen, a qualitative study is much more likely to obtain unexpected information, compared to a quantitative study since the latter's more structured approach prevents researchers from exploring avenues different from those already prescribed.

Other scholars do not see a dichotomy between qualitative and quantitative methods in scientific research, rather an evolution where any science at the early stages of its development relies primarily on qualitative data and later on, as the science matures, it comes "inevitably to depend more and more on quantitative data and on quantitative tests of qualitatively described relations." (Bernard, 2006, p.25) A similar point is raised by Newman & Ridenour (1998) who caution against the false dichotomy of qualitative versus quantitative, stressing the notion of the qualitative-quantitative research continuum. Thus, we read: "what are known as qualitative methods are frequently beginning points, foundational strategies, which often are followed by quantitative methodologies." (p.9)

Perhaps more relevant for the purposes of this research, another argument against the dichotomy view is the fact that a great deal of research actually uses mixed methods as already in the discussion related to Table 1. It is plausible to think that the actual mix varies with the stage of development and also complexity of the phenomenon under the research. We have seen that the subject matter of this research is clearly positioned at early stages of development of the phenomenon of accelerators and other mechanisms of entrepreneurship diffusion in society. In fact, the use of numbers will be mostly limited to illustrate the trend and quantitative growth of the experience of accelerators and other expressions of the diffusion of entrepreneurship support programs. The bulk of the data and research, however, will be of qualitative nature. This raises the issue of which approaches and instruments are the most appropriate to conduct the qualitative research in this thesis. This is the theme of the next section.

2.1.1 Qualitative research methods

Qualitative research is closely associated to a variety of names and, indeed, approaches that "are all slightly different, but each bears strong family resemblance to the others." (Erickson, 1986,

p119) These “are alternatively called ethnographic, qualitative, participant observational, case study, symbolic interactionist, phenomenological, constructivist, or interpretive.” (Ibid.) The same point is made by Newman & Ridenour (1998) who names ethnography, field studies, grounded theory, document studies, naturalistic inquiry, observational studies, case studies, interview studies, and descriptive studies.

The variety of names and strong family resemblance gives an indication of the lack of standardization and offer of clear-cut methods. Winter (2000) goes as far as to argue that:

> there are no standardized or accepted tests within qualitative research and often the nature of the investigation is determined and adapted by the research itself. There may not be any hypothesis or even any findings as such. Instead the 'validity' of the research resides with the representation of the actors, the purposes of the research and appropriateness of the processes involved. (p.8)

In fact, qualitative research offers multiple approaches and some may be more appropriate than others depending on the specific research study at hand. In his discussion on research methods, Zikmund *et al*. (2010) differentiate three types of qualitative research: *exploratory*, *descriptive*, or *causal*. “Exploratory research provide new insights … and often sets the groundwork for further investigation. … Descriptive research describes the characteristics of objects, people, or organizations. … Causal research is the only research that establishes cause and effect relationships.” (p.16) In practice, these three types of qualitative research are related by the degree of knowledge structuring or development the problem or field of research presents to the researcher. Thus, as anticipated, exploratory studies are better suited to situations where the field of research is emergent and scarcely structured and, therefore, there is a greater requirement for the discovery of ideas, insights, future research tasks and the development of hypotheses or further research questions for deeper understanding. Whereas descriptive research is able to produce descriptions of phenomena or characteristics associated with a subject population (the who, what, when, where and how of a topic), estimates of the proportions of a population that have these characteristics, as well as the discovery of associations between different variables (Blumberg *et al.*, 2014, p.158)

The methodological approach taken by the present research is a mixture of exploratory and

descriptive research: (i) *exploratory* because existing knowledge is not highly structured and in continuous evolution, raising the need for the discovery of ideas, insights and further research questions to gain deeper understanding; and (ii) *descriptive* because there is of necessity an element of description of trends, developments and ways of working in the fields of accelerators, pre-accelerators and inclusive accelerators. An element of quantification will also be found primarily in the graphics illustrating the evolution in the numbers of accelerators over time.

2.1.2 Exploratory/descriptive research techniques

There are a number of techniques for conducting exploratory/descriptive research studies and, as Iacobucci & Churchill Jr., (2010) indicate, "Exploratory studies are characterized by flexibility with respect to the research methods used. They rarely use detailed questionnaires or complex sampling plans." (p.61) Table 3 reproduces the extensive list of techniques found at Blumberg *et al*., (2014). These techniques are also valid for descriptive research studies, with the difference that this type of research poses clearly stated investigative questions or hypothesis regarding the characteristics of the phenomena under research (the who, what, when, where and how of a topic). (Ibid) As can be seen, then, there is a rich set of options for the exploratory/descriptive researcher.

Table 3 Tools for Exploratory/Descriptive Research

- in-depth interviewing (usually conversational rather than structured)
- participant observation (to perceive at first hand what participants in the setting of the experience)
- films, photographs and video tape (to capture the life of the group under study)
- projective techniques and psychological testing (such as a thematic apperception test, projective measures, games or role playing)
- case studies (for an in-depth contextual analysis of a few events or conditions)
- street ethnography (to discover how a cultural sub-group describes and structure its world at street level)
- elite or expert interviewing (for information from influential or well-informed people in an organization or community)
- document analysis (to evaluate historical or contemporary confidential or public records, reports, government documents and opinions)
- proxemic and kinesics (to study the use of space and body-motion communication respectively.

Source. Blumberg *et al.,* 2014, p.156.

Iacobucci & Churchill Jr. (2010) identify a more succinct set of three main techniques: *literature searches*, *experience surveys* and the *analysis of selected cases*. They argue that literature search is one of the quickest and cheapest methods to discover hypotheses since it uses the work of others. The literature search may involve conceptual literature, trade literature, or published literature. It relates to "document analysis" and "secondary data analysis" in Table 3. Experience surveys taps the knowledge of those familiar with the subject being investigated and relate to "elite or expert interviewing" and "experience surveys" in Table 3. Analysis of cases relate to "case studies" in Table 3, since it involves the intensive study of selected cases of the phenomenon under investigation, for instance, to identify "best practices" or "benchmarking" as a source of ideas. Iacobucci & Churchill Jr. (2010) note, however, that although literature searches, experience surveys, and the analysis of cases are important in exploratory research, "when people talk about "qualitative" methods, they usually mean one or more of the techniques shown in Table 4.

Table 4. Usual meaning of "qualitative" methods techniques

- Focus group (a small number of individuals are brought together in a room to sit and talk about a topic of interest to the focus group sponsor)
- Depth interview (one-on-one interview with interviewer building rapport and proceeding through a set of questions intended more as a guide than a structured survey. It allows interviewees to pursue preferred lines of thought)
- Projective technique (involves the use of an ambiguous stimulus (e.g., inkblot) that an individual is asked to describe, expand on, or build a story around)
- Ethnography (involve a prolonged observation of subjects' behaviour, emotional responses, and cognitions during their ordinary daily lives. It often employs observation combined with interviews)
- Observational techniques, including those assisted by mechanical devices (e.g., galvanometers, fMRIs, eye cameras, EEGs, voice pitch analyses) (observation may either in the field or in the lab. It is often more useful that surveys in separating fact from fiction with respect to behaviours, particularly "desirable" behaviours.

Source. Based on Iacobucci & Churchill Jr. (2010)

2.2 Elements of this Thesis' Research Methodology

In essence, this thesis is made up of two major parts. First, a review of trends and developments to reveal the evolution of the general context within which the empirical cases researched in the thesis are unfolding. This contextual analysis will enable a better interpretation of the data gathered in the empirical cases. Second, the empirical part making use of individual and comparative case study analysis involving (i) three leading cases in different European countries and (2) a case of an emerging experience that sees the participation of the author of this thesis. The two parts together are expected to generate evidence and conclusions regarding the main research proposition and associated research themes and questions raised by this thesis.

Each of the two main parts of the research is associated to specific research techniques. These are shown below in Table 5 and are expected to generate all the necessary information to respond consistently to the research challenge posed in the proposal.

Table 5. Blend of Research Techniques to be Applied in the Proposal Research

1. literature search and review
2. semi-structured interviewing for three leading case studies in three different European countries
3. desk research particularly exploring websites and documentation of various experiences
4. active participant-observation focused on the empirical case of the inclusive entrepreneurship accelerator pursued by my own organization, the Fondazione Mondo Digitale
5. activity evaluation questionnaires applied to the participants in the inclusive acceleration activities
6. semi-structured interviews with selected participants in the inclusive acceleration
7. video testimonials and photographs of the experience of the inclusive accelerator

Source. Adapted from elements found in Blumberg et al. (2012) and Iacobucci Churchill (2010)

Let's see in more detail the rationale for the selection of the various research techniques, starting with items 1 in Table 5, *Literature search and review*. As stated earlier, literature search is one of the quickest and cheapest descriptive/exploratory methods to discover hypotheses and deal with well defined investigative questions regarding the characteristics of the phenomena under research. In our case, given the emerging nature of the field of accelerators and pre-accelerators, this method is highly effective to gather multiple views and analyses that provide a base to make sense of the trends and

developments taking place in this field. As seen at the beginning of this chapter, one of the difficulties facing the researcher is the lack of standardization and embryonic state of theorization of accelerators. In this context, a review of literature (including academic papers, books, theses, reports, magazines and websites) is best to try to build a contextual panoramic where to insert later on the analysis of the empirical cases of the study.

Items 2 and 3 in Table 5 are *semi-structured interviewing* and *desk research* for the *case study research* in three different experiences in Europe. It is first important to give the reason for the use of the case-study methodology. Gerring (2007) proposes that a case study "may be understood as the intensive study of a single case where the purpose of that study is – at least in part – to shed light on a larger class of cases (a population). (p.20) In his classical book, Yin (2003) explains that "case studies are the preferred strategy when "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context. (p.1) In this respect cases studies can be explanatory, descriptive and exploratory. He adds that the distinctive need for case studies arises out of the desire to understand complex social phenomena, while retaining the holistic and meaningful characteristics of real-life events such as organizational processes and the maturation of industries. Of course, this would include the emergence of industries or entrepreneurial phenomena such as accelerators.

Besides, as Zikmund *et al.* (2013) pointed out qualitative research tends to use small samples, often in natural settings. Gerring (2007) stresses this point by stating that: "Sometimes, in-depth knowledge of an individual example is more helpful than fleeting knowledge about a larger number of examples." (p.1) In fact, the sample of cases in this research is small, combining three cases using *semi-structured interviews* and *desk research* and one using *action-research/participant-observation* in its natural setting.

As Table 5 illustrates, the preferred methods to gather case study data and information are the *semi-structured interview* and *desk research*. Desk research focuses particularly on the gathering of information, stories, videos, documents, etc. found in the websites of the cases under research;

whereas the semi-structured interview is the most appropriate method to gather original data and narratives from the 3 European cases. A semi-structured interview must be scheduled in agreement with the target interviewee; it is open-ended, unlike the fully structured interview, but follows a guide containing all areas of questioning of interest to the researcher. In this way, the conversation follows a logical order but at the same time allows flexibility for the pursuit of unexpected directions.

May (1991) argues that:

> one-time interviews may be best when access to informants is difficult or when the topic area can be covered readily in one contact and does not require substantial rapport and trust for exploration. … Even if only one interview may be needed, many experienced investigators build in provisions for later interviewing to allow for clarification on points that are unclear to the investigator, for validation as analysis, and for follow-up if the period of study must be extended. (pp.189-190) (see also Bernard, 2006)

This feature is particularly relevant for the research area of this thesis given that, as seen at the start of this chapter, there are significant problems to gather data from accelerators given its emergent nature. In fact, this research confirms the difficulty facing the researcher in trying to establish contact with specific experiences, since there seems to be little interest or little time for interviews seeking to enquiry about the details of the experiences. Fortunately, the three European experiences contacted and researched are rich and diverse and the interviewees are senior actors in each of them. This has allowed for informative semi-structured interviews, as well as leaving open the possibility of follow-up contact for both validation of interpretation and gathering of additional data if necessary. The communication and recording instruments used in the semi-structured interviews where Skype- or Zoom-based video-conferencing and recording, with audio-recording back up, and follow-up by email. In the view of Opdenakker (2006), this accounts for the use of synchronous and asynchronous communication. Synchronous because the interviewing was Skype or Zoom-based "face-to-face" and asynchronous because the follow up was by email.

The methodological items 4, 5, 6 and 7 in Table 5 are devoted to the empirical case of the inclusive entrepreneurship accelerator pursued by my own organization, the Fondazione Mondo Digitale. Given my direct involvement in this case, the methodology makes uses a blend of active

participant observation, *activity evaluation questionnaires*, *semi-structured interviews* with selected participants, and *video testimonials* and *photographs* of the experience. The last three are unproblematic since we have already discussed semi-structured interviews and the activity evaluation questionnaires and video testimonials have been used to get feedback regarding the satisfaction of the participants with the content of various activities.

Active participant-observation requires explanation given the particularity of the researcher's involvement in the emergence and implementation of the inclusive entrepreneurship accelerator program. Participant observation is an approach typically part of ethnographic research,[2] and implies "the researcher becoming immersed in the culture that he or she is studying and draws data from his or her observations." (Zikmund et al., 2010, p.138) In his review of participant observation, Kawulich (2005) refers to various authors who see this method as "the process enabling researchers to learn about the activities of the people under study in the natural setting through observing and participating in those activities." Johnson et al., (2006), however, points out that often the practice of participant observation emphasizes observation over participation, with the researcher acting as a stranger or outsider to the system under study. For this reason, they use the term *active participant observation* for cases when the researcher is actually involved as a participant in the processes under study. This is the experience of the inclusive entrepreneurship accelerator created by the organization I lead as general director.

A final methodological reflection is the generation of theory from the empirical research. Authors in the field of accelerators acknowledge the lack of models or theorization affecting the field due to its emerging status with variegated manifestations in variegated contexts. It is not the purpose of this thesis to develop theoretical models where many other have not been able to do so. In this respect, the thesis intends primarily to contribute further insights into the development process of accelerators and, particularly, offer insights into the novel development of an inclusive

[2] "Ethnography represents ways of studying cultures through methods that involve becoming highly active within the culture." (Zikmund et al., 2010, p.138)

entrepreneurship accelerator. This in turn intends to provide evidence for the proposal or hypothesis that there is an emergent trend and process of evolution towards a wider diffusion of an entrepreneurship culture and learning in society. In this way, we also contribute to the accumulation of groundwork for the eventual development of *grounded theory*, that is, "the discovery of theory from data systematically obtained from social research." (Glaser & Strauss, 1967, p.2) These authors stress the importance of comparative analysis as a strategic method in the generation of theory. Likewise, Stoecker (1991) contends that the case study is particularly useful for developing process theory. All this fits well with the comparative case study analysis adopted in this research. Nevertheless, it is yet to be seen whether the results generated here can overcome the difficulties inherent in the emergent state of the field and current lack of models and theorization.

It is now possible to start with the literature review and analysis.

Chapter 3 Review of Literature

As noted in previous chapters, the research program of this thesis focuses on the apparent emergence of a trend towards a wider diffusion of an entrepreneurship culture and learning in society. This implies the study and analysis of the rise and evolution of startup accelerators and other entrepreneurship support programs, including the incipient development of an *inclusive entrepreneurship accelerator* aiming at the promotion of entrepreneurial culture and learning amongst young people and the school world.

To advance this purpose, the literature review presented in this chapter deals in considerable detail with the characteristics and evolution of accelerators and pre-accelerators, since their experiences have preceded and influenced the inclusive accelerator. Indeed, for the sake of completeness, the review extends back in time to the historical origins of entrepreneurial programs in the form of *the incubator* around the late-1950. The analysis seeks to identify the main differences between these various forms of entrepreneurial programs.

Some of the main questions associated with this review are:

(1) what factors have underpinned the emergence of accelerators and pre-accelerators and even before, that of incubators?

(2) what has been the evolution of accelerators and pre-accelerators? What models do they implement in search of economic sustainability? What are the services they offer to target beneficiaries? What is the evidence of the impact of accelerators and pre-accelerators on the entrepreneurial scene?

(3) what kind of entrepreneurship learning processes take place in accelerators and pre-accelerators?

To deal with these questions and others, the review starts with an introduction to the theme of accelerators, since the rise of these organizations opened the flood of change from prior incubators towards the various new entrepreneurship support programmes, including pre-accelerators and the inclusive accelerator. Thus, the argument first looks at various definitions of *accelerator* found in the

literature. Then, to help highlight the specificity and novelty of accelerators, the argument steps back in history to the origins of entrepreneurship support programmes through incubators and science parks. The discussion then proceeds to the in-depth analysis of the characteristics and workings of accelerators, starting with an overview of accelerators' rapid quantitative growth and geographical spread and the trends that have made it possible. The discussion then concentrates on the working business models of accelerators, including the following aspects (i) organization and stakeholders network, (ii) perceived value by main stakeholders (i.e., startup founders, investors, mentors), (iii) main features of entrepreneurial support programs (i.e., accelerators' processes and mechanisms), (iv) impact and measurements, (v) evolution into vertical and corporate accelerators, (iv) specificity of learning environments and processes.

Then, the discussion passes to pre-accelerators as a preparation process to enhance projects' capacities to apply to accelerators. This opens the way for looking at other support programs casting light on the apparent emergence of a trend towards a wider diffusion of entrepreneurship culture and learning in society. Let us start with the definitions of accelerators.

3.1 Definition of Startup or Seed Accelerators

The rise of startup or seed accelerators is fairly recent, just over a dozen years. The first acknowledged accelerator is the YCombinator born in Boston, USA, in 2005. The following is the way the Y Combinator's website describe the acceleration model:

> Y Combinator (YC) created a new model for funding early stage startups. Twice a year we invest a small amount of money ($120k) in a large number of startups. The startups move to Silicon Valley for 3 months, during which we work intensively with them to get the company into the best possible shape and refine their pitch to investors. Each cycle culminates in Demo Day, when the startups present their companies to a carefully selected, invite-only audience. But YC doesn't end on Demo Day. We and the YC alumni network continue to help founders for the life of their company, and beyond.[3]

Since then, other startup accelerators have followed suit and their presence has spread rapidly

[3] http://www.ycombinator.com/

across many countries. Many formal definitions of accelerators are found in the literature. At its shortest, they are organizations that seek to accelerate the growth or failure of early-stage startups in reaching both investment and the market. For our purposes, however, one of the key elements of accelerators is that, essentially, they are experiential learning programmes of entrepreneurship.

Table 6 collects a number of definitions that, together, provide a more detailed idea of accelerators' purpose and activities. Some definitions see accelerators as a modern manifestation of incubators, insofar as they are entrepreneurship support programs. But accelerators have particular features that differentiate them from incubators, as we shall see later on. Most of the definitions in Table 6 focus on 2 broad aspects of accelerators: (i) services they provide to startup projects, and (ii) business models they implement for economic sustainability. Dempwolf *et al*. (2014) make an explicit distinction between these two aspects (i.e., innovation acceleration as a *program* and innovation accelerator as a *business model*) in their definition of innovation accelerator found below in Table 6. They argue that the business model and value proposition come first and the operational characteristics follow. Thus, "[w]hile the immediate goal of the accelerator is to help their startup companies obtain next-stage funding, their primary long-term goal is to make a substantial profit when those companies are acquired or have successful IPOs." (p.27)

Table 6. Various Definitions of Accelerators

… the accelerator provides financial capital, intensive mentoring, and a shared cohort experience as well as heightened visibility for potential investors. … The top accelerators take a small equity stake in the startup in exchange for a fixed amount of capital (Winston Smith & Hannigan, 2015, p.4)
Accelerators constitute a new incubation model, which has developed into an umbrella term for any programme providing structured mentoring, networking opportunities and access to funding. Funded by a mix of investors, public bodies or large corporates, these programmes typically provide space, money, mentoring and guidance to batches of entrepreneurs to help them rapidly grow and scale their business idea. (Clarysse *et al*., 2015, pp.5&6)
The accelerator model is an exemplar of the recent shift towards a focus on intangible, knowledge intensive, support services in incubation services. An accelerator is an organization, which aims to accelerate new venture creation by providing education and mentoring to cohorts of ventures during a limited time (Pauwels *et al.*, 2016, p.14)
"Startup accelerators support early-stage, growth-driven companies through education, mentorship, and financing. Startups enter accelerators for a fixed-period of time, and as part of a cohort of companies. The accelerator experience is a process of intense, rapid, and immersive education aimed at accelerating the life cycle of young

innovative companies, compressing years' worth of learning-by-doing into just a few months." (Hathaway, 2016b, p.3)
innovation accelerators … [are]… *business entities that make seed-stage investments in promising companies in exchange for equity* as part of a fixed-term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event or demo day. (Dempwolf, Auer, & Ippolito, 2014, p.31)
… they help 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 & Hochberg, 2014, p.4 and Cohen, 2013, p.19)
"Startup accelerators, or seed accelerators, are typically for-profit organisations that foster a physical environment that supports accelerated growth for startups." Deering, l., Cartagena, M., and Dowdeswell, C., Accelerate: Founder Insights Into Accelerator Programs, PG Press, 2014.
Accelerators, short-term incubators that foster technology startups … They bring together cohorts of technology startups in various global locations to help them develop their teams and products and learn from and connect with others in the ecosystem in a limited-duration "bootcamp." Haines (n.d.), pp.1&2
Accelerators are groups of experienced business people who provide services, office space, guidance, mentorship, networking, management services, knowledge, and expertise to nascent firms on an as- needed basis to help them succeed in the early stages of venture life (Fishback, Gulbranson, Litan, Mitchell, & Porzig, 2007). Accelerators assist with building the venture team, fine-tuning the idea, and mentoring the business from idea, prototype, through product development. Accelerators provide intensive, boot-camp training comparable to entrepreneurship classes at the collegiate level (Fishback et al., 2007). Hoffman and Radojevich-Kelley (2012). p.57
Accelerators are organizations that provide cohorts of selected nascent ventures seed-investment, usually in exchange for equity, and limited-duration educational programming, including extensive mentorship and structured educational components. These programs typically culminate in "demo days" where the ventures make pitches to an audience of qualified investors.4 Konczal (2013), p.139
The accelerator programme model comprises five main features. The combination of these sets it apart from other approaches to investment or business incubation: • An application process that is open to all, yet highly competitive. • Provision of pre-seed investment, usually in exchange for equity. • A focus on small teams not individual founders. • Time-limited support comprising programmed events and intensive mentoring. • Cohorts or 'classes' of startups rather than individual companies. (Miller and Bound, 2011, p.3)

Clarysse *et al*. (2015) adds a sixth feature: periodic graduation with a Demo Day/Investor Day.

A brief synthesis of the many points raised in Table 6 highlights that in terms of (i) s*ervices provided to early-stage startups*, accelerators provide working space, pre-seed financial investment, immersive education, mentoring and guidance, shared cohort experience (batches of entrepreneurs), networking opportunities, and visibility with investors who may provide access to further funding. These services are for a limited period of intense activity that culminates in a public pitch event or demo day. The application process for access to these services is highly competitive and, in practice, top accelerators select small venture teams who receive help regarding (i) definition and build-up of their initial products, (ii) identification of promising customer segments, and (iii) attainment of resources, including capital and employees. While in terms of (ii) *business models for economic sustainability*, the services provided are often in exchange for a small equity in the supported startups, although accelerators may also raise funding from a mix of investors, public bodies or large corporations.

Accelerators, however, come in various shapes; they are not a standardized world. For instance, they can be for-profit or non-profit and vary in many aspects such as: amount of stipend, size of the equity taken, length of educational programs, availability of co-working space, etc. They can also vary in terms of organizational affiliation since they may involve venture capital firms or angel groups, corporations, universities, local governments and non-governmental organizations. (Cohen and Hochberg, 2014) At their heart, however, the accelerator experience shares "a process of intense, rapid, and immersive education aimed at accelerating the life cycle of young innovative companies, compressing years' worth of learning-by-doing into just a few months." (Hathaway, 2016b)

Figure 1 shows a diagrammatic view of accelerators features, including operational services (*program package*), and business approach (*funding structure* and *strategic focus* that can be

industrial/sectoral or geographical). Also shown are other features: (i) *selection process* that involves online open call, use of externals for screening, and teams as primary selection criterion; and (ii) alumni network and post program support. (Pauwels *et al.*, 2016) This shows that there is much more to the discussion of accelerators than we have seen so far. In fact, as anticipated in the introduction above, this paper will delve in much greater richness and depth into the variegated world of accelerators. Prior to this, however, the argument steps back in history to the origins of entrepreneurship support programmes, particularly, in the form of incubators, with a view to highlighting the novel aspects distinguishing the new breed of accelerators.

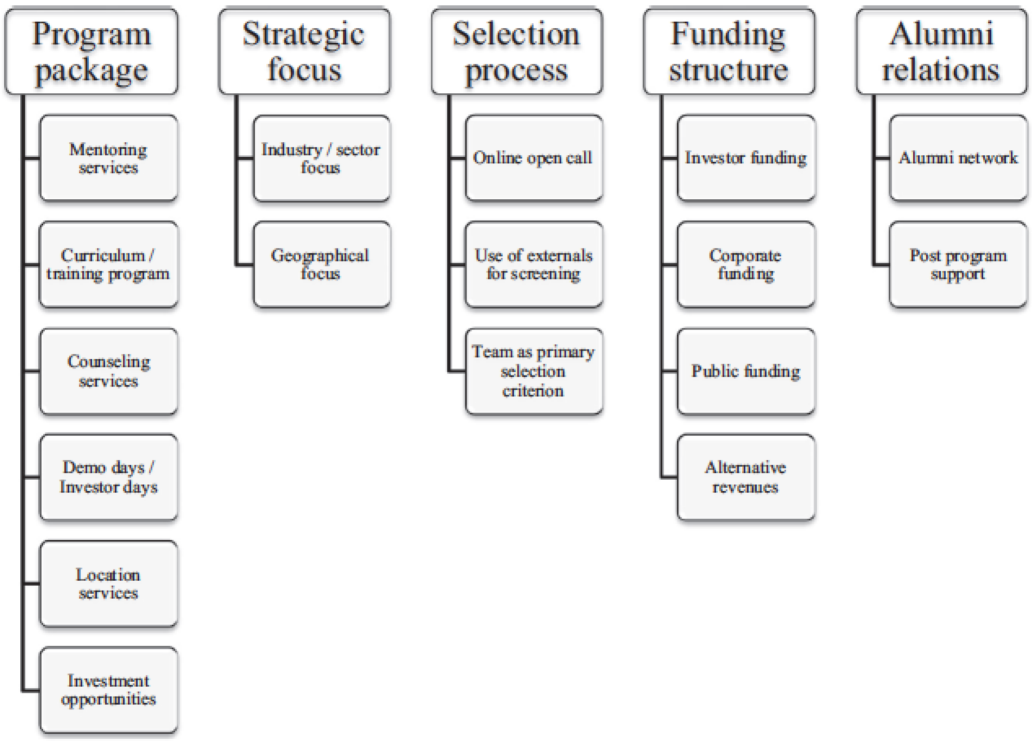

Figure 1. Accelerators' Design Elements and Constructs

Source. Pauwels et al. *(2016), p.17.*

3.2 Early Evolution of Entrepreneurship Support Programes: Incubators, Science Parks, etc.

Accelerators have a long pre-history associated to incubator programs fostering the birth and growth of enterprises, often, as part of economic development policies. The simplest definition of incubator is: a protected environment to incubate new companies' growth. In practice, incubators have rented space and provided seed funding to nascent companies and have also offered other

services such as networking and mentoring. One problem associated with incubators is that, often, the incubated companies have not been able to succeed quickly enough to be able to leave the protected environment in a short period of time; they have thus remained at the incubator. This has weakened the reputation of incubators and their popularity has declined since the nineties (Wu, 2011a), opening the way for the rise of the startup accelerator. Some authors do not see startup accelerators as a complete break from incubators, they rather see them as new forms of incubators; other authors identify significant diffferences between the two. It may all depend on the broadness of the definitions adopted. If one stops at broad definitions then the difference tends to disappear. For instance, Caley and Kula (2013) pick the definition of business incubator from Statistic Canada: "…a business unit that specializes in providing space, services, advice and support designed to assist new and growing businesses to become established and profitable." (p.6) They argue that it is broad enough to encompass accelerators since they both share the goal of assisting new and growing businesses. In fact, it is not just a matter of shared goals, it is also a matter of shared services. For instance, the definition by Pauwels *et al*. (2016) underscores that an incubation model "includes at least four of the five following services: (1) access to physical resources, (2) office support services, (3) access to capital, (4) process support, and (5) networking services … with a primary focus on overcoming the participating venture's liability of newness, and hence improve its survival rate." (p.14) These services may also be seen as part of accelerators. Even if the details of an incubator's definition are further extended to include the characteristics of its operational networks, one can still see similarities with accelerators. For instance, Hackett & Dilts (2004) defines a business incubator as:

> … a shared office-space facility that seeks to provide its incubatees (i.e. ''portfolio-'' or ''client-'' or ''tenant-companies'') with a strategic, value-adding intervention system (i.e. business incubation) of monitoring and business assistance. This system controls and links resources with the objective of facilitating the successful new venture development of the incubatees while simultaneously containing the cost of their potential failure. … 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. (p.57)

Again, as we shall see, these network characteristics are valid for accelerators too. Where does the problem lie then? Some authors argue that the conceptual overlaps between accelerators and incubators rests mainly on the lack of broad consensus in the emerging academic literature regarding what defines an accelerator; as a result, some researchers use the term accelerator while actually describing incubators (Barrehag et al., 2012; Bliemel et al., 2016)

Mian *et al*., (2016) is a more sophisticated example of the general use of the term incubator. They use the term Technology Business Incubators (TBIs) to encompass various forms of entrepreneurship support programs, such as technology/business incubators, innovation/technology centers, science/research/technology parks and business/seed accelerators. TBIs are described as property-based initiatives providing venture support infrastructure such as business services, networking, access to professional services, university resources and capital. In short, they link technology, know-how, entrepreneurial talent and capital. Inside this variety of "incubator" initiatives, accelerators are described as fixed-term, cohort-based TBIs providing a combination of services that are difficult and costly for entrepreneurs to find and obtain. These include education and mentoring for start-up teams, exposition to former entrepreneurs, venture capitalists, angel investors, and corporate executives, and preparation for public events in which they pitch their businesses to large groups of potential investors. The problem with such a diversity of programs is that it is very difficult to arrive to common "definitions, criteria for evaluating effectiveness, determination of how much value TBIs add, and determination of key success factors. … Therefore, the major challenges for research on Technology Business Incubators (TBIs) is the lack of an agreed upon definition and unified theory." (Ibid., p.2)

Mian *et al*. (2016) have distinguished three waves in the evolution of TBIs. The first wave begins with the birth of both: the Stanford Research Park, California, in 1951, and the Industrial

Center in Batavia, New York. The latter is acknowledged as the very first incubator.[4] At first, incubators provided low-cost space and a set of shared services to growing companies. As the concept evolved, services extended to training, mentoring, access to networks and help with raising investment. (Telefonica/O2, 2014) This first wave goes until 1980 and is dominated by incubator programmes and research/science parks providing affordable space and shared services, mostly aiming at economic development, real estate restructuring and job creation. By 1980, there were 20 research parks and 11 business incubators (Mian et al., 2016)[5]

The second wave starts in 1980 and unfolds through the eighties and nineties. Figure 2 shows the growth of incubators, science parks and accelerators in the US during this period. The growth of incubators is quite strong reaching over 600 by the year 2000, whereas research parks reach less than 200. In the process, the research/science park model evolved from a stand-alone technology garden to a networked commercialization enabler. In turn, incubators offered more services, including counseling, skills enhancement and networking.

Figure 2 also shows the third wave that started in the year 2000 and extended until 2014, thus including the end of the diagram's timeline in 2012. This period sees the rise of multi-purpose science/research parks, specialized incubators, innovation centers integrated in parks and, also, accelerators. The largest number is by far that of incubators with over 1,250 in the US by 2012 (the

[4] Barrow (2001) tells the story of the accidental birth of the Batavia incubator. "In 1959 the heirs of a prominent New York family business, Charles Manusco & Sons, had bought another building … a huge multistory structure amounting to 850 000 square feet. The building dated from 1882 … had been vacant for a few years, and much of its massive roof needed replacing. The cost of restoring the property would have dwarfed the $180 000 purchase price. Joseph Manusco … concluded that the property would be impossible to rent to a single tenant. He decided on a revolutionary strategy. He would partition the building and lease it out in small pieces, hoping to find enough tenants to turn a potential white elephant into a money-making proposition. … His first tenant, a sign painter, took 2000 square feet and by the end of the first year he had between 20 and 30 tenants taking 90 000 square feet." (p.11) Manusco is also credited with having invented the term 'incubator,' again very much by accident. "One of his early tenants, a company from Connecticut, incubated chickens. Soon after the firm's arrival, Mancuso would joke that he was incubating chickens, when asked what he was doing with his building. From there it was a short leap before his venture was know as business incubator. (Ibid.)

[5] Brown (2001) suggests that what is considered by some the first modern incubator was formed in 1980 at Troy, a city of 55,000 people located along the Hudson River east of New York. Rensselaer Polytechnic Institute (RPI) "began a networking programme that linked students and faculty entrepreneurs. Business people came to speak about what was required to launch a business. Students were paired with businesses in their areas of technological expertise so that they could gain first-hand knowledge of how businesses function. The students and professors began to launch their own companies and RPI's incubator project grew in leap and bounds.' (p.13)

estimated amount worldwide was around 7,000),[6] whereas science parks peaked around the mid-2000s and then declined slightly remaining around 200. In turn, the accelerator curve begins to climb up from the mid-2000s, following the emergence of the YCombinator in Massachusetts in 2005. As we shall see, the accelerator as a new form of TBI is associated to the digital economy and address the key challenge faced by traditional incubators – 'the life support trap', that is, the long dependence of incubated companies on the support of incubators programs. (Mian *et al*., 2016, p.6)

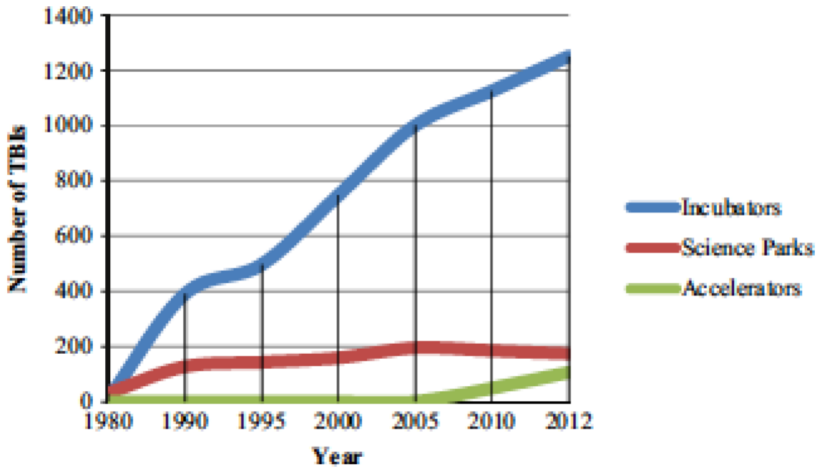

Figure 2. Growth of US TBIs

Source. Mian et al. (2016), p.3

The identification of the three waves reveals that, in spite of the umbrella name of Technology Business Incubator (TBI), there are differences not just in the services offered by incubators over different periods of time but, also, between incubators and accelerators. And the difference would not be that much in the goal they pursue, but in "how" they pursue it. (Caley & Kula, 2013) Amongst others, this would involve use of time, space, ownership of the operations and mechanisms for money-making.

In terms of time and space, for Bliemel *et al*. (2016) the "basic operating model for incubators

[6] In 2011, the National Business Incubation Association (NBIA) reported 1,900 members in 60 countries, including for profit, nonprofit, economic development, and government incubators. They provided office space, financial, technical, managerial support, and access to investors. Other authors reported that in the year 2005, 2,007 incubators assisted 27,000 start-up companies, created more than 100,000 jobs, and generated revenue of $17 billion. (Hoffman & Radojevich-Kelley, 2012)

has remained largely the same: maximizing occupancy of the shared office by offering discounted rent and professional services." (p.10) Fehder & Hochberg (2014) agree: "Incubators are primarily real estate ventures, offering startup co-working space at reduced rent." (p.8) Tenant's residence time varies from 1 to 5 years, mostly because the survival of the incubator depends on the survival of the tenants. As seen, later-generation incubators have added a variety of services to the basic occupancy model, for instance, mentoring, coaching, and access to capital by providing referrals to potential investors, lead customers and strategic partners. In contrast, from the definitions listed in 6, it is possible to see that accelerators offer limited fixed-time occupancy, in some cases up to three months only. The reason is that "incubators tend to nurture nascent ventures by buffering them from the environment to give them room to grow …, whereas accelerators speed up market interactions in order to help nascent ventures adapt quickly and learn." (Cohen, 2013, p.21) The result is less co-dependence between startups and accelerators, with teams having to face more quickly the mechanisms of market selection. (Ibid.)

In terms of type of organization, according to the National Business Incubation Association (NBIA), 93% of all incubators are non-profit organizations focused on economic development, and roughly a third are affiliated with a university. (Cohen, 2013) In contrast, accelerators are typically for-profit operations relying little on government funding, although the motivation of founders may also be community-oriented. For example, the founders of TechStars, one of the best known and successful accelerators tell that "they started their company to help provide the assistance that they could not find when they were starting ventures as entrepreneurs … their motivation was to "give back" to the entrepreneurial community." (Hoffman & Radojevich-Kelley, 2012, p.57) The forprofit/nonprofit models relate directly to the way the two types of organizations make money and provide financial support to the startup companies they serve. Accelerators generally take equity in their startups in exchange for providing entrepreneurs with their services, including a modest sum of startup funding. Instead, business incubators generally do not take equity or invest in their startups, charging them for rent and services. (Christiansen, 2009a; Dempwolf et al., 2014) As Cohen (2013)

notes: “It is telling that ventures in incubators are called tenants, while those affiliated with accelerators are called portfolio companies.” (p.22)

Other operational differences between incubators and accelerators include:

(i) leading accelerators have a highly competitive process of application and selection with very low acceptance rates; they attract applicants from a very wide catchment area;

(ii) accelerators take cohorts or batches of startup teams that enter and exit the program together; during the limited time together, venture teams are expected to interact, network and support each other; the cohorts (usually once or twice a year) involve a much larger number of startup teams than those of a typical incubator accepting and graduating new ventures on an ongoing basis;

(iii) accelerators offer a much faster and intensive development experience than that offered by incubators. (Malek *et al*., 2014, p.27) This experience ends up at a specified time with graduations “marked by “demo days,” where venture founders pitch their businesses to large audiences of potential investors.” A perceived advantage of the limited duration of programs is that it facilitates the assembling of mentors, guest speakers, and other resources for the ventures.

(iv) the development experience offered by accelerators is a rich and concentrated learning process on entrepreneurship. It blends formal and informal activites such as seminars and mentorship and constitutes a major attraction: “intense mentorship and education are cornerstones of accelerator programs and often a primary reason that ventures participate.” (Cohen, 2013, p.23) Incubators were not conceived to offer such an experiential education and learning.

Various authors have constructed Tables aimed at showing the differences between accelerators and incubators. Table 7 below synthesizes and adapts the categories found in these tables. It highlights in a snapshot the difference between accelerators and incubators, paving the way for a more detailed

analysis of the characteristics of accelerators. First, however, it is worth remembering that incubators have evolved considerably, in many respects approaching the services offered by accelerators. In fact, a hybrid version is identified by Hathaway (2016a, 2016b) with the following features: startup support of 3 months to 2 years duration, no cohorts, can invest and can also be non-profit, selection is competitive and ongoing, focus on early stage ventures, apply various incubator and accelerator practices, provides expert staff support and some mentoring, and startup teams locate on-site. The blurring that has accompanied this evolution towards hybridity has been the cause of much confusion, particularly because the phenomenon of accelerators is recent and, as we shall see in the next section, has not yet developed a well-defined theoretical understanding.

Table 7. Comparison Between Accelerators and Incubators

Categories	***Accelerator***	***Incubator***
Duration	Intensive support over a limited time frame, with a fixed number of intakes per year. Generally 3 – 6 months	Longer, less intensive period of support, with rolling admissions and no formal cut-off point. Generally 1 to 5 years (33 months on average)
Cohorts	Yes	No
Business Model	For-profit; can also be non-profit Pre-seed investment ($18K -25K) in return for equity (4 to 8 percent); some charge program fees but increase their investment; help to attract investment	Non-profit; most charge rent or membership fees; usually do not have funds to invest directly and do not take equity, but provide help to attract investment through networks
Clients	Early venture stage; web-based, mobile apps, social networking, gaming, cloud-based software, etc.; firms that do not require significant immediate investment or proof of concept; primarily youthful, often male technology enthusiasts, gamers, and hackers	Early or late venture stage; all kinds, including science-based businesses (biotech, medical devices, nanotechnology, clean energy, etc.) and nontechnology; all ages and genders; includes those with previous experience in an industry or sector
Selection Process	Competitive, cyclical selection of firms from wide regions or even nationally (or globally)	Competitive selection, mostly from the local community; Cohen (2013) considers them non-competitive
Workspace	Offer workspace for limited periods; Ventures locate on-site	Long-term office or lab space with state-of-the-art facilities is usually a central part of the package; ventures locate on-site
Education	Greater emphasis on training, seminars and intense mentorship	Ad hoc, human resources, legal, etc. Minimal, tactical mentorship

Services	"Fast-test" validation of ideas, opportunities to create a functioning beta and find initial customers; linkage of entrepreneurs to business consulting and experienced entrepreneurs in the Web or mobile apps space; assistance in preparing pitches to try to obtain follow-up investment	Offer access to management and other consulting, specialized intellectual property and networks of experienced entrepreneurs; helps business mature to self-sustaining or high-growth stage; helps entrepreneurs round out skills, develop a management team and, often, obtain external financing

Source. Adapted from Telefonica/O2 (2014), p.9; Dempwolf *et al*. (2014), p.10; Cohen (2013), p.20; Hathaway (17 February 2016a) & (Hathaway, 2016b)

3.3 Startup Accelerators In-depth Analysis

This section deals in greater depth with the characteristics and workings of accelerators, including:

- Accelerator's ecosystem: constituents, value flows and organization
- Accelerators' entrepreneurial cycle of activities
- Accelerators' sustainability models
- Accelerators' impact measurement
- Evolution of accelerators

As noted earlier in Chapter 2, accelerators are a recent phenomenon and many questions regarding their operation and impact are open. Indeed, the evidence generated by the recent experience of accelerators is rather limited to allow a definitive judgement about their effectiveness and impact on both companies and communities. Thus, "**…** scholars understand relatively little about how accelerators might shape the trajectories of new startups relative to other early resources, such as angel investor groups." (Winston Smith & Hannigan, 2015, p.1) In the same vein, regarding the broader community level, "[m]uch research needs to be done to better understand the effectiveness of these programs and the broader impact they have on startup communities—particularly as national and regional authorities look to them as tools for economic growth." (Hathaway, 2016a)

Nevertheless, despite the mentioned limitations and warnings, the next section seeks to provide further details on the organization, workings and evolution of accelerators.

3.3.1 Accelerator's ecosystem: constituents, value flows and organization

Figure 3 illustrates the main components of an accelerator programme's ecosystem. The key constituents are the startups, the investors, the mentors and the accelerator's organization.

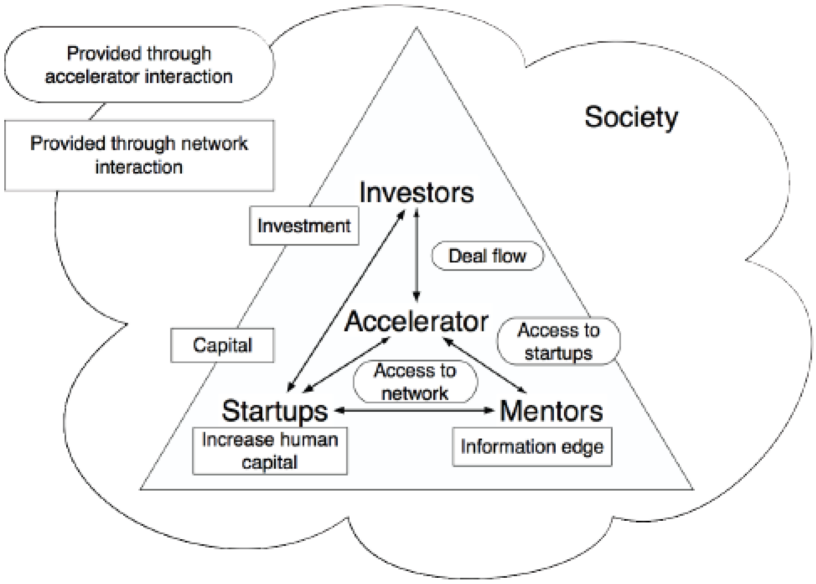

Figure 3. Main Components of an Accelerator's Ecosystem

Source. Barrehag *et al.* (2012), p.47

A variety of value flows are identified involving the different constituents. Later on, the paper examines these value flows in detail. At this point a quick glance suffices. In principle:

- Startups benefit with access to investors, mentors and networks from Accelerators
- Startups benefit with investment and capital from Investors;
- Startups benefit with information, increased human capital and access to networks from Mentors;
- Investors benefit with access to startups and potential deals from the Accelerator;
- Investors benefit with potential financial gains from successful Startups;
- Mentors benefit by contributing and associating themselves to the success of startups and by having access to networks; they also benefit from the Accelerator's matching of their expertise to suitable startups;
- Accelerators benefit from all the flows identified above to achieve consolidation and

> sustainability. The key is to maintain a constant flow of high-quality startups and this will depend above all on the quality of mentors, brand reputation, and networking opportunities offered. (Knott & Haguewood, 2016)

Other accelerator's stakeholders include corporate partners, alumni networks, pitch trainers, and investors may be, for instance, angel investors providing early stage capital, or, venture capitalists providing follow-on or growth capital. (Ibid.) It is worth underscoring that most accelerators are small organizations made up of the founders and a few employees receiving wages. For instance, "Canadian accelerator programs, whether for-profit or not-for-profit, typically consist of one or two general managers or executive directors and a small staff responsible for operations, marketing/publicity and stakeholder management." (Caley & Kula, 2013, p.14) Mentors are not formal employees and receive no payment (sometimes they receive a small compensation). This small team is entrusted with taking forward the accelerator's operation, managing and coordinating the daily operations (including marketing) and maintaining the network of mentors and investors. (Barrehag *et al.*, 2012)

Let us see in more detail the perceived benefits or value accruing to accelerators' main constituents: startup founders, investors and mentors. Their alignment is the key to an accelerator's business model for sustainability.

3.3.1.1 Startup founders' perceived value of accelerators

For Wu (2011b), startup accelerators can contribute four important resources to startups' growth:

(1) *development of human capital* through the pursuit of a variety of educational activities for the teams of accelerated startups; this education can be formal (e.g., training in finance, marketing, etc.) or informal (e.g., discussions with mentors, coaches, people from other companies, etc.);

(2) *reduction of search costs* through the accelerators' networking activities aimed at connecting startups with a variety of relevant actors such as mentors, investors, technical people,

other entrepreneurs; startups simply enjoy the connections available, and the richer and higher-quality the accelerators' networks, the greater the opportunities at hand for the startups. One important result is that founders get "the chance to meet people in the tech industry, both from successful startups and in larger tech businesses and get feedback on their product and company." (Miller & Bound, 2011, p.26)

(3) *signaling to market* through the reputational effect generated by the approval of a startup business idea by an accelerator with a highly competitive and rigorous selection process; the higher the accelerators' reputation and entry competition, the greater the signaling effect and hence, perceived of value, for the startup; another positive signaling effect comes from having a strong name in the company's board;

(4) *reduction of cost of capital* through the provision of funding generally less than $75k, roughly the level of angel investors; the amounts vary, for instance, the original Y Combinator makes small investments of $20K or less in exchange for a small equity that may go from 2% to 10%. Other accelerators provide larger sums and some such as MassChallenge ask for no equity in return for their funding that, mostly, comes from sponsors which includes government agencies, large corporations, universities, and law firms. (Wu, 2011b). To a large extent, the investment model accelerators apply to their startups depends on their own funding model. If the accelerator needs to fund itself through its services, then they will normally take equity from the companies they support. Regarding funding, however, research by Miller & Bound (2011) found that people who had been through accelerators' programs considered the amount of money on offer valuable but not the most important part of the package. A similar finding came from a study involving Canadian startup accelerators: "none of the accelerator directors interviewed identified their program's investment in or funding of startups as a benefit." (Caley & Kula, 2013, p.9)

Christiansen (2009) conducted a research to determine what service or factor startup founders valued most from a seed accelerator. The result gave top marks (average score of 8.51 on a scale of 1-10) to "connections to potential sources capital." For the author, this means that founders are having

their long-term interests in mind since "[g]etting connected to potential investors maximizes a startups survivability by helping ensure funding is available when required." (p.15) A related point is that accelerators' events get a lot of investors in the same place, something that is a rare opportunity for new ventures. (Miller & Bound, 2011) Next in popularity was voted "brand reputation" (average score of 7.83 on a scale of 1-10), a factor that a startup can leverage throughout its life for validation, marketing, fundraising efforts and positive press.[7] For the author, it demonstrates that there is a lot of value in the strength of the community built around the seed accelerator program. He highlights the role of alumni networks: "The alumni network enables startups to quickly gain early adopters of new technology since founders experiment and test each others' products. This early feedback and adoption helps founders improve their own companies, and is related to the size of the alumni base." (Christiansen, 2009, p.13)

A different study argues that startups' expectations of support (above and beyond the expected financial support) are primarily intangible and related to network and skill development. In this respect, it was found that the "the top three types of impact due to receiving support were (i) finding a product-market fit, (ii) increasing revenues, and (iii) follow-on investment." (Bliemel *et a*l., 2016, p.5)

Another view of perceived value accruing to startup founders emphasizes "efficiency" (related to "cost reduction"). Founders can find and get in a single place services and functions that are individually costly to search and obtain. These include seed investment, value-added mentorship and advice, co-working/co-location with other startup ventures, introduction and exposure to capital, network building, opportunity to pitch to multiple investors, and friendship with other companies. (Caley & Kula, 2013; Fehder & Hochberg, 2014) The value of co-working/co-locating peer startup ventures is a particular result of accelerators; thus, "by spending time in the same building or meeting

[7] "Founders identified the fact that once accepted onto a programme you've been vetted by a group of successful founders and investors as a major benefit, whether with journalists, investors or potential clients. It helps to be able to say that you've been selected as a 'promising startup' by an accelerator programme. (Miller & Bound, 2011, p.27)

each other regularly over the course of a few months founders spoke of the value of getting to know their accelerator peers to a level where they could provide each other with meaningful support." (Miller & Bound, 2011, p.28) Overall, such advantageous situation may help increase the startup's leverage in relation to potential investors.

Testing "focus and commitment" is yet another factor emerging from interviews with founders reported by Caley & Kula (2013). Thus, "[t]he most common reason for joining an accelerator given by interviewed entrepreneurs was the opportunity it offered to ensure—and test—the commitment of all members of the founding team to the venture. Participation in most accelerator programs interviewed requires a full-time commitment from all founding team members and the cessation of part-time or full-time studies or work outside the venture." (p.8) Undoubtedly the limited and intensive time of an accelerator's program motivates and requires total commitment. And this pressure and discipline is appreciated, as Miller & Bound (2011) also report: "[a] number of founders told us that one of the things they got out of an accelerator programme was a deadline and basic framework for getting there." (p.28)

The limited duration and structuring of accelerator's programs has an additional valuable aspect for participants in the startup batches taking up the programs. In particular, the young ventures are encouraged to engage in a frequent dialogue with accelerators' directors, thus facilitating faster learning and adaptation. (Cohen & Hochberg, 2014)

Last but not least, a peculiar perceived value provided by accelerators is "acceleration to failure," or, as Dempwolf *et al*. (2014) calls it "successful failure." The reason is that:

> A startup may not last more than a few months; however, if this quickly demonstrates that its idea was not viable, it conserves resources for other ventures. … From the accelerator's perspective, it helped the startup and investors avoid going down an unprofitable path, and the accelerator could devote resources to helping the startup redesign the venture or develop a new venture that would be more successful. From the startup's perspective, the accelerator helped identify areas of weakness that could have resulted in a failed enterprise with potentially severe financial consequences. (p.28)

Winston Smith & Hannigan (2015) calls the experience of failing: "exit by quitting" and argue that two features of accelerators favor the likelihood of learning to quit. First, the intensive mentoring

experience with entrepreneurs who know about failure and are willing to share the lessons with startup founders and, second, the intensity of the cohort-based experience that provides founders with the opportunity to compare with a group of peers going through a similar experience. Indeed, they have compared the performance of accelerators with that of groups of business angels and find that "startups going through a top accelerator experience significantly quicker exit outcomes through acquisition and through quitting relative to those in angel groups." (p.3)

To avoid this section giving the impression that accelerators' perceived value is in fact widely-diffused effective (realized) value across all accelerators, it is worth reproducing the following conclusion from Hathaway's (2016a, 2016b): "…accelerators can have a positive effect on the performance of the startups they work with, even compared with other key early-stage investors, such as leading angel investment groups. However, this finding is not universal. So far, positive effects have been only attributed to leading accelerators. Outside of those, the impact of participation in an accelerator may be ambiguous—or perhaps even negative."

3.3.1.2 Investors' perceived value of accelerators

The perceived value of accelerators for investors has multiple aspects. Fehder & Hochberg (2014) identify a dual function: "deal sorter" and "deal aggregator." As "deal sorters," accelerators attract and screen a large population of applicant startups, sorting out high-potential candidates for investment; as "deal aggregators," accelerators locate these high-potential candidates in a single place, thus helping reduce investors' costs of searching for opportunities, particularly in smaller regions. More broadly, the value for investors is not just in the pool of investable companies accelerators create through their screening, sorting out, and aggregation, it is also in the concentrated stream of mentors and strategic resources accelerators provide to these startups to favor their development. (Miller & Bound, 2011)

Cohen (2013) identifies another accelerator's function related to risk reduction for investors, thus, "[t]he accelerator format helps investors select firms by combining the funds of many investors, enabling accelerators funds to spread risk across more portfolio firms. Thus, the accelerator serves as

a real option for investors, enabling them to learn about a batch of ventures before taking a larger financial stake in them." (p.24)

It is also important to note that investors often serve as mentors for startups and some serve as accelerator managers, roles that gives them privileged, early access to the process of startup development, including business plan, team dynamics and progress during the acceleration program. Moreover, during the final demo day investors can see the complete batch of startup ventures pitching their projects. This allows them to compare and take better-calibrated decisions. (Ibid.)

All the abovementioned factors brought together within a structured program of limited duration are largely responsible for the assembling of impressive groups of local, regional, and other investors by successful accelerators. (Cohen & Hochberg, 2014) These investors, however, show a certain characteristic: they are closer to business angels and small-scale individual investors who can take advantage of accelerators' focus on early-stage tech startups, particularly software startups, where the costs of entry are much lower than for capital-intensive industries. (Pauwels *et al*., 2016)

In sum, the accelerator-investor relation of mutual benefit is key to the success of the operation. In fact, for some, "[it] could be argued that the investor-accelerator relationship where the accelerator provides a service to the investor is the most important relationship in the stakeholder network of the accelerator." (Barrehag *et al*., 2012, p.47) Investors are fundamental to attract startup ventures and accelerators present investors with qualified investment suggestions. (Ibid.)

3.3.1.3 Perceived value of accelerators for mentors and other stakeholders

The perceived value of accelerators for mentors has not been as documented as the value of mentors for accelerators, particularly because most of the time they receive no payment (sometimes a small compensation). Earlier, it was said that mentors benefit by contributing and associating themselves to the success of startups and by having access to networks; they also benefit from the accelerator's matching of their expertise to suitable startups. It may not sound as much but mentors' commitment is certainly facilitated by the short duration of accelerators' programs as they can more easily decide their participation. (Cohen & Hochberg, 2014)

Miller & Bound (2011) ask: who else benefits from the accelerator programs? Their answer also includes large technology firms and service providers (e.g., accountancy firms, law firms, PR firms). The firms would benefit from (i) talent scouting for new employees, (ii) new customers for their platform and services, and (iii) associating their brand with supporting new businesses. In turn, service providers would benefit from new customers in the form of the startups the accelerators support. More generally, these authors see accelerators as benefiting the local communities in which they operate: "The connections they create have a positive effect on the local ecosystem in which they operate, providing a focal point for introductions and building trust between founders, investors and other stakeholders." (Ibid., p.3) A similar conclusion is reached by Barrehag *et al*., (2012) in their discussion on accelerators and sustainability. They argue that "accelerators are clearly contributing to a more socially sustainable society by employing an altruistic network of mentors to educate and help to develop the ideas of the next generation of entrepreneurs." (p.59)

Having looked at the perceived benefits of accelerators' programs for their diverse stakeholders, it is now pertinent to start looking at the dynamics of these programs, or, more precisely, at the dynamics of the cycle of recurrent activities implemented by accelerators.

3.3.2 Accelerators' entrepreneurial cycle of activities

The dynamics of accelerators' cycle of activities has received a great deal of attention given their recurrent, customised, and time-limited character. Although the specific content of the activities may differ, there is a consensus that all accelerators tend to go through similar phases. NUMA (2012) identifies three distinct phases: (1) set-up, deal flow and selection, (2) kick-off of the program through to demo day and (3) follow-on investments and exits. In turn, Barrehag *et al*. (2102) identifies 5 phases: (1) awareness, (2) application, (3) program, (4) demo day and (5) post demo day. Figure 4 and Table 8 synthesise the contribution of various authors on the main phases implemented by accelerators' programmes from awareness or promotion to graduation and post-accelerator development. They distinguish six phases: Awareness, Application, Team Selection, Programme, Demo Day, Post demo Day.

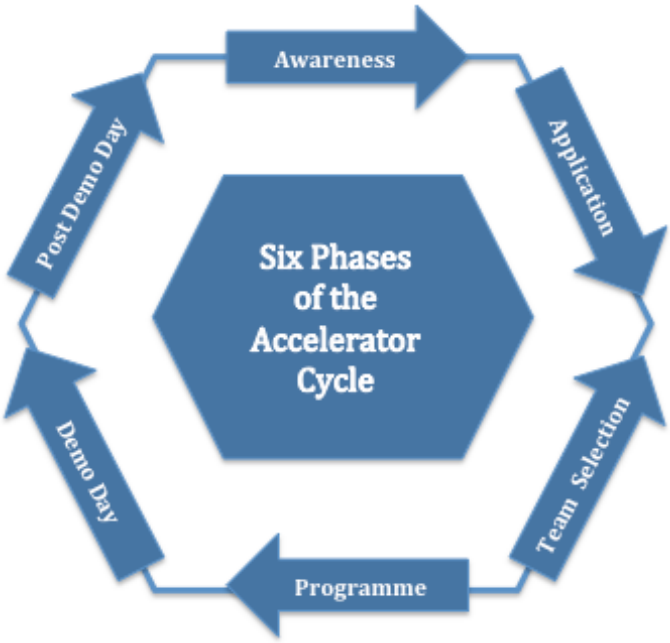

Figure 4.Phases of Accelerator Cycle

Table 8. The Accelerator Cycle

Awareness	The accelerator programme is advertised widely through networks and social media, and through events and well-known mentors. They need to stimulate a large number of applications to increase the chance of having high quality teams.
Application	Startup teams apply for the program, usually by filling out an online application and sometimes attaching a video presentation that enables a more thorough presentation and evaluation of the team (applications by single individuals are discouraged and teams should not be very large). Paperwork is kept to a minimum and anybody can apply, usually from anywhere in the world. Accelerators may receive hundreds or even thousands of applications for a few places. They may also be proactive in searching and recruiting startups rather than accepting only previously unknown applicants.
Team Selection	Increasingly, the selection process is highly rigorous and longer than a one-time interaction, involving pre-screening (first cut), meetings, final pitch and Q&A session. The reason is that the result of this process is most likely to influence significantly the outcome of the acceleration programme regardless of the content of the programme. Even so, the time from closing of application to decision is often shorter than that of other routes to funding. For top accelerator TechStars, for instance, the time is just six weeks. The evaluation uses expert judgment to choose the most promising teams and criteria tend to value highly the composition of teams, the vision, and increasingly the state of development of the product. Teams should be highly motivated to work hard and learn a lot together no matter the working pressure. Qualities valued are: resourcefulness, multi-disciplinary, passion, dedication, openness to criticism and change, adaptability. In Canada, for instance, accelerator directors associate the ideal startup founders with: “X factor,” “hustler mentality,” “hunger,” “tenacity” and a “willingness to pivot.” (Caley & Kula, 2013) Ambitious, global and disruptive visions are preferred. Increasingly,

	products should be in an advanced state of development with a solid prototype and preferably users or a few customers. Nevertheless, a selection process cannot completely ensure that all teams will perform successfully; this can only be know in practice as the teams engage in the acceleration programme. Selection rates are low, under 10% in many programs. For high profile accelerators, the rate of successful applicants can be lower than 1%. Several startup teams are selected to enter the acceleration program as a cohort.
Programme	Accelerator programmes provide support for a limited period of time to a selected cohort of startups, usually varying between three and six months, but it can also be seven weeks. Private accelerators also provide seed funding in exchange for equity (this will be discussed in greater detail below). The short time span is partly linked to the decreasing length of time it takes to launch a web startup, but it also creates a high-pressure environment to encourage participants to maintain a rapid pace and a clear set of targets. On the other hand, it is expected that as seed accelerators expand outside of web applications to produce physical products, it will be more difficult to reach the development and pitching of a product prototype, say, within 3 months. During the period of the programme, startup teams engage in education and networking and focus on developing their products and market capabilities in frequent direct contact with experienced founders, investors, mentors, and other relevant professionals. They also benefit from the peer support they provide to each other within the cohort, for instance, in terms of technical or presentation feedbacks. A variety of activities translate the rich environment into effective support, for instance, introductions to thematic sessions with mentors who present their ideas/experience and spend time with teams, giving them honest feedback on a one-to-one basis. This activity also gives teams a chance to create fruitful relationships with mentors who could even join an advisory board over time. Another activity is structured events presenting highly-relevant themes to startup teams such legal and tax advice, or pitch practice. [8] One model used for a three-month period is the shape-build-sell program: first month dedicated to shaping the idea and interacting with mentors. Then comes the building step and the focus is on developing the product. The last step, sell, is important for the startup's chances of getting funding and includes the refinement of pitching and presentation skills to face the investors.
Demo Day	It is the culmination of the programme, giving startups the opportunity to meet with investors, mostly VCs and business angels. It is the subject of intense preparation, with teams honing their presentation skills and content in an effort to attract investors' interest for potential investment in their products. The number of investors depends partly on the location and the day is important for both the startups and the investors. The days are open only to the accelerator's startups and not to the general public, unless by invitation. Commonly each team gets up to ten minutes to pitch their product and see

[8] A study of five prominent accelerators (Capital Factory, Launch Box Digital, Start@Spark, Tech Stars, and Y Combinator) found that they all "provide a combination of assistance: an intense in-house program of mentorship, mentoring, office space, access to legal advice, internet access, access to a network of entrepreneurs who help entrepreneurs tweak and improve their business concepts, and opportunities to pitch their ideas to VCs and angels. The boot camps vary from 10 to 12 weeks in length and provide the time and support for the start-up founders to build or tweak their prototype." (Hoffman & Radojevich-Kelley, 2012, pp.57-58)

	whether they are judged attractive enough to receive additional funding.
Post Demo Day	The startup has finished the program and has to manage on its own. The amount of engagement of the accelerator in a certain startup after the program depends mostly on how much equity it has retained.

Source. Based on Barrehag *et al*. (2012), NUMA (2012), Miller and Bound (2011), Konczal (2013), Barba (2016), Christiansen (2009), Caley & Kula (2013)

Clearly all stages are essential to the realization of accelerator cycles. Selecting the right teams, however, is the key first step in the path to success. In fact, often, teams are considered more important that the product idea, since ideas evolve and may change in the course of an entrepreneurial process (Barba, 2016; Barrehag *et al*., 2012). Miller and Bound (2011) reports that accelerators seldom take teams larger than four people, since more people implies larger investment; and neither take lone founders unless there are exceptional circumstances - a startup process is too heavy for a single person. Once the cohort of teams has been selected clearly the quality of the educational program and the richness of the network of mentors and investors come to the fore as decisive for the chances of success of startups and, consequently, for the success of the accelerators themselves. Let us now turn the attention, to the critical aspect of accelerators business or sustainability models. What approaches and mechanisms do they apply to be able to sustain their operations and remain in business?

3.3.3 Accelerators' sustainability models

Accelerators implement a variety of models to try to achieve sustainability. Clearly there is a major difference between private accelerators that must make a profit and publicly-supported accelerators that do not need to make a profit. Between the forprofit-nonprofit spectrum, there are hybrid models combining elements of one and the other. Dempwolf *et al*. (2014) makes a useful distinction between the *value proposition* and the *business model* of accelerators. The value proposition determines what the accelerator offers to startups; it describes the overall package of products, services, requirements, and costs associated when seed capital is provided to startups. Table 8 above contains core elements of accelerators' value proposition, particularly in the rows "Programme" and "Demo Day." Instead, the "business model determines how the accelerator is

structured to obtain its goals, how it prices its products and services, and how it generates income and, in some cases, profit." (p.18) Also included is the type industry in which the accelerator operates.

This section concerns various aspects of accelerators' business models reported in the literature. At heart, we shall find that the synthesis offered by Miller & Bound (2011) contains key elements regarding forprofit accelerators:

> "There are a number of variations, but the core business model of accelerators is simple: investors invest in the accelerator programme which acts as a small fund. Some part of the fund goes on the costs of running the programme while some of the fund is invested into startups that are accepted onto the programme. The accelerator programmes take equity in the startups and hope to make a return on those shares. Some programmes take ordinary shares, others prefer what's called a 'convertible note' which offers a discount on stock should the company raise further funding, others have a clause that makes the investment into a soft loan to be returned if certain conditions are met."

The synthesis, however, concentrates mostly on the financial aspects. A fuller picture demands attention to other elements. The first, already mentioned earlier, is the industrial context that saw the rise of the first forprofit accelerators, i.e., YCombinator (2005)[9] and TechStars (2006)[10]. Both focused in the software and internet industries associated to low capital requirements, low barriers of entry, rapid prototyping and continuous innovation. This is the realm of the "lean startup methodology" with its "build-measure-learn feedback" loop. (Ries, 2011) This type of industry lends itself to the model of cohorts of startups going through short-cycle programs (e.g., three months) and, potentially, achieving rapid growth in what could be large markets. In this dynamic environment the small seed-funding invested in exchange for a small equity can result in large gains for the accelerators, as were the cases of Airbnb and Dropbox accelerated by YCombinator. Of course, for every big win there will be many startups that will not make it or achieve limited growth. Also, for industries requiring larger capital investments, accelerators will find that they have to adapt the model to fit requirements, as we shall see later on in the case of vertical and corporate accelerators.

[9] http://www.ycombinator.com/
[10] http://history.techstars.com/

It is interesting to note that some private accelerators' founders wish to highlight that their motive to start the operations was not merely profit-making. Early on, the paper cited the case of TechStars and their motivation to help the development of the entrepreneurial ecosystem and give back to the community; similarly LaunchBox Digital (North Carolina) sights "support entrepreneurship and fill early-stage capital gap." (Hoffman & Radojevich-Kelley, 2012, p.61) Of course, there is no contradiction between these broad missions and having to make a profit to become sustainable and grow. The need to make a profit, however, differentiates private accelerators from other startup assistance programs that are publicly funded and must provide a public service. Dempwolf *et al.* (2014) writes: "the for-profit accelerator business model is rooted in an investment strategy for developing a portfolio of seed-stage investments. The portfolio is designed to yield a predictable minimum return on its contents as a whole over a specific time frame, although this time frame may vary significantly across accelerators." (p.15) In short, the value proposition of forprofit accelerators is fundamentally intertwined with the need to make a profit to become sustainable and, ideally, achieve strong growth. Let us examine some of the return-on-investment formulae implemented by various accelerators.

Table 9 aggregates data found in the literature, showing name and place of origin (US & Europe) of selected private accelerators, along with the amounts of seed funding and equity given and taken by these accelerators. Also included are the size of the cohorts and length of acceleration programs. The figures vary from accelerator to accelerator but most remain within a maximum of $20,000 of seed investment for the length of the program and a maximum of 10% of equity. The case of LaunchBox Digital is unique in the figure of up to 65% equity. It must be noted that the amount of seed funds is related to the cost of living of team members during the duration of the program. In a sense, this funding is better called pre-seed. It is intended to help the teams concentrate during the period of the acceleration. More substantial sums of funding may come in the form of loans that convert into equity, as shown in Table 9 by the cases of YCombinator and TechStars who offer $150K and $100K respectively.

Plainly the amounts of pre-seed funding and equity involved per startup ventures are not large and accelerators would hardly make a profit if the number of ventures were to be too low. This is specially the case as the equity is divided between the accelerator and those funding the program. Hence the need for cohorts and the rather short time of the acceleration cycles and programs. The size of cohorts depends on the accelerators' capabilities and Table 9 shows that most accelerators accept 10 ventures per batch; the exception being Ycombinator that accepts 65 teams per batch. The length of programs is in most cases 90 days.

Table 9. Various Business Model Implemented by Private Accelerators

Accelerator	***Place of Origin***	***Amount of Seed Funding***	***Amount of Equity Taken***	***Cohort size***	***Program Length (days)***
YCombinator	US	$11,000 – $20,000 ($150,000 CEN)	2% - 10% (Loan into equity)	65	90
TechStars	US	$6,000 - $18,000 ($100,000 CEN)	5% - 6% (Loan into equity)	10	90
Capital Factory	US	$20,000	5%	5	---
LaunchBox Digital	US	$20,000	Up to 65%	10	---
SpringBoard	UK	£5,000 - £15,000	6%	10	90
Startupbootcamp	Denmark	€15,000	8%	10	90
Nordic Startups	Sweden	-------	8%	10	90
betaFactory	Norway	€5,000 – 15,000	6% - 8%	5	90

Source. Based on Barrehag *et al*. (2012); Hoffman & Radojevich-Kelley (2012)
Note. A Convertible Equity Note (CEN) is a short-term debt that converts into equity.

Many other accelerators follow the pre-seed investment for equity model. A study by Telefonica/O2 (2014) in the UK found that "19 of the 59 programmes surveyed (16 in London, three elsewhere in the UK) invest on this basis; with several offering follow-on investment to successful companies at a later stage. …. Most investments range from £10,000 to £20,000 per team (or two founders), with equity averaging around 8%." (pp.12 & 13) The study also found that 7 other programs provide startups with loans or grants as part of the package.

Larger sums of seed funding are more common in corporate sector-specific accelerators, thus "Distill Ventures, which focuses on spirits, typically invests £150,000 to £200,000 in companies in its entry-level "seed-stage" programme and between £500,000 and £2m at the more advanced

"growth-stage" level; EcoMachines, which focuses on hardware in energy and renewables, invests up to £100,000 at the start, with up to £500,000 anchor funding available later on to successful companies." (Ibid., p.13) This type of larger investments, however, is not just the province of corporate accelerators, SeedCamp in the UK, for instance, offer a pre-seed of £100,000 in exchange for 7.5% equity. In their website, they also promise, "if you are in need of additional capital, we can bring in leading angels and high net-worths to anchor your round up to £250k."[11] Up to this funding level, called pre-seed, SeedCamp takes the investment lead. At the next level, called seed, SeedCamp co-invest up with other investors up to £2 million; here, SeedCamp invests up to £400,000 and the lead is left to the other investors. In addition, "We also reserve significant amounts for follow-on investment across both our Pre-seed and Seed strategies." (Ibid.)

Investment for equity, however, is accompanied by a variety of other business (financial) formulae in the galaxy of accelerators. Some operations have public funding, or, combine private with public funding. Other charge a program fee, as the 8 UK accelerators sighted by Telefonica/O2 (2014). These fees range "from £600+VAT (Accelerator Academy, a 12-week programme) to £30,000 (Collider, a 13-week intensive programme with a further 9 months of support). Four of the 8 programs charge between £10,000 and £15,000." (p.13) To help cover the fee, most increase their investment in the startups, thus effectively passing the charge onto the investors. Another accelerator, food-focused Kitchenette, takes a stake in each startup without making a financial investment, and yet another, WebStart Bristol, raises most of its capital via the crowd-funding website Seedrs. (Ibid.)

Some accelerators are nonprofit such as Startl (US) that has received backing from a number of large foundations, or Oxygen Accelerator (Birmingham, UK), and evergreen fund, where any profit is reinvested in the next cohort of companies. (Miller & Bound, 2011) Other accelerators receive support from a range of sources, including governments, foundations, corporations, and universities, such as the case of operations in emerging economies like India, South Africa, Kenya,

[11] https://seedcamp.com/how-we-invest/

Mexico, and Brazil. The World Bank's InfoDev program also provides grant funding for accelerators in developing countries; as it does the Swiss-based Argidious Foundation supporting, among others, Agora Partnerships and Technoserve in Latin America. (Roberts et al., 2016)

Nothing prevents accelerators from implementing multiple income-raising mechanisms including donations and event sponsorship. The NUMA (2014) report "Accelerate Now!" identifies a range of possible income-raising avenues that can be combined into workable business models by diverse accelerators. Table 10 contains these mechanisms.

Table 10. Various Mechanisms of Potential Income-raising for Accelerators

Mechanism	***Description***
Startup Equity	When significant value is provided to startups, they will perceive the equity as a fair deal. However, accelerators must be aware that this revenue source is subject to startups' exit cycle that can be quite long.
Raise Funds	Some accelerators manage to raise funding from angels and VCs. Angels are particularly interesting since, unlike VCs, they normally do not have access to the resources and talent necessary to find and engage startups. It is efficient for them to work with accelerators providing on-going, qualified deal flow. Another possible approach is crowdfunding, although it is best deployed when connected to a specific project or milestone.
Acceleration as a Service	The expertise accumulated by accelerators in running high-performance acceleration cycles certainly has value (see Table 8 above). This expertise could be packaged into a service. For instance, accelerators could help corporations set up or run efficient accelerators, from simple advisory services to outsourced accelerator management service. Another service to offer could be innovation programs, for companies with no interest in starting acceleration programmes, but interested in working more closely with startups and/or learning how to be more agile and innovative.
Expand Programme Size or Geographic Reach	This requires increased resources and a strong brand. Expanding the size of the programme (e.g., larger cohorts) is probably easier to implement. Few accelerators have taken this option. Among corporate accelerators, Microsoft Ventures Accelerators has 7 around the world.
Monetization of Fixed Space	Accelerators located in sizeable facilities/spaces have sought to monetize fixed space from the start. In fact, many have started as coworking and event spaces. Space also permits experimentation of new types of programs or enhancing the length, size, etc. of the existing programs. Renting out space is also a great way to try to get corporates, public entities, etc., introducing them to the startup world. Close attention to

	competition from tech-focused coworking and event space rental is important.
Fee-based Model	It is an area of debate whether accelerators should start charging startups a fee for the services they offer. A few notable programs charge startups fees, including 500 Startups that technically charges startups entering their program a $25k fee. However, this comes out of a $100k, 7% equity investment they put into the startups. Most accelerators do not make this type of investment and are therefore less justified to ask for a sizeable fee. Some alternatives could be: (i) charging startups a minimal cost, akin to charges from coworking space and/or coaching services, e.g., €400-800 a month for a 2 founder team. It is reasonable when accelerators are taking fairly minimal equity (7% or less). (ii) charging startups something akin to a 'success fee', i.e., startups pay the accelerator a percentage of sales over a limited period of time (e.g., 2 years). (iii) develop a fee-based membership of multi-activity tech accelerators open to the ecosystem community; people would benefit from perks or services, such as event discounts or access to high profile people within the ecosystem.

Source. Based on NUMA (2014)

It is not easy for accelerators to build an effective, long-term business model, since this goes hand in hand with the build up of a solid brand through strong measurable performance and effective communication. The basic principle for this to happen is straightforward. "The accelerator programme's continued survival is based on the startups it invests in being successful – to the point of being extremely profitable or to the point of the original shares being sold via an IPO or an acquisition." (Miller & Bound, 2011, p.25) In short, accelerators must create distinctive entrepreneurial value for their startups. This sustains effective marketing and communication and, ultimately, consolidates a virtuous cycle of growth.

Of course, as the number of accelerators and hence, competition grows everywhere, the difficulty of building up effective, long-term business models also grows. In fact, as we shall see later on, it is not just the number of accelerators but also the number of other organizations dedicated to entrepreneurship (e.g., pre-accelerators) that's growing and constraining the market space. This has already prompted an evolution of accelerators, for instance, towards verticalization as a path to establish a unique position and branding in niche markets, or, towards startups showing more

advanced stages of development with workable prototype and often users and/or customers. (NUMA, 2014) In this context, the basic package of acceleration of good ideas and demo day with investors is increasingly a non-distinctive value proposition for a long-term business model. Another formula considered at least doubtful to arrive to effective, long-term business models is government funding or funding by a couple of donors such as corporates or angels:

> Many accelerators, particularly those in Europe, got going via government funding or via the generosity of a couple key donors (either corporates or angels). But the general feeling amongst many accelerators is that this type of financing model is short sighted as government funding works well for you in the short-term, but doesn't provide much for you beyond that, while depending on one or two donors is risky at best and, likely not sustainable for the long-term. (Ibid., p.52)

This view seems fine for those operations that will continue to depend only on the government or donor sources. It is possible, however, to conceive of operations that will use this type of funding to build more diversified sources of income and hence, more sustainable business models.

Whatever the models adopted and pursued, in the end their long-term consolidation and success comes down to demonstrable results in terms of the value delivered to startups, and, indeed to the various stakeholders. This in turn depends on the efficiency and effectiveness of the accelerators' internal processes and across the entire value chain. In this respect, it is interesting to reproduce a comparison of strengths and weaknesses that can heavily determine the chances of success of accelerators (see Table 11).

Table 11. Features of Strong and Weak Accelerators

Strong	***Weak***

- Understand what an effective mentor is and knowing how to effectively engage with them throughout the program's duration; - Have a good rhythm for the program that is absorbable by founders—don't go too fast or too slow; - Create awareness of the stress and conflict points among and between the various participants (companies, founders, mentors) that will inevitably occur throughout the program, and strategically channeling those into learning opportunities embedded in the program itself; - Build a culture and network around the accelerator that feeds on itself and perpetuates a lifetime process of learning.	- Fail to have a clear view of the mentor dynamic—not helping mentors understand how they can be effective in working with companies; - Fail to set expectations at the outset around what the accelerator can do, and what is sensible given a company's individual situation; - Fail to focus on the people, rather than idea, because it is the people that matter most and will be lasting, while the idea will morph a lot; - Fail to understand how to scale their program (how fast do you want to grow? What is your strategy? To expand geographically? To expand the number of programs?); - Fail to have a point of view about what they are trying to accomplish, for example, fail to understand that there is more than one approach.

Source. Based on Hathaway (2016a, 2016b). The features come from Brad Feld, co-founder of TechStars

It is also crucial to define a range of measurable success criteria to help understand and compare the real impact of accelerators on startups and, more broadly, on the communities where they operate. As shall be seen, this is an area requiring a great deal of further development.

3.3.4 Accelerators' impact measurement

Multiple types of criteria have been proposed to measure the impact of accelerators both on startups and the broader community. Accelerators often provide quantitative information such the number of programs per year and the total number of programs performed over the years; total number of events and participants; number of companies applying, selected, graduating, active or acquired; number of mentors, alumni, etc.; total amount of funds invested by the accelerator, amount raised by the more successful companies and the total market capitalization of these companies, etc. For instance, a quick glance at YCombinator's website shows: 1,588 startups founded, over 3,500

community of founders, and combined valuation of companies over $80 billion.[12] In turn, TechStars's website shows: Total Companies 1274, Active or Acquired, $4.4B Total Funding and $11.4B+ Market Cap; along with over 4,000 events, over 150 countries, over 10,000 mentors, over 300,000 alumni for a total of over 1,500,000 founders, investors, mentors, and industry leaders.[13] Of course, YCombinator and TechStars are the oldest and highly successful startups, so it is not surprising to read that:

> TechStars publishes perhaps the most robust set of metrics of accelerator. Its published data encompasses survival (active, acquired, failed), average funding per company and jobs created. TechStars provides a summary of the data but also breakouts by cohort and individual company performance. Based on Crunch-Base data, the metrics are self-reported by each company and 96% of TechStars' companies have updated their profile in the last year. TechStars is also a vocal and persistent advocate for transparency by accelerators more broadly. (Caley & Kula, 2013, p.26)

The statistics for other accelerators, however, particularly for those of more recent creation and less accumulated successes, are more difficult to access, prompting calls for greater transparency to help aspiring entrepreneurs; for instance, "with the proliferation of programs, the newness of the phenomena, and little to no publicly available data on outcomes for the programs and affiliated start-ups, it is hard for entrepreneurs to determine which programs are most effective and, more importantly, which specific program would be the best fit for their particular start-up's goals." (Hochberg *et al*., 2015, p.2) This has led to the creation of the *Seed Ranking Accelerator Project* aimed at ranking US accelerators through a variety of metrics shown in Table 12. The ranking categories for year-end 2016 are shown in Table 13 along with the names of accelerators in each tier category.

Table 12. Accelerators' Performance Metrics Used by Seed Accelerator Ranking Project

Metrics	***Description***
Valuation	It is determined when a firm has a priced round.
Qualified Exit	Occurs when a portfolio company either issues an IPO or is acquired for an amount greater than $5M above the amount of capital raised by the company.
Qualified Fundraising	Occurs when a portfolio company raises an aggregate of at least $200k.

[12] http://www.ycombinator.com/ Accessed on 26.02.2018
[13] https://www.techstars.com/ Accessed on 26.02.2018

Survival	Percentage of startups still in business (considered a controversial measure of success). The ranking considered survival at 12, 24 and 36 months out from program end, but weighted it lower than other metrics.
Founder Satisfaction	Determined by a survey of the entrepreneurs who have graduated from the programs. It uses Net Promoter Score (NPS) for each program. NPS is a standard metric for assessing people's opinions about a service or product.
Overall Score	Metrics are weighted within categories, and categories are then weighted to produce an overall score. Categories receiving relatively higher weightings include valuations, fundraising and exits.

Source. Hochberg *et al*. (2017), pp.3-4

Table 13. Ranking of US Accelerators by Various Categories, Year-end 2016

TIER	PROGRAMS (**alphabetical within tier**)
Platinum Plus	AngelPad, YCombinator
Platinum	Alchemist, Amplify LA, MuckerLab, StartX, Techstars, U. Chicago New Venture Challenge
Gold	500 Startups, gener8tor, HAX, Healthbox, IndieBio, MassChallenge, R/GA, SkyDeck
Silver	Brandery, Capital Innovators, Dreamit, Plug and Play, Reach, Yield Lab, Zero to 510
Bronze	Accerlerprise, AlphaLab, FoodX, HealthWildcatters, Lighthouse Labs, UpTech, XLR8UH

Source. Hochberg *et al*. (2017), p.4

The ranking also helps reveal some statistics of the aggregate impact of accelerators. For instance, for the year 2015, the startups graduating from the top 10 US accelerators had a current total valuation slightly under $4.4 billion, though only 3.5% have exited successfully; also, 35.6% of the companies had raised a significant round of financing within a year of graduating from a program, with an average of $1.5 million; last, almost all startups were highly satisfied with the top accelerators with 96% saying that said that they would repeat the experience. The number of successful exits at 3.5% is certainly low, but not considered surprising "given how new the phenomenon is relative to the typical number of years it takes for a seed stage startup to reach a successful exit." (Hochberg *et al.*, 2015, p.4)

Other sources complement this information by revealing both the aggregate investments of accelerators over a period of years and how this has helped the median valuation of companies. Thus, Hathaway (2016a, 2016b) looked at 172 US-based accelerators with over 5,000 companies during the decade 2005-2015 and found that, during this period, the companies had raised a total of $19.5 billion in funding but, more interesting their median and average valuation had increased significantly

as they were able to attract further funding; thus the median and average valuation of companies completing- and recently-completing accelerator programs was $5.5 million and $7.1 million, respectively. In contrast, "[a]ccelerator graduates that went on to raise additional venture capital investment had a median valuation of $15.6 million during this period, and an average valuation of $90 million. Some very well-known companies belong to this group, including "unicorns" AirBnB, Dropbox, and Stripe, among others" (Hathaway, 2016b)

In the UK, the research by Telefonica/O2 (2014) was able to gather some aggregate statistics out of the 58 programs surveyed. Forty-eight of the programs had supported 3,225 startups, with an average of 70 startups per program. In London the average was only 40 for a total of 28 programs and 1,144 startups. The reason is that London has newer programs than the rest of the UK and their greater concentration tends to translate in fewer startups per accelerator. Information on alumni still in operation given by 35 programs enabled the calculation of survival rate in London at 94.77%, while in the rest of the UK the average survival rate was lower at 86,28%. A reason for the difference would be London's much higher proportion of new programs, with therefore less time for startups to fail. A final statistics from data made available by 17 programs supporting a total of 1,655 startups related to the investment the startups raised from when they joined the programs. The total figure was £112.83 million, meaning an average of £68,176 per startup. In London, ten programs had helped 279 startups raise £46.3m, for an average of £165,949 per startup.

In Canada, the study by Caley & Kula (2013) found that little is known about how well accelerators perform, despite the growth in the number of accelerator programs and the influx of funding from different levels of government. (p.22) There are no standardized performance metrics, they vary from program to program. Nevertheless, through the interviews, the study managed to identify two broad categories of metrics, largely driven by the need for accountability to key stakeholders. These two categories with examples of metrics are shown in Table 14.

Table 14. Broad Categories of Performance Metrics in Canada's Accelerators

Metrics related to startup's survival & growth	***Metrics related to the operation of the program***

(usually aggregated by cohort)	*(aggregated by cohort or fiscal year)*
• Startups' current status (operating, closed or acquired), cited by 55% of interviewees • Number of employees, cited by 73% of interviewees • Number of startups who have received investment or amount of investments, cited by 73% of interviewees Customer acquisition, cited by 27% of interviewees	• Number of applicants, cited by 18% of interviewees • Mentor engagement, cited by 18% of interviewees • Number of investors attending Demo Day, cited by 18% of interviewees • Net Promoter Score as rated by participants, cited by 11% of interviewees • Participant exit interviews and surveys, cited by 36% of interviewees

Source. Caley & Kula (2013)

Other studies have tried to cast light on the impact of accelerator programs on local economies, particularly, on "the entrepreneurial ecosystem of the regions in which they are established." The particular metrics used is "the availability and provision of seed and early stage venture capital (VC) financing for startups." (Fehder & Hochberg, 2014, p.2) They found that the areas[14] that receive an accelerator program exhibit significant differences in seed and early-stage financing patterns. In particular, the arrival of an accelerator is

> associated with an annual increase of 104% in the number of seed and early stage VC deals, an increase of 1830% in the total $$ amount of seed and early stage funding provided in the region, and a 97% increase in the number of distinct investors investing in the region. This increase in the number of distinct investors comes primarily from an increase in nearby investment groups, rather than from entry of additional investors from outside the region." (p.3)

Clearly, a number of performance metrics have been implemented to try to understand the impact of accelerators on companies and communities. However, a great deal more needs to be done to increase the transparency and accountability of accelerators all over. Several suggestions of further metrics have been put forward, for instance, NUMA (2014) argues the need to track aspects like:

1. number of companies still 'alive' 1, 2, 3 or more years out of their program
2. revenues or, at the very least, revenue growth alumni startups
3. satisfaction levels of startups coming out of the program
4. 'life changing events' they were able to facilitate for startups, including partnerships with key customers or introductions to top tier investors (see point 6)
5. exits, preferably with actual statistics attached to them (ie value of exit)

[14] Metropolitan Statistical Areas (MSAs)

6. for funding, amount of money coming from top tier investors, either top tier angels or VC-funds
7. the number of jobs created by startups accelerated through their programs
Other factors that may be harder to measure, … include the capacity to attract international talent and the quality and strength of the alumni network. (p.52)

In turn, Dempwolf *et al*. (2014) suggest the need to collect performance metrics for both the accelerators program and their startups, with short- and long-term time horizons. Table 15 contains the elements of this proposal for short- and long-term metrics. The authors contend that accelerator metrics should specifically "address participation, process and performance for four distinct constituencies: startups, accelerator programs, accelerator sponsors, and follow-on investors. Such metrics would allow for true comparisons across the various types, business models, industries and so forth." (p.32)

Table 15. Short and long-term metrics for accelerators and their startups

Time Horizon	Accelerator Metrics	Startup Metrics
Short-term (program duration plus 6 months)	Number of applicants Number of participants (cohort size) Number of investors at demo day Percentage receiving next-stage-funding Percentage acquired Percentage failed	Operational status (operating, closed, acquired) Number of financial investments or number of investors) Size of financial investments Number of customers gained
Long-Term (expected cash-out in 3-7 years)	Sources of funding (series or portfolio) Performance distribution (cohort or portfolio) Internal rate of return (cohort or portfolio) Network metrics (partnerships, etc.)	Sales or revenue Number of employees Rate of return to investors Stock prices (if applicable)

Source. Dempwolf et al. (2014), p.28

Further metrics and information to be gathered by accelerators are suggested by Konczal (2013) (see Table 16), who would ask, for instance, personal information about founders, whether they have prior entrepreneurial experience, etc. Additionally, this author suggests questions for entrepreneurs at idea stage and for non-accepted ideas/startups; and the importance of periodical surveys to follow accelerators' and companies' outcomes longitudinally.

Table 16. Further Categories of Performance Metrics

Metrics related to companies
• basic demographic information of founders (age, race, gender, marital status, educational attainment);
• founder's prior exposure to entrepreneurship;
• whether the founding team members are still with the company (and if not, their current employment status).
Metrics for accelerators accepting entrepreneurs at idea stage
• establish whether the idea turned into a legally incorporated company.
Non-accepted startups/ideas
• ask similar questions about their demographics and company outcomes, and whether they ultimately enrolled in another accelerator or entrepreneurship training and education program.
Periodical Surveys
• Accelerators could also administer survey questionnaires upon program completion, six months after, and annually thereafter to follow outcomes longitudinally

Source. Konczal, (2013), p.146

No doubt there are many performance metrics and information useful to know about accelerators and startups. And others could be added to those already identified, for instance, it would be useful to know whether a startup team not selected for investment by an accelerator is later affected by the "signalling problem," that is, they would have a difficult time getting funding given that the founders of accelerators that knew them best had decided not to invest.[15] (Christiansen, 2009)

The bottom line is: having rich information about the operation, evolution, results and impact of accelerators and startups is extremely valuable for all stakeholders, including local and regional authorities concerned with economic and social development. This begs the question: why is it that this rich information is not readily available. The simple answer is that it is not easy for all types of accelerators to gather rich information, for instance, Caley & Kula (2013) found that: "[f]irst and foremost, the accelerator directors interviewed cite a lack of adequate resources as the key barrier to collecting more data, or collecting data more consistently over time. Accelerator staff are focused on supporting the current cohort, recruiting the next cohort and managing stakeholders—leaving little to collect and collate data, and report on performance." (p.23)

[15] David Cohen of TechStars worried about this problem but, in his experience, "this hasn't been an issue … [since]… other professional investors understand that some startups just don't meet a particular angel's investment thesis. While he has personally invested in only a small number of the TechStars startups, virtually all of them have found some future financing." (Christiansen, 2009, p.20)

In addition, it should not be forgotten that, depending on the state of development, it may not be even tactically convenient for accelerators to open themselves to deep research, or, to provide sensitive information; many young operations will not have yet a strong record. A similar consideration is valid for startup ventures in their early steps; they may not be open to talk about, for instance, their funding sources and performance for competitive reasons.

3.3.5 The evolution of accelerators

This section looks at the evolution of the accelerator phenomenon by dealing with three aspects: (1) the trends underpinning their emergence and growth; (2) their quantitative and geographical growth; and (3) the trend towards verticalization and corporate accelerators. This will create the base to examine after the emergence of pre-accelerators and other types of entrepreneurial activities or programs. It is all part of the trend towards a growing diffusion of an entrepreneurship culture and learning in society.

3.3.5.1 Trends underpinning the emergence and growth of startup accelerators

The emergence and diffusion of startup accelerators in the entrepreneurial scene of the US, Europe and eventually the world is associated to a variety of economic, industrial and technological phenomena. Amongst the most influential are the spread of software and Internet-based technologies, the lowering cost of entry for startups and, also, the impact of the 2008 financial-economic crisis. They have all converged to stimulate an entrepreneurial environment propitious for the growth and spread of accelerators across the world.

Let us start with the key role of digital Internet-based technologies and the consequent digital economy. Haines (n.d.) points out that the "rise of modular software and the emergence of inexpensive cloud computing has set up the next generation of computing, and this is also the cornerstone for today's emergence of startup scenes globally." (p.1) These developments are part and parcel of the successive generations of Internet with its ever-increasing range of opportunities. They have changed the landscape, underpinning dramatic reductions in the cost and time to bring a product or service to market. (Clarysse et al., 2015) Capital-intensiveness is no longer an unsurmountable

barrier to market entry for young entrepreneurs with a good idea and small funding available. In the words of Fehder & Hochberg (2014),

> The capital requirements to seed a startup software company have fallen dramatically along with the cost of experimentation; where building a software company may have cost $5 million on average 10 years ago, today it can often be accomplished with $500 thousand, and startups can often accomplish with a $50 thousand seed investment what used to take $500 thousand to $1 million. This has allowed accelerators to provide meaningful funding and assistance to their startup portfolio companies with a seed investment or stipend as low as $15 thousand. (p.8)[16]

Other technology-based industrial and economic trends include the development of open source software, easier routes to customer acquisition and better forms of direct monetization. (Miller & Bound, 2011) The spread of the lean startup practice with its concepts of minimum viable product (MVP), rapid prototyping and continuous innovation has also an important contribution (Ries, 2011). Table 17 lists some mechanisms that make it easier to reduce costs, reach customers, and generate revenue.

Table 17. Mechanisms to Reduce Costs, Reach Customers, and Revenue Generation

Reduce Costs and Reach Customers
• Pay-as-you-go infrastructure allows for lower monthly costs; no need to pay large sums up-front; • More specialised office providers allow greater flexibility, shorter contracts and even introductions to investors as part of the deal; • Customer acquisition costs (i.e., the cost of advertising to and attracting a paying customer) have dramatically fallen and the sophistication of the tools available to target customers and measure the effectiveness of different approaches has improved markedly, by using, for instance, Google Adwords or Facebook Adverts. They allow for testing and refining different approaches (and their cost) to gaining new customers.
Revenue Generation or Monetization
• Large numbers of potential customers available to online businesses; • Better routes to monetisation, particularly through direct payments in the form of transactions (e-commerce), app stores and subscription models. Examples of specific mechanisms are: • Shopping carts is now easy to install as part of any service. • PayPal and other internet payment platforms allow direct payments

[16] Also, "[c]osts associated with early-stage tech startups have dropped significantly in the last decade, creating an opportunity to invest with very small amounts of money (£10,000-£50,000) compared to previous eras of investment in digital businesses. … Conditions are perfect for nimble internet and mobile tech startups with talented teams and big ambitions, and the demand from both investors and buyers has never been greater." (Miller & Bound, 2011, pp.3 & 7)

• App Stores such as the Apple App Store, the Android Market or Amazon's Android Appstore offer direct ways of monetising their apps with clear submission guidelines.

Source. Miller & Bound (2011), p.22

Along with the technology-based industrial and economic trends, the financial crisis of 2008 is also acknowledged as a major influence in the development and growth of accelerators. The crisis sent shock waves across the financial sector and led to a serious reduction of capital from banks and traditional sources of funding. Venture capitalists were reluctant to invest in nascent firms and angel's investment tend to be rather small. This created a funding gap that stimulated the spread of accelerators following the steps taken by YCombinator and TechStars in 2005 and 2006 respectively. (Hoffman & Radojevich-Kelley, 2012) In effect, by pooling the resources of angels and small-scale investors and investing limited amounts of early-stage seed funding, accelerators became an appropriate response to the investment crisis. For instance, "often the problem first time founders face is how to cover their living costs while they build their first product, get their first customers or attract their first investment." (Miller & Bound, 2011, p.22) Accelerators addressed this need in the midst of the widespread opportunities generated by the digital sector. As Malek *et al*. (2014) points out, "the genesis of accelerators was driven by private investors who sought to develop and benefit from new ventures in this sector." (p.27) The end result was dramatic, "we found that most of these programmes were launched after the financial crisis struck in late 2008. The compound annual growth rate for accelerators in Europe more than doubled in the last 12 years to 29% post crisis, up from 14% pre-crisis, and increased by nearly 400% since the start of the crisis." (Salido *et al*., 2013, p.5)

But, as we have abundantly seen, accelerators have addressed more needs than just finance. In particularly, they have addressed the difficulties of entrepreneurship and the fact that many of the aspiring entrepreneurs have limited experience of the process of making a successful startup of their product-or-service ideas. Here, as we know, accelerators have offered new ventures a dynamic educational and networking experience aimed at accelerating the development of their lifecycles

towards success (or failure).

Another major factor in the emergence and growth of startup accelerators is the participation of government that has spotted in the accelerator an important mechanism for the development of entrepreneurial ecosystems for economic development. "Many local governments have adopted the accelerator model, hoping to transform their local economies through the establishment of startup technology clusters." (Fehder & Hochberg, 2014, p.2) The reasoning is that encouraging the birth of startups increases the overall number of companies and, hopefully, long-term employment from those companies. (Christiansen, 2009) In Britain, for instance, the government is aiming at creating a cluster of technology businesses in the capital while fostering greater entrepreneurialism through the Startup Britain campaign, defined as "a campaign by entrepreneurs, for entrepreneurs. … [offering] … inspiration, resources and guidance to help people start and grow their own business."[17] For Miller & Bound (2011), "Accelerator programmes have been on to this strategy for a while." (p.7)

Some observers believe that ecosystem conditions in terms of both institutions and methodologies/tools are favorable to startups. At least this would be the case in the more advanced places. Thus "an entire system of supporting institutions is ready to help steer a new venture through its early days. … ready to support a growing number of startups in bringing their innovations to market." (Weiblen & Chesbrough, 2015, p.67) Along these institutions, there are new methodologies such the Lean Startup and business schools teaching entrepreneurship, offering startup clinics, and holding startup competitions.

In contrast, it is important to be aware that establishing an accelerator is not likely to have much effect in a local culture where entrepreneurship is not strong. Much more than one accelerator would be needed. For this reason, "if one of the goals of the programme is to establish a strong local startup culture, recognize that a seed accelerator programme is not a panacea. For startups to start and stay, there have to be enough resources (money and talent) in the city to ensure they don't leave when they

[17] http://startupbritain.org/

get to their next stage of growth." (Christiansen, 2009, pp. 18-19)

All in all, putting everything together, it is reasonable to conclude that the blend of (i) technology-based trends, (ii) financial crisis, (iii) and government ecosystem involvement, has definitely opened opportunities for the growth of accelerators and for scores of people wanting to go into entrepreneurship. By so doing, this blend has stimulated as never before the diffusion of entrepreneurship across society.

It can be suggested that the next challenge is to reinforce the contribution of accelerators and seek to go further in the effort to stimulate a the growing trend towards a wider culture and learning of entrepreneurship in society. The emergence of other types of entrepreneurial activities provides useful pointers on this score.

3.3.5.2 Accelerators' quantitative and geographical growth

The quantitative and geographical growth of accelerators is fairly recent. Just close to 15 years have passed from the launch of the first accelerator in 2005 and just about a decade from the stimulus given by the financial crisis. Several sources have attempted to determine the number of accelerators at a given time, particularly in the US and Europe and to a lesser extent in other part of the world. The results may vary for different sources since what they count as accelerator may not be the same. There is no standard agreed definition underpinning the counting. For instance, the website f6s.com houses the broadest collection of programs devoted to founders and startups, including accelerators. It boasted a community of 2,448,508 founders & startups at the beginning of 2018[18] and of 3,504,261 founders and startups at the end of 2019.[19] Of these, the number of worldwide entries classified under 'accelerator/program' was 1,048 at the beginning of 2018,[20] and 1,128 at the end of 2019. The geographical spread of these 1048 'accelerator/program' is shown for both dates, that is, the beginning of 2018 and, then in brackets, the end of 2019: North America 392 (463), Europe 319

[18] https://www.f6s.com/ (site accessed on 13.03.2018).
[19] https://www.f6s.com/ (site accessed on 4.12.2019).
[20] https://www.f6s.com/accelerators (site accessed on 13.03.2018).

(468), South America 42 (48), Asia 159 (257), Africa 33 (61), Australia/New Zealand 22 (23), Middle East 48 (75), Caribbean 1 (3), Eastern Europe 32 (41).[21] The figures show an increase in the presence of 'accelerator/program' in all areas of the world contained by the website, particularly in Asia and Africa.

Most other counts of accelerators use more restricted definitions of accelerator, much in the same vein discussed in this paper. For instance, the Global Accelerator Network (GAN) claims presence of over 85 accelerators in six continents and over 120 cities. "Over the last 10 years, more than 4,700 startups have gone through a GAN Accelerator, and our network data shows that 85% of those startups are still in business today."[22] Almost two years later, at the end of 2019, GAN reported the presence of over 100 accelerators in over 120 cities and 6 continents. It claimed: "Over the last 10 years, more than 10,000 startups have gone through a GAN Accelerator, and our network data shows that 88% of those startups are still in business today."[23]

Seed-DB, a website created and maintained by Jed Christiansen,[24] gave at the beginning of 2018, a figure of 190 programs worldwide; 7,260 companies accelerated, fund raised close to $30 billion, with 953 company having achieved exits for a total of almost $5.9 billion.[25] Closer examination revealed that only three accelerators had invested over $1 billion with YCombinator alone investing over half of the total combined investment (over $18.8 billion on 1400 startups), then came TechStar with close to $4.7 billion invested on 1,029 startups and, third, came 500startups with over $1.37 billion invested on 686 startups. The 25 accelerators that came next in the ranking had invested figures that ranged from about $900 million (AngeIPad) to $108 million (Code for America Accelerator). The exits of the three top investors had raised: $4.6 bn for YCombinator, $546.8 million for Techstars, and $21.3 million for 500startups. Looking at the amount of funding received

[21] The sum of the number in brackets adds up to 1,128 and not the total figure 1,140
[22] https://www.gan.co/engage/accelerators/ (accessed on 13.03.2018)
[23] https://www.gan.co/engage/accelerators/ (accessed on 4.12.2019)
[24] https://www.seed-db.com/about/view?page=history (site accessed on 13.03.2018).
[25] https://www.seed-db.com/accelerators (site accessed on 13.03.2018).

per company, we find that 43 companies have received over $100 million of investment and just 2 of them (both with YCombinator) have received over $1 billion (AirBnB with almost $4.4 bn and Dropbox with just over $2.0 bn). The weight of YCombinator in the Seed-DB ranking is very high, since it alone is responsible for 20 of the total 43 investments ranked, including 9 of the top ten investments and 15 of the 19 investments over $200 million each.[26] Figures 5 and 6 illustrate graphically the evolution in the amount of funds invested by accelerators and the number of companies benefitting from this investment during the period 2015-2018.

Close to two years later, by December 2019, Seed-DB website reported significant growth in investment and exit funds.[27] Overall, the Seed-DB website still referred to 190 programs world-wide, but the total number of companies accelerated and exited has increased to 8,117 and 1,191 respectively, while the total funds invested and generated by exits has more than doubled to reach $US 65,724,201,149 and $US 13,204,098,600 respectively. (Ibid.)

YCombinator and Techstars still lead the league table: YCombinator with close to $US40 billion investment in 1,801 startups and about $US6.2 billion in exits, and Techstars with just over $US8 billion investment in 1,336 startups and about $US3.6 billion in exists. This time, however, the number of accelerators investing over $US1 billion has doubled to six, including 500startups, The Alchemist Accelerator, AngelPad, SeedCamp and DreamIT Ventures. The next 27 accelerators invested amounts ranging from $US948 billion to $US108 million. Looking again at the amount of funding received per company, we find that this time 91 companies have received over $100 million of investment and just 8 companies (all with YCombinator) have received over $1 bn (Cruise leads with almost $US5.7 bn funding and an exit of $US1 bn, then comes Airbnb with almost $4.4 bn and Instacart with about $2.5 bn).[28] The weight of YCombinator in the 2019 Seed-DB ranking is very high, since it alone is responsible for 42 of the total 91 investments ranked, including 13 of the top

[26] https://www.seed-db.com/companies/funding?value=100000000 (site accessed on 13.03.2018).
[27] https://www.seed-db.com/accelerators (accessed on 4.12.2019)
[28] https://www.seed-db.com/companies/funding?value=100000000 (accessed on 4.12.2019)

15 investments over $500 million each. Figures 5 and 6 illustrate graphically the evolution in the amount of funds invested by accelerators and the number of companies benefitting from this investment during the period 2005-2018.

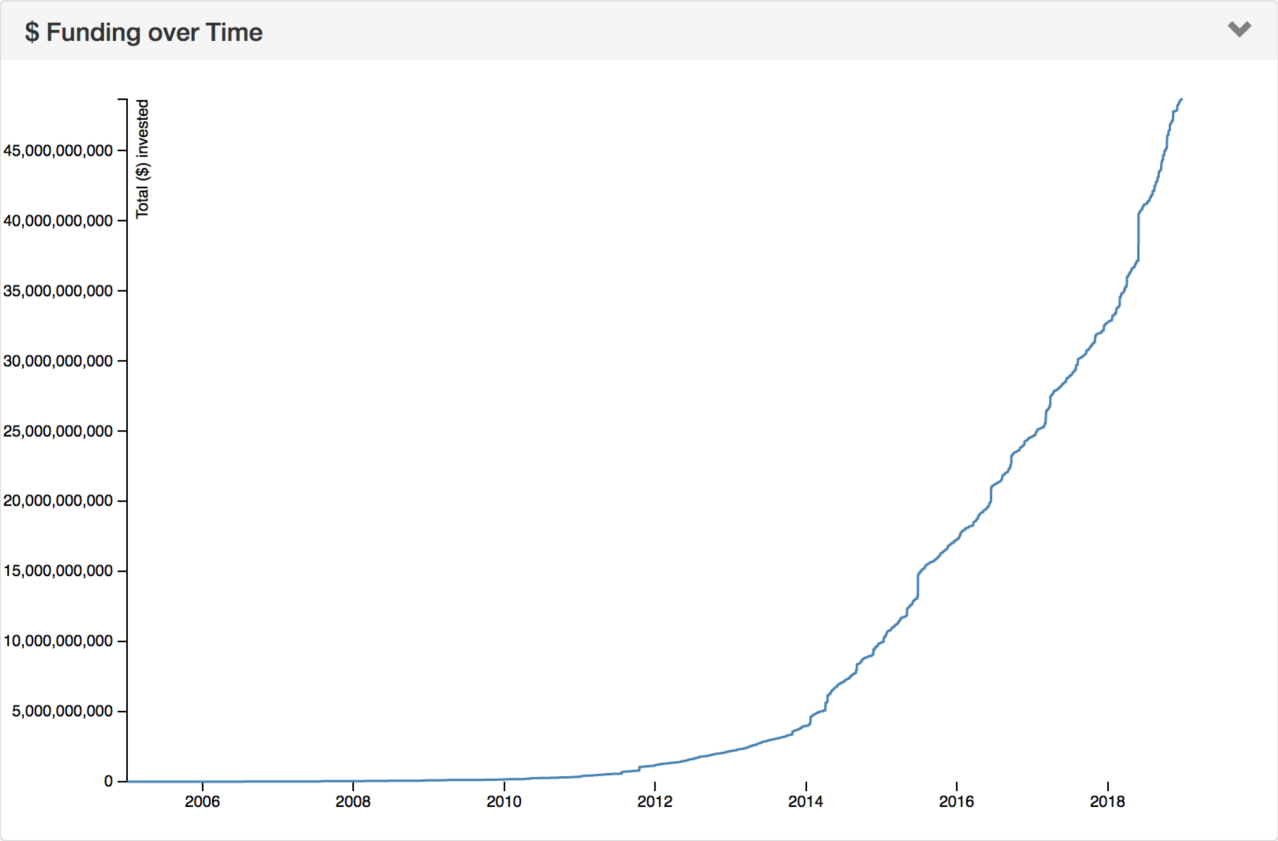

Figure 5. Evolution of Accelerators' Investment, 2005-2018

Source. https://www.seed-db.com/chartsandtables (site accessed on 4.12.2019)

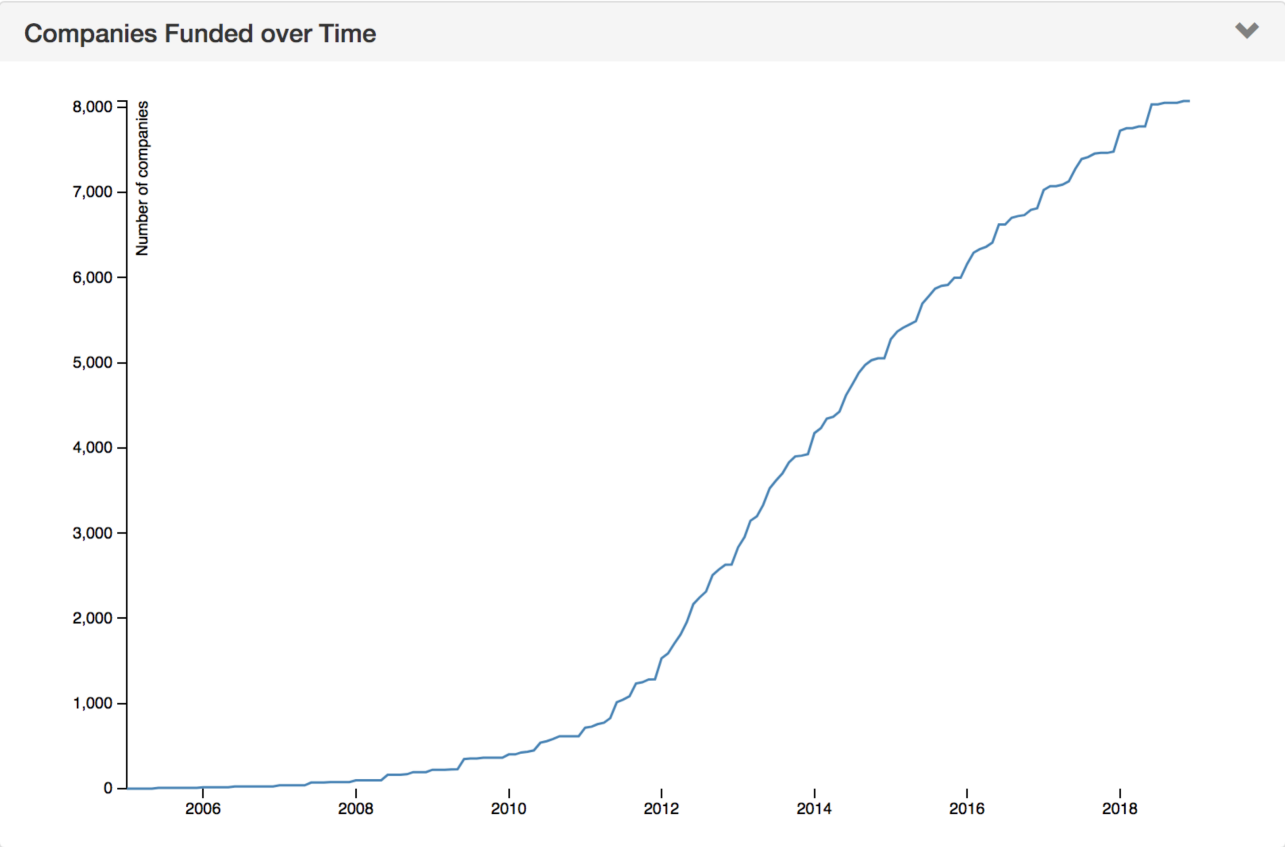

Figure 6. Evolution in the Number of Companies Funded, 2005-2018

Source. https://www.seed-db.com/chartsandtables (site accessed on 4.12.2019)

As expected, the growth of accelerators has been strong in the US. Figure 7 shows its evolution from 2005 to 2015. As noted earlier, their numbers began to take off after the crisis of 2008. As Hathaway (2016a, 2016b) points out "[t]hey grew from 16 programs that year to 27 in 2009 and to 49 in 2010, before eventually reaching 170 programs in 2014 and holding mostly steady. All told, the number of American accelerators increased an average of 50 percent each year between 2008 and 2014." Programs such the Growth Accelerator Fund Program run by the Small Business Administration have stimulated this growth.[29] Thus, "[w]ith its inception in 2014, the SBA awarded $2.5 million in cash prizes to a group of 50 such organizations. The program expanded in 2015, offering $4 million in cash prizes to 80 organizations throughout the country." (Ibid.)

[29] https://www.sba.gov/content/sba-growth-accelerator-fund-competition

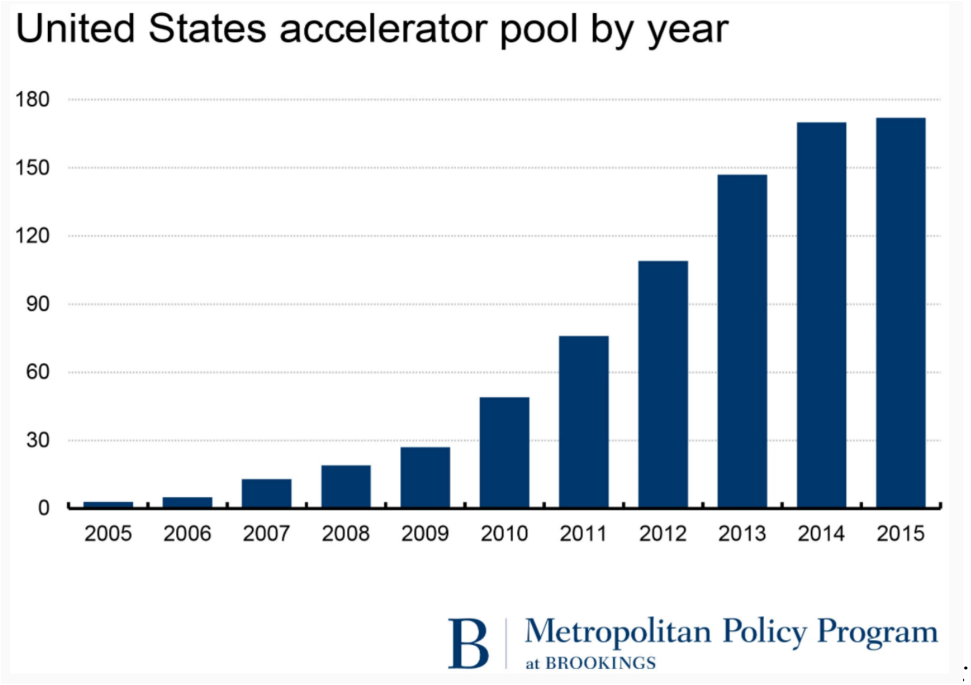

Figure 7. Evolution in the Number of Accelerators in the USA (2005-2015)

Source. Hathaway (2016a) – Pitchbook data, primary research, author's calculations

Europe also shows quite a healthy growth in the number of accelerators, although figures differ for different sources. Thus, Tech.eu estimated about 100 active accelerators by the end of 2013.[30] A study from Telefonica, also from 2013, quotes larger figures but puts accelerators and incubators together. Figure 8 illustrates the European growth from 2001 to 2013. Again, it is easy to see the impact of 2008 crisis in the take off in the number of accelerators/incubators. The authors note, "we found that most of these programmes were launched after the financial crisis struck in late 2008. The compound annual growth rate for accelerators in Europe more than doubled in the last 12 years to 29% post crisis, up from 14% pre-crisis, and increased by nearly 400% since the start of the crisis." (Salido et al., 2013, p.5) They concluded that Europe and the United States have a comparable number of startup programs per capita since they found 260 startup programs in the 10 European countries surveyed (population 361 million) compared to about 200 programs in the US (population 316 million).

The Telefonica study also found that, inside Europe, startup programs tend to be quite

[30] http://tech.eu/research/29/there-are-roughly-100-active-startup-accelerators-europe/

concentrated in a few countries and, then, mostly around the largest cities. This is shown in Figure 9 containing the number of startup programs (light blue dots & right axis) for the top seven EU countries ranked by GDP (bars & left axis). Germany has the highest GDP but not the highest number of startup programs. The latter goes to the UK with 50 organizations, 32 of them in the London area alone. An explanation for this concentration goes as follows: "A shortage of credible tech investors and networking opportunities means that many talented entrepreneurs are gravitating towards larger start-up hubs such as London to get the benefits of the accelerator and incubator boom." (Telefonica/O2, 2014, p.3) France also has a high level of centralization of accelerators/incubators around the capital, while in other countries they are more evenly spread across the territory. "This is the case, for example, in Spain and Sweden. Sweden has 22 accelerators and incubators, but only four can be found in the Stockholm area. Spain has 38 accelerators and incubators in total, with 11 in Madrid and nine in Barcelona." (Ibid., p.6)

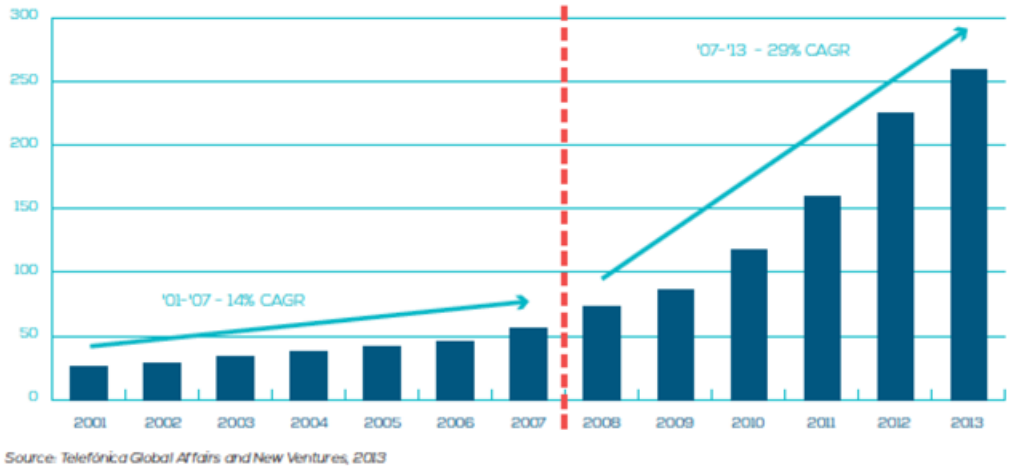

Figure 8. Accumulated Number of Incubators/Accelerators in 10 European Countries from 2001 to 2013

Source. Salido et al., 2013, p.5

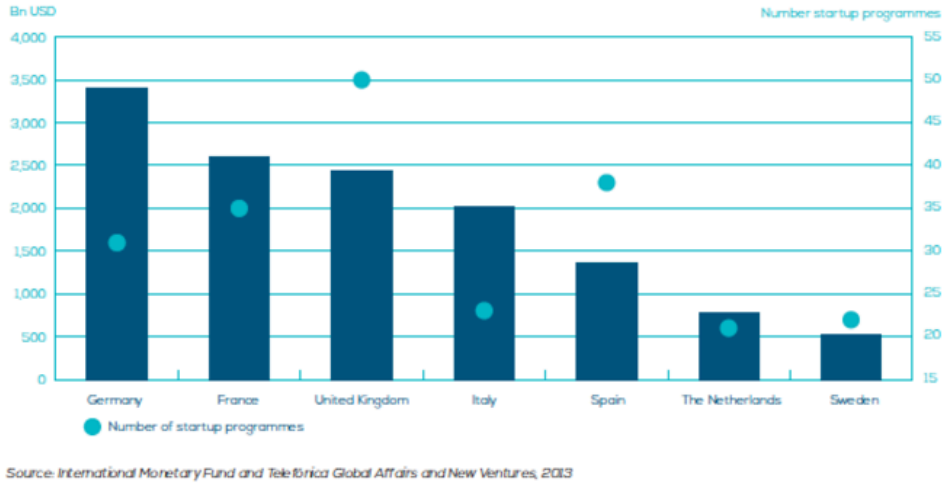

Figure 9. To seven EU countries ranked by GDP – left axis (2011) and number of startup programmes – right axis.

Source. Salido et al., 2013, p.6

Expanding the overview to global scale, there are various estimates about the number of accelerators worldwide. For Cohen & Hochberg (2014) the accelerators spanning six continents range from 300+ to over 2000. In turn, Haines (n.d.) quotes an estimated 230+ accelerators in 33+ countries (mostly in North America and Europe) with an annual growth rate of 20% in the developing world. While the 2016 Global Accelerator Survey conducted by the Global Accelerator Learning Initiative (GALI) has collected data from 164 organizations. They come from 41 countries, supported over 8,000 ventures in 2016, and run their first accelerator program after 2010. Figure 10 shows the distribution of the 164 accelerators by geographic region; it can be seen that over half of the 164 surveyed accelerators are in emerging markets.

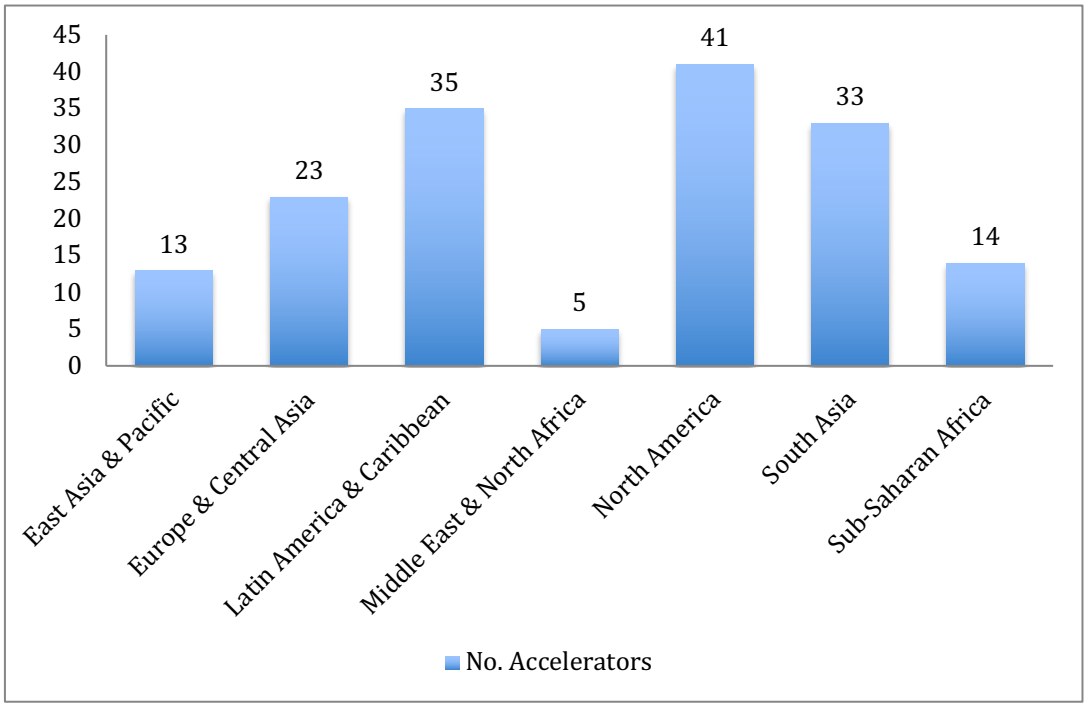

Figure 10. Number of Accelerators per Geographic Regions 2016

Source. Global Accelerator Learning Initiative (GALI), Global Accelerator Survey data collected in 2017 https://www.galidata.org/accelerators/ (accessed 27.03.18 & still the same at 6.12.2019)

Accelerators in emerging economies India, South Africa, Kenya, Mexico, and Brazil have received support from a variety of sources, including government, foundations, corporations, and universities. "For example, the World Bank's infoDev program provides grant funding for accelerators working in developing countries. The Argidius Foundation also supports accelerator programs, including those run by Agora Partnerships and Technoserve in Latin America. As an example of corporate support, both companies and corporate foundations provide funding for the various cohorts of Points of Light Civic Accelerator entrepreneurs. Lastly, Santa Clara University is a prime example of university support, running the GSBI Accelerator through its Miller Center for Social Entrepreneurship." (Roberts *et al*., 2016, pp.4-5)

3.3.5.3 New forms of accelerators – industry and vertical corporate accelerators

The third aspect in the evolution of the accelerator phenomenon is the trend towards verticalization in more industry-specific programs and corporate accelerators. This trend has followed the increasing competition accompanying the marked growth of generalist startup accelerators, offering services across industries primarily based on Internet software. At the same time, startups

began to realize that, especially in sectors like IoT and finance, "there is increased value in being accelerated with sector experts who can also offer valuable connections." (NUMA, 2014, p.9)

Ultimately, verticalization is a logical development since "there is a huge potential in focusing a startup accelerator programme on a particular vertical, either industry vertical or technology vertical. Virtually any industry where there is a sufficient market size could be a focus for a startup accelerator, including medical devices, mobile phones, and music." (Christiansen, 2009, p.24)

In a convergent vertical development, large companies began to see accelerator programs as vehicles to boost their own innovation, facilitating scanning and identification of ideas and projects that are aligned to their strategic needs. These corporate accelerators are time-limited, outside-in innovation programs that assemble promising startups with products that fall into company-relevant categories.[31] (Weiblen & Chesbrough, 2015) This development has led some corporations to partner with accelerators, seeking their guidance on everything from how to best engage with startups to launching their own accelerators. For corporations and accelerators is a win-win partnership, with corporations obtaining valuable knowledge and accelerators gaining a source of stability. (NUMA, 2014)

In the UK, startup programs backed by large corporations or business partnerships had reached 12% of the total number of programs in 2014 (Telefonica/O2, 2014). The attraction of these programs for startups is the possibility of gaining access to, and potentially doing business with, large, established companies. Among the corporate accelerators are: Barclays Accelerator, Microsoft Ventures, Wayra (O2 Telefónica), Red Bull Amplifier, JLab (John Lewis), Distill Ventures (Diageo) and BBC Worldwide Labs. Some accelerators are adapted to operate outside the technology sectors, for instance, Front Row in fashion, Healthbox in healthcare, Kitchenette in food, Emerge Education

[31] For instance, "In 2014, Intel began offering such a program for startups in the wearable technologies field. The challenge runs over several rounds (semi-finals, finals) and the 10 finalists are promised to receive $50,000, business coaching, technical support with Intel's new Edison platform, and "intensive incubation and education" for a three-month period before the final winner is determined. A virtualized accelerator model is used to track and manage the huge number of participants in this program: 400 teams from 27 countries applied." (Weiblen & Chesbrough, 2015, p.77)

in educational technology, Young Foundation Accelerator for social ventures. (Ibid.) Looking to USA, some industry-vertical accelerators include Surge (Texas) focusing on energy startups, Kaplan EdTech (New York) focusing on education, Healthbox (Chicago and Boston) and Rock Health (San Francisco and Cambridge) focusing on healthcare. (Cohen & Hochberg, 2014) An interesting point raised by Fehder & Hochberg (2014) is that even if the focus is industry-vertical, most "accelerator portfolio startups offer some form of software or internet services, though such software may be targeted towards use in a specific industry vertical." (pp.6-7)

Clarysse *et al*. (2015) sees the corporate accelerator as an archetype called "matchmaker accelerator," since it has been typically set up by "corporates who want to provide a service to their own customers or stakeholders." (p.15) This type of accelerator contrasts with a second archetype called "investor-led accelerator" that "receives funding from investors such as business angels, venture capital funds or corporate venture capital" (p.14) This investor-led accelerator can be generalist or industry-vertical. But there is a third archetype called the 'ecosystem accelerator' that typically has as main stakeholder government agencies "interested in stimulating startup activity, either within a specific region or within a specific technological domain." (Ibid.) Table 18 provides a comparison of key elements characterizing each of the three accelerator archetypes.

An interesting example of what may be seen as an archetype mixture of "ecosystem accelerator" and "matchmaker accelerator" seems to be related to processes supporting emerging industries. The experience of Clean Energy Commercialization Accelerators (CECAs) in Canada is revealing. As reported by Malek *et al*. (2014),

> CECAs are intended to shorten the time-to-market of new clean energy technologies by facilitating R&D capabilities and accelerating the design-to-demonstration cycle. Moreover, CECAs often offer shared business support services to help reduce the administrative, procurement, and regulatory or legal process times associated with commercialization. It is also common for CECAs to connect entrepreneurs to investors who provide seed capital to help facilitate the "lean demonstration" or "early market penetration process." (pp.29-30)

Table 18. Summary of Key Elements of Three Accelerator Archetypes

	Investor-led	Matchmaker	Ecosystem
Accelerator Strategy	Key stakeholders are investors; goal is to look for investment opportunities	Key stakeholders are corporates; goal is to provide a service for the customer base 'matching potential customers with startups' (NO profit orientation)	Key stakeholders are government agencies; goal is to stimulate startup activity and create an ecosystem
Program package	Fixed programme length; Mentors comprise of serial entrepreneurs and business angels; often sector specific	Fixed programme length; internal experts from corporates are used as coaches and mentors	Fixed programme length; Mentors comprise serial entrepreneurs and business developers; most developed curriculum
Screening process and criteria	Open application; cohort-based system, favour venture teams in later stages with some proven track record	Open application; cohort-based system: favour venture teams in later stages with some proven track record	Open application; cohort-based system: favour venture teams in very early stages
Funding Structure	Funding from private investors (business angels, venture capital funds and/or corporate venture capital); standard seed investment and equity engagement	Funding from corporates; seldom seed investment or equity engagement	Funding from local, national, and international schemes; experimenting with funding structure and revenue model (search for sustainability)
Examples	Techstars Startupbootcamp ProSiebenSat.1 Accelerator Axel Springer Plug and Play Accelerator L'Accelerateur	Fintech Innovation Lab Microsoft Ventures Accelerator	Climate –KIC Le Camping Bethnal Green Ventures Scientipole Croissance

Source. Clarysse et al. (2015), p.16.

In brief, CECAs are connecting vendors, integrators, utilities, end users, and regulatory bodies in the clean energy industry, providing a ''cross industry community'' service to promote clean energy technology development, profitable commercialization, and global integration of sustainable industry practices. So far, CECAs in Canada are typically non-profit organizations, drawing their finances primarily from government and public sector grants, venture capital funds, and revenue from facility and equipment rental fees and project-related services such as technology and market analysis and training. (Ibid., p.33) Table 19 shows the different types of business models CECAs are implementing in accordance with their service, governance and capabilities.

Table 19. Business Models for Clean Energy Commercialization Accelerators (CECAs) in Canada.

Typology Base on Type of Service

Incubation model	Provides entrepreneurs and new ventures with office space and financial services in return for a rental fee or member fee, generally below market rates.
Technical services model	Provides the technical expertise and resources clean energy ventures need to demonstrate market readiness of their technologies. Here CECAs either own testing facilities or utilize facilities available in their member organizations at favourable rates.
Market linkage model	Clean technology club or membership program involving advisors, corporate and community partner and working to expand an existing market or establishing new markets for emerging clean energy technologies
Partnership model	CECAs establish business relationships for their clean technology ventures, including (i) partnerships between ventures and R&D laboratories and technology testing facilities in return for sharing profits; or (ii) joint execution of pilot or demonstration projects in return for sharing long-term earnings.
Typology Based on Type of Governance and Capabilities	
R&D focused	CECAs characterized by a public–private partnership and governed by the policy or representative governance model. They follow either an incubation focused, customer focused, or a licensing focused operation and seek for financing from large public grants, public–private funds, or direct capital investment from VCs.
Technology enabled	CECAs that adopt a public–private partnership as their core strategy. They generally implement a policy model or representative model as their governance. They are characterized by their customer-focused operation and specialized business models in technical services, market linkage, and partnership activities. Technical service fees and public–private funds are the major source of financing for these CECAs.
Market enabled	CECAs whose main strategy is activity specialization (by focusing on specific clean energy sector or clean energy technology solution). Market linkage and partnership activities are considered as the core business models. With a policy representative governance model, they adopt a customer focused operation which is financed from government grants, service fees, or membership fees.
Network enabled	CECAs that create joint partnerships with private clean energy technology vendors and public entities. This helps venture to adopt a customer-focused operation with specialization in their network enabled services. They utilize representative or hybrid governance model, employ partnership or market linkage model as their business models and seek for financing from government grants and membership fees.

Based on Malek et al. (2014)

Various other types of organizations adapt accelerator features to offer services to startup companies looking for assistance. They differ in terms of program structure, operational features, financial approach, etc. Table 20 contains 4 of these organizations that have adapted elements of the accelerator model to serve, for instance, university–affiliated startups or minority-owned startups coming from specific communities.

Table 20. Various Types of Accelerator-adapted Startup Support Organizations

Venture Development Organizations (VDO)	A VDO is a public or nonprofit organization that contributes to economic development by providing a portfolio of services, including • assisting in the creation of high-growth companies; • providing expert business assistance to those companies; • facilitating or making direct financial investments in companies; and • accelerating the commercialization of technology. (Dempwolf *et al*., 2014)
University Accelerators	University accelerators are educational nonprofits that accelerate the development of student entrepreneurs and innovation at universities in USA. They typically provide seed grants to support students through the early stages of development and do not take equity stakes in student-founded companies. (Dempwolf *et al*., 2014) "Businesses created on campus benefit from very specialized and high quality training, and support. Moreover, entrepreneurs have privileged access to information and in most of the cases to credibility stamps from the university in which they are based. On the other hand, these programs also bring some advantages to universities, mainly by reinforcing the relation with the market, companies and the surrounding community. … These programs are mainly non-profit and supported by corporate sponsors and/or by the payment of a tuition fee. Finally most of these programs do not invest on start-ups, and only some pay for expenses." (Barba, 2016, p.20) Examples are Accelerate Cambridge and Unibator, and the MIT Entrepreneurship Centre.
Proof of Concept Centers (POCC)	Proof-of-concept centers accelerate the commercialization of innovations developed by university faculty and staff, and help move these innovations into the marketplace. POCC provide seed funding for novel, early-stage research that most likely would not be funded by other conventional sources. (Dempwolf *et al*., 2014)
Outliers Accelerator	These are special accelerators "that have unique characteristics, whether because of the working space, methodologies used or the target. … Examples are Boston's Start-up Leadership Program that specialises on the training of founders, they train two members of the start-up team to become strong leaders capable of developing a fast growing company. It has an intensive training program, with network as one of the priorities. Another programme is Start-up Bus, a programme performed on a Bus trip, where entrepreneurs travel from one place to the other for 3 days and are supposed to develop a first approach to the business plan of their idea. A third example is Women's start-up Lab, an accelerator especially dedicated to women entrepreneurs, helping companies that are mainly female owned. (Barba, 2016, p.20)

Source. Based on Dempwolf *et al*. (2014), Barba (2016)

In addition, an interesting organization that deserves to be mention is CONNECT from San Diego, California, born in 1984 with an "explicit commitment to enhance community capacity as it simultaneously provided support to individual entrepreneurs." (Walshok, 2013, p.8) This 30-year

project that made of San Diego a major innovation hub leads the author to the conclusion that "accelerating entrepreneurship is as much about community transformation as it is about helping individual entrepreneurs." (p.7) CONNECT draws attention to the importance of the larger ecosystem in supporting emerging entrepreneurs in their journey from idea to business. In particular, Walshok argues, for the existence of certain principles in the governance, finance and activities "that enable both the growth of an ecosystem of innovation and entrepreneurship and the acceleration of individual entrepreneurial activity, as measured over time by startups and successful companies." (p.14) These principles are contained in Table 21.

Table 21. Principles Followed in the Entrepreneurship Experience of CONNECT

Enabling cross-professional knowledge sharing relevant to innovation. CONNECT is a platform through which the business community, the research community and the innovation community made up of entrepreneurs and investors can regularly interact around issues of mutual concern, learning from one another
Risk-oriented culture adept at managing uncertainty may be the sine qua non of entrepreneurship-rich regions. In San Diego, expensive attorneys, consultants, marketing experts, even accounting and venture capital professionals contribute a great deal of pro bono time to help the new entrepreneur with a lot of front-end knowledge, assistance, and advice. Pro bono work becomes a type of longer-term business development opportunity.
CONNECT provides an integrated platform for members of the eco-system to interact. Successful integrative platforms do the following things: (1) Organize activities and harvest experience and knowledge that help validate ideas or provide truly meaningful input; (2) Occur in a setting that is pre-transactional and completely open. Ideas and plans can be discussed, criticized, and adapted in a highly collegial manner; (3) People learn about one another, their chemistry, their personalities, and not just about specific technologies or a business plan.
Importance of multiple gateways to the scientific community, as well as to the business community. The frequency and diversity of activities and the wide range of topics and talent that are brought into the CONNECT program in any given year enables a multiplicity of issues and technologies to be addressed.
Importance of a culture of co-investment and reinvestment to sustainable entrepreneurial regions. By reinvesting, beneficiaries of programs or of company success reinvest some of the profits or benefits they have received back into the innovation/ entrepreneurship community. This goes from sharing knowledge and relationships to evaluating technology and business plans; it also includes financial reinvestment.

Source. Based on Walshok (2013)

A final trend is toward internationalization of accelerators through expansion or by joining networks. This is valuable to startups as they themselves look for international market presence. In this respect, "Initiatives like accelerator exchange programs are just a first step in what ultimately should become a full-service accelerator network." (NUMA, 2014, p.9) A good example of an

international accelerator program is Village Capital, a program that invests in startups seeking to solve major global problems and uses a peer-selection model, in which startups entrepreneurs themselves select the applicant ventures that will gain access to the program's training and investment of about $50,000. Then, "Village Capital focuses on stimulating collaboration among entrepreneurs within each of their programs. In many cases, cohorts focus on a specific societal issue; honing in on specific sectors like agriculture, education, energy, financial inclusion, and health. Focusing specific sectors allows for peer-to-peer mentorship that may not be possible with more general programs." (Roberts et al., 2016, p.8)

Coming to the end of this section, it is clear that there is a wide variety of accelerators models and, most likely, the field will continue to evolve and innovate given its young age of less than 20 years. The following words underscore well the situation: "[w]e make no prediction about the future success of individual programs because we believe that the business model for running an accelerator programme is yet to be proven. There is certainly no one correct way of running a programme and there will continue to be a great deal of innovation in this area over the coming decade." It is not surprising then to find that most authors acknowledge the need for much more research to cast light on the so many aspects of accelerators' role and performance from supporting startup ventures to economic development.

Nevertheless, some authors have tried to identify some general aspects of good practice enhancing the chances of success of accelerators programs. Table 11 above has already identified some features of strong and weak accelerators. Here, Table 22 synthesizes a framework developed by Christiansen (2009) for the creation of new seed accelerator programs. It focuses on what would make a new program distinctive and compelling to entrepreneurs.

Table 22. Framework for Creating New Seed Accelerator Programmes

Founders and their backgrounds	The most important element. There simply must be a core person or persons involved that have experience in operating in a startup company and who have experience as angel or seed investors.
Programme focus	To date, startup accelerators have generally focused on funding web applications, just as Y

	Combinator does. But there is a great capacity for innovation in the vertical focus of a new startup accelerator programme.
Distinctive and compelling	The next most important element is a focus on distinction. Founders must create a programme with enough incentives or opportunities that startups will prefer it over other programmes.
Programme goals	Goals must be clear. If the primary goal is a financial return, then a substantial number of startups should apply and be funded in each cohort. If the primary goal to build an ecosystem, the emphasis must be on the educational elements of the programme and its support network.
Funding	Depends on the focus and goals of the programme, as well as on the founders' knowledge of the particular sector. Web applications, for instance, are very capital-efficient, requiring fairly small investment and, consequently, a small portion of equity. Equity should be as low as possible, while helping ensure the programme's financial success.
Size	Basically, the more startups a programme funds, the more opportunities exist to generate the desired returns. But each startup demands the time and attention of the founders, so a careful balance should be reached.
Education programme	Accelerators operating in regions without a strong history of entrepreneurship will need to create a more comprehensive educational programme, while accelerators focusing on more experienced entrepreneurs can be successful with a more tailored educational programme. There is significant space for new accelerator programmes to innovate in their education programme.
Office space / incubation	Any new programme needs to evaluate the practicalities of offering office space, such as rent, internet access, printing, etc. Also, new accelerators must evaluate the opportunities of startups working closely together.
Brand	New seed accelerator programmes need to establish a brand, as quickly as possible. This includes everything from visual identity and website design to the list of mentors and advisors to the programme.

Source. Based on Christiansen (2009), p.26

A related contribution comes from a study of entrepreneurs who applied to fifteen accelerator programmes in the Village Capital network (already encountered above) (Roberts et al., 2016). The following are the main findings:

- programs that attract entrepreneurs with superior educational, entrepreneurial and professional credentials will deliver better program-level performance.
- program performance depends less on the size of applicant pools and more on their composition;

- programs that spend less time on finance, accounting and business plan development perform better than the others;
- programs that allow more time for entrepreneurs to work on their own tend to experience better performance; and
- organizational partners that are willing to engage with entrepreneurs and to work on program content are more valuable that those that simply contribute to the program's brand or credibility. (p.33)

Finally, the paper could not end without a look at a number of concerns made relating to the accelerator model as it moves into the future. These are shown in Table 23 and come from interviewees in the study of Miller & Bound (2011).

Table 23. Concerns Regarding the Future of the Accelerator Model

They only build relatively small companies There is an incentive for them to support companies that do already have a revenue model and perhaps don't have quite global ambitions and are instead looking to be acquired.
They divert talent from other high-growth startups Attracting talent is a perennial concern of technology-based startups.
Good companies still fail after accelerator programmes Hype around particular accelerator programmes is leading to complacency about how hard it is to build a successful business, even if all the fundamentals are sound.
They exploit startup founders The amount of equity taken by accelerator programmes has also been controversial.
They attract companies that are already struggling As the number of accelerator programmes rises, they will struggle to avoid making investments in B-grade companies. It is often argued that if a business is attracted to an incubator it probably won't be as successful as a business that doesn't need support.
They're helping to create a bubble If accelerators continue to grow and start producing thousands of small companies, we can expect to see a bottleneck developing and in the event of a crash in confidence in the sector, the value of the portfolios of companies supported by accelerators could shrink considerably.
They're just 'startup schools' Accelerator programmes are a reaction to shortcomings of the university education system in creating suitable technical and business founders rather than a viable option for investors. Positive attitudes to the accelerated pace of learning and real life experience that accelerators provide compared to business school was a common theme in our interviews with alumni of programmes.

An investment based financing system The model of accelerators relies on occasionally large multiples in return on investment in a fairly short period of time. It's unlikely that a debt-based model could work.
The possibility of scale **T**he model also only really works if there is the potential for a few of the businesses supported to reach a very large scale with millions of users or very high revenues or if there are potential acquirers for the companies who see a business advantage in buying out the founders to fuel their own growth.
How should the performance and impact of accelerator programmes be measured? It's difficult to quantify the indirect, spillover impacts of programmes, or measure whether they make a positive contribution to the economy in the regions in which they operate. We should understand more about the impact on individual entrepreneurs and environmental conditions for building businesses and innovating.
Three favourable trends Beyond these prerequisites there are two trends to look for that make the model more likely to succeed. These are a) falling costs in the early stage of businesses in the sector; (b) high demand from entrepreneurs to start businesses in that sector (successful role models will be influential here); and growth of social ventures – over the past years there has been a notable growth in the number of people wanting to create businesses that have a social as well as profit motive. This is now starting to be mirrored by 'impact investing' where the investment not only produces a financial return but also generates measurable social impact.

Source. Based on Miller & Bound (2011)

In brief, the world of accelerators is evolving in multiple forms and the future is wide open for novel developments. There is a line of evolution, however, that deserves attention for it responds to the rather small and selective number of startup projects joining the accelerators' cohorts. The large majority of projects applying to accelerators are left out and, often, there are projects that do not even apply because they are not ready to compete. This has led to the emergence of the pre-accelerator aiming to support the preparation of projects with a view to enhancing their entrepreneurial capacities to reach accelerator's level. The pre-accelerator is interesting because, potentially, it widens the quantity and quality of the offer to accelerators but, above all, helps widen the diffusion of an entrepreneurship culture and learning in society. Indeed, we shall see that a variegated number of organizations and events have emerged in recent years to create a rich evolving ecosystem of entrepreneurship learning. This ecosystem seems to be moving gradually to the formal educational system of universities and schools, thus reinforcing the trend towards the wide educational and cultural diffusion of entrepreneurship. Let us examine in closer detail the characteristics of the pre-accelerators and other types of entrepreneurial support activities.

3.4 Pre-accelerators and Other Support Programs

As made explicit by the prefix "pre" in the concept of pre-accelerator, the purpose and operation of these organizations precede that of accelerators. Indeed, their emergence has been very much prompted by the rapid growth of accelerators and the consequent competition for startup talent, accompanied by the realization that the "overall quality of startups applying to accelerator programmes is still not high enough. … In addition, as more people become interested in starting their own businesses, there is not only an increasing number of people who need to be educated about entrepreneurship, but also a more diverse audience of people seeking information, education and guidance." (NUMA, 2014, p.19)

But what are they? As found with accelerators, there is no single accepted definition of pre-accelerators. For example, Barba (2016) defines them as organizations that "usually work with idea or pre-idea stages of development, when entrepreneurs are still seeking for a team and better defining what to do." (p.10) Pre-accelerators neither invest nor take equity in startup projects ("zero funding, zero equity") and, like accelerators, they have a large component of training, feedback, pitching, networking and a competitive, although less aggressive application process. The length of the programs can go from one day to three months, with teams numbering from 3 to 10. (Ibid.)

Silva & Bermejo (2015) differentiate at least two models of pre-accelerators. There are earlier-stage pre-accelerators, where "the program acts like a discovery journey for aspiring entrepreneurs: they take a glance at what being and entrepreneur means, experiencing also some of the obstacles they'll have to face in the future." (p.9) And there are "more advanced-stage pre-accelerators [where] people go further and deeper into entrepreneurship, working on their projects until they reach the quality level that might lead them to acceleration programs." (Ibid.) In a similar vein, referring to pre-accelerators in Europe, NUMA (2014) differentiates "'light-touch' versions, such as the ubiquitous Startup Week-end or Startup Bus, to longer, more intense programs such as Tetuan Valley or Startup Pirates, these important players aim not only at introducing participants to the world of tech entrepreneurship, but also at helping budding entrepreneurs understand what it means to build a high-

growth startup and assessing if tech entrepreneurship is, in fact, right for them." (p.21)

Due to this variety, pre-accelerators target people with different backgrounds: first time entrepreneurs, recent graduates, researchers, students and also unemployed people. They can take up people with ideas ready for market validation as well as people without an initial idea, nevertheless the ultimate goal is the development of a business idea and the entrepreneurial process necessary to take it to fruition. In this respect, the ideal outcome is to pave the way for a successful application to a proper acceleration program. In so doing, like accelerators, pre-accelerators offer access to a network of experienced mentors, who in certain cases "join" a project and work exclusively with one team for the duration of the program. As said, they also tend to have a "demo day" at the end of the program, with the teams pitching in front of judges, mentors, investors and even general public. The subjects included in the pre-acceleration programs are all intended to support the development of the product and business idea, such as Customer Validation, Marketing, Pitch, Product Development, Prototype, Business Model Canvass.

According to Silva and Bermejo (2015) pre-accelerators have 5 top goals: These are shown in Table 24 that also shows organizational forms.

Table 24. Pre-acceleration Goals and Organizational Forms

Tools and Knowledge	Pre-acceleration programs aim at empowering people with valuable tools, educating them about what it takes to create a business. These programs are also effective channels to raise the community's awareness regarding entrepreneurship
Problem Solution Fit	Pre-acceleration programs focus on helping people identify exactly what is the problem, and develop a solution that fits it. This is one of the most important stages for any first time entrepreneur and where pre-accelerators can add the most value
Entrepreneurial Mindset	Pre-accelerators goal is not only to technically skill-up entrepreneurs, but also to enhance and leverage people's entrepreneurial mindset.
Build Local Ecosystem	Pre-accelerators maintain a strong network, and link experienced mentors and inspiring entrepreneurs with the participants, working on helping people create new startups that will be part of the ecosystems and boost the local economy. In countries without an entrepreneurial mindset, this action is even more relevant. Everybody knows what

	difference does it make in a local ecosystem when a startup community is truly connected and cooperates.
Get into Accelerators	Many startups applying for acceleration programs do not fulfill all the requirements, or the expected quality level. Some Pre-accelerators already prepare teams and startups for the next phase, the acceleration, where they can grow and expand quickly.
Organizational Forms	
Structured Programs	Short programs dedicated to foster entrepreneurship through an agenda that fits the participants needs and the goals of the program (examples in Europe: Startup Pirates (finished), Tetuan Valley, Beta-start, Startup Next)
Innovation Hubs	Many started as coworking spaces where the community grew. They provide workshops, education, tailored services and a healthy environment for people creating their own businesses (NUMA, Betahaus, Google Campus, Impact Hub)
University	Lots of startups and entrepreneurs come from there and we are now watching the evolution of education through the implementation of entrepreneurship and innovation courses. However Universities in Europe still have a long way to go (example in Europe: iMinds)

Source. Based on Silva and Bermejo (2015).

Amongst the goals identified for pre-accelerators in Table 24, it is interesting to note that they are entrusted not only with the goal of raising the entrepreneurial capacity of startup projects aiming to reach accelerators. They are also seen as channels for much broader aims, such as (i) raising the community's awareness regarding entrepreneurship, (ii) enhance and leverage people's entrepreneurial mindset, and (iii) building the local ecosystem and boost the local economy. The latter aim is seen as even more relevant for countries without an entrepreneurial mindset.

These goals are consistent with the various types of organizational forms also identified in Table 24 for pre-accelerators. Apart from the dedicated Structured Programs started with the purpose of fostering entrepreneurship, one finds Innovation Hubs that have evolved, for instance, from coworking spaces to offer a community education programs and access to mentors and experts, thus acquiring an important role in preparing the next crop of startups. NUMA, for instance, started over a decade ago as a coworking space and now "runs 300+ free or low cost events, including trainings

and conferences for the tech community, offering accessible entrepreneurship and tech learning to all." (NUMA, 2014, p.23) Universities come next since they are seen as evolving towards forms of acceleration programs insofar as they compete in their offers of innovation and entrepreneurship education. Moreover, Universities "whether at the undergraduate or masters levels, have as the first step, moved to launch their own incubators, and, more recently accelerators. ESCP's Blue Factory, Stanford's StartX, University of Cambridge's Accelerate Cambridge, University of Waterloo's Accelerate Centre, etc." (Ibid. p.25)

Table 25 shows five mechanisms pre-accelerators can use to try to achieve sustainability. It seems clear that it is not possible or advisable to rely on just one of them to achieve long-term stability. In fact, depending on the content and context of pre-accelerators, the most likely approach would be a blend of mechanisms to diversify and expand funding opportunities. Another possibility is that pre-accelerators may decide to move down the path towards becoming fully-fledge accelerators but, here, they enter a pretty competitive arena. Yet another possibility is that they may follow accelerators in their trend towards verticalization, that is, providing in-depth services dedicated to one or few vertical sectors. This might work if vertical accelerators are doing well in their respective sectors and would benefit from pre-accelerated operations ready to enter their closer-to-market activities.

Table 25. Possible Sustainability Mechanisms

Sustainability Mechanisms	
Sponsorship	These days it is not easy to find sponsors. There is an increasing number of requests. A business model that relies only on sponsorship is not stable if there is a chance of not being renewed.
Public Funds	In Europe, it is quite common for organizations to get public/government funding. The risk is that the process can be very bureaucratic, requiring inside knowledge, and the organization might need to adapt the program to the funding goals, getting away from the core objectives.

Participation Fee	Some programs have participation fees, but the amount is usually not high enough to make the organizations sustainable. Increasing the price would be a barrier for almost all the aspiring entrepreneurs, as before the program starts they hardly understand or value what they are about to learn.
Pre-acceleration as a Service	Pre-accelerators could make use of their experience, community-creation understanding, and participation in entrepreneurial ecosystems, to advise, manage or create acceleration programs for other organizations.
Equity	Few pre-accelerators take equity at the end of the program. In fact, it is hardly a viable choice since startups coming out of programs are at so early stage. The exit cycle is often way too, and when it happens the amount of money is not very high due to the dilution.

Source. Based on Silva and Bermejo (2015).

It is early days to judge the results and/or efficiency of pre-accelerators. To a large extent they are work in progress and it is difficult to envisage if and when some models will turn out to be successful and stable, although stability is a precious currency in the turbulent world of entrepreneurship. Pre-accelerators and accelerators are also enterprises, often experimenting sustainability (business) models. In a number of years, perhaps a decade, might be possible to see whether pre-accelerators have arrived to stay as a permanent feature of entrepreneurship or were just a "preliminary moment" before experiential entrepreneurship education offered by universities and other educational institutions had the time to evolve into a permanent feature. Indeed, the main theme of this paper is the experience of a program of inclusive acceleration aiming to take entrepreneurship education at the level of school.

In this respect, it is worth noting that a proliferation of models enriching the unfolding entrepreneurship ecosystem is taking place. Table 26 shows a variety of these new early-stage entrepreneurship models in the ecosystem.

Table 26. The New Early-stage Entrepreneurship Ecosystem

Activity	Examples	Comment
Startup weekends	Startup Weekend Launch48 Garage48	While many would think that three months is a short period of time to start a startup, it's an age for some hackers. The Startup Weekend format is now backed by the Kauffman Foundation in the US and is being supported by Startup Bootcamp in Europe. Other examples include Launch48 and Social Innovation Camp in the UK and Garage48 based in Estonia.
Investment	Angel List	Started by the VentureHacks founders in 2009, AngelList is an attempt to open

Marketplace	SeedSummit CrowdCube	up the process of raising angel investment. While most angels deliberately hide themselves away online, AngelList puts their record up for all to see. It still makes it difficult to contact them though – unless you have what they call 'social proof' they're unlikely to forward your pitch onto investors. Silicon Valley angel investor Dave McClure describes it as the **"single greatest innovation in the venture capital industry since Paul Graham started YCombinator"**. It's now been replicated in Europe by the Seedcamp team in the form of Seedsummit.org. There has also been a recent growth in crowdfunding investment platforms including Profounder in the US and CrowdCube in the UK.
Startup Schools	The Founder Institute School for Startups Startups@TechHub	The Founder Institute has already spread from its first location in San Francisco to 17 locations around the world at the time of writing. UK efforts include Doug Richard's School for Startups and TechHub's Startups@ TechHub programme. Some of these programmes even describe themselves as 'pre-accelerator programmes'[9] and encourage their graduates to go on to apply for Y-Combinator or Techstars. One interesting example is Founder Labs created by the team behind Women 2.0 and funded by the Kauffman Foundation which runs a five-week series of events to help encourage more female founders apply to accelerator programmes.
Meetups	MiniBar Silicon Roundabout Social Club OpenCoffee	It's now much easier to find like-minded people in the startup community because of services like Meetup or GroupSpaces. In London events include Minibar, the London Tech Meetup, Open Coffee. Although it's often the smaller more specialised meetups to look out for if you want to see the health of the local startup ecosystem.
Office and co-working spaces for startups	Plug and Play TechHub	Perhaps most famously pioneered by Plug and Play in Silicon Valley, office space tailored for startups has started to be replicated in other US cities as well as in the UK by Tech Hub in East London. They offer monthly or even daily rent, shared meeting and conference facilities, relationships with service providers and events put on for startups that may lead to introductions to investors or potential clients.
Hackdays	Music Hackday History Hackday Home Camp	Most weekends, there's a choice of hackdays. These differ from meetups because there's a focus on building new tools rather than on connecting with new people, but they aren't as focused on creating new businesses as startup weekend events.
Venture Incubators	White Bear Yard Betaworks	Sometimes described as 'foundries', these are investment-led incubators that provide intensive support to occupant companies. Betaworks in New York liken themselves to a movie making studio – engaged in producing and managing their own startups but also backing external productions when there's a fit with their expertise. Unlike accelerators they are not time limited and do not accept applications in cycles.

Source. Miller & Bound (2011), pp.12-13

It is important to point out that well-established accelerators such as Techstars and YCombinator are also engaged early-stage entrepreneurship activities. For instance, *Techstars Startup Weekend* promises: "In just 54 hours, you will experience the highs, lows, fun, and pressure

that make up life at a startup. As you learn how to create a real company, you'll meet the very best mentors, investors, cofounders, and sponsors who are ready to help you get started."[32] Local organizers in over 700 cities and 150 countries worldwide run Startup Weekend. Then comes *Techstars Startup Week* promoted as bringing "entrepreneurs, local leaders, and friends together over five days to build momentum and opportunity around your community's unique entrepreneurial identity. … Over the course of five days, participants in Techstars Startup Week can choose the events they'd like to attend. Typically these events are held at various venues across a city."[33] Techstars has also created a "personalized insider newsletter for all things startup in your community and around the world. … [It] is carefully curated by the community, for the community."[34] Another accelerator that has offered short one-day events as well as week events is the European Seedcamp.[35] The short events are the Mini-Seedcamp aimed at providing advice, mentorship and contacts to selected startups, while the Seedcamp Weeks are five days of a much more intense advice, mentorship and networking. (Christiansen, 2009)

Finally, among the many developments, it is not surprising to see that accelerators have also jumped online to offer entrepreneurship courses. YCombinator has launched his YCombinator Startup School, a free 10-week massively open online course (MOOC), with lectures being posted weekly.[36] This MOOC on entrepreneurship is not the first since universities have been populating sites such as Coursera and EdX with MOOCs for quite a while now. However, YCombinator is a successful accelerator that has much to say in the realm of experiential entrepreneurship education. Few universities, if any, can boast having been behind of such Unicorns as Dropbox and Airbnb.

Clearly, never before in history there has been such a rich and diverse range of activities promoting and stimulating the diffusion an entrepreneurship culture and learning in society. It is a

[32] https://startupweekend.org/
[33] https://www.techstars.com/startup-week/
[34] https://www.startupdigest.com/
[35] https://seedcamp.com/
[36] https://www.startupschool.org/, https://www.startupschool.org/?course=1

veritable movement, yet still at a youthful age, if we take as reference the birth of YCombinator in 2005. An important challenge for the future is to take this educational and cultural evolution towards the school system, promoting an entrepreneurial innovation in the system itself. Already, programs and courses such as those offered by Junior Achievement[37] that work by simulating the creation of a company have entered schools and others are making they way such as those inspired by *The Entrepreneurship Competence Framework* (*EntreComp*), seeking to offer a tool to improve the entrepreneurial capacity of European citizens (Bagicalupo, Kampylis, Punie, & Van den Brande, 2016); for instance, the Italian Ministry of Education has recently published guidelines making reference to *EntreComp* (MIUR, 2018).

This paper will examine in detail a novel effort born in Rome in an innovative experiential-learning environment created by the Fondazione Mondo Digitale, known as the InnovationGym. The program takes inspiration from the learning experience created by accelerators and pre-accelerators and seek to integrate the learning of digital with entrepreneurship skills in an experiential program called Inclusive Entrepreneurship Accelerator, to stress that it is for everybody and not just for people with particular winning startup ideas. This takes us to highlight some of the learning practices of accelerators and pre-accelerators.

3.5 Accelerators and Pre-accelerators Learning Environments and Activities

One key aspect of accelerators and pre-accelerators is their role as learning environments with a time-limited intensive set of learning practices blending experiential activities with formal and informal knowledge transfer, all around a startup or pre-startup project that provides focus and a clear evaluation mechanism. This blend constitutes a very powerful educational experience. Indeed, Hathaway (2016b) reports about an interview with Brad Feld, where the cofounder of Techstars talks about the type of educational experience given by accelerators:

[37] https://www.juniorachievement.org/web/ja-usa/home

> he likened the accelerator experience to immersive education, where a period of intense, focused attention provides company founders an opportunity to learn at a rapid pace. Learning-by-doing is vital to the process of scaling ventures, and the point of accelerators, suggests Feld and others, is to accelerate that process. In this way, founders compress years' worth of learning into a period of a few months. (p.6)

Another view sees accelerators providing and intensive, boot-camp training comparable to entrepreneurship classes at the collegiate level (Hoffman & Radojevich-Kelley, 2012). Above, *Table 8 - The Accelerator Cycle* has synthesized (see row "Programme") some of the common educational content and activities of accelerators. This common educational content is seen as offering two types of advice: (i) general advice that all startups need to understand, for instance, about running a company, raising additional funding, hiring people, etc., and (ii) specific advice typically product-focused, for instance, specific value of product for customers, product/service pricing, etc. It is argued that "[i]n larger education programmes, the advice must be biased toward the general in order to be effective. But product-specific advice and education can be invaluable to the long-term success of a company, and should be included as a part of every accelerator programme." (Christiansen, 2009, p.25)

A matter of debate, however, is the balance of time spent between the different activities making up the programmes of diverse accelerators. Here there are no universally accepted formulae. Some authors have found that "[r]ather than spending as much time as possible delivering program content, high-performing programs tended to set aside more time for entrepreneurs to work on their own." (Roberts et al., 2016, p.22) The point is that time spent by early-stage entrepreneurs "in the classroom," i.e., in organised activities with other entrepreneurs and mentors is not as beneficial as time to working on their own (or with their own teams) putting a more limited range of structured insights into practice. Thus, "[w]hen we aggregated the responses, we found that the percentage of time spent working on-site or remotely with other entrepreneurs and/or mentors (versus working on their own) was 53% for the high-performing programs versus 83% for low-performing programs." (Ibid.)

On the other hand, Cohen (2013) argues that "intense mentorship and education are

cornerstones of accelerator programs and often a primary reason that ventures participate. Education often includes educational seminars on a wide range of entrepreneurship topics, including unit economics, search engine optimization, and term sheets." (p.23) The author warns, however, that meeting several mentors, say 4 or 5 a day for a month, can be a cause of delay in the new venture development, for instance, in product development such as coding. On the other side, the heavy mentoring activity provides ventures with a valuable opportunity to learn richer perspectives on strategy while strongly stimulating network development (Ibid.) Most likely, much of the relevance of the time spent on diverse activities depends on the state of progress of the startup venture regarding both networking and strategy. Not only. It is also likely to depend on the purpose and characteristics of the accelerator themselves. Thus, above, the paper dealt with the "ecosystem accelerator" identified by Clarysse et al. (2015) among their three archetypes. They state that "[t]he ecosystem accelerators have the most in–depth developed curriculum among the three archetypes. They typically organise training sessions, workshops and practical learning–oriented events to help the ventures develop their idea and value proposition." (p.15)

All in all, the literature has identified a number of aspects regarding accelerators and pre-accelerators learning environments and activities. Much more is required, however, to reach a better understanding of what happens in these programs from the point of view of individual and collective learning in startup ventures. It is certainly a difficult matter that requires at least an understanding of: (i) the starting condition of the learners both individually and as a team, (ii) the specific blend of learning approaches and environments offered by the accelerators, and (iii) the resources, characteristics and culture of the places (i.e., cities, regions, etc.) where accelerator programs take place, including their international connections. This may not be so urgent for accelerators and startup ventures that have a high dynamic of growth, given the "virtuous cycle of success" implicit in the blend of experiential learning they have generated.

For the purposes of the "inclusive entrepreneurship accelerator," however, understanding the role of learning approaches and environment is very important, given that the aim is essentially

educational and open to all, hence the use of the word "inclusive." In the inclusive accelerator, the exclusive pursuit of startup ventures is replaced by innovation projects that may or may not lead to startups; they may be projects of technological innovation, social innovation or civic innovation, they are all equally valid for the educational journey towards entrepreneurship, particularly, as the school is the ultimate target to reach. The approach, characteristics and difficulties of such an inclusive program is the subject of Part II, where the thesis deals with the empirical cases of three leading European accelerators as well as with the Inclusive Entrepreneurship Accelerator.

As final word, it is possible to say that, in spite of the so many areas in need of better understanding, there is a clear fact in the growth and diversity of so many entrepreneurship initiatives, namely, that a trend towards a wider diffusion of an entrepreneurship culture and learning in society is underway.

Let us now move to Part II to see whether the evolution of four empirical cases is consistent with the findings of the literature review. Of course, given the fact that one of these findings is the large diversity of initiatives, the analysis of Part II is expected to have more depth than breath by revealing the opportunities, difficulties and practical ways in which the four accelerator experiences are realizing the trend towards a wider entrepreneurship culture.

PART II

Chapter 4. Case study No.1 – NUMA (France)

Chapter 5. Case study No.2 – MinCET (Israel)

Chapter 6. Case study No.3 – H-Farm (Italy)

Chapter 7. Case study No.4 – Inclusive Phyrtual Accelerator (IPA) (Italy)

Chapter 8. Comparative Analysis of Case Studies

Chapter 9. Conclusions

Chapter 4 The Evolution of NUMA Startup Accelerator, France38

The story of NUMA begins in 2003 in Paris with the founding of Silicon Sentier. It is one of the oldest European experiences and has later inspired the emergence of other NUMA operations in Berlin, Barcelona, New York, Mexico, etc., although they are mostly autonomous from each other. More than any of the other cases in this thesis, NUMA reveals the struggle and dilemmas to strike the right business model in an evolving entrepreneurship environment influenced by their own activities.

4.1 The Nonprofit Era – 2003-2015

Before NUMA there was Silicon Sentier - Silicon for "Silicon Valley" and Sentier for the metro station in Paris next to the space were they met up. Marie Vorgan Le Barzic led the experience and the founders were digital agencies and some startup that wanted to create the first network of digital entrepreneurs in the City of Paris and the Region of Île de France to engage in lobbying and promotion of new economy entrepreneurship and show that Paris was a startup city. The declared objective was: "Grow together in the new economy." (Siliconsentier.org, 2012) The diffusion of entrepreneurship in society was then in the DNA of Silicon Sentier and later on NUMA. In 2007, Silicon Sentier gained the European label of Living Lab, the first in France. They promoted the territory of Île de France as a natural terrain of experimentation for all enterprises, organizing 35 joint experimentations between startups and big companies such as Orange Telecom and SFR (Ibid).

Until 2008, Silicon Sentier did not have its own space and this was limiting. In this year, however, a landmark development took place, as the organization was able to set up its first important private partnership with Orange Telecom. This enabled the opening of *La Cantine* the first co-

[38] A great deal of the information for the NUMA case is based on an interview with Claudio Vandi, Expert in Design and Head of Learning Experience of NUMA, Claudio has been involved in over 100 innovation projects. The interview took place via Skype on 1st March 2019.

working space in Paris.[39] Le Barzic described it as "a hybrid space for events and co-working, a common house for the digital ecosystem in Paris." (Gordon-Guterman, 2018) More specifically, it had

> the goal of actually giving a roof to the community so people could come and work by paying a daily ticket or for free, and we organized a lot of events. The idea was to create connections in the ecosystem through events and basically a space where you can go and find people that were working in web development, digital design and creating new businesses… a very open space. (Vandi, 2019)

While Orange Telecom sponsored *Le Cantine*, Silicon Sentier was also able to attract funding from public sources, mainly through an important project from the European Social Fund (ESF) and additional funding from the City of Paris and the Region of Île de France. At this stage, the ESF funding covered about two-thirds of the total funding, while the other public-private sources covered about one-third. This funding was substantial and enabled Silicon Sentier to cover well its total costs for salaries, rent and all other expenses amounting to some €250 or €300 thousand per year since the organization was small, 5 people. Moreover, further income came from renting the space as the community grew, including other companies wanting to join the movement. Thus, it is possible to say that Silicon Sentier had managed to combine a number of income sources for their non-profit business model. These included the important European grant from ESF, the private sponsorship from Orange Telecom, the public sponsorship from the City of Paris and the Region, and a service income coming from renting the space. The bulk of the funding for the non-profit model, however, could be seen as *grant-sponsorship-based.*

As far as activities is concerned, at this point, the main activities were renting the space, getting big companies to organize events in the tech space, and connecting them to the developer ecosystem. One of the most active networks was first the open source community but this expanded to become a developers network involving Javascript, Firefox and other technologies. For them, the space *La Cantine* was available at no cost, since to a large extent their presence was an important asset to the space. This meant that the first period of the space was "more tech-based than entrepreneurship, more

[39] https://www.lejournaldugrandparis.fr/portrait-marie-vorgan-le-barzic-dans-les-champs-du-possible/

startup and tech than business, more engineering schools and design schools than business schools …" (Vandi, 2109) *La Cantine* attracted 15,000 people per year and saw 2000 events organized in 4 years. (Siliconsentier.org, 2012)

4.1.1 Expansion and the birth of the accelerator and the Project Laboratory

In 2011, however, Silicon Sentier took a definite turn towards active entrepreneurship by beginning two new activities: *Le Camping*, the Startup Accelerator (the first in France with an accelerator model) with the goal of "accompanying and accelerating entrepreneurship projects in France" (Table 18 in Chapter 3 placed *Le Camping* inside the category of *ecosystem accelerator archetype*), and Silicon Xperience, a Project Laboratory (a kind of Innovation Lab), an activity aimed at helping companies to beta-test their services and co-create prototypes new ones. (Siliconsentier.org, 2012) The Silicon Xperience' services were paid and hence, generated earnings from the private sector, including large companies such as Google, SNFC Transilien, Doro, Evernote, Bla, Bla Car. By 2012, this operation had tested 70 projects (30% from large companies) and had 30 prototypes designed during 10 co-creation events. It had also gathered a network of some 1,500 testers. (Ibid)

The analysis of the evolution and business model of the Startup Accelerators will be dealt with in detail later on. For the time being the argument will continue to follow the evolution of Silicon Sentier since the fortunes of this organization were obviously entangled with that of the startup accelerator. We know that Silicon Sentier had a broader set of activities with the Project Laboratory (Silicon Xperience) and the renting of the space for company activities. Indeed, by 2012, the full set of activities was described as a unique recipe blending barcamp, startup accelerator, mobile monday, coworking, co-création, living lab, along with a geographically expanding network of *Cantines* to other cities, Toulouse, Nantes, Rennes, Toulon, Paris. (Ibid)

4.2 NUMA and the Forprofit Era (2015 – Present)

The year 2013 saw the transformation of Silicon Sentier into NUMA (a neologism formed by

the words *numérique (digital)* and *humain*. Le Barzic, founder and CEO of NUMA, remembers setting the vision of NUMA in her opening speech:

> I clearly remember the opening address at NUMA on 14 November 2013 when I asked the question out loud: how can common ground be found between major companies and start-ups? How can we prevent society being divided between the old and new economy? Thousands of companies ran the risk of folding if they did not fully gauge the importance of entrepreneurial culture, while thousands of entrepreneurs ran the risk of failing if the ecosystem surrounding them did not adapt to support them. NUMA's value proposition was to open wide its doors and model to identify common competitive levers, for the benefit of all, for Paris and France's global outreach. (Gordon-Guterman, 2018)

Clearly NUMA saw itself playing for the benefit of all, for Paris and France's place in the world by promoting and diffusing "the importance of entrepreneurial culture." Along with the vision, however, NUMA brought about some fundamental changes in the business model sustaining the full operation. To start with, the funding structure was changing significantly with a sizeable reduction of the sponsorship and grant component. In fact, by 2013, the ESF grant had finished and the sponsorships from Orange Telecom, the City of Paris and the Region had dwindled to a minor contribution. The public sponsors first reduced their funding to 80%, then 50%, and so on. The funding coming from the private sector, however, was substantial and enabled in 2014 the renting of a new, bigger 1500 m^2 space, and the hiring of more personnel to implement the new Acceleration Program and the Project Laboratory.

More fundamentally, the shift in funding structure away from public sponsorship went hand in hand with NUMA's development of business-oriented strategic ambitions. This stimulated, in 2015, a major change in the organization's business model, from nonprofit association to forprofit company. In particular, NUMA wanted to have more capital to be able to invest in the market growth of their startups, with a view to increasing the value of the equity they had in the companies. Moreover, NUMA had begun to invest in some international developments, an expansion that also required money.

An article in the French newspaper *Le Figaro* spelled out the challenge NUMA was taking in 2015:

> Until now, NUMA had operated by selling consultancy services to companies, activity that accounted for three-quarters of its annual budget of € 3 million. The rest came from partnerships with large groups and funding from the City of Paris and the Île-de-France. The transformation into company must facilitate the identification of new financial resources. All the company's shares will be held by its twenty-three salaried personnel. NUMA will open 12.5% of its capital to the public, through a campaign of crowdfunding conducted in the site YesWeCrowd. In this way, it will be able to raise up to a € 1 million. Finally, fundraising of greater magnitude will be addressed to companies, investment funds, and the Bank for public investment and completed by the end of June. (Ferran, 2015)

Clearly, these types of business-oriented developments were not aligned with the nonprofit status, "because you can't invest … you can't lose money." Instead,

> we wanted to be for-profit and to have money to invest and to develop so it's not the same goal … and we also invested in some international developments so we needed more money to grow the company. Also, when you do corporate service, you are competing with agencies and consulting groups for the people that you hire, for these kinds of profiles. It's no longer a non-profit organization where people contribute to the common good, so in terms of salaries and skills that you need, it changes a lot. The people that were working for you for free, when you say it's for BNP, I mean, they want to be paid and they are right. (Vandi, 2019)

Such a momentous change of business model implied a move well beyond the initial public mission focused primarily on growing a culture of entrepreneurship. But for Le Barzac (NUMA CEO), this did not mean abandoning the mission to improve the world. Indeed, it was "a chance to show that the ideological straightjacket that opposes economic performance and general-interest action is not viable. Economic performance and ambition must serve a broader action than its own advancement. Economic performance cannot be uncoupled from strong values and a drive to make the world a better place." (Gordon-Guterman, 2018)

In practice, NUMA had little option than to move to a forprofit company because the ambition to invest, grow and expand internationally was also hindered by two convergent factors: (1) the environment had become highly competitive with scores of other organizations operating in the process of growing a culture of entrepreneurship and, (2) the sponsorship-based public funding was inherently uncertain.

Looking at the second point first, it is plain that NUMA's new more demanding ambitions required greater freedom from the uncertainties of political changes, because it is well known that changes of government, particularly with new governments of opposing views, may imply changes of policies with consequent negative impact on funding to organizations. So, it was NUMA's choice to seek greater autonomy from sponsorship-based public funding. The key point is that this did not mean the end of the financial relationship with public authorities, because NUMA "still work with the city of Paris, I mean, they still funded a couple of projects that make sense to them. Today the French government is one of our biggest clients because we coach their teams in entrepreneurship. … So we still have money from the public sector, but more as clients than receiving funding." (Vandi, 2019)

Regarding the changes in the competitive environment, NUMA was faced with serious competition in each of the three areas of value proposition they had: (i) space renting, (ii) mentoring or education, and (iii) investment money. In particular, in the first two areas, NUMA (Silicon Sentier) had been a pioneer, contributing very much to the growth of an entrepreneurship culture and ecosystem in the City of Paris and the Region of Île de France. Now this success was forcing NUMA to review and upgrade its initial value propositions. The details of how this came to happen are as follow:

> providing space for early space startups, the main competitor was the city of Paris itself, because they opened a few incubators in the centre of Paris where startups could be hosted for free, or almost for free. People looking for a space to work with a bit of support and other people to connect to, so the city itself was a competitor for this. For the education part, [the competition came from] new co-working spaces, new incubators and accelerators that organized events ... You can learn a lot simply by going to events, meetups, this kind of thing ... you don't need to pay someone for the content, and also there's a lot of content for free, Stanford, like online videos are very good - so you could train by yourself. Also the schools, like Politechniques, Design and Engineering Schools, they have all integrated some entrepreneurship classes. … the level of maturity of students who would previously ask "what's a startup?" or "what is entrepreneurship?" has raised a lot in the last 3 years. (Ibid)

Regarding investment money, NUMA was never able to accumulate enough capital to be able to play with substantial sums in further round funding. It never entered the league of the major

investing funds.

> the vision we had was to earn money from the corporate side, from the corporate services, to invest the money in startups, or raising the funds for more startup, as a long-term business … and that wasn't the case for us, for mainly three reasons. The first one is that to grow a corporate business you also need operations, you need to hire people to do projects and consulting and it's an expensive activity. The second thing is that we didn't have much money to invest in the company, and the third one is that the competition was growing, so to attract the right startups was harder to do than before. Also because you have big funds that raised a lot of money and they were able to invest big capital in the startup for the same service … (Ibid)

NUMA eventually abandoned the idea of making it big in the world of startup investment. They also abandoned the lines of general entrepreneurship education and space renting given the competitive offer of so many other spaces. The organization became more sharply concentrated on the business of corporate services, including services to the public sector, providing training and consultancy. Simultaneously, they continued with the process of international expansion, sometimes through offices operating directly under NUMA, other times through operations that adopted the NUMA branding but remained autonomous. This is something that the study will return to at the end of the case study, when we shall also see the types of services and programs NUMA is working on today.

At this point, the argument will shift to the analysis of the evolution of the Startup Accelerator, the main purpose of this thesis. We shall see, however, that the evolution of the NUMA business model is inseparable from that of the accelerator and its struggle for success.

4.3 The Silicon Sentier and NUMA Accelerator - From Nonprofit to Forprofit

As seen earlier, the startup accelerator *Le Camping* started in 2011 during the nonprofit era with a sponsorship-based business model (Table 18's *ecosystem archetype*). The main sponsors were the national railways company SNFC, the bank BNP Paribas, and Google through its program Google for Entrepreneurs (GfE). They sponsored the start of the "accelerator because they wanted to be associated with the image of startups and also because they could come and visit the space and connect with the young generation of entrepreneurs that were a bit inspiring for them." (Vandi, 2019)

These companies contributed €50,000 each for a total sponsorship funding of €150,000 to the accelerator. This funding covered the costs of paying for the rent, for experts, for people hired, etc. Over time, however, the public companies SNFC and BNP reduced their funding and GfE became the main sponsor with a yearly funding of €300,000.

In the footprints of YCombinator, they began to offer three-month acceleration programs and space to start ups. Like most of the models reviewed in Chapter 3, the personnel of the accelerator was typically small with a managing director, a responsible for the selection of the startups, a responsible for the network of mentors, and two other people: an entrepreneur in residence and a designer in residence. Likewise, the startup acceleration program was quite standard. It took cohorts of companies, 12 at a time, twice a year. The process to find the startup projects was application-based, that is, the organization issued a call for startup projects and then a jury selected those that would enter the cohort of 12 to be accelerated. The three-month program combined formal and informal learning activities through classes and mentoring by the network of mentors. There was also the Demo Day with the pitches from the projects to stakeholders, followed by graduation and alumnae. The mentors were mostly volunteers, about 100 of them, but those who really worked with the startups were about a quarter (25 people). Mentors just sought to benefit from the network and some of them may have invested individually in a startup. Up to here, not much difference with the three-month accelerator programs seen in Chapter 3. Unlike the business-oriented accelerators, however, at the beginning the Silicon Sentier (NUMA) accelerator neither gave any funding to the cohort projects, nor they took any equity from them.

We have seen that at its start in 2013 NUMA saw itself playing for the benefit of all, for Paris and France's place in the world by promoting and diffusing "the importance of entrepreneurial culture." In the case of the Startup Accelerator, this vision of public service was even more marked given the nonprofit sponsorship model implemented – the accelerator was to stimulate the entrepreneurial capacity of the ecosystem in the City of Paris and the Region of Île de France (*ecosystem accelerator archetype*). This mission, however, required economic sustainability and this

has always been a major challenge for accelerators and, more so, for sponsorship-based operations that depend on securing funding from donors who are unlikely to fund permanently.

Conscious of this situation, in 2014, as NUMA moved to a new 1500 m^2 space, the organization decided to start generating some income from the accelerator by doing both: providing some funding to and taking equity from their accelerated startup projects. Thus, "The money that we got from sponsors was also used to give some cash to the startups, in exchange for a small equity, around 5-10%. We started with 10% but it became more competitive and we moved to 5%." (Vandi, 2019) The amount of funding given to startups was initially fixed at €20,000 and then it became more variable depending on the amount of equity and the value of the startup, it was on a more *ad hoc* basis. The reason is that equity is not something that produces quick results since the startups themselves must first begin to succeed in the market -- and the early the stage of development of the startups, the longer the pay off time.

Critically, as we have seen earlier, the entrepreneurial environment in the city and the region was changing, becoming more competitive due to a growing diffusion of organizations engaged in entrepreneurship activities. Where the Silicon Sentier/NUMA had led, now many other organizations had come to enrich the entrepreneurship ecosystem. In April 2015, the press reported the phenomenon as follows:

> Accelerators … have flourished everywhere. The main French companies, such as Orange, Axa, Crédit Agricole, have opened their own accelerators to attract talent, while some foreign companies have preferred to have accelerators in France (an example is Microsoft Ventures). Investment funds, like Partech in France, have equipped themselves with structures dedicated to young entrepreneurs. … In the race to gigantism, the apex will be achieved by "1000 Start-Ups", the project from Xavier Nils' incubator, created in collaboration with the Paris Municipality and co-financed by the Caisse des Dépôts. (Ferran, 2015)

Thus, "we moved from being the only startup accelerator in France to tens of startup accelerators, so it was harder to say we have a 10% equity when other people do that for free or take a smaller amount, so that was the main change. Same thing for the co-working space, we moved from being the only co-working space in Paris to more than sixty in a few years." (Vandi, 2019)

As we know, in 2015, NUMA became a forprofit organization and the plans for the accelerator

were big:

> About twenty startups will be accompanied (before they were only twelve) during diverse phases of their growth. Numa will take 3% of the capital of these startups, as happens already since last year. The objective is to pass from 76 companies to a total of 700 in 2019 and to have about 500 startups in its own portfolio. Numa plans to exit their capital "as soon as possible," in order to recover new funds and have sure profitability at the end of 2017. … [In addition] … to distinguish itself from the existing offer, Numa wants to identify around 30% of startups outside France. After Moscow the past month, this year two other international offices will be open, and a total of fifteen are foreseen by 2019. (Ferran, 2015)

Clearly NUMA was trying to move closer to the *investor-led accelerator archetype* (Table 18) by adopting a path of small equity from investment in a high number of startups (high-volume / small-equity model) and the organization was confident since its track-record and startups incubated had attracted a lot of praises. At the time (2015), the companies that had passed through the incubator had raised €30 million and 90% were still active. NUMA was attracting hundreds of visitors and received the visits of highest-level government people, including President François Hollande, Emmanuel Macron (then Minister of Economy) and the Vice-President of the European Commission Jyrki Katainen.

The high-volume/small-equity model, however, did not produce the expected fruits and pretty soon the search for startups moved to a more selective model of more mature startups. The result was that the standard application-based cohort model focused primarily on early-stage startups left its way to a new model of proactive-search for more mature startups requiring support to make it in the market. These startups sometimes already had seed funding, a completely structured team, and were preparing for further round of investment. They needed, however, to improve their operations and structure to show that they were ready for market success and growth.

For NUMA, the proactive-search model meant scouting for startups instead of waiting for them to apply, and the number was no longer fixed, it was more *ad hoc*, maybe five or six startups, depending of the result of the scouting. It also meant implementing more customized mentorship program according to the startups' requirements – the fixed program with the same agenda for a

cohort was abandoned and the startuppers came to the space for a masterclass but in a less regular way. NUMA was to find that the new model did not result in an increase of income from the mentored startups, but it had an advantage in relation to the previous application-based model: it was less costly since "it required a bit less effort to operate because we didn't have all that selection, … so it was lighter in operation and therefore less expensive. But it wasn't more profitable. (Vandi, 2019)

4.3.1 The pre-accelerator

In 2018, NUMA decided to open up a pre-accelerator for two reasons: First, sometimes good teams with good ideas came to the accelerator but they were not yet ready to be accelerated at the level of the more mature startups. So, not send them away, maybe losing an opportunity, NUMA opened the pre-accelerator and hosted the startup projects for three months, without taking any equity, and getting them ready to go to the real accelerator. Second, more startups were applying to the accelerator, so it was decided to take also the less mature ones. As things worked out, the pre-accelerator was run for two seasons only and then it was closed down, the expectation that the pre-accelerated startup projects would then go to the organization's accelerator of more mature startups did not materialize. In fact, "they never went to the real accelerator; they all had the service for free so once they had it and they'd built their company, they didn't want to give us equity. One thing we learned was that if you want to take equity from a company you need to take it from day one." (Ibid)

4.3.2 The Demise of NUMA's Accelerator

NUMA faced some fundamental choices during the evolution of its startup accelerator. Vandi (2019) reflects:

> It seemed the main problem we had was to decide if we were in the business of volume … I mean two things, is it a business or not? Are we doing it just for the purpose of contributing to the economic development of Europe? Or are we doing this to earn money? If we do this to earn money, are you in the business of volume? So a lot of companies pay through equity or through money but a small amount, and then you need a lot to fund that work. Or are you in a business of a more capital intensive business where you select a few startups and then you act more like a fund, so you take a few and invest strongly in them?

In practice, these types of dilemma hounded NUMA, although for Le Barzac, as seen earlier, "Economic performance cannot be uncoupled from strong values and a drive to make the world a better place." This thinking was clearly manifested in 2017, when she announced the clarification of NUMA's vision as follows: "*NUMA empowers mission-driven tech entrepreneurs to solve the global challenges of 2030*. I am convinced that in doing so, we will be supporting the future companies of the Unicorn List …" (Gordon-Guterman, 2018) She took into consideration forecasts that by 2030, "global demand for water will exceed 40% of Earth's capacity. More than 40% of today's jobs will have disappeared. Climate change alone will have created 100 million additional poor people." She pointed out that NUMA received some 6000 applications annually from entrepreneurs all over the world. Some of them want to improve the world putting their energy to solve global problems. Le Barzac concluded:

> NUMA is striving to seize and foster this opportunity, by empowering mission-driven tech entrepreneurs to solve the global problems of 2030. It is time for us to demonstrate our drive to support the entrepreneurs who provide answers to the key problems of the future. Education, healthcare, food, mobility, energy, work, transparency and security: we will now devote our work to issues requiring urgent action and a relevant technological response. (Ibid)

But the NUMA startup accelerator did not manage to gather the strong necessary momentum to realize this new mission and, indeed, the 2015 goal of 700 startups by 2019 remained in the realm of dreams. All in all, the real numbers were more modest. The NUMA accelerator saw the graduation of about 80 startups in 12 seasons, including those from the non-equity period, that is, from 2011 the year of the beginning of the accelerator. The companies accelerated in the period of proactive-search of more mature startups amounted to about 20.

The equity money NUMA managed to raise was between €300 and €400 thousand until the year 2018. It was not a large amount for all the effort that went into the accelerator and the reason was that, initially, the startups were predominantly early-stage and the equity taken was small, something that did not change with the more mature startups given the growing competitive environment. In parallel, NUMA never came to have the capital necessary to invest in later rounds of

funding (did not reach the status of *investor-led accelerator*), something that would have justified greater equity. “They needed more investment and people that could help them grow. We weren't able to do that because we didn't have the capital to invest in the startups.” (Ibid.) At the same time, other organizations had emerged that made it easier for startups to raise funding. For instance, a startup in mobility could go to a corporate accelerator operating in this field. “They throw money at you ... they give you, I don't know, €30K just to be there and look smart [jokingly]. Or public funding, in France we have BPI, the public investment bank, it's super easy to raise 20-50 thousand euros.” (Ibid) So, in this situation, the offer of the NUMA’s accelerator *de facto* became uncompetitive and, worst, there was little space for maneuver to regain its competitive edge.

Not surprisingly, in early 2019, NUMA took the dramatic decision to stop the startup accelerator. “We closed down, but the space is still open. Now we are focusing more on training, so corporate training, long life learning and programs for training for companies. And so we are redesigning the space, we are still in the same space but we are redesigning a bit because one of the floors was dedicated to the startups, and it's no longer used for the startups.” (Ibid.) Thus, the dream of every accelerator i.e., to see a Unicorn company (valuation over €1 billion) came out of its facilities never materialized for NUMA.

From the point of view of this thesis, it is possible to state that the story of the rise and fall of the NUMA startup accelerator provides strong support to the proposition that a trend towards a wider diffusion of an entrepreneurship culture and learning in society is under way. NUMA was a pioneering contributor to the start of this trend in France and the end of the startup accelerator is paradoxically a tribute paid to the organization’s success in nurturing the country’s entrepreneurship ecosystem.

4.4 NUMA Lives On

As seen, the demise of the startup accelerator did not spell the end of NUMA that became more focused on corporate training but also on more programmatic actions for cities and, lately, on the

sustainability 2030 goals. Fifty people make up its personnel. There is also the international dimension that we shall now see in more detail.

In June 2019, NUMA's Facebook page described its mission in the following terms: "NUMA supports entrepreneurs and innovators in business, helping them to renew their working methods and to develop competitive advantage in their market. Anticipation of the future of work is in the DNA of NUMA."[40] In addition, NUMA's website (www.numa.co) presents their business offer along the lines of three core dimensions: Training, Space Renting, and Network. Table 27 shows the various training programs offered under Training, while Tables 28 and 29 illustrates the offer of the Rent a Room and Network programs respectively (for more details visit corresponding website pages).

Table 27. NUMA's Training Program Offer Today

Management	How to become an agile manager. It addresses the question: What makes the successful manager today and tomorrow? It deals with the following key skills: (1) *soft skills* at the business, collective and individual levels, (2) *leadership* as a relay (carrier and implementor of the enterprise's vision), example and mentor, and (3) execution, involving vision, team and performance. https://www.numa.co/fr/thematique/management?referrer_name=/)
Intrapreneurship	Innovate in your company. It addresses the question: How effectively build or improve a service or product offering in your company? As above, it also deals with soft skills, leadership and execution but the latter focuses on strategy, product and execution. (https://www.numa.co/fr/thematique/intrapreneuriat?referrer_name=/fr/thematique/design-thinking)
Design Thinking	Innovate with Design Thinking. It addresses the questions: How to prioritize a problem, conduct a user research, make sure your solution solves a real problem? As above, it also deals with soft skills, leadership and execution but the latter focuses on analysis, design and deployment. (https://www.numa.co/fr/thematique/design-thinking?referrer_name=/fr/thematique/intrapreneuriat)
Digital Marketing	Make marketing a performance driver by translating data into insights, experimenting and iterating. It addresses the questions: How to master the channels of interaction with your customers? How to collaborate with agencies, creative and influencers? How to design and run user centric marketing strategies? As above, it also deals with soft skills, leadership and execution but the latter focuses on analysis and definition, build, and execute and iterate. (https://www.numa.co/fr/thematique/marketing-digital?referrer_name=/fr/thematique/intrapreneuriat)

[40] https://www.facebook.com/pg/numaparis/about/?ref=page_internal

Learning Expeditions	Visit and exploration of innovative places ("territories of innovation"). These are tailor-made formats of one to five days spent in one or more cities, to meet the key innovative players, inspire, learn, connect, align and work on strategic topics related to digital transformation. The Learning Expeditions are c o-created with the clients to ensure full alignment with the economic, strategic and human issues. At present the exploration sites include the cities of Paris, Berlin and New York. (https://www.numa.co/fr/learning-expeditions?referrer_name=/fr/thematique/marketing-digital)

Table 28. NUMA's Rent a Room Program

Atelier	Room for meetings, creative workshops or training. Rented half day or evenings (€900) or full day (€1200).
Creativity	Favorite for creativity and brainstorming sessions. Also hosts meetings and creative workshops. Rented half day or evenings (€900) or full day (€1200).
La Pulse	Room for meetings, training and workshops. Next to the meeting space there is a lounge area for small groups. Rented half day or evenings (€900) or full day (€1200).
La Terrasse	Private space for seminars, conferences, hackathons. It is fully equipped and has a large balcony. Rented half day (€3500), evenings (€4000) or full day (€5000).
La Toile	Space located in the 3rd floor that hosted the startups of the acceleration programme. Rented half day (€1800), evenings (€22) or full day (€2800).

Table 29 illustrates NUMA's Network Program as presented in NUMA's website. The first entry (row) contains the network program DataCity, an interesting strategic approach to dealing with challenges at a city-scale. The following three entries (rows) contain the current international dimension of NUMA's work. Let's deal first with the DataCity program and, then, with NUMA's international dimension that, as anticipated above, has a long history.

DataCity

The details of the DataCity program are well synthesized in the first raw of Table 29. Figure 11 adds a historical timeline to the birth and evolution of the program. As can be seen, DataCity was preceded by two initiatives: Data Shaker in 2013 and a project with the French Press Agency in 2014. NUMA considers these projects part of the pre-history of DataCity, since they provided the track record to win the call for tender "to run an open innovation program on smart city topics" that saw the birth of DataCity. Two editions followed in 2015 and 2016 respectively. In 2017, DataCity starts

its international expansion with Casablanca and in 2018 the program is run in Berlin and Barcelona.

Table 29. NUMA's Network program

DataCity	It is a program aimed at improving the quality of life in the city. It has an ecosystemic approach bringing together "corporations, startups and local authorities to co-design and implement solutions for more inclusive and liveable cities. … Over a 6 month program, the participants go from a challenge definition phase to the co-creation of concrete tech-solutions designed to solve main cities' challenges for a sustainable future." (NUMA, 2018) DataCity projects start small in contact with the field to best meet the needs of users and then ensure effective deployment on a large scale. In collaboration with the City of Paris, the DataCity program has run for 4 seasons, involving 48 experimentations, 40 large partner groups, and 46 startups. The focus has been on the following strategic issues: transport, health, environment and logistics. Finally, the DataCity program has been recently implemented internationally in Bangalore (focused on Energy, Mobility & Transport, Environment, Urban Planning, Quality of Life, and Local Development) and Berlin (focused on waste management and mobility - officially launch in April 2018). Two other places are: Barcelona (focused on enhancing Barcelona's vision of data as a common good to solve City challenges (NUMA, 2018) and Casablanca. (https://www.datacity-fr.numa.co/ https://www.datacity.numa.co/cities-barcelona
NUMA – New York	This operation is a service dedicated to growth stage startups that wish to achieve scale within the US and global markets. During the program, startups participate in workshops that identify the best strategies to scale their businesses and in events that immerse them into the local tech ecosystem. Learning Expeditions are organized for visits, meetings, networking with key players of the New York leading innovation hubs. https://www.new-york.numa.co/
Berlin Innovation Agency (BIA)	BIA is an entrepreneurial agency and academy offering services for New Work and Startup initiatives for large and medium-sized established companies. BIA run (1) *Training Bootcamps* for people focused around Startup Thinking, Innovation Design, New Work and Agile leadership; (2) Program Services to power transformation through program design, facilitation, digital services, and entrepreneurial coaching; and (3) *Venture Studio*, seeking to bring new product ideas to life through a 4-levelled innovation architecture: Business, Product, Technology, and Corporate Integration. BIA has a joint venture agreement with NUMA. (https://www.berlin-innovation-agency.com/)

NUMA Bangalore (NB) (India)	This operation engages with startups, cities and corporations to speed up innovation and solve global challenges. It is in Bengaluru (also called Bangalore) one of the most innovative cities of the world. NB offers services for (1) *Team Empowerment*, triggering cultural change by providing training and coaching to instill a "learning by doing" mindset (design thinking, lean methodology, etc.); (2) *Experiment, Build & Test New Ideas*, acceleration of business goals achievement through fast-tracking innovation using entrepreneurial methodologies (bootcamps, hackathon, etc.); (3) *Access the Startup World of Innovation*, scouting, selecting and collaborating with startups to fuel the innovation pipeline (startup cafe, vertical Innovation & accelerator, DataCity etc.); and (4) *Grow Your Startup*, turning startups into execution engines and raising venture capital by leveraging NUMA's in-house resources and global networks (NUMA AI Hub, startup corporate connects, etc.) NUMA Bangalore also offers renting space for offices, meeting rooms, event space, and coworking, and run Learning Expeditions with visits to Bengaluru's leading innovation hubs and focused workshops. NUMA Bangalore is the only international operation running an accelerator program. It started in 2015 and has three lines of vertical acceleration: AI Hub, EdTech and Retail and Food Tech. It receives over 1000 applications per year and already counts over 20 startup alumni. (https://www.bengaluru.numa.co/)

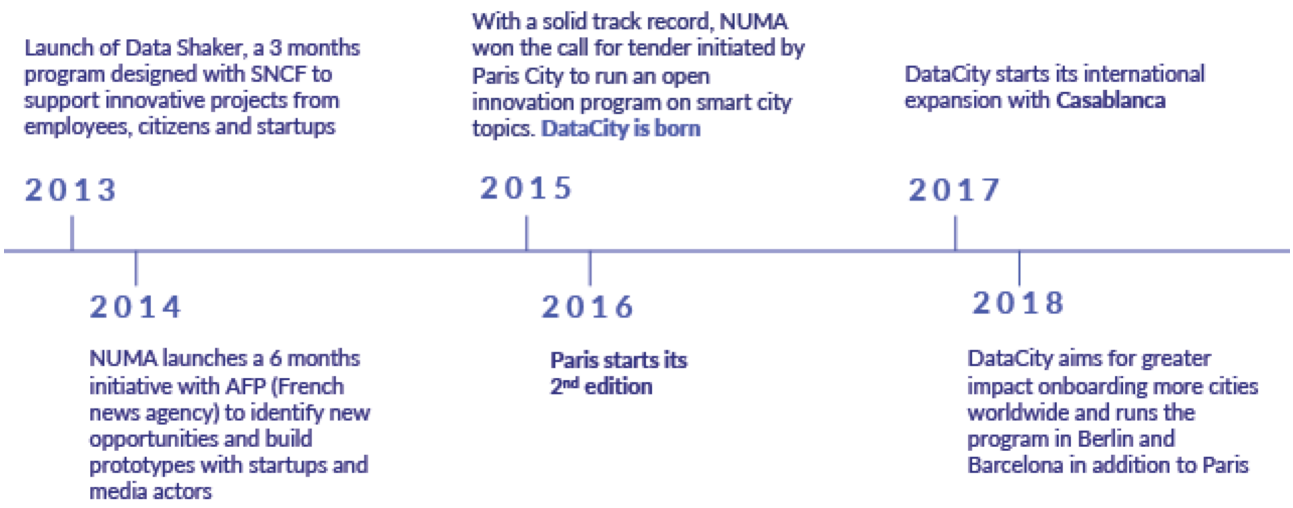

Figure 11. Birth and Evolution of the DataCity Program (2013-2018)

Source. NUMA (2018)

Two of the key aspects of the DataCity program are: (1) ecosystemic character focused on a city scale and (2) international expansion. But DataCity is not the only city-oriented program run by NUMA. The organization has also created other programs at the request of companies, that is, as

corporate service. An example is the City Maker program initially driven by Renault with the participation of many other partners. City Makers is an open innovation program designed as a platform to understand the challenges created for cities by rapid urbanization such as pollution, congestion, stress on infrastructures, and experiment innovative mobility solutions with startups. 70% of the world's population will be urban by 2050. (NUMA/Renault, 2018; NUMA, 2019)

The first edition of the program (2017-2018) was driven by Renault and sponsored by RCI Bank and Services, Nissan, AXA, and the City of Paris. NUMA conducted the 10-month program on two axes:

- *Think* – public events about mobility and innovation, involving researchers, startups, mobility experts to discuss about the themes of experimentation. Over 1000 people participated at these events.
- *Make* – Open innovation challenges to experiment innovative mobility solutions. The City of Paris and corporate partners co-developed solutions in partnership with startups.

The first edition carried out 9 experiments: 2 on the theme of electric vehicle, 3 on new services from car data, 1 on augmented experience in the car, 1 on insuring new mobility services, and 2 on multimodality solutions. (NUMA/Renault, 2018)

The second edition of City Makers was conceived by NUMA and brought together as partners Europcar Mobility Group, the Renault Group, MAIF, Nissan, RCI Bank and Services, Shell and the City of Paris. This edition tackled 6 challenges: 5 products and a predictive study on mobility in Paris in 2030. (NUMA, 2019)

For NUMA, a corporate service program such as City Makers works well since corporations pay a fee to be part of the program and NUMA use the startups they know to co-create service solutions with the corporations. But it is a complex program, not that easy to operate because "it doesn't work unless you have a few partners involved that pay at the same time. So there's a lot of work to find the partners each time, but it works." (Vandi, 2019)

4.5 NUMA's International operation

Let's start by remembering that, in 2015, NUMA had already opened an office in Moscow and was about to open two more in the same year, with fifteen planned by 2019. Le Barzac explained those ambitions: "We received an increasing number of calls from accelerators and cities wishing to duplicate our model. … I therefore decided to launch NUMA's expansion on an international scale, by opening offices in Moscow, Bangalore, Casablanca, Barcelona, Mexico City, then Berlin and New York ..." (Gordon-Guterman, 2018)

Figure 12 shows the Timeline of NUMA's evolution with the international expansion of the years 2015 (Bangalore, Moscow), 2016 (Casablanca, Mexico, Barcelona) and 2017 (New York and Berlin). Table 29 has described in detail the operations in New York, Berlin and Bangalore. These are the operations that continue to have a close relationship with NUMA, while others such as Barcelona and Mexico had a shorter or a branding relationship, and there is little information regarding Moscow and Casablanca.

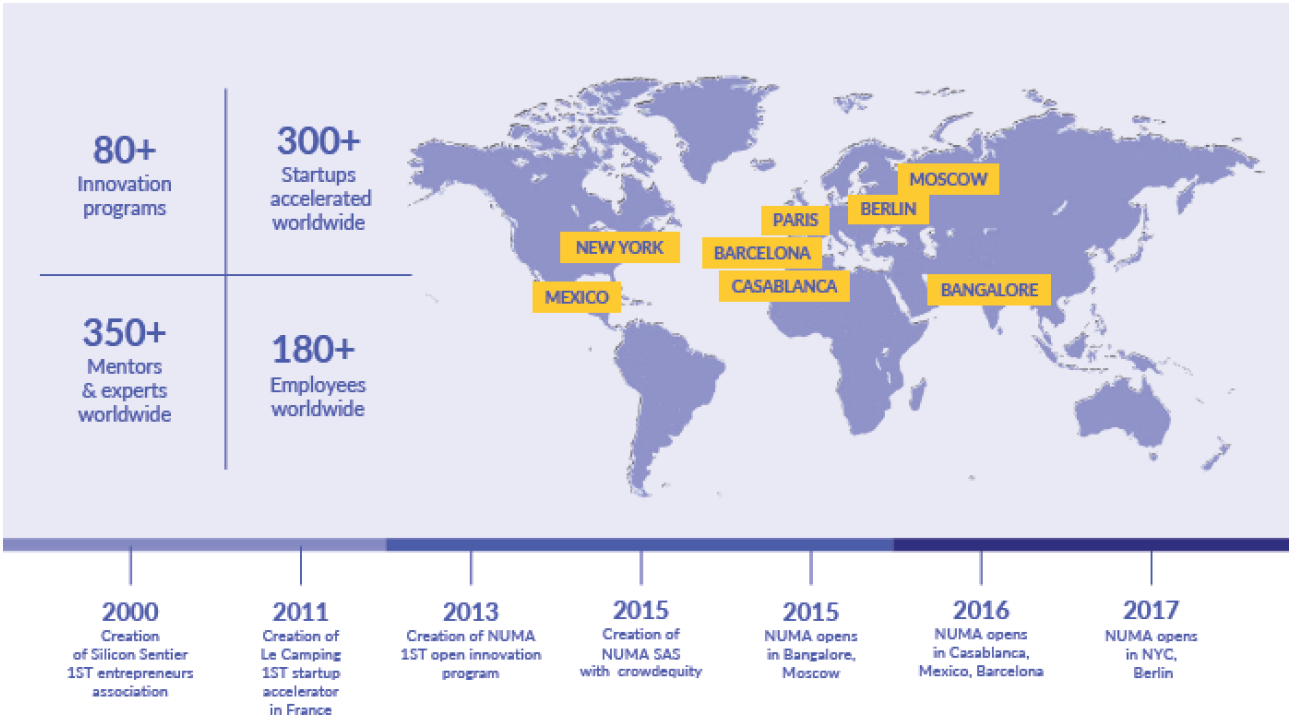

Figure 12. NUMA's International Evolution

Source. NUMA (2018)

Thus, it is important to realize that NUMA's international expansion was not a unified operation; there was not a single model such a franchise operation would have been. Most of the time it has been a joint project where NUMA played a part but did not owned the venture. In fact, "the only ones 100% operated by us are Berlin and New York – these are the ones that we opened with teams that we hired to start Numa abroad … The others were companies that already existed and that we trained and became partners with them. We didn't buy them, nor are they owned by Numa Paris." (Vandi, 2019) From Table 29, we see that Berlin and New York do not run startup accelerators, Berlin is rather a corporate-oriented hub; whereas New York "help companies and also young startups to develop their business in the US and in New York, … you pay a fee for that ... it's not equity - you pay a service." (Ibid) From Table 29, NUMA Bangalore is the closest to NUMA Paris, offering renting space, coworking, Learning Expeditions and it is effectively the only international operation running a program of vertical accelerators. Certainly NUMA Bangalore has benefitted greatly from its joint venture with NUMA Paris but it is run largely as an autonomous organization.

Regarding the experience of NUMA Barcelona, this operation is now quite autonomous. NUMA Paris was only involved for two years: "it was a two-year program and so we did the 2 years and we stopped … It was a project with the Mobile World Congress so the city of Barcelona and the Mobile World Congress paid us to operate a startup accelerator in Barcelona, so we had money out of that but in terms of additional income it wasn't that interesting." (Vandi, 2019) More recently, NUMA has started collaborating with the Municipality of Barcelona on the DataCity Program (see Table 29). In the first edition, corporations and technological enterprises are being invited to tackle urban challenges whose resolution sees data as the central instrument. The Municipality of Barcelona proposes the challenges.[41]

Finally, NUMA Mexico evolved from a joint-venture with an existing organization, Venture Institute. "Venture Institute … joined forces with the French accelerator NUMA to launch NUMA

[41] https://www.datacity.numa.co/cities-barcelona

Mexico, as a catalyzer of startups, communities and corporations in the entrepreneurship ecosystem in Mexico. This joint-venture bring together the 5 years of experience of Venture Institute in the Mexican ecosystem and the 15 years of NUMA experience in France and international markets." (NUMA Mexico, 2016) Venture Institute was already running an accelerator since, the title of an article in 2016, read: "NUMA Mexico will accelerate 25 startups in its batch 14." (NUMA Mexico, 2016) In December 2017, NUMA Mexico launched "a **new generation of startups** in our incubation and acceleration programs. … and also led the **soft landing of international startups**, with the objective of creating greater competition and diversity in the Mexican market." (NUMA Mexico, 2017) This was batch 16, and the call for batch 17 is already closed. Today NUMA Mexico is an autonomous operation claiming the following services startups, co-working, incubator, accelerator, and open innovation. In the accelerator, "In exchange for the program, NUMA will take 5% of equity of the company. There is no cash fee associated with the program. As part of this program, Numa becomes a long term partner in exchange for 5% equity stake, which means support during and after the program, with investor rounds, and business and growth strategy among others." (NUMA Mexico, 2018)

As a final word, the national and international evolution of NUMA in almost two decades constitutes the fascinating journey of an organization that meandered between visions and strategies of common good and business performance in a dynamic context that the organization itself helped shape. In the end, the ambitious targets regarding the startup accelerator did not work out as envisaged, but the legacy of lessons and expertise is certainly a treasure NUMA will fruitfully use as the organizations continues its adventure into the future. It remains just to reiterate that the story of the development and demise of the NUMA startup accelerator clearly support this thesis's hypothesis of the existence of an unfolding trend towards a wider diffusion of an entrepreneurship culture and learning in society.

Chapter 5 MindCET, Israel[42]

MindCET is a young experience of about 7 years. It started in September 2012[43] and has grown and enriched continuously its activities both nationally and internationally. A key success factor in this evolution has been the stability afforded by its business model that can be described as *sponsored-based vertical accelerator*. Let us examine in detail the governance and practical implication of this model.

5.1 Birth of MindCET and the Path of Entrepreneurship

MindCET is the brainchild of Avi Warshavsky, CEO of the Israeli company Centre for Education Technology (CET), the largest education technology company in Israel with about 1000 employees. CET was created 42 years ago and innovation has always been part of its DNA. CET mission has been described as follows:

> to empower educational systems around the globe through sharing our knowledge and expertise to create the learning environments of the future. CET's approach to innovation has always been to harmonize pedagogical needs with the evolution of new technology. Instead of 'pushing' technology onto the education system, we work closely with education stakeholders to ensure that technology and digital content best serve their teaching and learning needs.[44]

About 6 years ago, CET felt that technology was advancing fast, while education systems were moving much more slowly. There was a widening gap between what the education system was providing and the needs of the new generations of digital learners. Consequently, the "organization decided to create a group of people that would dedicate themselves to creating solutions for the digital learner." (Waismann, 2019) The target was to be the education system: schools, teachers, students, etc., and, very important, the new group was to have the full support of the company, operating autonomously, beyond the worries of making business, it "would have the privilege of thinking about

[42] A great deal of the information for the MindCET case is based on an interview with Cecilia Waismann, Vice-president for Research and Development of MindCET. The interview took place via Skype on 27 March 2019.
[43] https://www.crunchbase.com/organization/mindcet#section-overview
[44] https://www.home.cet.ac.il/cet-world/

what the needs of the digital learner are, and what would be the direction that educators should take to meet these needs." The group became MindCET, initially formed by 5 people and, in practice, acting like an independent spinoff under the wings of the mother company, deciding the objectives and the processes to follow. One benefit MindCET enjoyed from day one was the allocation of an open space occupying one floor in CET's Tel Aviv offices.

The group began to decide how to approach the key problem of the widening gap between the educational system and the needs of the digital learners. They looked around to the world of industry and saw that large companies were bringing inside startup approaches to benefit from their different product development models that fit better with the digital user. Thus,

> We were the first ones in the world who actually decided to explore the world of startups and see how we could use their elements to, in a way, help create a system that meets the needs of the digital learner. That's how MindCET started. So we saw ourselves at the beginning as a startup, we had no answers, so we always had a very exploratory spirit. … We thought from day one that there are a lot of amazing things happening in universities, there are a lot amazing things happening in R&D in the faculties, but this knowledge stays there. So from day one, MindCET's proposition was: 'let's bring together researchers, startups, teachers and students to everything MindCET does.' Let's open an equal dialogue, with no hierarchy, and this dialogue is going to be the leading process in everything MindCET does. So firstly we decided to open the accelerator. (Waismann, 2019)

This was a crucial realization that put MindCET's nascent strategy straight into the path of entrepreneurship and, specifically, into the path of vertical acceleration. It is important to stress, however, that this accelerator had no obligation to make business or become profitable, given the stability provided by its sponsorship-based model (close resemblance to the *matchmaker accelerator archetype* of in Table 18)

MindCET's paramount objective was to provide new pedagogical approaches, educational innovations that disrupt the current educational system. This particular situation gave MindCET the possibility to evolve a very distinctive strategy of vertical acceleration operating in the EdTech industry. Thus, very early on, in the first two or three years of existence, MindCET opened three lines of acceleration that, together, constituted an interrelated set of instruments to favor the diffusion of an entrepreneurship culture in society, particularly through the world of education.

- the first was a line devoted to early-stage entrepreneurs trying to transform educational solutions into products. This line was very much in the tradition of vertical accelerators seen in Chapter 3, with MindCET seeking to support the journey of the educational startups in the understanding that these could become instruments of disruptive education into the traditional educational system.[45]
- the second was a line of acceleration dedicated not to aspiring entrepreneurs but to teachers, with a view of supporting teachers and the educational system to understand the entrepreneurial culture. As such, this program was not intended to generate business results, but rather to tackle the difficulty EdTech startups find in having their products adopted by the educational system.[46]
- the third line was a Research and Development program called MindCETeX devoted to outstanding, highly motivated developers with an interest in the EdTech field. These developers work at the MindCET campus at Yeruham conducting R&D on innovative technologies and participate in the MindCET accelerator program, having support from professional and senior personnel from leading tech companies. While in the program, the researchers enjoy free accommodation and a monthly income.[47]

As we shall see, these three programs constitute the foundations of a continuous enrichment of MindCET offer of entrepreneurship acceleration to startup, teachers, and outstanding developers, as well as of the growing international relations established by the organization over the years. In the following, the paper concentrates on the analysis of the first three fundamental programs and then it will turn its attention to the other programs that have further enriched the MindCET ecosystem of activities.

5.1.1 The startup accelerator

[45] https://www.mindcet.org/en/accelerator/
[46] https://www.mindcet.org/en/fellows-program/
[47] https://www.mindcet.org/en/mindcetex-program/

The year 2012 saw the start of the MindCET startup accelerator. It took inspiration from the lean startup model proposed by Eric Ries in his book *The Lean Startup* (Ries, 2011). It followed the steps of the already famous YCombinator accelerator seen in Chapter 3, while keeping a variety of conversations with other organizations to learn as much as possible. As the first activity in 2012, the MindCET accelerator took 4 entrepreneurs who had an idea for an educational solution. At this early stage, the accelerator accepted people with early ideas to be developed, something that was about to change later on as the accelerator became more established. But this was an early learning period in which the accelerator itself was defining and piloting its program. The key element was the distinctiveness of the EdTech industry and particularly its customer base, the educational system. So, "we built a program for them, based on what we thought. We thought that actually the EdTech industry has some sort of differentiations that they needed to learn. … in Israel for example education is public - there's no private sector. So there's many things you have to understand about providing a product to education that are different about selling something on a store." (Ibid)

In fact, being a vertical accelerator in the EdTech industry, it was logical for the accelerator to introduce the specificity of this industry to the aspiring EdTech entrepreneurs. After all, the mother company CET had 42 years of successful product adoption in the Israeli market. This wealth of expertise in the EdTech market was a unique knowledge asset MindCET could bring to its vertical acceleration program, along with the more common themes of business models, design, etc.

In practical terms, the full program of the Startup Accelerator run for over 4 months involving cohorts of several companies. The aim was to bring these early-stage EdTech companies from Minimum Value Product (MVP) (concept borrowed from the Lean Startup approach) to market penetration and raising capital. Cecilia Waismann explains the program in greater detail:

> It lasts almost 5 months. … We have a thorough selection process; we always receive hundreds of applications… we choose up to 10 companies only. We actually try to choose less because every company comes with 2 or 3 entrepreneurs. So ideally, 6 to 8 companies, but there were years when we accepted 10 companies. … Almost all of them are required and obliged to be with us for 2 days a week. If they cannot commit, we don't accept them. They have to be physically at MindCET two days a week. … The rest of the week is flexible.

Lectures are a critical part of the program, aimed at making the startups understand that the "educational industry is a bit messy. … People think they understand the education system because they've been a student." (Ibid)

> So we do have some lectures that they all have to attend, we bring people from the education industry, we give lectures on the pedagogical value that all EdTech startups should think about. If you don't know your pedagogical value then you cannot be an EdTech startup. We bring financial advisers, we also give talks on financing. It's an extremely important business model. What we found in 6 years is that startups don't understand business models. (Ibid)

Thus, the program also contains lectures on business model and this is complemented by mentoring activity conducted by the same program's teachers but in a much more individualized fashion. The matching of mentors and startups happens at the beginning of the program during one day when the startups illustrate their products to all the MindCET mentors and then each mentor is matched with one startup. In addition to lectures and mentorship, the MindCET acceleration program also implements many problem-solving workshops, thus,

> we do a lot of workshops and they actually work better than the lectures … for example everyone has a serious problem understanding what problem they are solving with their product? So we host a lot of workshops on problem solving, product development and ideation. MindCET has developed specific workshops, actually a lot of people across the world invite us to come and do workshops because with our experience we have developed specific workshops to help startups develop EdTech solutions. (Ibid)

Clearly, the MindCET vertical accelerator shares many features of the types of accelerators found in Chapter 3. Something different, however, is the mentor network that's basically internal to MindCET. On the other hand, despite the fact that the MindCET accelerator is not obliged to make business or a profit, this does not mean an absence of a financial policy regarding both (i) initial funding provided to the selected startups and (ii) an equity taken in exchange for the acceleration service. On the first point, MindCET "used to have a fixed fund and every year we changed … there were some years that we didn't give funding at the beginning, after they've been with us for a month there's a board which decides if we are going to give them funding or not." (Ibid) On the equity issue, "we take equity from all startups that are with us. It depends a lot, we usually give ourselves one

month to get to know the startup and then according to what we believe about the future, from 3 percent to 8 percent." (Ibid)

As the MindCET accelerator has evolved to attract many applicants, the selection procedure has moved from accepting early-stage MVP startups towards selecting startups with more developed products and teams. Thus, "for the accelerator today we only select companies that … show us something working. Initially we accepted MVP's or even ideas … but we don't do that anymore unless we see something very promising. But we tend to request now a tested prototype; we tend to choose startups that provide either technological or pedagogical innovation." (Ibid) In addition, once the acceleration program is completed, MindCET continues to assist the startups helping them to connect with people in the world of education as well as with potential partners, customers, investments and technology.

Table 30 shows in detail, how the MindCET website publicizes all the elements of its accelerator program.

Table 30. Elements of the Accelerator Program

Product development and adapting it to the market	Entrepreneurs take part in workshops on product development and are exposed to working methodologies and best practices. The entrepreneurs check the suitability of their product to the market, and are assisted by specialists and professionals who, from the beginning, provide advice on legal matters, accounting, finance, product development, product design, marketing, public relations, and more.
Pilot	MindCET helps each venture carry out usability trials with real users, as well as pilot studies over a significant period of time, to test the product and receive comprehensive, structured feedback about the product.
Involvement in an ecosystem	A large part of MindCET activity includes continuous meetings with entrepreneurs, experts and investors active in the entrepreneurship scene. Many meetings are arranged with leading teachers and educators, to obtain feedback and ideas for improvement. Teacher involvement assists in obtaining product feedback from a relevant audience with access to future users, providing both sharp knowledge of the needs on the ground and an in-depth understanding of optimal methods of deployment. MindCET also arranges meet ups and other events with the participation of entrepreneurs and investors from Israel and abroad, at which MindCET entrepreneurs can present their initiatives.

Business strategy	Assisting entrepreneurs in the development of business strategies for their products, understanding their target market and most appropriate user audience. Construction of a business plan, budget, capitalization table, deck for investors, and so on. In addition, discussion on the way to present the venture to various audiences – clients, investors, users, etc.
Investments and post program	The program ends with a Demo Day, in which the different initiatives are shown to a group of investors with varied areas of interest. MindCET continues to assist entrepreneurs, as far as possible, through regular meetings, connection with our own networks, organized business missions abroad, meetings with investors, feedback on products, and any other assistance that can be provided.

Source. Adapted from https://www.mindcet.org/en/accelerator/

5.1.2 The Fellows Program – acceleration for teachers

During the second year, 2013, MindCET noted that there were a lot of startups coming out with attractive solutions but all of them were facing the problem of adoption and this led to imagine new acceleration target: "the education industry was not adopting those solutions, and nobody understood why. In the second year we started to approach more clearly the educational professionals, so we created an accelerator exactly like the one of the startups, only for teachers." (Waismann, 2019) It was not business-oriented as the startup accelerator, since the startups need to make a living. Instead, the accelerator for teachers had a different objective: "help teachers and the educational system to understand the entrepreneurial culture. We strongly believe that an entrepreneurial culture has some elements that can disrupt the educational mindset, that can help the education system to better understand the learner … [for that] we have to bring the teacher and student as part of the product development." (Ibid.) This was in fact a unique step into helping the diffusion of a culture of entrepreneurship in the educational system. MindCET had already found out that EdTech startups did not fully understand EdTech business model, particularly, the fact that "If you don't know your pedagogical value then you cannot be an EdTech startup … [And they realize that teachers were in a similar position]… Actually teachers don't either, in our teachers program we've also taught that when you are in front of a student you have to understand what you are providing, you have to understand what the student is buying from you." (ibid)

This was a momentous shift of vision for the MindCET operation. The concentration was no longer exclusively on EdTech startups and the potential of their products to disrupt the dynamics of the educational system. Now, a second line of 'acceleration' sought to pervade directly the educational system with an entrepreneurial culture through forming teacher entrepreneurs (or *intrapreneurs* for that matter) who eventually could bring the system closer to the digital learners. Clearly, this lends direct support to the main idea of this thesis of a growing diffusion of an entrepreneurship culture and learning in society, in this case, through teachers in the school system.

The result was the Fellows Program born in collaboration with the Ministry of Education. The Ministry provides the means of finance for the teachers who participate in this program with teachers having to dedicate one day a week for a full scholastic year to attend the MindCET program. It is worth noting that, in Israel, teachers work 6 days a week, having only one day of the weekend free. If they are accepted into the MindCET program, this free day "is the day they dedicate to MindCET. In fact, the teachers on our program have zero free days. They don't take a school day, they take to come to us their free day." (Ibid)

Clearly, this reveals an important commitment from the teachers and MindCET must make sure that this is the case with all selected participants. So the process of selection is rigorous and not necessarily determined by the fact that they should have an idea of an EdTech solution already in mind. This is not a decisive part of the selection criteria, as it is the fact that they should have an open attitude towards technology.

> So we do try to look for teachers that see technology as a positive thing, even if they don't know anything about technology. We accept teachers that have zero skills with technology, but that have the wish to learn. Of course, at the end after we've selected a group, we try to find the ones that have a more, let's say, more probability of bringing their ideas to their schools, because at the end of the day that's our objective. We see the [learning] team provoking a domino effect in the education sector, so we try to find teachers that can be leaders in the schools they are working at, and they can bring everything they've learnt in MindCET into their schools. (Ibid)

At the end of the day, "the methodology of the program is based on turning a teacher into an entrepreneur." If they don't experience entrepreneurship, MindCET sees the difficulty of transferring

to them all the organization has learnt. One element to consider is that teachers are used to professional development courses where some trainer teach them some topic or skill in more traditional formats. For MindCET, this doesn't truly change their mindset,

> so we feel that if we allow them to go through the process of a startup, they then understand. What happens is that many teachers at the end, end up with very interesting solutions and we help them take their solutions and transform them into a real product. We have a lot of foundations in Israel that support innovation in the education system, what we do is we bring these foundations to listen to the teachers solutions and connect them with them, so many of these foundations help these teachers carry on with their products. (Ibid)

The specific dimensions of the Fellows Program, as described in the MindCET website,[48] are shown in Table 31. It is easy to recognize the basic model of an accelerator, although adapted to the needs of forming teacher entrepreneurs whose purpose and innovations are the transformation of the educational system to bring it closer to the digital learners. They are also the carriers of an entrepreneurial culture into the system.

Table 31. Elements of the Fellows Program

Product development	Teacher-entrepreneurs will take part in workshops on product development, and are exposed to working methodologies for the development of an EdTech product. They test the suitability of the product for their selected market, carry out user research among teachers and students, gain an understanding of learning processes, learn about pitching their idea, and so on. Experts assist the entrepreneurs in various professional areas – product development, product design, marketing, public relations, and so on.
Involvement in the ecosystem	Regular meetings with entrepreneurs, experts and investors active in the entrepreneurial scene, and meetings with educators – the program offers numerous opportunities to present the ventures to leading educators, in order to obtain feedback and ideas for improvement. During the program there will also be a number of Demo Days, on which the ventures can be presented to people connected with the program. The program ends with a public event at which the various initiatives will be presented.
Marathons and sprints	The program includes three marathons aimed at accelerating specific processes over the course of the program. These are in conjunction with specialists in the fields of characterization, design and development.

[48] https://www.mindcet.org/en/fellows-program/

Professional development	The program includes learning and enrichment on a variety of topics in the fields of technology and education: familiarization and trialing learning international trends in the field, exposure to a range of technological tools for day to day educational work, and sessions and discussions with experts and educational entrepreneurs. The program is also recognized for in-service training credit.
After the program	At the end of the first school year, MindCET continues to support the projects through the process of development and deployment within the education system, connection with mentors, developers and potential partners for the projects, media exposure and marketing.

Source**.** Adapted from https://www.mindcet.org/en/fellows-program/

MindCET considers the Fellows program very successful. To date, five cohorts of teachers have completed the program with over 40 educational tools developed in a variety of fields. (Ibid)

5.1.3 MindCETeX – R&D program for outstanding developers

The success of the Fellows Program for teachers was followed by the start of a third program for Research and Development (R&D) under the name of MindCETeX. This program originates from the opportunities opened to MindCET by the continuous engagement they have with both the main universities in Israel and companies such as Google, Microsoft and Intel. The purpose is to establish interesting R&D partnerships around projects involving emerging technologies or theories. For instance, with universities, MindCET had realized that some great ideas were coming out from their technological research but they did not find a place to evolve them into the market or startups. An example was a professor from the Weizmann Institute of Science in Israel[49] who taught smart systems to engineers. In a conversation, MindCET proposed:

> 'listen, we think that our students today should be learning complex systems and computational thinking. Let's collaborate and create a solution for kids to understand computational thinking.' So we worked with them for 6 months, we ended up with a prototype, which we took out to the schools and today this prototype is a startup product, that's actually being used in many schools. (Waismann, 2019)

On the other hand, with companies MindCET found that they had interest in the MindCETeX program for the development of some of their own technologies. Intel, for instance, was developing

[49] https://www.weizmann.ac.il/pages/

a technology called RealSense[50] and approached MindCET to explore if this technology had a future in educational settings. MindCETeX took the R&D challenge, exploring and developing a prototype during a period of six months. Intel took for itself the solution MindCETeX provided. A different case was Microsoft, since at the end of the 6 months of R&D, "Microsoft said: listen we would love some startup to develop your prototype. So we passed the idea to startups that actually developed our results." (Ibid)

In practice, the details workings of the MindCETeX program are as follows: "we find the sponsor for the project and then we select 2 entrepreneurs that usually are a developer and the second one a graphic designer. The entrepreneurs have to come and live with us for 6 months at the Yeruva Camp. … They get the challenge and at the end of 6 months, they have to have a tested prototype. … They get an income and we pay for everything, their accommodation and all their expenses. … After the 6 months we have our demo day, so we present the results and the first opportunity is given to the sponsor." (Waismann, 2019) The monthly stipend amounts to 50,000 NIS (approx. $US14,360 at rates dated 13th August 2019) for the six-months duration of the program. At Yeruva, they also participate in the acceleration program, learning about entrepreneurship, marketing, user experience, etc., enjoying the interaction and support from personnel of leading technology companies.

Table 32 shows the specific dimensions of the MindCETeX Program, as presented in MindCET website and, again, it is easy to see the basic framework and dynamic of acceleration with due adaptation to the EdTech R&D aims of the program.

Table 32. Elements of the MindCETeX Program

Product development	MindCETeX members take part in workshops in product development, and are exposed to working methodologies and best practices, ranging from preliminary, in-depth research to identify the problem, through formulation of a number of solution concepts, to the development process for an innovative product in the educational field. In addition, during the program the participants gain an understanding of learning processes, pitching a product, and so on. Members of the team are assisted by

[50] https://www.intel.com/content/www/us/en/architecture-and-technology/realsense-overview.html "Intel® RealSense™ technologies are fundamentally re-shaping the future by equipping devices with the ability to see, understand, interact with, and learn from their environment."

	specialists with experience in supporting new ventures as they start out – in areas such as product development, product design, user experience, usability testing, and so on.
Marathons and sprints	Five marathon sessions aimed at accelerating individual processes, and days during which their products are available for testing by users and professionals. Other events are held, allowing developers to obtain feedback from the relevant market.
Cash stipend and accommodation	Those accepted into the program receive a 50,000 NIS scholarship for the length of the program. They work at the MindCET campus and have accommodation in Yeruham, while integrating in the life of the community and its younger members.
Mentors' network	Experienced mentors accompany the entrepreneurs, assisting them in improving and focusing their products or ideas, and progressing with the development processes. MindCET mentors are very experienced in their fields and bring with them various aspects of the ecosystem.
After the program	The program ends with a Demo Day, when the products are presented to MindCET's partners and the management of the Center for Educational Technology. Toward the end of the program, a decision is made regarding continued development of the various products.

Source**.** Adapted from https://www.mindcet.org/en/mindcetex-program/

5.2 MindCET Growth and National and International Program Enrichment

The sound bases created by the three original lines of programs: (1) startup acceleration for EdTech entrepreneurs, (2) fellows program for teachers and (3) R&D for outstanding developers, have opened the way to other complementary programs nationally and internationally. Let us see the progress in each of the three areas, starting with R&D for outstanding developers.

5.2.1 R&D complementary programs

Here MindCET has created two lines of action to complement the MindCETeX program. These are (i) *Vision Groups* and (ii) *Publications*.

- ***Vision Groups***[51] are multidisciplinary groups made up of leading experts in various field. They meet with the MindCET team throughout the year to think about significant challenges facing the world of education. The group's work contributes and enriches MindCET' vision and continuous learning process, helping lead the organization towards technologically and pedagogically interesting avenues. Table 33 shows the themes treated and conclusions achieved by 3 Vision Groups: one in 2015, a second in 2016-2017, and a third in 2017-2018-

Table 33. Themes and Conclusions of Three Visions Groups

Vision Group No.1 (2015) ---- Theme: The challenges of the education system.
The group's objective was to reflect on the challenges facing the education system since its inception: relevance to students' lives, boredom, coping with heterogeneous classes. The conclusions identified various directions of action:
1 Creating classes according to subjects
The curriculum will be based on broad topics (e.g., sustainability, energy, etc.), and each class will be dedicated to a certain topic. Students will arrive at a specific class according to their schedule and will be taught different aspects of the broader subject, by different teachers. This type of learning will enable students to focus on subjects that interest them and will create, in addition to learning, a social experience
2 Opportunities to learn in different spaces
Students will be able to choose the subjects, times and environments that enable them to learn most effectively. Personal learning in addition to group learning will encourage students' independence.
3 Socratic Learning
This type of learning will enable the empowerment of teachers and will prevent the teachers' burnout. This approach will create independent and critical thinking for students as part of 21st century skills.
4 Breaks
Creating longer breaks and exploiting them for incidental, creative and students' motivated learning. The groups that will be created will be on a social basis and will enable connections that are different from those created in the classroom, thus facilitating instruction in a heterogeneous class. https://www.mindcet.org/en/vision_group/challenges-education-system/

[51] https://www.mindcet.org/en/vision-group/

Vision Group No.2 (2016-2017) ---- Theme: Rethinking learning spaces

The group's objective was to rethink the axioms of time and space in the context of schools, and their reciprocal effects. Various aspects of time and space were analyzed, along with a discussion on their pedagogical implications and the possibility of integrating them within schools. The group defined the important characteristics to include in education frameworks, and how different facets of time and space can serve this. They realized that the word "school" (Hebrew: *book house*) connotes multiple meanings, and thus opted for the phrase "collaborative learning space". Various directions of action were identified:

1 Learning environment

The learning environment emphasizes the creation of a community, based on the understanding that community is a key to meaningful learning in today's online culture. However, a community can be formed and sustained even without a classroom, as the term is currently understood. A community describes a group of students working together on a project or learning a subject together for a certain period, with every student belonging to several communities according to the subject and projects they are involved in. The work includes meetings, joint planning, discussions, material collection, creative work, and more.

2 Students' learning style and physical environment

Each student has their own style of learning, which is itself dynamic, changing from time to time, subject to subject, and depending on other collaborators. Thus, the physical environment should be geared towards the learner and support different learning styles and situations: individual learning in an open/closed space, teamwork in large/small groups, remote partner learning, and more. In the flexible, variable space, each learner and teacher should have a fixed private place. Time-wise, learners should have more independence in managing their time, and apart from certain predefined anchors, should be allowed to set their own schedules.

3 Physical environment

The physical environment that we propose is very open, and relatively unstructured. This isn't to forgo order and boundaries, but rather transpose those elements to the technological platform that accompanies the learner, organizing and focusing the learning.

https://www.mindcet.org/en/vision_group/2-לבחון-מחדש-מרחבי-למידה/

Vision Group No.3 (2017-2018) ---- Theme: AI and learning. How do they interact

The group's objective was to consider the challenges, advantages, and dangers of integrating artificial intelligence (AI) systems in education, particularly around the issue of communication. These systems were studied from various aspects, and the group received lectures from several experts. Again, various directions of action were identified:

1 Artificial intelligence

AI is gradually making inroads into every aspect of our lives. One of the interesting directions is the ability to communicate with the "machines". We know that dialog is the fundamental element between teacher and student, and the cornerstone of any educational act – yet it seems that in the future we will "outsource" at least some of this dialog to machines. Dialog with a machine has the advantages of greater ability to focus, freedom from physical and emotional limitations, and the integration of insights built on numerous dialogs with "similar" people. It is clear that these systems will not significantly alter the school structure in the next few years, but their use will become increasingly significant, and we must prepare for it in order to balance between person-to-person and person-to-machine interaction.

2 Identification of persons' mood and conflict prevention

Another important aspect of smart systems is their ability to identify a person's mood by tone, facial expression, and more. As early as a few years ago, systems such as these have been used in call centers in order to route the call to the appropriate representative. … In the future, these systems could help teachers identify, address, and intervene in social and learning interactions in order to mediate or prevent conflicts.

3 AI mentoring and counseling

AI systems are already serving as advisors and mentors in various matters such as navigation, healthy living, and time management. As these systems develop, their guidance will become more personal and cover broader ground, so that these systems will serve as a sort of counselor reminding us of tasks to do, advising us on action in various situations, and even putting us in touch with other entities as needed or desired.

https://www.mindcet.org/en/vision_group/לבחון-מחדש-מרחבי-למידה/

- ***Publications.***[52] MindCET generates a stream of publications and research papers on trends in the world of EdTech, with a view to keeping up to date with what's happening at the frontier of the field. MindCET considers that sharing EdTech knowledge is an important part of providing transparency to their activities.

  Table 34 shows the list of R&D publications MindCET has produced over the years since 2014.

Table 34. MindCET R&D publications

Date	Themes
September 2013	• *Kids & Digital Games* (1019 Children tell us what they are learning from digital games)
March 2014	• *Big Data & Education*
March 2015	• *2014 EdTech Promises* (Virtual Reality, Minecraft, Accelerators, Google – 2014 was an interesting EdTech year)
June 2015	• *EdTech Beyond the Screen – virtual to tangible* (A special edition of the EdTech Mindset magazine)
January 2016	• *2015 Tech Giants Assault on Education* (2015 EdTech review)
August 2016	• *Virtual reality and Education* (What, How and Why Now?)
January 2017	• *EdTech Startups Breaking Down School Walls*
June 2017	• *From Schooling to Learning* (Students are disinterested with the current educational system)
January 2018	• *How Human Can ChatBots Be?* (Leading experts explore Chatbots and share their perspectives)

[52] https://www.mindcet.org/en/snapshots/

February 2019	• *AI in Education: Monster or Savior* (Educational opportunities offered by AI develo promises)

Source. https://www.mindcet.org/en/snapshots/

5.2.2 Fellows Program complementary programs

Let us see the progress in each of the three areas, starting with R&D for outstanding developers.

5.2.2.1 R&D complementary programs

MindCET has created two lines of action to complement the Fellows Program, dedicated to supporting teachers to understand entrepreneurial culture. One is the *Teachers Early Adopters of MindCET (T.E.A.M)*, another is the *E.S.T. Alliance*

5.2.2.1.1 Teacher's Early Adopters of MindCET (T.E.A.M)

This program is in its fourth year and was born out of an initial teachers' entrepreneurship activity that attracted the attention of the Ministry of Education. This activity involved 15 teachers and the Ministry wanted a greater participation. MindCET response was to create a methodology that sought to transform teachers in early adopters rather than entrepreneurs. To do this, MindCET needed to attract startups from any place or country (not just MindCET startups) that wanted to pilot their products in Israel. The teachers would then become early adopters by choosing the products to pilot in their classes. In the words of C. Waismann, the program functions as follows:

> we talk to all the startups that we know, from Israel and outside of Israel, and we select a few startups and, it's a very open selection. Here we don't really select but the teachers do. So, we open an application for teachers to join our team and the startups and the teachers have a few months of interaction, and the teachers test these startups. For example, the first meeting we have is at an EdTech show, where these startups present their companies, and every teacher has to select one company that they would like to try out in their classes. Then using our methodology, we help them test, we provide instruments and meetings where they test this product and for the whole time they are in a dialogue with their startup. (Waismann, 2019)

To an important extent, this program transforms classes into real-life test sites, with teachers piloting innovative products and pedagogy, under the guidance of MindCET. As written in MindCET website, "As part of T.E.A.M's activity, the community experiences new technology and EdTech

products, while implementing and conducting pilot projects in their own educational settings."[53] Today, the T.E.A.M. innovation comprise over 1200 teachers from all parts of Israel.[54]

5.2.2.1.2 E.S.T. Alliance --- EdTech Startups & Teachers Alliance[55]

The E.S.T. Alliance is promoted to passionate educators who care about their work. Participants in E.S.T.A are offered the achievement of EdTech Competency and a place in the Global EdTech Community. More specifically, the list of benefits listed in MindCET website are the following:

- EdTech Certificate that accredits you digital tech proficiency
- A professional training program offered by leading experts
- Participation in startup product development
- Access to Select EdTech Startup products
- A place al the EdTech Global Community
- Connection and dialogue with entrepreneurs
- Support and guidance in the use of specific technologies
- Creation of your own EdTech product

5.2.3 Startups complementary programs

In the original vertical startup acceleration MindCET sought to accelerate EdTech startups with innovative solutions that could potentially disrupt the traditional educational system. MindCET has strongly enriched this activity, giving it a highly prominent international dimension through three programs: (1) Global EdTech Startups Award (GESA),[56] (2) MindCETGO, the Global EdTech

[53] https://www.mindcet.org/en/about-the-laboratory/
[54] https://www.mindcet.org/en/about-en/
[55] https://www.mindcet.org/en/esta/

[56] https://www.mindcet.org/en/gesawards/

Accelerator,[57] and (3) High Grade Ventures, the financial venture created to support EdTech startups.[58]

5.2.3.1 Global EdTech Startups Award (GESA)

Waismann (2019) explains the ultimate purpose of the Global EdTech Startups Award (GESA),

> It is a joint venture with EdTech startups from all over the world and the idea is to bring together accelerators from really all over the world and create a global network where we all help each other. The main objective here is supporting EdTech startups, there are no sponsors or there are no economic or other objectives, we want to increase visibility of all EdTech startups in Italy, Brazil, Finland, China, Japan and the USA. That's the objective. And it's a very successful project, every year we have 600-700 startups joining this community.

For MindCET, the international competition is a key mechanism to provide encouragement to EdTech startups around the world, stimulate productive collaboration, and help create a dynamic ecosystem in the EdTech field. It started in 2014 and it includes various events over the year in different locations around the world. Table 35 gives an overview of the four main opportunities associated to the Global EdTech Startups Awards.

Table 35. Global EdTech Awards Opportunities

The Global Edtech Startup Bootcamp	Two-days event prior to GESAwards London Finals, exclusively for GESAwards finalists, providing them with practical tools and specific opportunities to grow their businesses. The crowd in the bootcamp includes 30-40 selected startups from around the globe, at different stages and from various EdTech verticals, as well as GESAwards global partners. The bootcamp is first of all an opportunity to connect, share experiences, challenges and opportunities across the global EdTech industry. The agenda includes presentations of industry leaders, workshops and discussions, with an emphasis on practical experience enabling the participants to generate usable outcomes. https://www.globaledtechawards.org/bootcamp
Global EdTech Startup Awards Finals	Global Finals in London, a highly expected EdTech event showcasing the chosen finalists to a large audience of Edtech stakeholders, during the BETT Show week which attracts thousands of education decision makers from around the globe. https://www.globaledtechawards.org/gesa-finals

[57] https://www.go.mindcet.org/
[58] https://highgradevc.com/

Global EdTech Network	Network composed by a select group of EdTech entrepreneurs, investors, organizations, and GESA partners in order to facilitate connections, relationships and partnerships, as well as exposure to relevant content. Being part of the network enables to: Ask for connections, information, tips Reach out to partners and selected startups from around the world Be exposed to global EdTech events and get discounts for participation Be exposed to opportunities and webinars GESA Network Gold is a closed group for finalists of GESAwards from 17 locations around the globe. https://www.globaledtechawards.org/network
MindCETGO	GESAwards finalists and Semifinalists are pre-screened and automatically pass the first phase of the selection process of MindCETGO, a one-of-a-kind international accelerator for late stage startups (post seed or bootstrapped with revenue). The accelerator focuses on the business challenges of EdTech startups that have already introduced a successful product to the market, but have not yet reached sustainable growth. It helps EdTech companies to grow their business, expand internationally and raise funds. https://www.globaledtechawards.org/mindcetgo

Source. https://www.globaledtechawards.org/opportunities

Besides the opportunities the GESAwards give to participating startups, the three top winning companies receive the following in-kind prizes: *Winner*: $100,000 Cloud Credits, sponsored by Google Cloud for Startups and AWS Edstart, and the 2nd and 3rd places get 20,000 Cloud Credits each, sponsored by Google Cloud for Startups. In addition, all finalists get $3,000 Cloud Credits, sponsored by Google Cloud for Startups. The competing entries are judged in accordance with the following criteria: (1) address a clear pain point, relevant to the market; (2) provide an innovative pedagogical approach; (3) have an outstanding user experience; (4) how potential for tremendous growth in its user base, and (5) operate in the context of a sustainable business model.[59]

5.2.3.2 MindCETGO[60]

[59] https://www.globaledtechawards.org/
[60] https://www.go.mindcet.org/

The last row of Table 35 introduced the program MindCETGO as one of the opportunities associated to the GESAwards. This program is in fact a major new international step MINDCET took in 2019. It is a Global EdTech Accelerator focused on more developed startups that have already introduced a successful product to the market, have revenue generation, but have yet to reach sustainable growth. Hence the MindCETGO accelerator focuses primarily on growth, scale and international expansion of these EdTech startups, with particular guidance on international education markets entry. The initial companies of the MindCETGO program are all MindCET alumnae. At this level, the selection criteria becomes quite stringent, including: (1) great team; (2) innovative/disruptive solution; (3) growth potential; (4) significant revenue or traction; and (5) post-seed or bootstrapped. In addition, startups must commit to: (1) participation in the entire program by CEO or co-founder; (2) discount on the next funding round; and (3) be great. The companies selected for the MindCETGO program stand to gain an important range of benefits in terms of learning activities, networking and exposure. Table 36 shows details of these benefits that clearly constitute a unique package in the international EdTech acceleration scene.

Table 36. Activities associated to MindCETGO – The Global EdTech Accelerator

Worldclass Bootcamps	Each bootcamp will include topics such as: • Selling to government and education systems • International marketing • Operational scale • Funding
Access to EdTech Investors	Connect with MindCET's vast global network of EdTech angel investors and VCs
Deep Market Exposure	Market overview - regional and local players, competitive landscape, education system structure. Cultural aspects of doing business in the region, Talks and meetings with local game changers (Unicorns, Education champions & Thought leaders)

Meetings with potential customers and distributors	Distributors - meet with established local distributors and potential partners Customers - meet with decision makers from government, schools, universities, after school, and corporate education. MindCET will perform the proper matchmaking to make the networking events personalized to each startup's needs.
Operations, Sales, Marketing, Finance and Strategy Mentors	Access to world-class business mentors with experience in EdTech and additional industries
Conferences participation including Booth Space	Israel – Israel EdTech Week, Shaping the Future US – NY EdTech Week Europe – BETT, LearnIT * Locations and conferences are not final. Based on availability, MindCET will provide booth space for the cohort

Source. Adapted from https://www.go.mindcet.org/

Table 37 provides details of the intended bootcamp activities (first row of Table 35) on offer to the companies selected for the MindCETGO program.

Table 37. Bootcamp MindCETGO program 2019-2020

Time	Bootcamps
Week 1 - Israel Sept. 2019	*Kick-Off Bootcamp* -Goal Setting, Strategy -Israel EdTech Week, Shaping the Future -Meetings with global EdTech investors
Week 2 Asia (Nov 2019)	*Bootcamp - Selling to Governments* -Multiple Asian markets exposure -Talks and meetings with local game changers (Unicorns, Education champions & Thought leaders)
Week 3 - US (Dec 2019)	*Bootcamp – Marketing, US education market, business models, fundraising* -NY Edtech Week, Investor breakfast -Meetings with distributors and customers.
Week 4 - Europe (Jan 2020)	*Bootcamp - International marketing, operational scale* -BETT, Learnit, GESA finals -Meetings with global EdTech investors

Source. Adapted from https://www.go.mindcet.org/

5.2.3.3 High Grade Ventures[61]

[61] https://highgradevc.com/

MindCET has always tried to find ways of supporting financially or in-kind the efforts of their EdTech startups. One informal way has been to allow the startups to continue to use MindCET facilities. Also, the presence of MindCET on the board of the companies has translated into efforts to help the startups to get financing, as well as access to the educational market. In 2019, however, these efforts will take the shape of a more formal program to provide startups with more visibility and more access to the market and financial possibilities. "We have High Grade Ventures, which is a micro-fund, so startups that leave our accelerator are the first ones to have the opportunity to receive funds from this micro-fund. We have a task force with England, with Italy, that helps create opportunities for these startups." (Waismann, 2019) In this effort, MindCET and Arie Capital have joined forces to launch the new investment fund for early-stage EdTech startups from the UK and Israel. The mission "is to support the best startups through capital combined with the added value of business development, vast experience in the EdTech field and mentorship. We provide the groundwork to attract investors, as well as a massive network of stakeholders to help EdTech startups penetrate the market."[62] The focus will be on the pre/early revenue space, where the investment fund thinks it can bring the most value; while the target beneficiaries for investment must be (i) passionate about technology innovation in the EdTech space; (ii) have successfully launched a product with initial market traction. Putting all together, MindCET is clearly succeeding in creating a unique support ecosystem for the development of EdTech startups in Israel and gradually internationally.

5.3 MindCET Today and the Future

Plainly, since its inceptions MindCET has been successfully building a rich set of activities that's helping to move forward the EdTech field through a wide diffusion of an entrepreneurship culture in the educational system and society as a whole.

[62] https://highgradevc.com/

MindCET today has grown to a group of 15 people and continue to maintain its successful sponsorship-based vertical EdTech model. They are largely independent, although the company CET still provides 80% of everything MindCET needs. As we have seen, this is also very beneficial for startups that can have access to close interactions with the largest EdTech company of Israel. MindCET's facilities are very good and expanding, with the base for the Center's activities located in the Negev town of Yeruham, where "MindCET has gradually created around itself a small industrial park, focusing on the EdTech field, and which includes a hub for companies in the field, and an experiential center currently under construction.[63] In fact,

> In September, we are opening a building dedicated to allowing people to experience our models so we have a Fab Lab, an experiential educational space, an open space for startups, several spaces where teachers, educators and startups can experience part of our work. … We've worked for many years with the global Fab Lab network, [with] Stanford and Columbia - we are part of their network. (Waismann, 2019)

From the point of projects, it can be said that MindCET is today largely sustainable, since over the years every project described above has developed its own model of sustainability. For instance, MindCETeX is financed by the collaboration with companies and universities; the Fellows Program is a collaboration with the Ministry of Education, and so on MindCET has the capability to develop different sponsorships mechanisms according to the different challenges it faces – and the richer the ecosystem of networks, people and activities the better the chances of financial support.

Let us remember that the MindCET sponsorship-based model frees the organization from the obligation to make business (profits). Their deep association with CET plays a truly key role. Another aspect playing an important role in MindCET's growth is the fact that:

> fortunately we don't have competitors … We have a few, much, much smaller organizations that are also offering different things for EdTech, and we all work together... Here, because Israel is a very young country, they are very community-oriented, so the competitors work with each other … So, here we partner with our competitors, we need each other, we do partner. … [Simultaneously] … There's a very strong startup ecosystem, it's very developed and there's a lot of know-how about how a startup develops so

[63] https://www.mindcet.org/en/about-en/

> MindCET was very lucky. … I think that's why we are so successful. Israelis are naturally entrepreneurs, so it was very easy to install this culture here. (Ibid)

5.3.1 MindCET and the diffusion of a culture of entrepreneurship in society

Returning to the main argument of this thesis, it is possible to say that the case of MindCET provides clear support to the contention that there is a growing diffusion of an entrepreneurship culture and learning in society today. Let us remember the aims of MindCET as written in the organization's website:[64]

1. To partner in the creation of a new educational paradigm.
2. To enlist the Israeli culture of startups and innovation to the field of educational action.
3. To serve as a catalyst for improvement of the processes of learning, reflecting and developing within MindCET's parent organization – CET.

In this respect, MindCET sees itself squarely in the role of diffusing a culture of entrepreneurship in school and society.

> Definitely, one of the main goals of MindCET is doing exactly that. … Unless we join the entrepreneurial culture - we aren't even talking about education in MindCET anymore, we talk about learning solutions. We think that education has expanded and there is not anymore only an educational system, it's extremely important to keep this conversation with entrepreneurial culture, because that's where learning solutions should be coming from. (Waismann, 2019)

In addition, the entrepreneurial learning of teachers is bound to have a spillover effect on students, thus ensuring a longer-term impact of MindCET's mission. MindCET people have no doubt that this is the case. In fact, "I think it's also the other way around, I think students today are born in an era where entrepreneurial culture is the basis of all the products that they use. They are already embedded in the entrepreneurial culture. So actually the teachers are the ones that have to understand that … and play a fundamental role in the lives of the future generations. Kids are embedded into this culture but they don't have the skills to develop confidently these entrepreneurial skills and so we are supposed to be doing that." (Ibid)

[64] https://www.mindcet.org/en/about-en/

Undoubtedly the case of MindCET is highly successful and its potential for helping to diffuse a culture and learning of entrepreneurship in society is enormous. It is possible to say that, together with the story of NUMA, these cases give unique details regarding the opportunities, difficulties and successes of the world of accelerators and their impact in the diffusion of entrepreneurship in society. Obviously, it is not possible to generalize from only two cases, but they certainly open windows to see how in different circumstances entrepreneurship acceleration and diffusion in society is happening. Let us open a new window by dealing with the third case of H-Farm and, later, the case of the inclusive entrepreneurship accelerator, Phyrtual Factory.

Chapter 6 H-Farm, Italy[65]

The case of H-Farm is quite different from those of NUMA and MindCET. It started in 2005 as a direct forprofit investment from Riccardo Donadon (resembles the *investor-led accelerator archetype* of Table 18), a successful entrepreneur who in 1998 created a company, E-Tree, that became the first web agency in Italy, passing from 8 to 150 people in two years. "In 2001, a large group acquired it. I took a sabbatical year. I started to reflect what I could do for young people who wanted to start an activity in the digital world. In this way H-Farm was born." (Chioda, 2016) Donadon got a partner to work together in the venture, Maurizio Rossi, and so H-Farm was born with the "H" representing "Human". "**The H in our name stands for Human because people are at the heart of everything we do:** services, relationships, interactions. It's people who make the difference."[66]

The word Farm in the name was also highly appropriate because H-Farm is quite unique in having set up shop "at the heart of the Sile Natural Park, Ca' Tron (TV -Treviso), one of the largest single-piece agricultural estates of Italy, property of **Cattolica Insurance**, facing the Venice Lagoon. Its strategic position with respect to the main cities of the Nord-East places H-Farm at barely 12 km from the Venice Marco Polo airport, 20 km from Treviso and 50 km from Padua. (Assinews.it, 2019) A more vivid description of the unique setting is the following:

> We are completely in the middle of the countryside, that is, we are located completely on the countryside. We are inside a thing called Cà Tron, an agricultural estate of over 1800 hectares. It is the largest, the largest plot of land left undivided in the Veneto region, and among the largest in Italy. And therefore the infrastructure is certainly not in great condition, it is clearly close to the airport, near the motorway, but it is countryside, tractors pass around here. (De Rossi, 2019)

It is legitimate to ask why H-Farm with its look into the future of startups and entrepreneurship

[65] A great deal of the information for the H-Farm case is based on an interview with Marco De Rossi, Head of Marketing at H-Farm Education, Italy. The interview took place via Skype on 17 April 2019.
[66] https://www.h-farm.com/en/about

was born in such a huge agricultural land. True, Veneto is one of the entrepreneurial regions of Italy and there was the vicinity to Venice and the airport. One could thing that in spite of the location H-Farm would be anyway inserted in a dynamic entrepreneurial midst and so on. Marco De Rossi tells a different view:

> "… to a certain extent we are born in Veneto because de facto the soul of this company is Venetian. And so this is our home for all sorts of reasons. However with respect to this type of profession, above all, the acceleration o startups, thinking on a Venetian or national scale is restrictive, in the sense that there is no venture capitalism at such a scale as to facilitate exits on a global dimension, that is, to answer your question, the territorial fabric cannot be sufficient enough to keep up, or at least support an ambitious dimension from an entrepreneurial point of view. (Ibid)

Such a peculiar territorial origin makes all the more interesting the story of H-Farm.

6.1 Historical Timeline and Phases in the Evolution of H-Farm

Table 38 gives 10 snapshots of the development of H-Farm from its birth in January 2005 to 2018. In fact, as De Rossi proudly recalls,

> H-FARM was born at a time when co-working didn't exist; the FabLab didn't exist. It was founded before incubators were started in Silicon Valley, in terms of timing, so it was founded as a space for sharing and developing ideas … H-Farm is born as a unique case, because there was nothing like it before in Italy. Today, if something similar to this is established, you may think in terms of a co-working space, an incubator etc. Instead, H-FARM was born as a unique case in which innovative ideas were financed in the digital field, without any other type of infrastructure except for the sharing of ideas and t h e provision of support to their development through cultural, economic and network and relationship support. (De Rossi, 2019)

Table 38. Timeline of H-Farm Development from 2005-2018

Year	Achievement
2005 (January)	We are born in Ca' Tron with the goal of fostering the creation of digital projects that are able to make life easier for people and companies. We are the first Venture Incubator in the world. Combinator born in the US a few months later. 28 people, 2 companies: H-Art and H-Care and a beautiful country yard as home.
2007	The first iPhone is released. A true digital revolution starts and has a positive impact on our sector. We invent the "Storming Pizza", an informal event to exchange views and share ideas with startups, with a lot of pizzas of course! We are more than 70 people, the works for the new headquarters begin.

2008	We make ourselves know. We land in Seattle, USA, where we settle Zooppa headquarters. This is the year of our first exit: H-Care is sold to Comdata. Our model work! BigRock, the first training center in Computer graphics, moves in Cà Tron and become a part of our growing ecosystem. 9 startups, 100 people and a new headquarter
2009	It's the black year of the finance industry, but it's the turning point for us: we sell H-Art to WPP group, world leader in advertising services. We firm a partnership with the giant The Times of India that marks our entry in Indian market and we open another branch office in London. Our investment portfolio grows: 16 startups.
2011	Digital Accademia is born, becoming the new reference point in digital training for companies and individuals. We launch the first edition of Digital Summer Camp, coursed for kids. A huge success!! We choose the 10 best projects. 35 startups, 250 people. Construction begins on a new building.
2012	In the spring we invite the most important world accelerators and organize the first Global Accelerator Meeting (GAM). It becomes an annual event hosted by the leading accelerators in the world. In the same year Corrado Passera, Italy's minister of Economic Development, sets up a task force to achieve the "Decreto Sviluppo" and Riccardo Donadon is part of the process. 7 years, 7 startups exit.
2013	We inaugurate H-CAMP the most innovative all inclusive acceleration program in Europe. 15 new startups enter the program. We launch H-ACK industry, a 24 hours marathon inspired by the most renewed hackathons where young people coming from all over Italy, works in team to develop digital solutions for the needs of different companies that want to open up to innovation.
2015	10 years have passed. Fast and incredibly full of events. We have invested almost 19.8 M€ in more than 80 startups, we are more than 450 people. The H-CAMPUS takes shape and it will be the biggest hub in Europe where startup, company consultancy and education will coexist. On 13 November we listed on the stock exchange at AIM market.
2017	We sign a € 101 million agreement for the development of H-CAMPUS. We start our H for Human foundation and we sign the agreement with the Ca' Foscari University for the BA in Digital Management. We acquire Celi, a company specialized in artificial intelligence applied to natural language, and the two international schools of Vicenza and Rosà. Our student network is increasingly large. We give life to our maize magazine.
2018	We inaugurate the new headquarters in Milan in February, 2 thousand square meters of offices hosting more than 130 farmers. In September 1200 students have chosen one of our courses of study. We invested over € 28 million in 127 startups, we invoice €61 million with a positive EBITDA. Production value increased of 38%. We are 630 people

Source. h-farm.com/en/about

H-Farm distinguishes two major phases in the period between its birth in 2005 and 2018, the last year shown in Table 38. These are:

- *Investment Phase* (2005-2015), when H-Farm basically played the role of investor supporting young entrepreneurs to develop and accelerate their businesses. (H-Farm S.p.A, 2019);[67] and
- *Transformation & Consolidation of the Business Model* (2015 -2018), phase started off with a new business model based on 3 pillars: Industry, Education and Portfolio. (Ibid)

H-Farm also identified the opening of a third future phase starting in 2018: *Growth and Scalability of our Model*, in which the expectation for the future was to "leverage our skills and synergies to grow each units and to scale our model." (Ibid) This third period, however, is much more about deepening the offer and results of the major change triggered in 2015. For the purposes of this thesis, the analysis concentrates on the first two phases, particularly because the first 10 years since 2005 contain the main efforts of H-Farm in the field of incubation/acceleration, while the years following the major change of 2015 contains the efforts to disseminate a culture of entrepreneurship at the level of education.

6.1.1 First investment phase - investment and incubation/acceleration (2005-2015)

Looking at Table 38, H-Farm initial activity was the support of startups and during its first year (2005) it counted with 28 people and 2 companies: H-Art and H-Care, as well as the incomparable setting where they had set up home. In 2007, H-Farm more than doubled its personnel, reaching over 70 people and began work on a new headquarters. Their work with startups was enriched with the invention of the "Storming Pizza", an informal event to exchange views, share ideas with startups and, of course, eat a lot of pizzas. Growth continue in 2008 with 100 people, 9 startups a new headquarters; the first successful exit also arrived with the acquisition of H-Care by Comdata and, in a sign of confidence, Big Rock the first training center in Computer Graphics moves in Cà Tron. The

[67] Giannizzari (2017) defines the legal nature of H-Farm in conformity with the Decree-Law of 18th October 2012, n. 179. H-Farm S.p.A "is a joint-stock company, established also as a cooperative, under Italia law or a Societas Europaea, which offers services to support the birth and development of innovative start-ups. In particular, the company defines itself as venture Incubator, that is, an effective mixture between an investment fund and a technology incubator, given its nature as a provider of risk capital simultaneously with incubation and acceleration services." (p.13)

first international expansion also occurred to Seattle, where H-Farm settled Zooppa headquarters. The fledging operation went through the financial crisis that hit the world with high resilience and, indeed, they sold the second startup H-Art to a world leader in advertising services, WWW Group, entered the Indian market through a partnership with The Times of India and opened another branch office in London. By now the number of startups in H-farm portfolio had reached 16. Looking back then at the first 5 years of H-Farm, it is possible to say that the startup operation was building up, having a few successful exits, expanding to other countries, notably USA, India and UK, and growing in personnel and facilities.

Year 2011, however, marks a watershed in terms of educational activities. This year sees the birth of Digital Accademia aimed at providing digital training for companies and individuals. The same year, H-Farm launched the first edition of the successful Digital Summer Camp dedicated to kids. Investment and growth continued unabated with the number of people reaching 250, the number of startups 35, and a new building began to change the skyline. Years 2012 and 2013 saw new startups exits, 7 exits in 7 years, and 15 new startups joined the program. Diversification of activities also gathered momentum with the organization of the first Global Accelerator Meeting (GAM), an event that invited the most important world accelerators and left and indelible track in the accelerator community. As *Timothy O'Connell, heads of H-FARM Acceleration Programs, recalls in a 2017 article:*

> In 2012, we invited over 50 leading accelerators from 23 countries on 5 continents to a two-day event in Venice called the **Global Accelerator Meeting (GAM)**. The goal of the meeting was to establish a structured playbook on how to design and run an accelerator program. The selected participants, including accelerator directors and startup investors, attended workgroup sessions to exchange successes and failures in order to come up with a **shared acceleration methodology**. The GAM events were repeated in 2013 and 2014 and today have been replaced by the GAN which includes more than 70 accelerators from more than 100 cities. (O'Connell, 2017)

This event reinforces the presence of H-Farm in the world of accelerators. In fact, in 2013, H-Farm inaugurated H-CAMP, presented as the most innovative all inclusive acceleration program in Europe. In parallel, H-Farm launched H-ACK industry, a 24 hours marathon inspired by the most

renewed hackathons, events of teamwork ideation and even prototyping. People came from all over Italy to develop digital solutions for the needs of different companies that want to open up to innovation.

In 2015, H-Farm reached its first decade of existence and it is also the end of what the organization has called the first period of *Investment Phase*, when they basically played the role of investors supporting young entrepreneurs to develop and accelerate their businesses. (H-Farm S.p.A, 2019) This first decade certainly created an operation that was ready for further growth and diversification. Indeed, H-Farm had invested €19.8 million in more than 80 startups, had grown to more than 450 people and, in total, had invested some €28 million during the decade. By the end of year, 13th November 2015, H-Farm was listed in the stock exchange at AIM market.

Having briefly reviewed the main development of H-Farm's first 10 years, it is time to have a closer look at the details of the incubator/accelerator model implemented by H-Farm during the *Investment Phase*. Comparing with the NUMA and MindCET experiences, there are elements that share some similarity, others not. For instance, H-Farm did not implement either the cohort modality or the more formal and structured educational programs found at NUMA and MindCET; on the other hand, H-Farm did provide seed funding to, and took equity from, its startups; moreover, H-Farm also undertook a similar evolution to NUMA and MindCET accelerators in its selection process, from accepting early-idea startup projects to accepting only the more developed and market-promising startups.

A brief synthesis of the evolution of the acceleration activity of H-Farm is as follows:

> To give you an evolution in the development of our acceleration programs, the path was this: (1) we accelerate innovative ideas in the digital field, any idea; then (2) we accelerate innovative ideas in the digital field, dedicated to a given topic by making targeted calls on specific topics which we then evolve; (3) we then accelerate with respect to vertical areas and sectors for which we have a specific competence. In phase (4) of the evolution process, we accelerate programs with innovative ideas in the digital sphere linked to themes that our partners / customers / subjects with whom we deal with consider relevant. (De Rossi, 2019)

The evolution has then followed the need for greater and faster income and this is much more

likely to be achieve with teams that have already established their business idea and are looking for greater business opportunities. It is also a fact that, in the experience of H-Farm, as of other accelerators, the exit system is complex from the time "I take an idea, develop it, invest in it, develop it further, bring it to maturity, seek to consolidate it in the market, and get the possibility of an interesting exit or an interesting return. This system is very long and very variable." (Ibid) In this way, for H-Farm everything depends of the market conditions and at the moment the venture capital market that can make it profitable is not well developed.

An important element of the financing of an accelerator is the equity they have in the startups, especially if they manage to generate highly valuable exits. In the case of H-Farm, the amount of equity has not been the same for all startups. It has varied depending on individual cases. But, as known, equity is not secure financing since it only translates into income when the startup succeeds in the market and begin to make good profits. Not all startups reach this stage, and many who do never manage to earn substantial profits. A more secure form of income from startups is to charge them for the space and services they received from the incubator/accelerator. This is something H-Farm has applied to their startups. On the other hand, the selected startups have got seed investment from H-Farm. This seed investment has varied from case to case but, normally, has been between €40,000 and €60,000. Looking at the selection of the startups, this has not been a complex process, since it has been mostly based on the high-level of competence found among the H-Farm founders and personnel. They have analyzed and creamed off the applications, finally selecting those that would join the H-Farm community.

From the tens of startups that H-Farm has hosted and seed-funded at Cà Tron, as often happens, only a few have reached real success in the terms of H-Farm, that is, they have repaid from 4 to 8 times the investment made by H-Farm. The number of startups that have achieved these results goes from 6 to 8, according to De Rossi. As it happens with most accelerators, equity and exit alone are not mechanisms that can ensure the sustainability of operations such as H-Farm with hundreds of employees.

From the point of view of the educational program, H-Farm started by offering a 4 to 6 months acceleration program to startups at early-idea stage. This program varied over time.

> Let's say it contained a series of milestones that the startups had to meet every month. Every month was oriented to a specific activity: market analysis rather than the business model, or the search for investors, or prototyping. At that time, each month there were milestones the startups had to reach to arrive at the Demo Night, which was the night in which the startups presented their projects to an audience of potential investors. … During the 4 to 6 months, the startups spent at H-Farm they benefitted from moments of mentoring as well as from technical meetings with people from the areas of operation of the startups. The training at H-Farm was structured, codified, organized, but it was not formal with frontal generalist lectures. It was always very specific on the business model. (De Rossi, 2019)

This program was in part abandoned as H-Farm left behind early-stage startups and moved towards ventures that had a more mature presence in the market. The approach was changing before the end of the first 10 years but the turning point was between 2015 and 2016. H-Farm was evaluating how to continue to develop the program, modifying it in line with the fact that "we have started and continue to work with big brands and hence, with clients of this kind the most interesting growth mechanism is that of open innovation. This means selecting startups, and/or innovative ideas that can be integrated, or at least that can enrich the research and development (R&D) for big brands.

6.1.2 Second phase - transformation & consolidation of the business model (2015-2018)

The year 2015 marks a major change in the development of H-Farm. It opened the period *Transformation & Consolidation of the Business Model* (2015 -2018), which kicked off with a new business model based on 3 pillars: Industry, Education and Portfolio. Internal and external growth remained the focus but, clearly, the new business model took H-Farm beyond the successful investment in startups to begin to contribute to what this thesis has identified as the trend towards a growing diffusion of entrepreneurship culture and learning in society. In 2018, H-Farm saw the opening of a third period of "Growth and Scalability of our Model," in which the expectation for the future was to "leverage our skills and synergies to grow each units and to scale our model." (Ibid) This third period did not bring about a new model, it rather deepened the offer and results of the major

change triggered in 2015. De Rossi recalls the change and the reasons for the addition of the two new components besides the original 'investment' model:

> In 2015, H-Farm changed and enriched the business model because it was listed in the stock exchange. Two components are added: one is innovation, digital consultancy to companies, helping them to transform their products and processes, or, management development through the opportunities offered by the digital transformation. The second addition was training or education because it meant courses from three to over-forty years of age, that is, from school to post-university courses. The logic was to give a point of observation in innovation, a point of familiarity within digital transformation, a point of understanding and ability to develop prototyping and work activities such as that of startup thinking, let's say working as a startup, this would enrich and increase the quality of all training courses. Then, it was a matter of choosing the educational-pedagogical partners to activate the various paths, enriching them with some innovative analysis linked to the world of digital transformation, and indeed the world of startups.

A closer look at consultancy services for companies reveals that in some way "they also cross the world of education because it's a consultancy that certainly has among its key elements the cultural transformation of organizations. It aims to implement a different way of working and thinking into large companies, or at least organized groups, inspired by more liquid organizational systems, more transversal, less vertical, less top-down, more collaborative, more in the form of a startup shall we say." (Ibid)

But it is the new fully dedicated educational program of H-Farm that highlights best the way in which the strategic evolution of its activities has come to add to the trend towards a greater diffusion of an entrepreneurship culture and learning in society. In effect, this program has basically three major areas: "(i) a part that concerns schools from 3 to 18 years-old which is based on the international model expanded by a digital and entrepreneurship curriculum; then there is (ii) a three-year university degree based on an existing pedagogical model, that of the Cà Foscari University of Venice, enriched and augmented with a digital and entrepreneurship curriculum; then (iii) there's a post-university path made up of training courses and professional development, in practice they are technical training courses linked to specific areas, such as graphics, 3D animation and more." (Ibid)

At high school, for H-Farm was important to see youngsters dedicating some hours of their

curricular paths to creating startup projects. This is not because it's important that they create a startup but because, from a theoretical and didactical point of view, that type of entrepreneurial work shapes them and helps them to develop transversal skills as well as particular work capacities. (Ibid) In an interview given to *Il Tempo* in March 2018, Riccardo Donadon underscores the strategic importance of their work with schools: "We wish to give to the new generations the instruments to face the future. It is fundamental that they acquire as soon as possible awareness of the potentiality offered by the digital. Thus, we have decided to focus more and more on the school … A school that knows how to evolve with the times, offering kids suitable instruments to both read and intervene in the real world." (Grella, 2018)

The build up of the school operation started in 2015 with the acquisition of a school at founded in 2004 at Treviso; this became the H-International School of Treviso that cater for children and youngsters from 3 to 18 years of age. All lessons are in English and care is taken of using advanced digital technology. By 2018, other 3 H-International Schools had joined the H-Farm offer: Vicenza, Rosà, Monza and an International School of Talent Multicampus.

But, as Table 38 shows in year 2017, H-Farm signed a €101 million agreement for the development of H-Campus, considered to become the largest innovation pole in Europe. The online journal *Il Tempo.it* has reported on 19th September 2019 the start of the works for the expansion of H-Campus, describing the ambitious project as follows.

> Today, the work of extension of H-Campus, the campus of H-Farm, has started. With its surface of 51 hectares, H-Campus will be able to host up to 3000 people, thus becoming the largest innovation pole in Europe. The enlargement, which will have only 10% of built up area, foresees the realization of 13 new buildings dedicated to education as well as to the startup and enterprise world for a total of 30,000m^2 of covered surface. Thanks to the recovery of the volumetric space of abandoned structures and to the demolition of an ex-military base in the area, the newly built structure will be at zero added volume. Along other buildings, the construction will include a student house with the capacity to host around 250 students, a sport center of around 7000m^2 that also includes a skate-park and a track for athletics. The most iconic and central building on the campus, that will house a library, an auditorium and a restaurant, carries the signature of the architect Richards Rogers, who has designed, among others, the Pompidou Centre in Paris. The remaining space will be used as an equipped park with over 27 hectares of wooded area open to the public."

Certainly, since 2015, the transformation of H-Farm has been extraordinary and has implied heavy financial investments that have involved a number of institutions in the creation of the €101 million fund, including Cattolica Assicurazioni (57% share), Cdp Investimenti Sgr (40% share) and Cà Tron Real Estate, the society of H-Farm' founders (3% share). Finint Investments Sgr will manage the Fund. It has been estimated that the wealth to be generated by the total investment of €101 million in the operation will reach €8.7 million annually for the territory. (Grella, 2018)

Along with the notable growth in investment for infrastructure development, H-Farm has actually grown in all directions. We know that in 2015, H-Farm diversified into 3 business areas Startup Portfolio, Innovation and Education. Tables 39, 40 and 41 provide a shortened version of the way in which the content of each of the three areas is presented in the H-Farm website. Figure 13 give a pictorial overview full H-Farm educational program for various ages of students. Quite clearly it is a substantial enrichment of the organization's offer from the early times of incubation/acceleration.

Table 39. Elements of H-Farm Startup-Portfolio Program

We invest in small, innovative enterprises and companies allowing them to develop and accelerate their business. Our goal is to be the first movers in intercepting new ventures. The VC market is outdated and ready to be changed. It is key to have a wider perspective on investments, looking for promising projects on a European level. **We analyze** several digital entrepreneurial projects in Italy and Europe and select and invest in the rising stars. **We invest in inReach**, the first software powered investment firm focused on early stage European startups. https://www.h-farm.com/en/startup-portfolio

Table 40. Elements of H-Farm Innovation Program

Strategy & Innovation Culture	Innovation is a **way of thinking**, it is an **attitude towards process transformations**, and a strategic approach to decision making. Our offering embraces the entire **organizational ecosystem**, ranging from co-designing, new collaboration and ideation models, to executing business and production processes, through new tools, new products, new communication languages, and learning paths for employees. It deals with Business Transformation, Future Envisioning, and People Empowerment. https://www.h-farm.com/en/innovation/strategy-innovation-culture

Enabling Solutions	Enabling Solutions benefits from the **frontier technology** opportunities to develop digital innovative products and experiences. Just as a startup would, we have an agile approach even to the most complex projects. **Effective** and **modular** in the design and implementation. **Critical** and **result-oriented** in every challenge and in finding the best solutions. Enabling Solutions cover areas of Digital Strategy, Commerce, Sales & Marketing, Customer Services, and Digital Environment. https://www.h-farm.com/en/innovation/enabling-solutions
Digital Marketing	**Map out unexplored routes in marketing to interpret new models of communication. We unite data and creativity to generate concrete results alongside our customers**. We work on all touch points of the digital customer experience, redefining the concept of audience with a data-driven approach. We study data scientifically and work to convert these data into the most suitable messages to make our clients' digital communication relevant, throughout the customer journey. Digital Marketing covers the areas of Content, Distribution, and Data & Technology. https://www.h-farm.com/en/innovation/digital-marketing
Brand Innovation	Work alongside contemporary brands to completely rethink ways they can present themselves to and communicate with consumers. **We work to create** a new concept of identity: languages **that can communicate on every channel, content and authentic stories for consumers and markets that know no limits.** We develop the concept of a brand from mere identity to a real relationship platform**, perfectly integrated with its business ecosystem.** It covers areas of Branding, Content & Storytelling, and Editorial Platforms. https://www.h-farm.com/en/innovation/brand-innovation
Artificial Intelligence	We help our clients to use Artificial Intelligence in order to **create new models of natural interaction** with their customers based on **language and voice** guaranteeing intelligent and effective access to data that allows understanding of business phenomena and **predicting future trends**. It covers areas of Data Science, Voice, Search, Analytics, and Natural Language Processing. https://www.h-farm.com/en/innovation/artificial-intelligence

Table 41. Elements of H-Farm Educational Program

We believe that students need inspiration and creativity to **develop the skills they need to face the challenges of tomorrow**. H-FARM educational project is characterized by an innovative approach that revolutionizes teaching and learning, **helping students develop their potential through dynamic programs**, the development of multidisciplinary skills and the use of new educational tools. All of our courses are based on a multidisciplinary, collaborative, experiential and concrete approach. https://www.h-farm.com/en/education

H-International School	H-International School is a network of international schools developed by H-FARM. This educational path is unique in both Italy and Europe, because it is able to provide education to a comprehensive age range, from nursery to High school. It's characterized by an innovative approach that revolutionizes teaching and learning, helping the students to develop their potential through dynamic teaching, the development of multidisciplinary skills and the use of new educational tools. Students grow in an **immersive, idea-inspiring learning environment**, the latest in digital educational tools and exclusive digital contents in digital entrepreneurship, which make our schools an unparalleled center for learning. There are H-International Schools at Treviso, Vicenza, Rosà, Monza and an International School of Talent Multicampus. https://www.h-farm.com/en/education/h-international-school
SPARX	Digital laboratories designed for children, that allow them to never stop learning and to freely express their creativity. Our approach is centered around the method, the environment and the technology that we use. The method is to imagine, design and create, taking our time to experiment and working together. We are inspired by the challenges set. The offer includes Sparx for Corporate, Sparx Digital Saturdays, and Sparx Summer Camp. https://www.h-farm.com/en/education/sparx
College	H-FARM College is the home to **all of the post-secondary diploma programs**, including university courses as well as professional education, starting with the Bachelor degree and continuing with Masters courses and various programs that were created to enrich and renew the existing skills of those who are already in the workforce. The educational offer is comprised of **both in-person and blended courses**, which integrate face to face lessons with online activities, in addition to courses that take place entirely online through our dedicated platform and our e-learning content. The offer includes Bachelor's Degree, Master Programs, and Executive Programs. https://www.h-farm.com/en/education/college
Big Rock	BigRock represents a **state-of-the-art reality** in the 3D animation scenario in Europe and trains hundreds of new computer graphics students every year. Many former BigRockers, today they work for the most important film production companies like **Pixar, DreamWorks and Paramount** and their names appear in the credits of some recent great movies. The offer includes: Master in Computer Graphics, Master in Virtual Reality, Master in Concept Art. https://www.h-farm.com/en/education/bigrock

Figure 13. Full H-Farm Educational Program for Various Ages of Students

Source. H-Farm S.p.A, 2019, p.15

Obviously, none of this growth would have happened without a substantial growth in the number of people working for H-Farm. In fact, as Table 38 shows for year 2018, the number of people reached 630 on that year. One year later, according to De Rossi the number was 666 and clearly edging up towards 700 people. Simultaneously, in three years, H-Farms has increased its revenues about sevenfold from just over €8 million to over €61 million. The main contributor to this revenue was the area of Innovation with €41.1 million in 2018, a growth of almost 20% over the €34,3 million of 2017. The second main revenue contributor was Education with €11.9 million in 2018, a growth of 52.4% from the €7.6 million of 2017. These two areas alone contributed almost 87% of H-Farm revenues in 2018. In terms of earnings, however, the strongest performance came from Innovation with a positive EBITDA[68] of 4.0, even if this was a 0.5 decrease over the 4.5 EBITDA of year 2017. Education, on the other hand, maintained a negative EBITDA of -1.0 in 2018, event if this was an improvement from the -1.4 EBITDA of 2017. Overall, however, H-Farm reached a positive EBITDA of 1.1 in 2018. The margins nevertheless remained negative once interest, taxes, depreciation and amortization were taken into account: Innovation (-10.6%) and Education (-28.2%). Overall, the profitability growth was 1.8% in 2018.

[68] EBITDA - Earnings Before Interest, Taxes, Depreciation and Amortization.

These numbers tell a story of recent high investments and growth of production in all business areas of H-Farm, although strong economic sustainability is still in the making. In fact, De Rossi confirms that education is still an investment and it is worth noting that although all school and degree students in H-Farm educational programs pay an annual fee, or the cost of a professional technical course, there is also the possibility for deserving students in need to apply for a grant. On the other hand, De Rossi is clear that work with medium and large enterprises is H-Farm's main source of sustainability. In this work, Riccardo Donadon is quoted in an interview for Il Sole 24 Ore dated 2017 as saying: "Today our acceleration services are erogated only to the large companies that engage us to search for the best startups at international level." (Giannizzari, 2017, p.16) In this process, H-Farm has learned to act more as a sort of external R&D to the companies. Basically, H-Farm discusses with the client companies their needs and search for startups that possess new ideas or products in the technologies or sectors of interest to the client company. These startups can be accelerated if necessary and H-Farm mediates the alliance between the startup and the client company. It looks rather simply and profitable but the reality is always more complicated that it looks.

> They are absolutely interesting activities but not so simple because they require a very large effort from all players involved. It is not a simple mechanism. … The external operation is in reality an opportunity for the client company, in the sense that a big brand is not able to carry out the new type of activity in house, simply because it has such a dimension and structure that any attempt at rapid prototyping of something becomes almost impossible. The problem is that to be able to build profitable paths for everybody cannot be taken for granted, it's not trivial, nor simple because it needs so many parties and so many elements that it's not sure that the process will work. The income that results is surely interesting, but it is not a rain of money." (De Rossi, 2019)

6.2 H-Farm National and International Expansion

An important aspect of H-Farm growth is its national and international dimension. Nationally, H-Farm has opened offices in Milan, Torino and another in Catania. At Milan the operation is mostly dedicated to company consultancy. At Catania, there is a development center working on software code; whereas at Torino, there is a part dedicated to artificial intelligence and machine learning. And not to be forgotten is the extensive network of venture capital that H-Farm has consolidated over the

years. For De Rossi they are very important for H-Farm objectives but their participation is not to be taken for granted and nor they are a guarantee of success.

Internationally, we saw earlier that H-Farm had been involved in the birth of the Global Accelerator Network (GAN). Through GAN, H-Farm has relations with the main European accelerators and above all with the main Israeli accelerators. H-Farm is also part of a network of international schools and, so far, has offices in New York and Barcelona. In New York, it is Zooppa, the startup created by H-Farm that has transferred its main office to New York. In turn, in Barcelona, H-Farm has recently opened a hub. It is important to stress that the international offices do not engage in education, they are rather operations focused company consultancy and open innovation. (Ibid)

All these aspects lead Giannizzari (2017) to conclude that:

> notwithstanding the noticeable presence of acceleration programs at national and international level, the package offered by H-Farm is unique. Such situation is the result of the fact that the strategic business areas are highly diversified. … As far as the threat presented by potential new entrants in the H-Farm market, it has been fundamental for the organization to secure cost advantages derived from a learning process accumulated in time, thus profiting from the so-called "economies of experience." But not only this limits the threats of new entrants in the market: H-Farm has succeeded over time in creating around itself a network of contacts for distribution and procurement that allows it to hold an important position in the Italian accelerator scene. (Giannizzari, 2017, p.14)

All in all, H-Farm seems well on its way to consolidation and growth. To an important extent its experience shares features of the experiences of both NUMA and MindCET. With both shares the evolution of the acceleration activity from early-stage startups towards more mature startups that have products in the market and are closer to succeed. With NUMA, H-Farm also shares the evolution toward greater emphasis on company innovation services as key to the sustainability model, while with MindCET it shares the emphasis on education, particularly the effort to take entrepreneurship to the school system. True, the H-Farm school education is a business with paid fees and, although they offer grants to deserving needy students, this represents a limitation as far as dissemination to the entire school system is concerned.

Nevertheless, as De Rossi states, considering the possible contribution of H-Farm to the trend towards a greater diffusion of a culture and learning of entrepreneurship in society: "Let us say that we have built an educational model inside here [H-Farm] because we believe deeply that what we have seen and continue to see from an entrepreneurship and intrapreneurship point of view is an enrichment with respect to educational paths, whether it is the lever or the element that makes the formative courses more contemporary." (De Rossi, 2019)

Chapter 7 The Inclusive Phyrtual Accelerator, Italy[69]

The case of the Inclusive Phyrtual Accelerator (IPA) is the most experimental of all the cases seen so far: NUMA, MindCET and H-Farm. It is also an experience that happens within the limits of a governance very much controlled by the public sector, with all the consequences of political instabilities already identified in the NUMA case. The organization behind the Inclusive Phyrtual Accelerator is the Fondazione Mondo Digitale (FMD),[70] a small highly active nonprofit Foundation of about 25 people today that's part of the group of companies/entities having strategic participation from the Municipality of Rome. This means the Municipality controls the FMD's governance through the appointment of its President and 3 directors of the total of 5 composing the Board. In practice, the political forces governing the Municipality select the members of the board and these forces have changed color quite frequently, particularly in the last decade, when the Municipality has undergone a profound structural crisis that even today shows little sign of abating. The result has been a great deal of instability and turbulence in the environment where the Foundation and the experience of the Inclusive Phyrtual Accelerator (IPA) have unfolded. In the following, the argument presents the story of the emergence of the IPA, with constant reference to the fundamental traits and activities of its mother organization, the FMD.

7.1 The Fondazione Mondo Digitale (FMD) - Background to the Development of the Inclusive Phyrtual Accelerator (IPA)

The IPA is the result of a long-term educational vision that has taken shape and evolved since the early days of the Fondazione Mondo Digitale in 2001, when the Municipality of Rome and 6 ICT companies created the organization as a nonprofit private-public partnership, named Consorzio

[69] A great deal of the information has an ethnographic character since the inclusive Phyrtual Accelerator is an original program of the Fondazione Mondo Digitale that I have the responsibility to direct in my capacity of General Director. As such I have been deeply involved in the origination and development of the program.

[70] www.mondodigitale.org

Gioventú Digitale[71] (CGD). The aim of the CGD was to contribute to the development of the information society in the City of Rome, with particular emphasis on the school system and e-inclusion. The CGD was transformed into the Fondazione Mondo Digitale in 2006 and, today, its board of director is composed by the Municipality of Rome and three companies: Gruppo Engineering, Unidata, and Wind Tre S.p.A.[72] The majority partner is the Municipality that has seen a great deal of political and economic turbulence since the start of the global financial crisis in 2008. In fact, governments have changed from center-left, to right, to left again, and now a government of "populist" inclination, with important consequences for the Board and financial stability of the Foundation. A single example will suffice: it took the Municipality 5 years to appoint a President and 3 directors, something that has occurred only recently.

It is important to highlight early on the context of turbulence affecting the governance and resources of the Foundation, because they help explain in part the particular characteristics and challenges of the processes leading to the emergence and development of the Inclusive Phyrtual Accelerator. At heart, the seeds of IPA are found in the explicit mission of the Fondazione Mondo Digitale:

> The Fondazione Mondo Digitale (FMD) is committed to the creation of an inclusive learning/knowledge society in which innovation, education, inclusion and fundamental values are all combined to work together. The potential benefits offered by learning, new technologies and innovation must be made available to everyone without any form of discrimination.[73] [see Figure 14]

7.1.1 Strategic approach

[71] Digital Youth Consortium
[72] https://mondodigitale.org/en/who-we-are/organization_temp
[73] https://mondodigitale.org/en/who-we-are_temp

Three elements characterize the FMD's strategic approach to the pursuit of its mission: (i) areas of work, (ii) modality with which the areas of work are approached, and (iii) funding and resource gathering.

Regarding areas of work, the FMD focuses on two broad interrelated areas: (i) ICT-based innovation in education, mostly in the school system from primary schools to upper secondary schools and technical institutes, and (ii) digital inclusion of those sectors most at risk of being left out of the benefits of the learning society, namely, older people, unemployed, immigrants/refugees, long-term sick kids as well as gender parity.

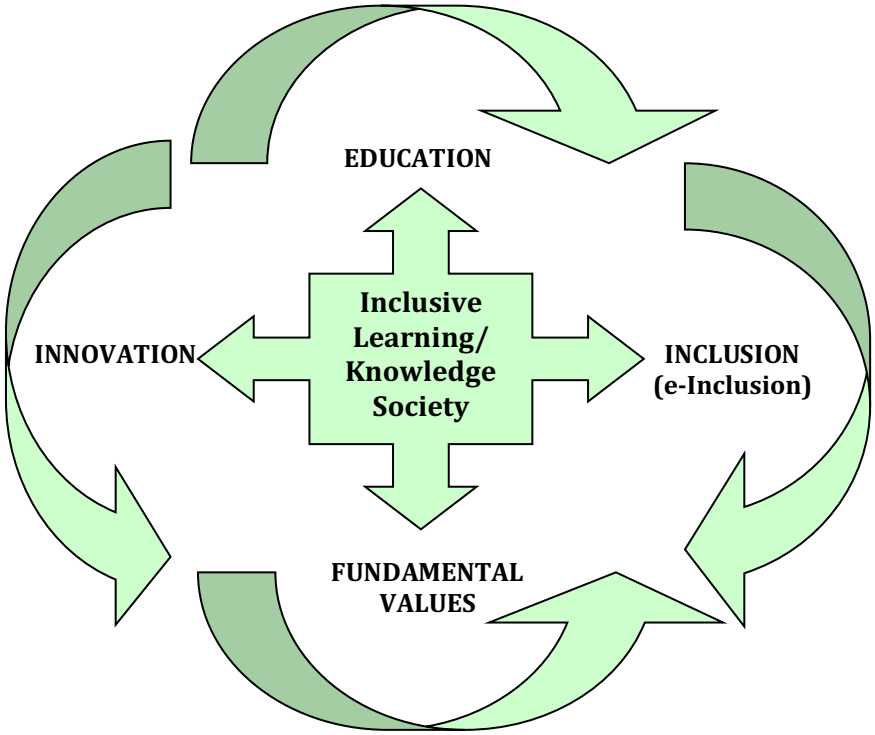

Figure 14. Interrelated elements in the FMD's approach to inclusive learning/knowledge society

Source. Michilli (2010), p.9

Regarding modality of work, as shown in Figure 15, the FMD's strategy has implemented since its inception an approach called Action Research-Development and Implementation (ARD&I). Action Research (AR) accounts for theoretical studies of strategic relevance for the foundation, particularly in the areas of scientific and technological development, social and educational innovation and entrepreneurship. Development (D) accounts for the transformation of the AR results

into products such as handbooks, videos, reports, course programs. These outcomes find their way to, and are prompted by, the many projects the FMD takes into implementation. Implementation (I) gives real meaning to the other two dimensions (ARD) since all projects are geared to enhancing the capacities of some group in the school world and/or in disadvantaged sectors of the population. The different sizes of the circles are intended to give the idea that the greatest effort is invested in implementation, then in development and then in action-research. (For more details on the development of the FMD, see Michilli, 2009, 2010)

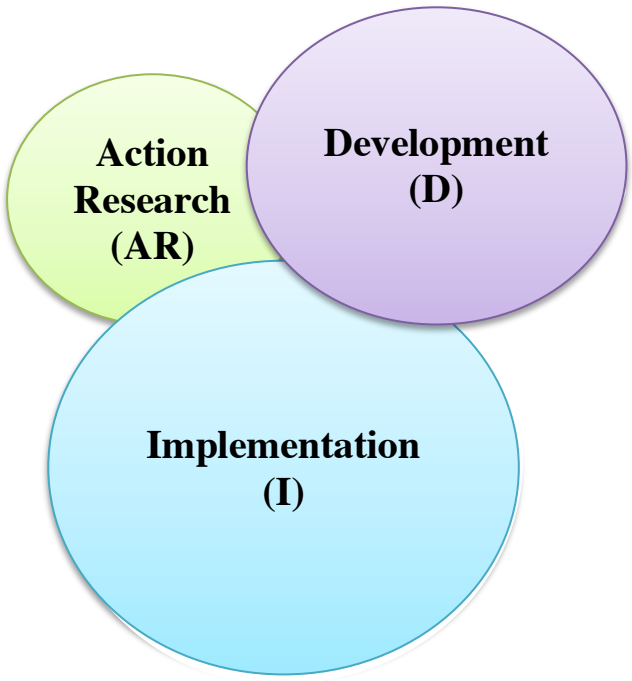

Figure 15. ARD&I Approach

Regarding funding and resource gathering, the FMD runs almost the totality of its services and activities for the school system and disadvantaged sectors free of charge. This makes the FMD essentially a project-based organization with funding coming from projects the organization obtains from the private and public sector, apart from a financial contribution that should come from the Municipality by statute, but in later years has simply disappeared. Comparing with the business models of the other three cases, it is possible to say that the FMD's business model (and consequently of IPA) is similar to that of the first funded years of NUMA, namely, a *grant-sponsorship-based* business model that more closely resembles the *ecosystem accelerator archetype* of Table 18.

Putting it all together, as shown in Figure 16, it is possible to provide an overview of the FMD Activity Space and the major areas of programs under way. It can be seen that there are five program areas focused on (i) Youth, (ii) Women, (iii) Older People, (iv) Immigrant/Refugees, and (v) Educational Robotics. The programs have no rigid borders and, in fact, theories, instruments, projects developed for a certain area may also be applied in other areas. As an example, the work for Older People has a strong element of intergenerational solidarity, since school youngsters -even from primary schools- carry out the digital alphabetization of older people. The result is threefold: reduction of the digital divide, reduction of intergenerational divide, and learning of life skills. The same happens with the intercultural solidarity performed by high school youngsters who teach digital skills to refugees in Italy. Additionally, the FMD also runs large events that see the participation and attendance of thousands of people. Figure 17 shows the main large events created and run by the Foundation. The Global Junior Challenge is the oldest event. In fact, it is historically at the origins of the FMD, since it was the event that immediately after led to the creation of the Consorzio Gioventù Digitale in 2001.

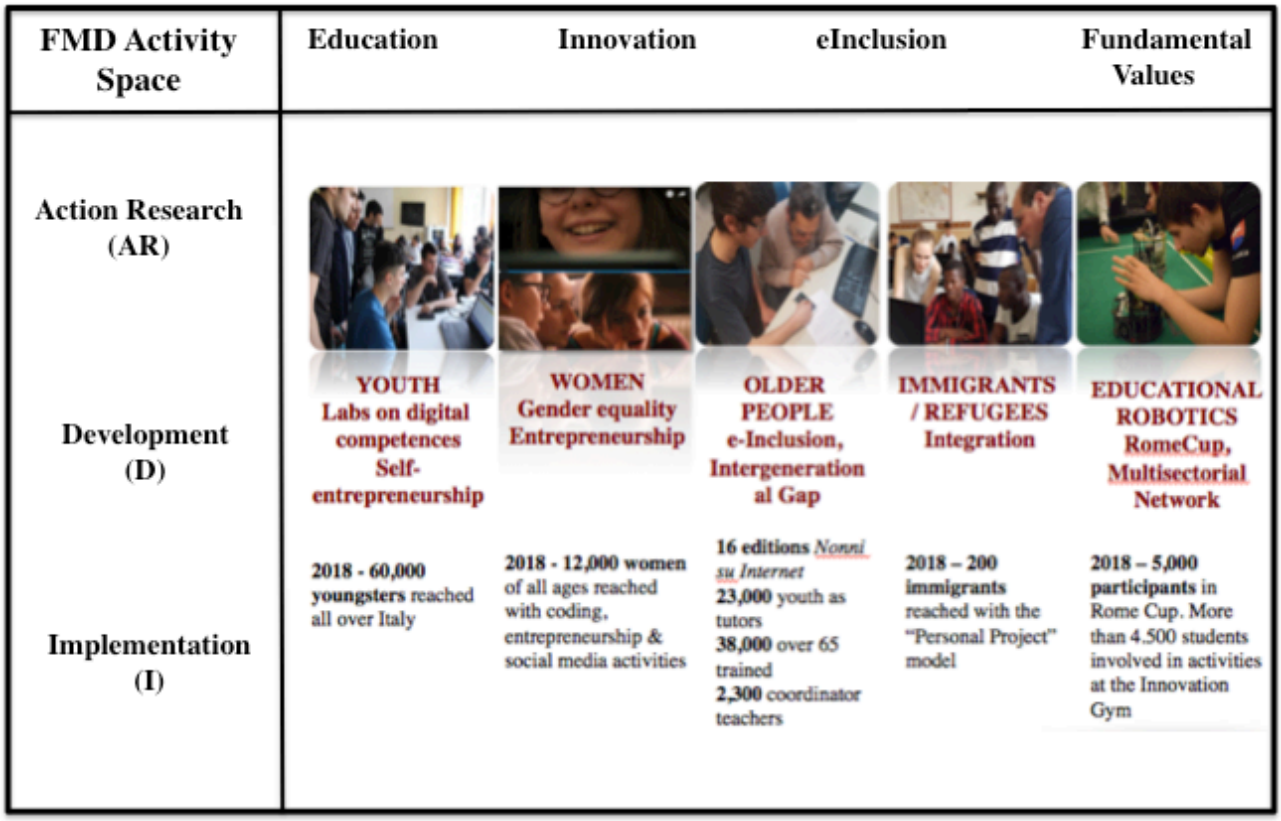

Figure 16. FMD Activity Space and Various Workprograms

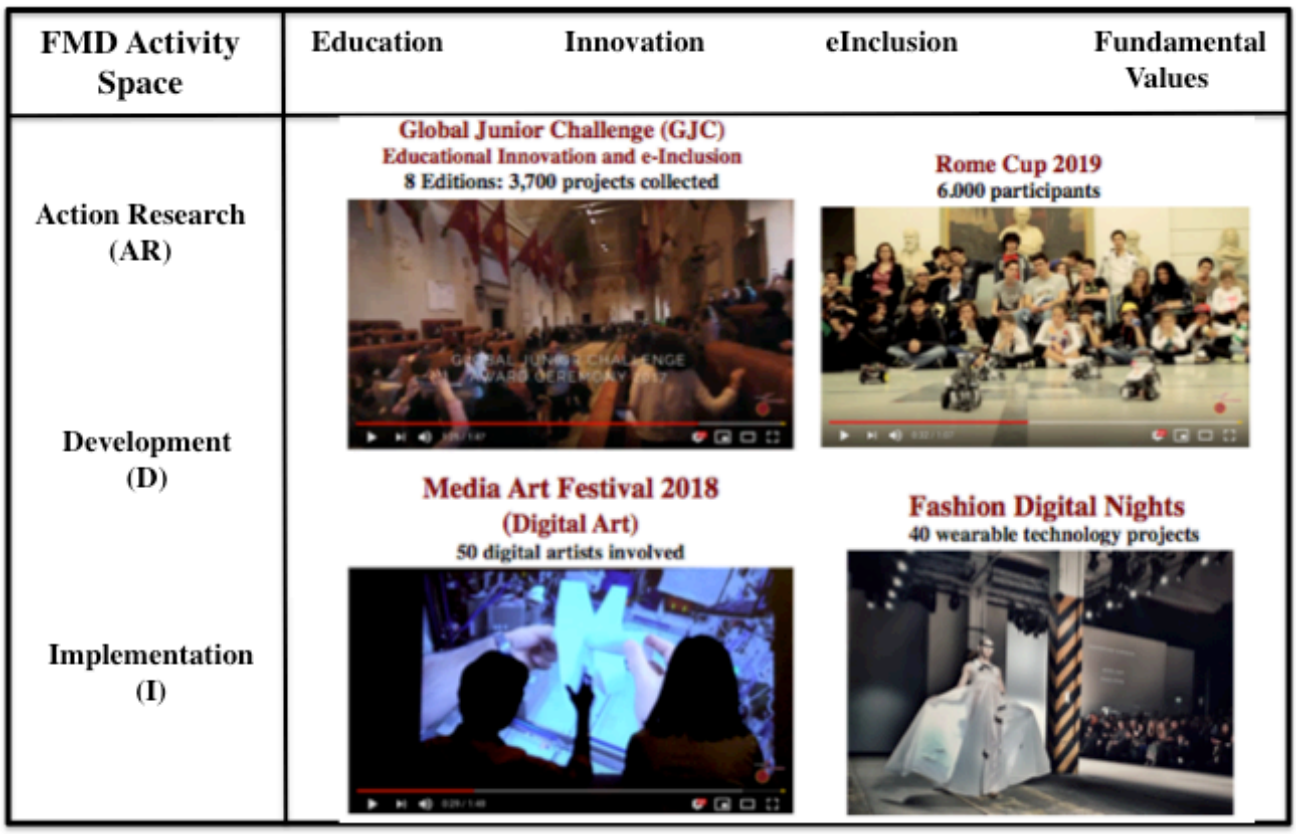

Figure 17. FMD Large Events

Today, the FMD's work is spread across Italy and also in Europe through participation in many European projects. Critically, it has a strong network of stakeholders that includes all sorts of

organizations and individuals: schools, universities, libraries, research centers, large companies, SMEs, startups, Foundations, NGOs, mentors and coaches, makers, digital artists, entrepreneurs, students, teachers, etc. The FMD works companies such as Microsoft, Google, Facebook, Ericsson, and others through these companies' activities in corporate social responsibility. Literally, the FMD works with a broad spectrum of people, communities, organizations and society and, as said, most of the activities are offered free to its beneficiaries, particularly to the world of schools and disadvantaged sectors, since the funding comes mostly from projects won at multiple calls nationally and internationally. It is not the purpose of this work to enter in detail in all the projects currently run by the FMD, since they are about 50 from orientation in artificial intelligence for schools[74] supported by Microsoft to social media for women entrepreneurs supported by Facebook, and many more. (For an idea of the extent of the FMD's work, see FMD (2018) and a short 2-minute video: https://www.mondodigitale.org/it/risorse/materiali-multimediali/video-e-spot/la-fmd-in-2-minuti).

This brief overview of the mission and activities of the FMD is enough to give a background idea of the organization and the reasons that led to the creation and initial implementation of the Inclusive Phyrtual Accelerator. Thus, below, the chapter will concentrate only on the specific developments and projects that led to the IPA.

7.1.2 Development, vision and aims leading to the Inclusive Phyrtual Accelerator (IPA)

It is possible to identify events, concepts and projects that led to the creation and initial implementation of the IPA. These events, concepts and projects are spread in time and contain responses to opportunities and also serious difficulties faced by the FMD. The main milestones leading to the IPA are found in Table 42:

Table 42. Main milestones leading to the emergence of the IPA

Activity/Milestones	Year	Content

[74] See video with almost 360,000 visualizations at https://www.youtube.com/watch?v=6HyWrp0hL7w

Educational City & Education for Life in the 21st Century	2004/ 2005	The Educational City (Città Educativa) was and still is a program funded by the National government and the Municipality of Rome under the Law 285. The program made available funding as well as a large autonomous space of 1400m^2 in a school in the Quadraro quarter, in the periphery of Rome. The FMD was given the creation and implementation of the content of the Educational City program and the concession of the space in the Quadraro quarter for a period of 9 years. The Educational City developed the 15-week Thematic Week program where educational innovations from leading school were presented to a number of other learning schools, involving teachers and students. This activity also interacted with the projects participating at the international contest, Global Junior Challenge, and with a research program on educational best practices. Simultaneously, the FMD elaborated the concept of *Education for Life in the 21st Century* that guided its activities promoted to the school world in Italy. In its present version shown in Figure 18, this concept stresses (see inner circle) that education should be person-centered caring for students but also teachers and other personnel; it should use the best of learning methods according to the task at hand (see second circle), for instance, personalized and collaborative, project-based, problem-based, blended, formal and informal, brain-based, experiential, autonomous; and have three broad types of knowledge and learning respectively; the 3 types of knowledge should integrate: (i) *standardized disciplinary knowledge* (e.g., school and university subjects), (ii) *life skills* such as the 4C – communication, collaboration, creativity and critical thinking, and (iii) *values for a responsible citizenship* contributing to personal and social development. The three broad types of learning should integrate (i) *lifelong learning* or learning through the length of life, (ii) *lifewide learning* or learning in all ambits of life, and *lifedeep learning* or learning or learning that transform thinking and attitudes from passive and closed into open, curious, exploratory and self-driven.
Phyrtual Concept and Phyrtual.org	2005/ 2006	Emergence of the *Phyrtual* concept, meaning the integration of the physical and the virtual dimensions of any project of educational innovation. It was the result of the limitations in the diffusion of the content of the program Thematic Weeks created and run by the FMD only inside the physical premises of the Educational City. *Phyrtuality* came to be perceived as an important life skill, namely, to see from the beginning the integration of the physical and virtual dimensions of innovation projects, as critical to their development strategies. This realization led to efforts to start the development of the *virtual innovation environment, Phyrtual.org*, as complementary to the *physical innovation environment* of the Thematic Weeks project. See Phyrtual.org and Michilli (2010)

Serious Crisis due to changes of government	2007/ 2011	In 2007 the incumbent Mayor of Rome resigned to run for national government and the subsequent election produced a shift from center-left to right for the period 2008-2013. This had a serious impact on the FMD particularly on the running of the Educational City. The new responsible for Education *de facto* did not support the program, withholding all funds and leaving only the concession of the Quadraro space. Activities were suspended for a period of 2 years and most of the equipment in the Educational City was stolen. Another blow around this time was a change of government to the right in the Lazio Region, leading to the elimination of the funding contribution of the region to the FMD. During this period, the FMD abandoned its premises in the center of Rome and moved to the Quadraro space. Fortunately, the administration continued paying the funds that corresponded to the FMD by statutes and the organization was also able to win some projects that enabled it to survive. In 2011 and until 2013, there was a favorable change in the responsible for education and this allowed the FMD to recover part of the original funding for the Educational City.
	2013/2015	Change of local government to the center-left again. This administration maintained the statutory funding and the level of funding for the Educational City as left by the previous administration. However, it came to an end before its normal term of five years because the Mayor was forced to leave by its own party. In the three year in office, the Mayor never came to appoint the President and three directors of the FMD, leaving the FMD effectively without a Board of Director, only the support of three directors representing the companies. After Marino's fall, an interim Commissariat was appointed to run the Municipality and new elections took place in June 2016. This was the start of the current administration guided by the 5 Star Movement created by the comic Beppe Grillo. Since the start of this period, the FMD passed another 3 years without the appointment of the President and Directors representing the municipality (they took office at the beginning of this year 2019) and, until today, all funds – statutory and Educational City- have been cut off. Fortunately, due to the complete instability and constant turbulence, the FMD has succeeded in diversifying its sources of funding, amongst them, from major international ICT companies Microsoft, Google and Facebook. As we shall see, funding by Google.org played a central role in the process leading to the Inclusive Phyrtual Accelerator (IPA).
InnovationGym	March 2014	The FMD launched the InnovationGym (Palestra dell'Innovazione in Italian), a space dedicated to the experiential learning of technological, social and educational innovation. At its launch, the InnovationGym had a Robotics Lab, the first to be created in the premises of the Educational

		City, given the long-standing work of the FMD on educational robotics (over a decade); then a FabLab was added that followed all the recommendations of the MIT's Center for Bit and Atoms, birthplace of the Maker movement; and then there was an Activity Space equipped with a variety of instruments (e.g., Lego Serious Play, TooBeez, Zome Tool, etc.) for the practice and reflection of aspects such as problem-solving, team-building, leadership, entrepreneurship and self-awareness of the new conditions of life and work in the 21st century. The vision of the InnovationGym propounded that in the same way as schools had physics labs, chemistry labs, in the future they should also be equipped with InnovationGyms. The argument did not advocate a single formula or format; it was stressed that the birth of InnovationGyms was in itself a process of innovation and the approach should be evolutionary, modular and configurable, starting from the resources available at the different schools, including the motivation and passion of teachers, headpersons, students, etc. (https://www.innovationgym.org/en/ this webpage can be translated into English using Google Translator found on top right hand side, but some material will remain in Italian)
National Policy Impact	Sept 2014	The concept of InnovationGym had immediate echo with the Ministry of Education and in October 2014, it was included in the government's educational policy document for the school system, *The Good School* (La *Buona Scuola*) as example of a new breed of creative and problem-solving labs.[75] (MIUR, 2014)
National Network of InnovationGyms	10 Nov 2014	FMD called for a meeting of schools to discuss the formation of a National Network of InnovationGyms. This led to the formulation of National Network Agreement on 29 March 2016. Today there are about 120 schools subscribed to the network, with some schools having very well equipped InnovationGyms, and others behind depending on available resources. (https://www.innovationgym.org/en/la-rete-delle-palestre/)
Project Office of New Jobs (ONJ)	June/July 2014	Submission and approval of an FMD/Google Italy project to Google.org (USA) aimed at enriching the vision of the InnovationGym with other 3 digital labs: Immersive Lab for Virtual Reality, Video Lab for 3D

75 "Making the lab/workshop activity a usual space in the didactic practice means rethinking the idea of laboratory as a "demonstration" place and only associated to a technological dimension. While today an interpretation of laboratories as **innovation gyms must be promoted, linked to the stimulation of students' creative and "problem solving" skills."** (MIUR, 2014, p.111)
(Italian version: "Rendere l'attività laboratoriale uno spazio consueto nella pratica didattica significa ripensare l'idea di laboratorio come luogo "dimostrativo" e unicamente associato ad una dimensione tecnologica. Mentre oggi va promossa un'interpretazione dei laboratori come **palestre di innovazione, legata allo stimolo delle capacità creative e di "problem solving" degli studenti."**)

Inauguration **Visit by Head of Google.org**	March 2015 October 2015	Animation, and Game Lab for Interactive Videogames, to create a project dedicated to 10,000 youngsters in transition i.e., NEETs, unemployed, people about to leave university etc. The grant amounted to $US 0.5 million and the project that was to run for two years received the name of Google's Office of New Jobs (the Officina dei Nuovi Lavori). See video of expanded InnovationGym made by the national TV Science program SuperQuark: (https://www.youtube.com/watch?v=AjJhYT6-rmo) The project started in earnest in March 2015 and its Inauguration took place on 18 March 2015 with the attendance of many teachers, students and also the Minister of Labor, the Head of Google Europe and the Governor of the Lazio Region. For the Municipality came a member of the cabinet of the Mayor responsible for Productive Activities. See video at https://www.youtube.com/watch?v=oDULsm1nZ1o About six months after the launch, the project Office of New Jobs was already a resounding success and this prompted the visit of Jacqueline Fuller, Head of Google.org to the premises of FMD InnovationGym. She praised highly the work been done as can be seen in the following video (in English): https://www.youtube.com/watch?v=6io0pDlECIc&feature=youtu.be Below the chapter discusses in greater detail this crucial project for the FMD since it is at the roots of the IPA.
Inclusive Phyrtual Accelerator (IPA)	Feb/March 2017	The end of the Google project Office of New Jobs left a clear feeling of success, particularly, given the motivation and enthusiasm it caused among the youngsters who would have been happy to continue. Unfortunately, Google.org could not offer further funding because the rules or the organization do not allow for a second tranche of funding, once a project is finished. This faced the FMD with the question: how can we offer more value to youngsters in transition, building on what we had learned during the Google project. This led to the birth of the Inclusive Phyrtual Accelerator at the beginning of 2017.

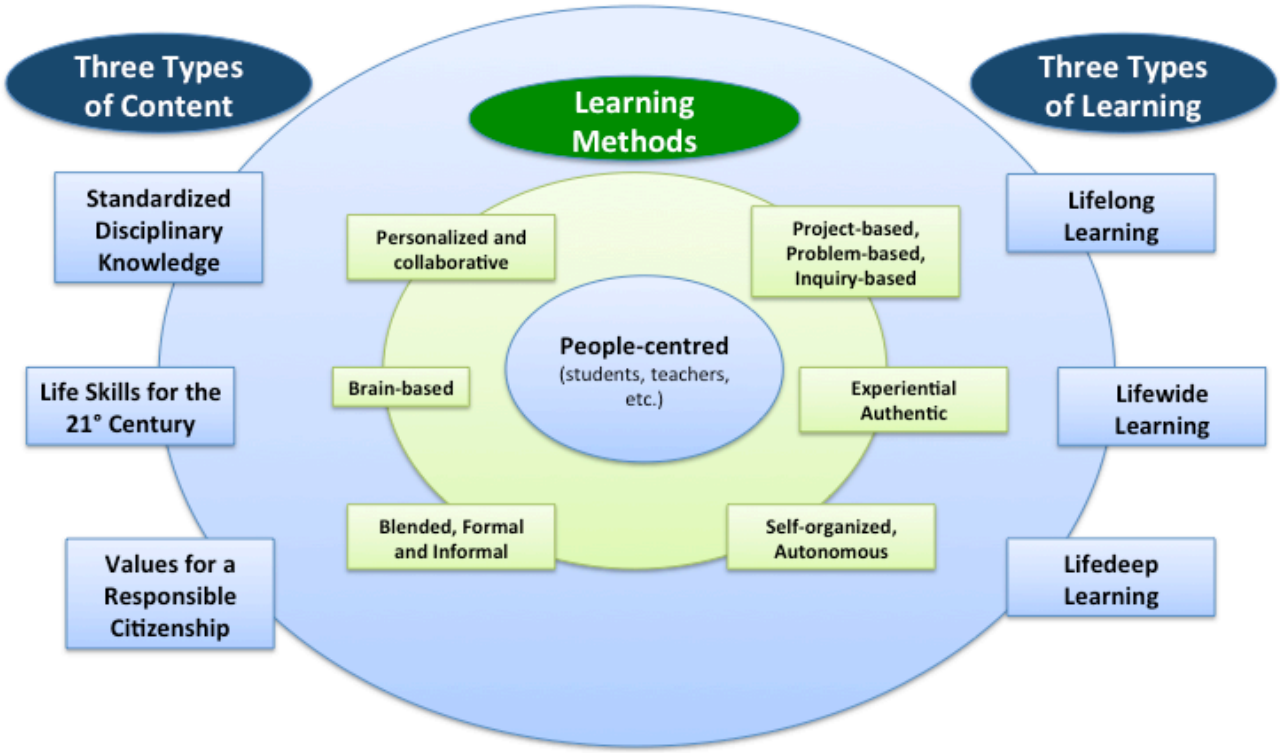

Figure 18. FMD Education for Life in the 21st Century

7.1.3 The contribution of the Google project Office of New Jobs (ONJ) to the Inclusive Phyrtual Accelerator (IPA)

In the following, the argument will give, first, an overview of the Google project *Office of New Jobs,* to pass then to deal in greater detail with the reasons and activities of the Inclusive Phyrtual Accelerator.

As seen in Table 42 the Office of New Jobs (ONJ) project started in earnest in March 2015, with Google having approved the two-year $US 0.5 million grant by mid-2014. The Challenge for the FMD was considerable since 10,000 youngsters in transition (i.e., i.e., NEETs, unemployed, people about to leave university etc.) three new labs had to be created on areas that were new to the expertise of the Foundation: Video Lab (3D Animation), Game Lab (Interactive Video Games) and Immersive Lab (Virtual Reality). Simultaneously, a meaningful program had to be created with the available space and other resources. Simple calculations of available total time and space and number of youngsters to be reached led to the possibility of offering 22 hours of activity per week. At the time, Italy had about 30% of youngsters under 29 unemployed and one of the largest populations of

NEETs in Europe with over 2 million people. Jobs was the key word for everybody but with 22 hours per week, the FMD was clear that the project was not offering a program that could lead either to a job or to a proper certification. It was to be an orientation program focused on self-awareness and new digital languages for life and work. In fact, the objective of the program was presented to the participants as follows:

> To do and create, all together, a significant moment that leaves us with a positive message, a charge of ideas and of energy to face the paths of construction of your lives with renewed determination. We want this week to be a positive moment of group orientation and reflection on the challenges, opportunities and skills / professionalism needs of the complex world of today and this century. (FMD Introductory Presentation)

For this purpose, the FMD offered two tracks respectively called "All4All" and "One4One." The All 4All track was made up of 6 hours of self-awareness about life and work in the complex world of the 21st century, including evaluation of the track activities, and 4 hours a day in each of the 4 labs participating in the track (FabLab, Video Lab, Game Lab and Immersive Lab). It was for people who wanted a brief introduction to all the technologies on offer. Instead, the One4One track offered the same 6 six hours of self–awareness and evaluation and 16 hours in a single lab. This was for people who wanted to work on a single technology more deeply. Table 43 gives an idea of the content of the two programs, taking into account that all laboratories included a teaching/learning modality that blended lecturing, group work, interactive exercises, learning by doing and specific training to develop a concrete result.

Table 43. Office of New Jobs – Content of 22-hour weekly programs in the two tracks

All4All Track	Participants attend all available labs for one week (Monday – Friday) for a total of 22 hours. They have 6 hours of self-awareness and evaluation of activities and attend one of the 4 labs each day to complete a shorter but wider orientation in new emerging digital technologies.
Self-awareness and evaluation of activities	*Self-awareness*: group work, exercises, and frontal lessons about the challenges posed by today's complex society, with reference to the rapid changes in technology, careers, jobs, organizations, etc. It stressed the importance of open thinking and attitudes and life skills for life and work in the 21st century. This part also provided practical instruments and exercises for competence assessment, and job orientation, search and pursuit within the development of an individual project. . Strategies addressed the

	stimulation of an open mind and life skill exercises, etc. *Evaluation*: Continuous evaluation was an essential part of the entire program with activities evaluated every week (sometimes daily) by the weekly groups of participants.
Four-hour programs in each of the four labs:	- *FabLab:* Brief introduction to digital manufacturing, rapid prototyping and the main digital manufacturing tools (3D printer, laser cutter, etc.); manufacture of a small object. Brief overview of competences and job opportunities associated to the Maker movement. - *Video Lab*: Selection of movie scenes with visual effects and brief demonstration of the techniques used to produce them; brief overview of competences, professions and job opportunities involved - *Game Lab*: Game micro-sessions to understand styles and genres; overview of various skills, professions and job opportunities involved in the development of Games; Coding. - *Immersive Lab*: Demonstrations of VR applications and hands-on exercises using Oculus and a Cave-environment to understand immersive reality; overview of competences, professions and job opportunities in the emerging world of virtual.
One4One Track	Participants have the same 6 hours of self-awareness and evaluation of activities as for the All4All track and 16 hours in a single selected lab for a deeper experience with the technology.
Self-awareness and evaluation of activities	The same as for the All4All track
Sixteen-hour programs in a selected lab	- *FabLab:* Introduction to digital manufacturing and rapid prototyping; description and operation of the main digital manufacturing tools (3D printers, laser cutters, plotters, milling machines, etc.). Practical labs focusing on two devices in which small groups devise a product, design it and plan its manufacture: 3D Printer (brief history, overview of models, operation, software), Laser Cutter (how it works, characteristics, 2D drawing software, cutting exercises) - *Video Lab*: Introduction to professional process for the creation of visual effects and 3D animation for movies, advertising and videogames (technological process and professional figures) and to main development software; methodologies and pre-production, prototyping and compositing techniques; project management, agile development and rapid prototyping. Small groups design and develop a video product via all the implementation phases. - *Game Lab*: Analysis of styles and genres via games sessions; Professional game development processes and introduction to main development software. The track includes methodologies and pre-production, prototyping and final product analysis techniques, as well as creative exercises. The aim of the laboratory is to develop the participants' ability to produce videogames with particular attention to two professional profiles: game designer and game programmer. Small groups design and develop a game prototype via all the implementation phases. - *Immersive Lab*: Demonstrations of VR applications and interactive experience

	sessions (videogames) and immersive reality (virtual reality); overview of professional VR development processes and main development software; methodologies and pre-production, prototyping and final product analysis techniques; analysis of psychological and sensorial concept of immersion; interactive storytelling concepts. Small groups design and develop an interactive product via all the implementation phases.

As anticipated, the FMD implemented continuous weekly evaluation of the program to ensure that the objective described above was fully achieved. In fact, participants had the obligation to fill the evaluation questionnaire to obtain the certificate at the end of their courses. The results were highly satisfactory. One of the reasons was that all labs and courses were handled by professional coaches, who could interact with the participants providing them with the best of expertise and experience. For instance, the program of the Video Lab was run by Animatika, a small company with long experience in 3D Animation and Special Effects; the Video Game Lab was run by the Accademia Italiana di Videogiochi (Italian Videogames Academy); and the Fablab was run by highly skilled makers associated to the FMD, while the Immersive Lab was run by an experienced professional working at the Foundation. The environment of the Foundation and the quality of the Labs was also a factor of success, as it was the brand of Google.

It is interesting to note that the participants came at their own expense from all over Italy, although the majority came from the City of Rome and the Lazio Region given the greater vicinity. The FMD advertised the program in the social media and in the government databases of unemployed youngsters. There was no requirement to join the program and, in fact, the FMD personnel did not know who the participants were going to be almost to the start of the week. Near the end of every week, the FMD sent a short questionnaire asking the people who had registered asking them: age, level of education, place of origin, experience with the technologies of the labs, whether they had had career orientation in their school or universities. One of the striking data was the level of education of the people, with over 40% having a university degree or post-graduate degree; also very few had had experience either of the technologies or of orientation. The age bracket went from 15 to 35 years old. So, at the start of every week, the results of the brief questionnaire were useful to tell the

participants “who they were” and, also, they enabled the coaches to have an idea of their audiences. Above all, the message was “we are all resources for each other in the brief week journey.”

By the time that the Head of Google.org, Jacqueline Fuller, and members of her team came to visit the FMD, the project Office of New Jobs was well on its way to success. Taking into account that the weekly groups were only a part of the youngsters occupying the InnovationGym premises or associated to the work of the project ONJ, the numbers shown in Table 44 provide a picture of great dynamism. Thus, the total number of people reached in the period from 18 March to 25 September 2015 (6 months and a week of work for project ONJ) was 11,796 and by the end of the project on 31 August 2016 the total number of people reached was 23,970. They include also the participation of new makers.

Table 44. Number of youngsters and makers involved in the activities of project ONJ

Students and Makers	**Number (25 Sept 2015)**	**Number (31 Aug 2016 - end of project)**
School Kids	***Number reached***	***Number reached***
Attending the labs	5,535	12,285
Involved in demonstrative events	2,700	4,654
Total number of school kids	**8,235**	**16,939**
Youngsters in transition (Jobless, NEET)	*Number reached*	*Number reached*
Completed the All4All and One4One	940	2,719
Involved in demonstrative events	1,901	2,971
Total number of youngsters in transition	**2,841**	**5,690**
Makers	*Number reached*	*Number reached*
New clients	95	185
Involved in demonstrative events	625	1,156
Total number of makers	**720**	**1,341**
TOTAL NUMBER OF PEOPLE REACHED DURING PERIOD OF PROJECT ONJ	**11,796**	**23,970**

Source. FMD (2015)

In addition, to complete the picture of success, the project ONJ attracted a great deal of attention

in the Italian media. Thus, more than 130 articles and services were generated on the main radio and TV national channels, daily newspapers, magazines and press agencies. The most important national newspaper *Repubblica*, the main national newscasts *TG1* and *Rai News 24*, the national radio network *InBlu* and more than 50 press agency services spoke or wrote about the project "Officina dei Nuovi Lavori."

But in a way all the success left a bitter flavor because for all the orientation and motivation that project ONJ generated, the FMD could not offer any further path to follow; first because the resources had finished and, second, because there was need for a new, deeper program that could build on the foundations left by ONJ. This led to the birth of the Inclusive Phyrtual Accelerator.

7.2 The Inclusive Phyrtual Accelerator

The FMD started the experience of the Inclusive Phyrtual Accelerator (IPA) in 2017 without any external financial resources but the knowledge that this was a strategic step for the Foundation and its mission of an inclusive knowledge society. At this time, the FMD began to study the evolution and arguments regarding the recent phenomenon of accelerators and pre-accelerators. Particularly interesting were the learning and networking approaches being used by these experiences to accelerate the journey of entrepreneurship and began to see that all sorts of programs and approaches were emerging in different places, which led to the main proposal of this thesis, namely, that an apparent trend towards a greater diffusion of an entrepreneurship culture and learning is taking place in society. For the FMD, it was key to make progress in this arena with the ultimate goal of taking this trend into the school system of Italy, not an easy task given the difficulties facing the country and its educational system. But a first step had to be taken under the resources available to the Foundation, or, under an **FMD-sponsored business model**. This meant no external funding, availability of the InnovationGym labs and FMD's internal expertise, mentors/coaches, as well as a network of people and organizations that could potentially donate their time and expertise in areas the FMD could not cover. There were also areas where the FMD possessed the knowledge but there was a need for

codifying and processing it to transform it into didactical material and flows. To an important extent, the first version of the IPA was to be built up and piloted along with the simultaneous development of a good number of its components. It was decided that the most suitable youngsters for this process were school and university students motivated by: (i) the challenge of experiential learning about innovation & entrepreneurship; (ii) the pursuit an original project aimed at devising a product and prototyping it; and (iii) the flexible use of any of the labs that the FMD made available to them through the Inclusive Phyrtual Accelerator, also named Phyrtual Factory for short.

Thus a first step in the process was taken in October 2016 with an event to make a public presentation of the idea of project Phyrtual Factory[76] and the need for an Alliance for Self-entrepreneurship conceived as "a set of organizations that want to collaborate in stimulating a culture of innovation by helping create an ecosystem of support for youngsters' projects that help their journeys towards entrepreneurship, as individuals and in groups." (FMD presentation)

Then came a triple call:

Call4Idea – for youngsters with a product idea they wish to realize; they could apply as single individual or in groups sending a CV and a brief video message telling about something they may have already realized or were in the process of realizing, for instance, a device, a piece of software, etc.

Call4Interest – for youngsters without their own idea but motivated to join a team to realize an appealing product idea; they had to send the CV and a presentation letter explaining their motivation and area of specific competence.

Call4Pro – for professionals e.g., coaches, mentors, and experts in various areas willing to donate their time and competence to support youngsters in both: deepening their knowledge and the realization of their product ideas. These experts could contribute formal lessons, informal agreed coaching sessions, testimonial talks, etc. There was also the possibility for professionals willing to

[76] https://www.mondodigitale.org/it/news/la-phyrtual-factory-%C3%A8

involve youngsters in a project of their own.

The triple call was left open until the beginning of 2017. Over twenty applications were received mostly from Rome-Lazio and also from a group of youngsters who had won a contest with a game-based project (Urby) and wanted to see the possibility of furthering its development. The members of the group were spread in various cities and most of them expected to participate through video-conferencing and online, something that proved difficult since they were also engaged in other activities. Then, there were two other projects with teams of final-year students from two secondary schools: IIS Dante Alighieri from Anagni and IIS Enzo Ferrari from Rome. These teams had won the school challenge in an IoT acceleration project the FMD had implemented in collaboration with the Lars Magnus Ericsson Foundation. The students' projects were respectively Sun Flower, a solar tracking photovoltaic panel, and Automatic Cockpit System (ACS), a customizable car sharing system.

In March 2017, all applicants were invited at the Phyrtual Factory to present their ideas as groups or individuals. Following the short presentations (pitches), they were all invited to interact for 45 minutes and form small or larger groups; nobody had to remain alone. Out of the process and including the two school teams came a group of 35 people organized in 7 teams with different number of members (see Table 45) aged from 16 to 32 years old. One of the teams, Infinite Edge, was made up of Ph.D students. So there was quite a variety to start the journey of the Inclusive Phyrtual Accelerator. Table 45 also gives a brief presentation of the full list of projects.

Table 45. The Seven Projects Starting in the Phyrtual Factory

Sun Flower (Team of 6)	Solar tracking photovoltaic panel. The project applied it to a solar-energy car for environmental purpose.
ACS – Automatic Cockpit System (Team of 6)	Customizable system for car sharing. ACS allows the driver to customize the comfort of his/her car wherever s/he is with a simple gesture. All it is needed is a keychain and an ACS account.
Urby (Team of 4)	Edugame, city oriented and home based. A new video game that connects children with their cities through 3D maps, virtual reality and augmented reality.

NM3 (Team of 7)	Personal household assistant operated by app. A small device facilitating the planning and consultation of one's own activities through the use of simple and rapid voice commands. Later it pivoted towards a domotic toy house.
CrowdActing (Team of 5)	Online fundraising without cost to "donors" to create campaigns to improve the world through posts, clicks and views. The website brings together a project to finance, a sponsor company and a network of users.
Infinity Edge (Team of 4)	Interactive installation to make children interact with space through colors and sounds. It focuses on the theme of the body-constructed space relationship.
Living Your Dream Team of (3)	Web platform able to aggregate the tourist services of a single territory. The portal service is based on integration with different operators and their ability to work in synergy. Everyone can use the platform to promote their business

Simultaneously, the FMD began to promote the Phyrtual Factory among its own network with the aim of engaging people and/or organizations willing to play a role in the project. In May 2017, the Foundation sent letters to many of the actors in the entrepreneurship arena of Rome/Lazio. The invitation distinguished 4 types of voluntary roles people could play depending on their time and resource availability:

- *Mentor*: person able to give lessons to the participating teams on one or more topics in the Phyrtual Factory training program (e.g., problem-solving, team building, communication, marketing, finance, etc.). The lesson could be in presence, online (video-conference, webinar) or blended. Mentors could also be open to informal meetings with teams to help them reinforce their knowledge.
- *Coach*: person taking the task of accompanying and coaching one or more of the participating teams in the realization of their project idea. The coach had to agree times and methods of interaction (in presence, online) with his team.
- *Sponsor*: person taking the task of supporting a project by offering useful contacts and potentially some technological and financial resources. The sponsor could be an individual or an organization.
- *Supporter*: person taking the task of giving prompt advice in response to a request from the team participants. It could be a short email, message or phone call, etc. This mode was for

those who were not able to play an active part in the project but could still contribute to the learning path of the participants.

The promotion of the Alliance and request for voluntary involvement generated good results and attracted about a dozen of people including expert business coaches, directors of organizations with expertise in communications and measurement of return on investment, and consultants experts on finance, organization, and negotiation. In addition, a three retired managers from the ICT industry also joined the coaching activity.

7.2.1 The environment, resources and educational program of the Phyrtual Factory

The participants were offered a program and environment reminiscent of startup accelerators but much more educationally oriented, digitally equipped and inclusive, as seen by the target of the calls above. There was no requisite to pursue a startup, no seed-funding given, only the experiential learning process of entrepreneurship. Table 46 gives an idea of what was available to participants, taking into account that various elements were created along the six months of the project. This was possible because the participants themselves were busy with their studies or other activities and required pacing the program along the six-month period. The first formal 4-hour session started in May 2017 and the last took place in October of the same year. The final month of November was left for the final Demo Event with the projects pitching and showing their products.

Table 46. Some important Elements of the Phyrtual Factory Offer

Digital Environments and Coworking	Access to all the labs/mentoring of the Phyrtual Factory: FabLab and Digital Fabrication, Robotics and IoT/IoE Lab, Game and Coding Lab; Video Lab, and Immersive/Digital Art Lab. *Coworking:* groups could also use the premises of the Phyrtual Factory to meet as needed, discuss their ideas, test their solutions, and converse with the other groups.
Formal training	Set of ten 4-hour sessions using interactive frontal lessons, group exercises and games (e.g., Lego Serious Play and a variety of canvasses) covering problem-solving and entrepreneurship themes key to Education for Life in the 21st Century. These ten 4-hour sessions were: (1) Self-awareness and self-entrepreneurship; (2) Complex world: new technological and global challenges and exponentiality; (3) Problem-solving: facing challenges, obstacles and opportunities; (4) Team-building and leadership, emotional

	intelligence; (5) Innovation and entrepreneurship; (6) Communication and promotion (marketing); (7) Financing; (8) Organization and Governance; (9) Measuring economic and social impact; (10) Negotiation.
Project Design and Prototyping	Teamwork approach to develop the product ideas with the support and guidance of digital mentors and entrepreneurship coaches. They explored the design thinking process and used the acquired knowledge to move their projects forward to the realization of prototypes or models.
Mentoring and coaching – informal learning	Each project benefitted from the assignment of coaches and mentors who advised them in the key phases of project development; sometimes this led to important modifications in the project or to a new path of development (pivoting); or to changes in the way the project was communicated.
Professional Networking	Access to the wide network of professionals of the Fondazione Mondo Digitale. The Foundation could search for the appropriate type of expertise as required by the projects, by contacting universities, research centers, companies, etc.
Demo Day:	As in startup accelerators, teams had the opportunity to pitch and show their prototypes in a major Demo Event with people from investor and managerial organizations that were able to give useful feedback for furthering the projects. A selected jury voted the pitches and achievement of the teams and the project with most points became the winner.
Award	A prize of €3000 was given to the winning project and all participants received a certificate.

All teams were able to make progress with their projects and with them the Inclusive Phyrtual Accelerator itself. Only the Urby project decided to stop at one point because of the extremely difficult logistic conditions facing the team. During the Demo Event, the jury identified *CrowdActing* as the best project in terms of innovation, social utility, and feasibility. In fact, CrowdActing was able to demonstrate a working website already taking its first steps. (See https://www.crowdacting.org/) Come December all 7 projects were invited to exhibit their prototypes at the Rome Cup, the FMD's annual event devoted to educational robotics and attended by thousands of people.

For the FMD, it was a rewarding experience, particularly, because everything was done based on the enthusiasm and understanding that this was a strategic path for the organization and a concrete answer to the "bitter flavour" emerged at the end of the Google Office of New Jobs Project. The issue of inclusivity still means to reach the world of school and for this the FMD has continued to

navigate the progress of the Phyrtual Factory in the conditions it finds and faces.

7.2.2 Second edition of Phyrtual Factory - September 2018 to April 2019

The second edition of the Phyrtual Factory saw a shift to **a grant-sponsorship-based business model** due to funding awarded to the FMD by the Lars Magnus Ericsson Foundation for a project targeted on Italian Schools and focused on orientation on advanced digital technologies and entrepreneurship. The project named *5G4School*[77] involved 200 students from upper secondary schools[78] in two large Italian cities: Milan and Rome. The specific technical focus was the application 5G technologies in different domains: IoT automatization, Merged reality, Cloud robotics and Automation, Smart agriculture, Logistics.

The program was divided in two phases:

(Phase 1) *school-work rotation* ("*alternanza scuola-lavoro*"): a 30-hour program focused on the development of IoT and Cloud applications for robotics. It combined experiential activities in presence and webinars and ended with two *hackathons* (ideation marathons) in Rome and Milan respectively. For the *hackathons* he students were guided to think about the following four areas:

- *Tourism and culture*. How can we exploit the potential of 5G to create solutions that improve the interaction of people in a smart city? How can we find a meeting point between technological innovation and the world of culture and tourism?
- *Safety*. A world with lots of connected devices also brings with it some critical points from the point of view of security. How can we protect people and their information?
- *Robotics*. Cloud Robotics, Remote Surgery, Gaming, Companion Robot. The possibilities in the field of robotics are limited only by imagination.

[77] Link to the FMD project 5G for School: https://bit.ly/2Jz6B35
[78] IIS Croce Aleramo of Rome and IIS Feltrinelli of Milan

- *Mobility*. Self-driving cars, intelligent traffic lights, interactive signage ... mobility will be one of the areas that will benefit most from a fast, low-latency network like 5G. What possible scenarios can we imagine in this area?

A jury evaluated the resulting ideas and 40 youngsters grouped in 8 teams were selected to enter the second Phyrtual Factory "acceleration" phase. Table 47 briefly presents the eight projects entering the second acceleration phase.

Table 47. Eight projects entering the acceleration phase after the hackathon selection

Smartsensor (Team of 5)	Speed and efficiency of emergency services. Through the use of different sensors the response time of the emergency reliefs decreases, the vital activities of the patient as well as its position are immediately communicated to the emergency relief. Intelligent traffic lights connected to ambulances vehicles improve traffic organization in order to obtain a better flow in case of rescue operations.
SmartHelp (Team of 6)	Solution to monitor the mood of people, through which we can improve the conditions of those who have behavioral, cognitive and communication troubles. The solution is made up of a digital bracelet, an App and a video camera.
5G Helmet (Team of 5)	Helmet that, thanks to 5G technology, is able to provide useful information (eventual car accidents, speed, GPS, etc.) to the driver in order to assist him until the destination is reached.
Memory PRO (Team of 5)	Reminder tool designed for people with diseases like Alzheimer's, but also for ordinary people. Thanks to 5G technology, with this tool it is possible to access a large archive of information, instantly and easily.
SafeZone (Team of 5)	Intelligent speed bumps rise according to the speed of incoming vehicles by exploiting the speed of data flows brought by 5G.
Smart Street (Team of 5	An interconnected road network, where traffic lights change according to car traffic, setting priorities for ambulances.
Smart Door: (Team of 5)	An evolution of common doors, it is equipped with wireless notice board, biometric sensors that can detect movements, 24h camera and integrated microphone.
SmartWaste 2.0 Team of 5)	Waste management system interconnecting intelligent rubbish bins to an underground network and to a fleet of autonomous driving vehicles.

(Phase 2) *youth acceleration with Phyrtual Factory*: 40 hours of activity dedicated to mentoring, coaching, design and rapid prototyping to the 40 students of the teams that succeeded in the first phase. These teams spread in Rome and Milan had to work in the production of a prototype to be exhibited at the RomeCup 2019 due to take place in Rome from 2 to 5 April. The path concluded

with a Demo Event where the students presented their pitches and prototypes in front of a jury who voted the winning project. An award ceremony closed the full set of activities.

All eight projects were presented at the Rome Cup 2019, and the jury composed of experts identified SmartHelp as the best project on the basis of the following criteria: concreteness, innovation, development potential and social impact. The first three teams received the following prizes: (a) the winner got an Arduino Kit with all the components to construct small IoT mechanisms; (b) the second place got an IoT Kit consisting of an electrical socket to be programmed to exercise remote control of two domestic appliances; (c) and the third place also got an IoT Kit, but enabling the connection and remote control of only one domestic appliance.

In short, the second edition was adapted to the requirements defined in the project 5G4School and was able to offer a program with a set of activities and resources similar to those of the first pilot Phyrtual Factory edition. Thus, the students enjoyed formal lessons and experiential training provided by Ericsson personnel on 5G technologies and cloud robotics, as well as on 5G strategic positioning in the value chain and on its business potential. They learned about case studies, ATAC and Zucchetti, and got engaged in an ideation hackathon, pitching their projects in a Demo Day competition leading to the selection of the best project ideas. Then, the projects that went through to the second phase had webinars with coaches from different companies and accelerators (Ericsson, Comau, TIM, Luiss Enlab), who provided them with knowledge about innovation, design thinking, business development and communication. Webinars was a difference in relation to the first edition and justified by the fact that the project 5G4Schools was spread in two cities. For the same reason, the students from Milan had much less access to the Phyrtual Factory space in Rome. This was alleviated by engaging an organization in Milan, Italia Camp, that was able to offer access to a FabLab. Finally, they all came to Rome for the Exhibition and challenge during the Rome Cup that ended with the project SmartHelp as the winner.

7.2.3 Future developments

The Inclusive Phyrtual Accelerator continues building its own **grant-sponsorship-based path**

in accordance with the opportunities that emerge and the resources the Foundation is able to gather. After the end of the 5G4School project, two lines of development have emerged. First, a large multi-partner project focused on Educational Poverty has entrusted the FMD with the build up of InnovationGyms in schools in poor areas of 4 cities: Bari, Milan, Palermo and Reggio Calabria. The schools hosting the InnovationGyms are hub schools, so they use them for their own activities and, also, must offer the facilities to other schools and community organizations in the area. The facilities are Coding Lab, FabLab, Robotic Lab and Video Immersive Lab. In these spaces, The FMD is implementing a program of activities based on the experience and materials accumulated through the Inclusive Phyrtual Accelerator. The activities are customized according with the age of the students. Table 48 gives an idea of the content and learning activities of the 4 labs of Open Space.

Table 48. Content and activities of the 4 Labs of project Open Space

Coding Lab	Uses, for instance, Ozobot and App Inventor for the ludic learning of programming basics, development of logic, thinking, problem solving, cooperative learning, peer education and peer tutoring.
FabLab	Makes available instruments of digital fabrication for the realization of ideas and projects, promoting the shared learning among people and projects.
Robotic Lab	Offers robotic kits for various ages including the simple Bee robot, a manual toy to get a first touch with the concepts of programming and robotics, several Lego kit enabling an ever more complex in the construction (assembling) and computer-based programming of robots.
Video and Immersive Lab	offers to small kids the possibility to produce animated cartoons and to older kids the possibility to practice green screen professional filming and the creation of 3D short films. This Lab also implements workshops to discover immersive technologies and augmented reality through engaging experiences, thanks to different types of viewers, including low-cost viewers.

It is important to note, that, at the same time, the FMD activities are integrated with activities offered by the other partners, for instance, art-based learning, entrepreneurship, etc.

The second development of importance is the signature of an agreement with the Information Technology Managers Club of Rome (Club Dirigenti Tecnologie dell'Informazione - CDTI), a non-profit association aiming at contributing to the social, economic and industrial development of the country through the promotion of the use of information technologies. To date, CDTI counts on about

450 members and organizes working groups and events, as well as internal seminars for the professional growth of the members. The agreement with the FMD is specifically based on the participation of the CTDI members in the mentoring, coaching and networking activities of the Inclusive Phyrtual Accelerator.

The FMD will continue to pursue all opportunities of new projects and partnerships to ensure the growth of activities, content and network (Alliance) of the IPA. For the FMD it is a strategic project that should eventually enter the school world, as it has already partially done through the 4 new Innovations Gyms of project Open Space. True, the difficulty and turbulence of a country in crisis does not make it easy, but this only means to pursue the progress of IPA with even greater determination.

Chapter 8 Comparative Analysis of Case Studies

This Chapter looks back at the 4 organizations and their accelerator experiences analyzed in the previous chapters. These are: (1) NUMA from France, founded in the early 2000s as a non-profit association (initially named Silicon Sentier) following a strategy of lobbying, and promotion of entrepreneurship; (2) MindCET from Israel born around 2012 as a vertical accelerator under the wings of an educational technology company (CET); (3) H-Farm founded by a successful entrepreneur as an independent (forprofit) incubator/accelerator of startups in 2005, and the Inclusive Phyrtual Accelerator (IPA) founded by a nonprofit Foundation (FMD) as a long-term project aimed at diffusing digital and entrepreneurship learning to the school system and society. As we have seen, these different strategic origins have conditioned their diverse evolution paths and results, yet in their own way they are all experiences that confirm the trend towards a wider diffusion of an entrepreneurship culture and learning in society. The mechanisms and processes the four organizations have applied differ in interesting ways, including their business models in search for sustainability and, in the end, they all contribute to the diffusion of entrepreneurship in society.

The other feature in common has been the rather difficult communication with the case studies for the purposes of research, with the exception of the FMD since I am the General Director. This difficulty is the reason the first three cases are based on single interviews and much research on secondary sources. However, this is consistent with what other scholars have reported regarding research in the world of accelerators, that is, it is not the easiest of task possibly given the difficulties associated with the emergent nature of the phenomenon (see Chapter 3).

This Chapter compares, first, the evolution of the business models implemented by the four organizations: NUMA, MindCET, H-Farm, and the Fondazione Mondo Digitale and, second, the evolution of the four accelerator models.

8.1 Evolution of Business Models Implemented by the Organizations Promoting the Four Accelerators

This section compares the origins and evolution of the business models of the four organizations in the case studies, starting with NUMA the oldest experience.

8.1.1 NUMA

NUMA started in 2003 as Silicon Sentier and it is the case that reveals most the struggle and dilemmas to strike the right business model in an evolving entrepreneurship environment influenced by their own activities. There are two major eras in the evolution of NUMA (Silicon Sentier), the nonprofit era and the forprofit era. In addition, inside these eras, particularly during the nonprofit era, a number of changes took place as the organization strove for sustainability and growth.

8.1.1.1 Period 2003–2015 - nonprofit era

8.1.1.1.1 2003-2008 – nonprofit association model

The founders were digital agencies and some startups wanting to create the first network of digital entrepreneurs in the City of Paris and the Region of Île de France. The business model was a non-profit association and the objective was to engage in lobbying and promotion of the new digital entrepreneurship and show that Paris was a startup city.

8.1.1.1.2 2008 – 2011 - Grant-sponsorship-based nonprofit model (tech-oriented)

This operation went on for five years up to 2008, when NUMA (Silicon Sentier) managed to set up an important private partnership that provided funding for the opening of the first co-working and event space in Paris (*La Cantine*). This was the start of what can be seen as a *grant-sponsorship-based* non-profit model. Following the first private funding, Silicon Sentier increased the number of sponsoring partners and grants, adding public sponsorships from the City of Paris and the Region and a European grant from ESF; also, small service income came from renting the space to companies for event organization. The target communities of this business model revolved very much around the use of the space *La Cantine*. They were, first, the open source community and other networks of technologies' developers and startups, because they constituted an asset to attract big companies to

organize events and getting them connected to the developer ecosystem. Thus, this first period was more tech-based than entrepreneurship. *La Cantine* attracted 15,000 people per year and saw 2000 events organized in 4 years.

8.1.1.1.3 2011 - 2015 – Shift towards entrepreneurship-oriented activities

The next period 2011-2015 witnessed an important evolution of the business model of Silicon Sentier (soon to become NUMA in 2013) towards active entrepreneurship through changes in five interrelated aspect:

(1) *beginning two new strategic activities*: the first startup accelerator in France *Le Camping*, and Silicon Xperience, a Project Laboratory selling services aimed at beta-testing companies' services and co-creating prototypes of new ones. It was the beginning of a serious generation of earnings from the private sector;

(2) *enrichment of the target communities and activities:* year 2012 saw 70 projects tested (30% from large companies), 30 prototypes designed, and about 1,500 testers. The activities now blended barcamp, startup accelerator, mobile monday, coworking, co-creation, living lab;

(3) *national expansion*: network of *Cantines* reached other French cities, Toulouse, Nantes, Rennes, Toulon, Paris;

(4) *substantial change in the composition of financial resources*: new composition brought about by: (i) sizeable reduction of the sponsorship and grant component (by 2013); and an increase in the funding coming from the sale of services to the private and public sector;

(5) *bigger space and more personne*l: renting a new, bigger 1500 m^2 space in 2014, and hiring more salaried personnel for the Acceleration Program and the Project Laboratory.

During this period NUMA saw itself playing for the benefit of all, for Paris and France's place in the world by promoting and diffusing "the importance of entrepreneurial culture." This model resembled the *ecosystem accelerator archetype* identified in Table 18. At the same time, the significant growth set up the basis for the organization's evolution towards a forprofit model.

8.1.1.2 Period 2015–present – forprofit era (Company)

In 2015 NUMA's business model changed quite radically towards a forprofit company offering services to private and public sectors. The organization was aiming for strong growth and internationalization and needed a significant amount of new capital to invest in: (i) increasing the number of startups being accelerated, (ii) accelerate the market growth of these startups, with a view to increasing the value of the equity they had in the companies, and (iii) expand further the international developments. NUMA's nonprofit operation was worth €3 million annually and this was clearly insufficient for the new ambitions. A forprofit operation was required to be able to raise capital in the market, thus moving closer to the *investor-led accelerator archetype* identified in Table 18. Indeed, this change was also required because the competitive landscape had changed markedly in the arenas of coworking space and startup acceleration. This was to an important extent due to NUMA's own pioneering success in promoting a culture of entrepreneurship through coworking, startup acceleration and digital innovation services for the private and public sectors. Thus, NUMA found itself facing serious competition in its areas of value proposition: (i) in space renting because the City itself was opening spaces to host startups for free; (ii) in mentoring or education because a lot of content had become available for free through free events, meetups, or simply online, and (iii) in startup acceleration because other accelerators with stronger resources had come to the scene, such as corporate accelerators or accelerators supported by investment funds.

All in all, the entrepreneurship ecosystem in the City of Paris and the Region of Île de France had clearly grown, along with the level of entrepreneurship culture and learning, and NUMA had little option than to evolve and try to make it in the forprofit market. Unfortunately, for NUMA, the key step to increase available investment capital did not work out well and the organization was never able to reach substantial sums for further round funding for startups. It never entered the league of major investing funds or made a strong alliance with at least one of them. In fact, the competition from big investment funds made it increasingly difficult to attract startups.

Not surprisingly, NUMA eventually abandoned the idea of making it big in the world of startup investment and acceleration. They also abandoned the line of general entrepreneurship education and

the organization became more sharply concentrated on the business of corporate services, including services to the public sector, providing training and consultancy. Simultaneously, they continued with the process of international expansion, sometimes through offices operating directly under NUMA, other times through operations that adopted the NUMA branding but remained autonomous.

Undoubtedly, the evolution of NUMA's business model represents a rich experience of an organization successfully pioneering the diffusion of a culture and learning of entrepreneurship in France. Paradoxically, this success led to the growth of an entrepreneurship ecosystem that made the environment more competitive. NUMA was not able to maintain its leadership in startup acceleration and was forced to abandon this area of entrepreneurship.

NUMA, however, refocused its activities along three core dimensions: Training, Space Renting, and Network and has maintained its international dimension. The area of Network has been particularly novel and challenging since it takes an ecosystem approach to bring together corporations, startups and local authorities to co-design and implement solutions for more inclusive and livable cities. Regarding the international dimension, NUMA has maintained the control of the operations in New York and Berlin, and has a close relationship with Bangalore, while other places have rather used the NUMA branding in largely autonomous operations. In fact, NUMA's international operation was never a unified model applied under NUMA's ownership. Instead, most of the time it was a sort of joint project with NUMA playing start activities and lending its prestigious brand.

Looking back at almost two decades of existence, the national and international evolution of NUMA has been fascinating journey of an organization that meandered between visions and strategies of common good and business performance in a dynamic context that the organization itself helped shape. The legacy of lessons and expertise is certainly a treasure NUMA is fruitfully using as the organization continues its adventure into the future. To the story of the Startup Accelerator, the thesis will return later on in the section comparing the accelerators of the four cases.

8.1.2 MindCET

MindCET is a much younger operation than NUMA's, having started seven years ago in 2012. The evolution of MindCET's business model has been pretty stable, with nothing like the shifts just seen in the NUMA experience. In fact, a key success factor for MindCET has been precisely the stability afforded by its business model that can be described as *sponsored-based vertical accelerator* (close resemblance to the *matchmaker accelerator archetype* of in Table 18). The reason is that MindCET was created by the Centre for Education Technology (CET), the largest education technology company in Israel with about 1000 employees. CET was created 42 years ago and educational innovation has always been part of its DNA. In 2012, CET's CEO, Avi Warshavsky, saw that there was a widening gap between what the education system was providing and the needs of the new generations of digital learners. This set up the challenge to start a new operation inside the company, a small group of 5 people fully supported and funded, occupying one floor in CET's Tel Aviv offices, but autonomous to pursue its mission without sustainability worries. This group of people was to dedicate itself to create solutions for the digital learner, seeking to provide new pedagogical approaches and educational innovations that disrupt the current educational system. The target was clearly focused on the education system: schools, teachers, students, etc.

The combination of this specific objective inside CET's 'protective umbrella' led MindCET's evolution towards its distinctive path of *sponsored-based vertical acceleration* in the EdTech industry. In addition, MindCET's distinctive path also includes *multiple-target acceleration* involving entrepreneurship learning and product development, although not necessarily startup development. Let us see how MindCET's evolution has happened.

8.1.2.1 The evolution of MindCET's vertical multi-target acceleration in EdTech

The selection of an acceleration model was not immediate. It came as a result of exploring what was around and, particularly, the decision to explore the world of startups because MindCET saw itself as a kind of startup. Eventually, they took inspiration from the book *The Lean Startup* (Eric Ries) and the well-known accelerator YCombinator (Boston). They also held a variety of conversations with other organizations to try to learn about the best path to take and concluded that

the entrepreneurship dynamics of the startup world could be adopted to help create a system aiming to meet the needs of the digital learner. This put MindCET's nascent strategy straight into the path of entrepreneurship and, specifically, into the path of *sponsorship-based vertical acceleration*. Thus, in the first two or three years of existence, MindCET opened three lines of acceleration that, together, constituted an interrelated set of instruments to favor the diffusion of a culture and learning of entrepreneurship in society, particularly through the world of education.

(i) the first line was the *Startup Accelerator*, a line devoted to early-stage startup entrepreneurs trying to transform educational solutions into products, very much in the tradition of vertical startup accelerators.

(ii) the second line was the *Fellows Program*, a line of acceleration dedicated to teachers, seeking to support them and the educational system to understand the entrepreneurial culture and the difficulty EdTech startups find in having their products adopted by the educational system.

(iii) the third line was a Research and Development program called *MindCETeX* devoted to outstanding, highly motivated developers with an interest in the EdTech field. These developers conduct R&D on innovative technologies at the MindCET campus at Yeruham and participate in the MindCET accelerator program.

These three programs constitute the foundations of a continuous enrichment of MindCET offer of entrepreneurship acceleration to startup, teachers, and outstanding developers, as well as of the growing international relations established by the organization over the years. In the following, the discussion provides a brief reminder of the second and third line of acceleration, namely, the Fellows Program (Teachers Accelerator) and the Research and Development (R&D) (MindCETeX), leaving the first line of Startup Acceleration for the comparative analysis of all four startup accelerators to be made later on in the chapter.

8.1.2.1.1 The Fellows Program

As anticipated, this program came out of the realization that the educational system was not adopting attractive solutions being produced by startups. The response was an effort to bring an understanding and culture of entrepreneurship to teachers and the educational system. This program was not intended to create startups, it rather sought to disrupt the prevailing educational mindset by introducing elements of entrepreneurship and bringing the teachers and students to become part of the product development. By so doing, MindCET took a unique step into helping the diffusion of a culture of entrepreneurship in the educational system and society. The successful development the Fellows Program led to further growth through two new complementary activities dedicated to supporting teachers to understand entrepreneurial culture: (1) *Teachers Early Adopters of MindCET (T.E.A.M)* and (2) *E.S.T.Alliance (E.S.T.A.).* The T.E.A.M. program is now in its fourth year and counts on the support of the Ministry of Education. The program has created a methodology aimed at transforming teachers in early adopters rather than entrepreneurs. To an important extent, this program transforms classes into real-life test sites. The E.S.T.A. program is devoted to passionate educators who care about their work. Participants in E.S.T.A are offered the achievement of EdTech Competency, a place in the Global EdTech Community, and enjoy a number of benefits that enhance the quality of their careers. The E.S.T.Alliance is an important part of the international expansion of Mind CET.

8.1.2.1.2 MindCETeX – R&D program for outstanding developers

The MindCETeX program followed the Fellows Program for teachers, but this time the target for acceleration was the R&D work of outstanding developers. MindCET realized that great ideas coming from R&D in universities and research institutes were not evolving into the market or startups. MindCET set about to mediate the path of these ideas into the company world and also found that companies had interest in the MindCETeX program for the development of some of their own technologies. In a similar fashion to the Fellows Program, the MindCETeX program has also grown two complementary lines of action: (1) *Vision Groups:* multidisciplinary groups of leading experts in various fields who meet with the MindCET team throughout the year to think about significant

challenges facing the world of education. *Publications:* MindCET's stream of publications and research papers on trends at the frontier of the EdTech field. It reinforces the results of the Vision Groups.

As said earlier, MindCET's Startup Accelerator will be discussed later on in the comparative analysis of the 4 accelerators. Here, to end this section, it suffices to say that, today, MindCET has grown to 15 people and continues to maintain its successful sponsorship-based vertical model with multiple-target acceleration. The organization remains largely independent, although the company CET still provides 80% of everything MindCET needs. On these bases, it can be legitimately said that MindCET is today largely sustainable. Nevertheless, the organization's growth into its various lines of actions and projects has required a fund- and resource-raising capacity of its own. Today, MindCET has the capability to develop different sponsorships mechanisms according to the different programs and challenges it faces – and the richer the ecosystem of networks, people and activities the stronger the basis for sustainable further growth.

8.1.3 H-Farm

As pointed out already, the case of H-Farm is quite different from those of NUMA and MindCET. It started in 2005 as a direct forprofit investment from a successful entrepreneur, who sold its company and wanted to support young people wishing to start an activity in the digital world (close resemblance to the *investor-led accelerator archetype* of in Table 18). The name H-Farm is quite telling with H for Human, while Farm reflects the unique place where the organization set up its base, Ca' Tron, an agricultural estate of over 1800 hectares, one of the largest of Italy, property of Cattolica Insurance, facing the Venice Lagoon. Clearly, this also makes the role of Cattolica Insurance of paramount importance in the birth of H-Farm in the middle of the countryside. In fact, this alliance has been fundamental to ensure the stability of H-Farm and its growth and diversification in about 15 years of operation. The business model of H-Farm can then be described as *forprofit capital investment model* and, according to H-Farm its evolution has seen two distinct phases: the

Investment Phase that cover the first ten years until 2015 and, subsequently, the phase of *Transformation & Consolidation of the Business Model*, from 2105 to 2018 and onwards.

8.1.3.1 Investment phase (2005-2015)

During this first phase, H-Farm played the role of investor supporting young entrepreneurs to develop their businesses. However, H-Farm had neither cohorts of startup projects nor formal lessons-based training program. It started with supporting two companies, more like a venture incubator. On the other hand, H-Farm did provide seed funding to and took equity from their startups; moreover, H-Farm incubator/accelerator also undertook a similar evolution to NUMA's and MindCET accelerators in its selection process, from accepting early-idea startup projects to accepting only the more developed and market-promising startups. The H-Farm's incubator/accelerator operation will be dealt with later on in the comparison of the accelerators of the four cases. Next, below, the argument concentrates primarily on the evolution of H-Farm during the decade of the Investment Phase that lasted until 2015.

During the decade of the Investment Phase, H-Farm grew gradually from 28 people and two companies in 2005; to 70 people and the launch of the Informal event "Storming Pizza" for startups' ideas sharing in 2007; to 100 people, 9 startups, a new headquarter, the first exit, the first training center operation moving to Cà Tron and the first international operation in USA in 2008. Undoubtedly, 2008 was a good year. H-Farm's performance in 2009, however, was hit by the financial crisis but the number of startups reached 16 and the international operation included a partnership India and an office in London. The year 2011 saw the start of both: (i) the Digital Accademia offering digital training to companies and individuals and (ii) the Digital Summer Camp for kids. Personnel grew to 250, startups reached 35, and the construction of a new building began. Year 2012 saw further international activity with the organization of the first Global Accelerator Meeting (GAM) and the number of exits reaching 7 (one per year on average). Year 2103 began to anticipate the important growth and diversification to take place in the second phase; the H-ACK industry, a 24-hour development marathon inspired by hackathons was launched and 15 new startups

entered the program; most importantly, H-Farm inaugurated H-CAMP aiming to become the most innovative all inclusive acceleration program in Europe. Year 2015 marked the end of the H-Farm's first phase of investment and growth, having invested almost 19.8 M€ in more than 80 startups and a total investment of €28 million during the decade. H-Farm personnel reached 450 and by the end of year, on 13 November, the organization was listed on the stock exchange. Critically for the second phase, the foundations of the H-CAMPUS had been set with the mission to become the biggest hub in Europe where startup, company consultancy and education will coexist.

8.1.3.2 Phase of transformation & consolidation of the business model (2015 -2018)

The second phase started off with a diversification of H-Farm's business model based on 3 pillars of activity respectively called Industry, Education and Startup Portfolio. For the purpose of this thesis, this phase is interesting because, to an important extent, is much more about H-Farm's efforts to disseminate a culture of entrepreneurship at the level of education. H-Farm has also identified a third phase starting in 2018 and called *Growth and Scalability of our Model*. In practice, however, this third phase does not involve a major qualitative change of business model; it rather deepens the offer and results of the major change triggered in 2015 and, above all, in 2017 with a massive new investment of over €100 million. Let us give a closer look to the developments of this second phase.

Startup Portfolio is mostly a continuation of H-Farm's original activity dedicated to investment in small, innovative enterprises and companies to develop and accelerate their business. Here, H-Farm identifies and analyze several digital entrepreneurial projects in Italy and Europe and select and invest in the most promising.

The two new areas of Industry and Education are major additions to H-Farm business model. *Industry* is all about offering consultancy services to companies on digital innovation, accompanying them in the transformation of their products, processes, or, management, and helping them envision future developments based on frontier technology opportunities to develop innovative products and experiences. It could be said that such processes of digital transformation intrinsically entail processes

of learning and education in the companies.

The new area fully dedicated of Education, however, is the one that highlights best the way in which the strategic evolution of H-Farm activities has come to add to the trend towards a greater diffusion of an entrepreneurship culture and learning in society. This program has three major areas: "(i) a part that concerns schools from 3 to 18 years-old based on the international model (lessons in English) expanded by a digital and entrepreneurship curriculum; (ii) a three-year university degree based on an existing pedagogical model provided by Cà Foscari University of Venice and enriched and augmented with a digital and entrepreneurship curriculum; and (iii) a post-university path made up of training courses and professional development linked to specific areas, such as graphics, 3D animation and more. At high-school, H-Farm propounds that it is important for youngsters to engage in entrepreneurial work because this helps them to develop transversal skills as well as particular work capacities.

8.1.3.2.1 2017: massive jump in investment

Year 2017 marks a major investment landmark in H-Farm development with the signature of a €101 million agreement for the development of H-Campus, envisioned to become the largest innovation pole in Europe with a surface of 51 hectares, 13 new buildings dedicated to education and to the startup and enterprise world for a total surface of 30,000m^2 with a capacity to host up to 3000 people. Clearly, H-Farm has succeeded in involving a number of institutions in the creation of the €101 million fund for this major development. These have included Cattolica Assicurazioni (57% share), Cdp Investimenti Sgr (40% share) and Cà Tron Real Estate; the society of H-Farm's founders contributed with only a 3% share. Along with this investment in infrastructure development, H-Farm has actually grown in all directions consolidating its path towards sustainability. Thus, in 2018, the number of people was edging up towards 700 people. Simultaneously, in three years, H-Farms has seen its revenues increased about sevenfold from just over €8 million to over €61 million with the area of Innovation as main contributor, followed by the area of Education. These two areas alone contributed almost 87% of H-Farm revenues in 2018. Nevertheless, a strong economic sustainability

is still in the making. In fact, the main source of sustainability is the work with medium and large enterprises, while education is yet to pay its way.

8.1.3.2.2. International dimension

Finally, H-Farm has continued to grow nationally and internationally. Nationally, H-Farm has opened offices in Milan, Torino and another in Catania; while internationally, through theGlobal Accelerator Network (GAN). H-Farm has consolidated relations with the main European accelerators and above all with the main Israeli accelerators. H-Farm is also part of a network of international schools and, so far, has offices in New York and Barcelona.

8.1.3.2.3 Some common points with NUMA and MindCET.

All in all, H-Farm seems well on its way to consolidation and growth having strong backing from venture capital. To an important extent its experience shares features of the experiences of both NUMA and MindCET. With NUMA, it shares the evolution toward greater emphasis on company innovation services as key to the sustainability model, while with MindCET it shares its regard for education, particularly the effort to take entrepreneurship to the school system. True, the H-Farm school education is a business with paid fees and, although they offer grants to deserving needy students, this represents a limitation as far as dissemination to the entire school system is concerned.

8.1.4 Fondazione Mondo Digitale (FMD)

The case of the inclusive entrepreneurship accelerator of the FMD is the most experimental of all the cases and happens within the limits of a governance very much controlled by the public sector, given that the FMD, its creator and developer, is part of the group of companies controlled by the Municipality of Rome, in a context of protracted and profound crisis affecting the city, with frequent changes of political forces generating much political instability and turbulence, with consequent impact on the governance and availability of resources for the FMD and the IPA.

The FMD started its life in 2001 as a consortium and became Foundation in 2006. It is a small non-profit organization of about 25 people today and with the ambitious mission of contributing to

the creation of an inclusive learning/knowledge society in which innovation, education, inclusion and fundamental values are all combined to create benefits for all, without discrimination of any kind. This has taken the FMD to implement a distinctive strategic approach that includes: (i) areas of work and (ii) modality with which the areas of work are approached, and (iii) funding and resource gathering.

Regarding areas of work, the FMD operates in two broad interrelated areas: (i) ICT-based innovation in education, mostly in the school system, and (ii) digital inclusion of those sectors most at risk of being left out of the benefits of the learning society.

Regarding the modality of work, the FMD has implemented since the start an approach called Action Research-Development and Implementation (ARD&I). (i) *Action research (AR)* involves theoretical studies in areas of strategic relevance for the foundation, mainly S&T development, social and educational innovation and entrepreneurship; (ii) D*evelopment (D)* involves the transformation of the AR results into products such as handbooks, videos, reports, course programs, etc., that feed into implementation; and (iii) *Implementation (I)* gives real meaning to the other two dimensions (ARD) since it uses their results to create and implement projects for the benefit of the school world and/or disadvantaged sectors of the population.

Regarding funding and resource gathering, almost the totality of the services and activities run by the FMD for the school system and disadvantaged sectors are free of charge. This makes the FMD largely a project-based organization with funding coming from projects the organization obtains from the private and public sector, apart from a Municipality's contribution that has disappeared in later years. This basically means that the FMD's business model is similar to that of the first funded years of NUMA, namely, a *grant-sponsorship-based* business model and more closely resembles the ecosystem accelerator archetype of Table 18.

In practice, the FMD's strategic approach has been applied to five major program areas focused on (i) Youth, (ii) Women, (iii) Older People, (iv) Immigrant/Refugees, and (v) Educational Robotics. There are no rigid borders between these programs and, in fact, theories, instruments, projects

developed for a certain area may also be applied in other areas. Additionally, the FMD also run large events that see the participation and attendance of thousands of people.

The work of the FMD is spread across Italy and also in Europe. Its network of stakeholders includes all sorts of organizations and individuals constituting a wide cross-section of society. Highly important strategic partners are large companies such as Microsoft, Google, Facebook, Ericsson, and others. They fund projects through their corporate social responsibility activities and have helped maintain the Foundation sustainable in spite of the turbulence of the political environment. Currently, the FMD is running about 50 projects from orientation in artificial intelligence for schools to social media for women entrepreneurs and many more. It is a hectic activity but largely unavoidable is the organization is to continue to exist and grow.

8.1.4.1. Concepts, projects and events leading to the Inclusive Phyrtual Accelerator

It is possible to identify events, concepts and projects that led to the creation and initial implementation of the IPA. These events, concepts and projects are spread in time and contain responses to opportunities and also serious difficulties faced by the FMD. The main milestones leading to the IPA are found in Table 42 in Chapter 7. Here only the headings and dates are reproduced below in Table 49.

Table 49. Headings of main milestones leading to the emergence of the IPA

Activity/Milestones	Year
Educational City & Education for Life in the 21st Century	2004/ 2005
Phyrtual Concept and Phyrtual.org	2005/2006
Serious Crisis due to changes of government	2007/ 2011 and 2013/2015
InnovationGym **National Policy Impact** **National Network of InnovationGyms**	March 2014 Sept 2014 10 Nov 2014

Project Office of New Jobs (ONJ) **Inauguration** **Visit by Head of Google.org**	June/July 2014 March 2015 October 2015
Inclusive Phyrtual Accelerator (IPA)	Feb/March 2017

As Table 49 shows project Office of New Jobs (ONJ) funded by Google.org with a two-year $US 0.5 million grant preceded and, in fact, set the foundations for the development of the Inclusive Phyrtual Accelerator (IPA). The Challenge of this project for the FMD was considerable involving (i) 10,000 youngsters in transition (i.e., i.e., NEETs, unemployed, people about to leave university etc.) as beneficiaries of an orientation program, (ii) the creation of three new labs on areas that were new to the expertise of the Foundation: Video Lab (3D Animation), Game Lab (Interactive Video Games) and Immersive Lab (Virtual Reality); and (iii) the creation of meaningful digitally-based orientation programs making use of old and new digitally-equipped spaces and other resources. The results were two 22-hour programs per week: All4All and One4One, as explained in Chapter 7. The objective of the 22-hour orientation programs was a sensitive issue and it was presented to the participants as follows:

> To do and create, all together, a significant moment that leaves us with a positive message, a charge of ideas and of energy to face the paths of construction of your lives with renewed determination; We. want this week to be a positive moment of group orientation and reflection on the challenges, opportunities and skills / professionalism needs of the complex world of today and this century. (FMD Introductory Presentation)

The details of the two programs and the number of people reached are found in Table 43 and Table 44 in Chapter 7. Here, Table 50 below only the head reproduces only the headings.

Table 50. office of New Jobs Content of 22-hour weekly programs in the two tracks

All4All Track • *Self-awareness and evaluation of activities* • *Four-hour programs in each of the four labs*
One4One Track • *Self-awareness and evaluation of activities* • *Sixteen-hour programs in a selected lab*

As anticipated, the FMD implemented continuous weekly evaluation of the program to ensure that the objective described above was fully achieved. One of the reasons was that all labs and courses were handled by professional coaches, who could interact with the participants providing them with the best of expertise and experience. The environment of the Foundation and the quality of the Labs was also a factor of success, as it was the brand of Google. The total number of people reached during the two years of the project came close to 24,000 and it is interesting to note that the participants came at their own expense from all over Italy, although the majority came from the City of Rome and the Lazio Region given the greater vicinity. One striking data was the level of education of the people, with over 40% having a university degree or post-graduate degree; also very few had had experience either of the technologies or of orientation. The age bracket went from 15 to 35 years old.

In addition, the project ONJ attracted a great deal of attention in the Italian media. With more than 130 articles and services were generated on the main radio and TV national channels, daily newspapers, magazines and press agencies.

But in a way all the success left a bitter flavor because for all the orientation and motivation that project ONJ generated, the FMD could not offer any further path to follow; first because the resources had finished and, second, because there was a need for a new, deeper program that could build on the foundations left by ONJ. This led to the birth of the Inclusive Entrepreneurship Accelerator.

8.2 Comparison of the Evolution of the Four Accelerator Models

Let start by going back to the Review of Literature of Chapter 3 and remember some of the key features identified in the various definitions of accelerators and, also, pre-accelerators, taking into account that a single agreed definition does not exist. A brief synthesis on accelerators written in Chapter 3

> "highlights that in terms of (i) s*ervices provided to early-stage startups*, accelerators provide working space, pre-seed financial investment, immersive education, mentoring and guidance, shared cohort experience (batches of entrepreneurs), networking opportunities, and visibility with investors who may

> provide access to further funding. These services are for a limited period of intense activity that culminates in a public pitch event or demo day. The application process for access to these services is highly competitive … While in terms of (ii) *business models for economic sustainability*, the services provided are often in exchange for a small equity in the supported startups, although accelerators may also raise funding from a mix of investors, public bodies or large corporations. … Accelerators … are not a standardized world. For instance, they can be for-profit or non-profit and vary in many aspects … "

Regarding pre-accelerators, as found with accelerators, there is no single accepted definition. One definition quoted in Chapter 3 saw them as organizations that "usually work with idea or pre-idea stages of development, when entrepreneurs are still seeking for a team and better defining what to do." (Barba, 2016, p.10) Pre-accelerators neither invest nor take equity in startup projects ("zero funding, zero equity") and, like accelerators, they have a large component of training, feedback, pitching, networking and a competitive, although less aggressive application process. The length of the programs can go from one day to three months, with teams numbering from 3 to 10. (Ibid.)

In the light of these characteristics, this section compares the evolution of the accelerator experiences of the four cases from a variety of aspects, particularly, their origins, business models and associated objectives, target startup projects, financial policies in terms of equity and investment funding, types of programs implemented, facilities, growth and so on.

8.2.1 Origins, business models and objectives of the four accelerators

Clearly, there is a close relationship between the evolution of the models and objectives of the accelerators and the evolution of their mother organizations, particularly in terms of funding and other resource availability. In a few words, the accelerators have very much followed the fortunes of their mother organizations, with some of them enjoying a great deal of stability and growth, while others have faced more complicated journeys. Let us start with the experience of the NUMA startup accelerator, given its tortuous journey and eventual demise.

8.2.1.1 Origins, objectives and business model of the NUMA startup accelerator

The experience of the NUMA accelerator is the one with the longer pre-history and changes as it strove to find a business model for sustainable growth, initially, within a nonprofit organization

with a mission of public service (growing the culture of entrepreneurship in Paris and the region of Île de France.) and, then, a forprofit organization with a mission seeking to combine profit-making and economic performance with public service. Thus, historically, the birth of the NUMA accelerator in 2011 followed several years after the creation of its mother organization Silicon Sentier (later NUMA) in 2003. Silicon Sentier went through several models: first, until 2008, it was a *nonprofit association* following a strategy of lobbying and promotion of digital entrepreneurship; then significant funding came from public and private sources and Silicon Sentier, still a nonprofit, shifted model to *grant-sponsorship-based.* During this period that lasted until 2011, Silicon Sentier opened its first co-working and event space (*La Cantine*) in Paris, with a tech-oriented target community. This lasted until 2011.

Other important shifts followed in the coming years up to 2015. The most important for the purposes of the present discussion was the birth of the first Startup Accelerator in France, *Le Camping*. This was the result of a general shift by Silicon Sentier towards entrepreneurship-oriented activities that also included the creation of Silicon Xperience, a Project Laboratory selling services aimed at beta-testing companies' services and co-creating prototypes of new ones. The name NUMA was adopted in 2013 and the organization, still a nonprofit, was beginning to change towards the objective of generating substantial earnings from services to the private and public sector. NUMA had seen a decline in the sponsorship-grant-based sources of income and envisaged that to have greater control of its own income and future it was necessary to offer paid services as well as being able to raise capital in the marketplace. Initially, however, the startup accelerator continued the nonprofit mission of public service: to stimulate the entrepreneurial capacity of the ecosystem in the City of Paris and the Region of Île de France. In this model, the accelerator did not provide funding nor took any equity from the cohorts of startup projects. In 2014, however, NUMA moved to a new 1500 m^2 space and an important shift followed since the organization decided to evolve towards an income-generation model for the accelerator by doing both: providing some funding to and taking equity from their accelerated startup projects. The bases were now set for the last major change of

business model from nonprofit to forprofit organization in 2015.

The forprofit phase of the startup accelerator began with great ambitions. NUMA expected substantial increases in investment capital to invest in: (i) the growth (later round funding) of an increasing number of startups generating equity value for the organization, and (ii) an international expansion, all leading to make NUMA a powerhouse in the world of startup accelerators. Unfortunately for NUMA, the dream did not materialize since it never managed to raise large amounts of investment capital to multiply the number of growing startups, and the equity value raised from its startups was small. NUMA became uncompetitive since the entrepreneurship ecosystem that the organization itself had helped stimulate was, by 2018, populated with competing lower–cost coworking spaces and entrepreneurship learning events and resources; on the other hand, investment funds and corporate accelerators could offer more funds and support than NUMA. NUMA tried the two models available to startup accelerators, on the one hand, the *high-volume/small-equity model* based on taking small equity from a large number of startups and, on the other hand, *the selective/higher-investment model* based on the identification and acceptance of a smaller number of more mature startups requiring more capital intensive and operational support to make it in the market. In 2018, NUMA even tried a pre-accelerator program for early development projects, offering no funding and taking no equity, with the idea of supporting them to reach the startup accelerator where an amount of equity could be negotiated for further services. It did not work.

Ultimately, the NUMA startup accelerator was virtually squeezed out of the forprofit market and, eventually, at the beginning of 2019, NUMA took the painful decision to stop its operation. NUMA has continued focusing more on corporate services and training and, also, on city challenges through the application requiring the build up of ecosystems of actors. It also has continued a reduced international operation.

Later on, the paper will look at further details of the operation of NUMA's Startup Accelerator. Now it is the turn to look at origins, business models and objectives of the other accelerators, following with MindCET next.

8.2.1.2 Origins, business model and objectives of the MindCET startup accelerator

Compared to NUMA, the case of the MindCET startup accelerator is rather straightforward. Basically, it started in 2012 as a small group of 5 people inside the Israeli EdTech company CET (Centre for Educational Technology), following the recognition that the educational was not satisfying the needs of the new generations of digital learners. So, the immediate objective was to work on the creation of solutions for the digital learner, with the target focused on the education system: schools, teachers, students, etc.

MindCET received strong support from its mother company CET, including the allocation of an open space occupying one floor in CET's Tel Aviv offices. Since its inception, seven years ago, MindCET has grown continuously, nationally and internationally, and a key success factor has been the stability afforded by its business model, described earlier as *sponsored-based vertical accelerator*. The main practical implication of this model is that MindCET has had no worries of having to pay their own way, earning its own financial resources by making a business. Thus, the organization has been able to dedicate completely to pursuing its objective of creating EdTech solutions for the digital learner.

In these highly favorable conditions, MindCET explored the possible paths to follow in pursuit of its objectives and this led the group towards entrepreneurship and the launch of a startup accelerator. They took inspiration from the book *The Lean Startup* and the experience of YCombinator. In fact, MindCET saw the diffusion of the startup and entrepreneurship culture inside the educational system and society as crucial. For this reason, its distinctive path of *sponsored-based vertical acceleration* in the EdTech industry also came to include *multiple-target acceleration*, involving not only the *Startup Accelerator program* but also two other lines of acceleration seen earlier on: (i) the *Fellows Program* and (ii) the *MindCETeX Research and Development program*. These two programs have promoted entrepreneurship learning and product development, although not necessarily startup development.

Here, the primary concern is with the MindCET startup accelerator, the first line of acceleration

created to support the transformation of educational solutions into products, very much in the tradition of vertical startup accelerators. Below, the paper looks at its structure and program in detail, comparing it with the other accelerators. Let us just add that MindCET has very much enriched the activity of its startup accelerator, giving it a highly prominent international dimension through three programs: (1) *Global EdTech Startups Award (GESA)* aiming at creating a global network of accelerators from all over the world, helping each other; (2) *MindCETGO, the Global EdTech Accelerator* focused on startups that already have a product in the market and revenue generation, but are yet to reach sustainable growth and, (3) *High Grade Ventures,* the micro-fund created to support EdTech startups, first, those that leave MindCET accelerator. Also, MindCET and Arie Capital have joined forces to launch the new investment fund for early-stage EdTech startups from the UK and Israel.

Returning to the three lines of acceleration, however, they clearly constitute an interrelated set of instruments to favor the diffusion of a culture and learning of entrepreneurship through the world of education and society. They have been the foundation of MindCET success over 7 years of national and international growth in its activities. In fact, MindCET has grown to 15 people today and continues to maintain its successful sponsorship-based vertical model with multiple-target acceleration. The organization remains largely autonomous and, in September 2019, it was due to open a new facility equipped with FabLab and other spaces where teachers, educators and startups can experience the work of the organization. MindCET is today largely sustainable even because it has developed the capability to create fund-raising sponsorship mechanisms according to the different programs and challenges it faces.

8.2.1.3 Origins, objectives and business model of the H-Farm startup accelerator

Compared to NUMA and MindCET, H-Farm is much closer to the latter in terms of the simplicity of its origins, objectives and business model. An important difference is its business model that can be described as *forprofit capital investment model* and, according to H-Farm, its evolution has seen two distinct phases: the first is the *Investment Phase* lasting a decade from 2005 to 2015, and

the second is the phase of *Transformation & Consolidation of the Business Model* from 2015 to 2018 and, in fact up to the present day.

The first phase saw the start of H-Farm as a direct forprofit investment from a successful entrepreneur, becoming *the first incubator/accelerator of startups* in Italy, placed at Ca' Tron in the middle of a 1800-hectares agricultural estate in Veneto, property of the financial institution Cattolica Insurance. In fact, this makes the role of Cattolica Insurance also fundamental to the origins of H-Farm and, indeed, to its stability, growth and diversification during its 15 years of evolution.

During the first phase of H-Farm (2005-2015), its business model was more akin to a *forprofit incubator/accelerator* making investments in startups and supporting their evolution towards potentially successful exits that would generate a profit to the operation. In fact, during this period the H-Farm incubator/accelerator grew gradually its number of companies, with no cohort mechanisms or training programs found in the traditional model of accelerators. The aim was to provide seed funding, take equity, and earn profits from the company exists. Thus, H-Farm started with 28 people and supporting 2 companies in 2005; by the end of the decade of the investment phase, H-Farm had grown to 450 people, with an investment of almost €20 million in more than 80 startups. The total investment had reached €28 million. In between, H-Farm achieved its first exit and first international operation in USA in 2008, and a partnership India and an office in London one year later. Other activities included the Digital Accademia offering digital training to companies and individuals, a Digital Summer Camp for kids in 2011, and the first Global Accelerator Meeting (GAM) in 2012, the year in which H-Farm reached 7 exists. Year 2013 anticipated the growth and diversification coming in the second phase with H-Farm running the H-ACK industry and, most importantly, inaugurating H-CAMP aiming to become the most innovative all inclusive acceleration program in Europe. By the end of the first phase in 2015, H-Farm was listed in the stock exchange and, critically for the evolution of entrepreneurship and startup acceleration, H-CAMPUS had set the objective to become the biggest innovation hub in Europe where startup, company consultancy and education coexist.

The second phase shifted H-Farm business model towards 3 major areas of activity respectively

called Industry, Education and Startup Portfolio, opening for the first time efforts to disseminate a culture of entrepreneurship at the level of education. To a large extent the area of Startup Portfolio was mostly a continuation of H-Farm's original incubator/accelerator activity dedicated to investment in small, innovative enterprises and companies. The two new areas of Industry and Education, however, were major additions to H-Farm business model.

Industry was about offering consultancy services to companies on digital innovation, taking an organizational ecosystem approach from co-designing to communications, and branding. *Education*, however, was the new area that most closely brought H-Farm to contribute to the trend towards a greater diffusion of an entrepreneurship culture and learning in society. It contained international schools curricula from 3 to 18 years-old expanded by a digital and entrepreneurship curriculum; a three-year university degree enriched and augmented with a digital and entrepreneurship curriculum; and a post-university path made up of training courses and professional development. In essence, H-Farm propounds that it is important for high-school youngsters to engage in entrepreneurial work because this helps them to develop transversal skills as well as particular work capacities.

Year 2017 marks a major investment landmark in H-Farm development with the signature of a €101 million agreement for the development of H-Campus, envisioned to become the largest innovation pole in Europe with a surface of 51 hectares, 13 new buildings dedicated to education and to the startup and enterprise world for a total surface of 30,000m^2 with a capacity to host up to 3000 people. Again, Cattolica Assicurazioni has played a major role with a 57% share of the investment, another 40% came from Cdp Investimenti Sgr, and H-Farm's founders contributed with only a 3% share. This ability to raise large amounts of capital is clearly a major strength of H-Farm, it was the aspect that most failed NUMA. Thus H-Farm has continued to grow edging up towards 700 people in 2019. Revenues have also increased about sevenfold with the area of Innovation as main contributor and the area of Education coming next, although Education has yet to pay its way. Undoubtedly, the massive capital investment of 2017 is certain to ensure further growth and economic sustainability. The goal of making H-Campus, the largest innovation pole in Europe where startup,

company consultancy and education coexist is yet to become reality. Time will tell whether H-Farm succeed in this ambitious dream.

8.2.1.4 Origins, objectives and business model of the Inclusive Phyrtual Accelerator (IPA)

The Inclusive Phyrtual Accelerator (IPA) was born in 2017 and it is clearly the youngest and most experimental of all the accelerator experiences seen in this thesis. A nonprofit Foundation (FMD) started it as a long-term project aimed at diffusing digital and entrepreneurship learning to the school system and society.

The origins, objectives and business model of the IPA have a number of substantial differences with those of the other three accelerators. First, it was born inside the Fondazione Mondo Digitale, a nonprofit Foundation committed to the creation of an inclusive learning/knowledge society in which innovation, education, inclusion and fundamental values work together for the benefit of all; this mission pervades IPA. Second, the Foundation operates inside a highly turbulent environment as a result of two factors: (i) political control by the Municipality of Rome and (ii) the deep economic crisis affecting the city with consequent political instability. Third, most of the FMD activities are free to its beneficiaries, particularly to the world of schools and disadvantaged sectors, to do this the FMD raises funding mostly through projects won at national and international calls. Fourth, the IPA is not dedicated to startup acceleration, rather to the diffusion of project-based entrepreneurship, using learning aspects of the acceleration process, but with no obligation to reach a startup. Fifth, the IPA started a pilot phase with no funding from any external sources to the Foundation and, then, it has continued on the basis of project funding obtained by the Foundation, with adaptations in line with the amount of funding, length and content of the projects. Sixth, since IPA's purpose in not getting income from startup acceleration and exits, it has neither provided pre-seed funding nor taken any equity.

Comparing these aspects with those of the business models of the other three cases, the discussion has earlier on identified that the business model of the FMD is most similar to that of the first nonprofit funded years of NUMA, namely**,** *a grant-sponsorship-based business model.* In turn,

the business model of IPA has shown two phases: the first, *an FMD-sponsored model* applied during the pilot phase, and the second *a grant-sponsorship-based model,* once project funding arrived.

For the FMD, the start of the Inclusive Phyrtual Accelerator was a strategic decision completely inside its mission, main work areas, and modality of work. Let us remember that the FMD works at the crossroads of education, innovation, inclusion and fundamental values for responsible citizenship, focusing specifically, on the one hand, on ICT-based educational innovation in the entire school system and, on the other, on the digital inclusion of sectors of the population at risk of being left out. In this work, the FMD applies a modality that goes from theory to practice: the approach ARD-I (Action-Research, Development and Implementation. For this reason, the concept of IPA has been well-informed by research on the development of accelerators in the entrepreneurial scene, something that's essential to the content of this thesis. In fact, work on this thesis has been a critical addition to the FMD's understanding and implementation of the IPA.

The two other critical dimensions have been (i) the richness of the FMD's ecosystem created on almost 20 years of operation, and (ii) the trajectory of events, concepts, projects and infrastructure that created the basis for the FMD to launch IPA's pilot initiative without funding of its own. Above, in Table 49, the paper identified key milestones leading to the launch of the initiative.

In effect, the FMD started the IPA experience in 2017 under *an FMD-sponsored model* enabling the pilot phase that was simultaneously a development phase of content and activities. The pilot phase set the foundations for the second phase under a *grant-sponsorship-based business model* that is now expected to continue and grow as the FMD searches and obtains further project resources. As part of the process of developing the IPA (or Phyrtual Factory), the FMD also promoted the creation of the Alliance for Self-entrepreneurship in 2016 and then proceeded to make a triple call: *call4idea, call4interest, and call4pro*. These calls had an inclusive spirit, something central to the vision of IPA: to contribute to the trend towards a greater diffusion of an entrepreneurship culture and learning in society, as a key element for an education for the 21st century. The triple call was followed by the configuration of the teams and the start of the IPA adventure in March 2017. Simultaneously, the

FMD invited 4 types of volunteers to support the projects: mentors, coaches, sponsors, and supporters. A dozen people joined the IPA activities, bringing their variegated expertise and, above all, the will to contribute to the growth of youngsters in the complex world of today.

8.2.2 Comparison of characteristics of the four accelerators

Before, the argument has already looked at the evolution of the business models and objectives of the 4 accelerators. This final section compares the evolution of the accelerator programs of the four accelerators considering several aspects, specifically:

- target clients/beneficiaries and associated financial policy (the focus is on project teams and not on other stakeholders such as mentors/coaches/investors who can also be considered as beneficiaries, as seen in the literature review chapter);
- selection process
- structure, timing and content of acceleration programs
- learning approaches/processes

8.2.2.1 Target clients/beneficiaries and associated financial policy

The target clients for most of the accelerators discussed in this thesis have varied in time. Thus, the target clients/beneficiaries of the **NUMA** startup accelerator evolved with the changes in the business model of the organization. At the start, in the non-profit period when NUMA (Silicon Sentier) was mainly focused on public service and the diffusion of a culture of entrepreneurship, the target clients/beneficiaries were early-idea project teams which did not receive any funding from, nor provided any equity to, NUMA (this approach targeting early-stage project teams without funding nor equity was also applied to NUMA's pre-accelerator in 2018). Then, when NUMA evolved towards an income-generation model for the accelerator in 2103, the organization begun to do both: provide seed funding to, and take equity from its target accelerated startups. This process was deepened as NUMA's model shifted from nonprofit to forprofit, eventually targeting more mature project teams with products or prototypes close or already in the market place. Initially, NUMA's funding was €20,000 and equity started with 10%, then moved to 5% - 3% and then both became

variable depending on the value of the startup. NUMA's efforts, however, did not manage to raise the high volume of capital investment necessary for further round of investment on a high number of startups, so the *high-volume/small-equity model* based on taking small equity from a large number of startups shifted to *the selective/higher-investment model* where the target was a smaller number of startups identified and selected by NUMA itself with a view to furnish them the capital intensive and operational support they needed. As we know, the NUMA startup accelerator was squeezed out of the forprofit market and, eventually, closed down.

Turning to **MindCET**, the stability of its business model has been largely reflected in the evolution of target clients/beneficiaries for its startup accelerator. Initially, it accepted early-ideas project teams because the accelerator was itself in an early learning period, defining and piloting its program. Once the accelerator became more established, the target clients became only more mature startups with solutions/products closer to the market place. In terms of funding and equity, MindCET came to a policy of not giving funding to, or taking equity from, a startup project team immediately at the beginning; it gave itself one months to get to know the startup and the decided if and what amount of funding and equity to give. Equity varied from 3% to 8%. Of course, if one takes account of MindCET's *multiple target acceleration*, the target clients/beneficiaries also include (i) the teachers' accelerator (Fellows Program), i.e., teachers motivated to understand technology and entrepreneurship to help facilitate the adoption of EdTech in schools, and also (ii) the outstanding researchers and developers interested in the EdTech field who participate in the MindCETeX Research and Development program.

H-Farm's target clients/beneficiaries were, for most of its existence, only startups to be incubated/accelerated towards a market exit. Nevertheless, H-Farm shares with NUMA and MindCET the evolution of the acceleration activity from early-stage startups towards more mature startups that have products in the market and are closer to succeed. In fact, today, H-Farm incubator /accelerator services are furnished primarily to large companies, as mediator of relationship between these companies and startups possessing new ideas or products in technologies or sectors of interest

to the company. In this process, H-Farm has become more a sort of external R&D to the companies, discussing their needs, and searching for the appropriate startups that can be accelerated if necessary. Lately, particularly with the addition of the area of Education that includes a line of entrepreneurship, the target clients/beneficiaries regarding the diffusion of a digital and entrepreneurship culture also include students from 3 to 18 years of age and university students.

The **Inclusive Phyrtual Accelerator**'s target clients/beneficiaries have been youngsters with ideas, in groups or alone, and even youngsters without their own idea but motivated to join and participate in a project of other youngsters. This target has included school students (15-17 years old), university and doctoral students, and people striving to prove an idea not strong enough to make it to a startup accelerator providing funding in exchange for equity. The IPA is aiming to reach the school system so, by definition, it must be inclusive as its name clearly implies.

8.2.2.2 Selection process

The selection process of startup accelerators has also evolved with the evolution of business models. Thus, initially, **NUMA** implemented a standard application-based cohort model through a process based on a public call and jury-based selection of the best early-stage startups to join the cohort. Later, as the organization moved towards its own selection of more mature startups, a proactive-search and selection process completely in its own hands replaced the standard application model. The proactive-search model not only meant scouting for startups instead of waiting for them to apply, it also meant that the number of startups was no longer fixed, it was more *ad hoc*, maybe five or six startups, depending of the result of the scouting.

The **MindCET**'s selection process also involves the application by EdTech startup project teams trying to gain a place in the cohort of companies to be accelerated. The very first cohort in 2012 had only 4 entrepreneurs with an idea for an educational solution. In the first year, the idea was to bring early-stage EdTech companies from prototype or Minimum Value Product (MVP) to market penetration and raising capital. Later on, as the accelerator became well established, this changed and the selection process evolved towards selecting startups with tested prototypes of a technological

or pedagogical innovation. Early-stage ideas are considered only if they are very promising. Today, MindCET receives many applications and the process of selection is thorough. The cohorts of selected startups can reach 10 companies, but the accelerator prefer 6 to 8 companies since every team comes with 2 or 3 people. They have the obligation to spend 2 days minimum at the MindCET facilities.

The **H-Farm's** selection process is straightforward since it has no cohort structure. The H-Farm founders and personnel with high-level of competence analyze and cream-off the applications, and select the companies H-Farm wish to invest in with the goal of reaching an exit. The amount of seed funding given by H-Farm has varied from case to case, normally, between €40,000 and €60,000. The same has been the case with equity that has varied depending on the value of each startup. H-Farm considers an exit a success if it repays the investment 4 to 8 times.

Last, the selection process of the **Inclusive Phyrtual Accelerator** has followed two modalities. First, during the *FMD-sponsored pilot phase*, it implemented a call for applications open to individuals or groups of people with a project idea to pursue, as well as people without their own idea but motivated to join a group (this was accompanied by a call for professionals). A pitching session exposed all the ideas and provided the base for the formation of teams of variable number of members. In the second *grant-sponsorship-based phase*, the selection came together with the selection of schools and classes participating in the project. The FMD proactively identified and selected the schools participating in the project, while the schools selected the final-year classes. All classes worked towards the identification of an idea to present at a pitch-based competition where a jury creamed off the project selected for the second prototyping phase. This process involved no startup development and no project funding or equity,

8.2.2.3 Structure, timing and content of acceleration programs

The acceleration programs of the 4 cases show similarities and differences and, also, changes reflecting the evolution of the 4 organizations. Thus, both NUMA and MindCET initially took inspiration from the original accelerator YCombinator for their acceleration programs; while H-Farm

started before the YCombinator but with a different program, and the IPA took inspiration from the general idea of acceleration program.

The **NUMA** acceleration program was the first to follow in the footsteps of the YCombinator program. Thus, it offered a three-month accelerator program and space for cohorts of 12 companies selected, as we know, through the application-based with jury selection model. The three-month program was run twice a year and combined formal and informal learning activities through classes and mentoring by the network of mentors. It closed with a Demo Day where the startups pitched their projects to stakeholders for potential investment. This was followed by graduation and alumnae network. The mentors participating in the program were mostly volunteers, about 100 of them, but those who really worked with the startups were about a quarter (25 people). However, as NUMA changed its model from standard application-based to the proactive-search and selection model, the acceleration program followed a similar route. Thus, the standard formal-informal educational program given to all cohorts was no longer useful and was replaced by a more customized mentorship program defined according to the startups' requirements. In this new modality, the startuppers came to the space for a master class but in a less regular way.

The **MindCET** acceleration program also got inspiration from the YCombinator experience, although being a vertical EdTech accelerator it gives emphasis to knowledge about the characteristics of the education industry. The full program for the cohort of EdTech startups runs for over 4 months and participants must be present 2 days a week at MindCET facilities. The content of the program includes formal lectures, often by people from the education industry, on the specificities of the education industry and the critical importance of the real pedagogical value of EdTech products if they are to succeed in the educational system. Other lessons address common themes in acceleration programs such as on business models and financing. Then, customized mentoring complements the formal lessons. For this purpose, mentors and startups are matched at the beginning of the program during the day when the startups illustrate their products to all the MindCET mentors. A difference here is that the mentor network is internal to MindCET. In addition to lectures and mentorship, the

MindCET acceleration program also implements many workshops on problem-solving, ideation and product development tackling. The program ends with the traditional Demo Day, in which the different initiatives are pitched to a group of investors with diverse areas of interest. Later, MindCET continues to assist the startups helping them to connect with people in the world of education as well as with potential partners, customers, investments and technology.

The **H-Farm** accelerator program shows substantial differences to the NUMA and MindCET programs, since it has lacked the latter's more formal and structured educational programs inspired by YCombinator. Nevertheless, H-Farm started by offering an acceleration program of 4 to 6 months to startups at early-idea stage. It was structured and codified but it was not formal with frontal general lessons. Rather, it was based on a series of monthly milestones very specific to the business model. For instance, one month the milestone could be related to market analysis, another month to the business model, or the search for investors, or prototyping. The fulfillment of the milestones eventually culminated in the Demo Night, in which the startups presented their projects to an audience of potential investors. During the 4-6 months program the startups spent at H-Farm, they also benefitted from mentoring and meetings with technical people from their operation areas. This program was in part abandoned as H-Farm left behind early-stage startups and moved towards ventures that had a more mature presence in the market. The new program reflected the fact that H-Farm started to work with big clients interested in open innovation as an important growth mechanism. This meant selecting innovative ideas that could enhance the R&D focus of the big clients. In fact, H-Farm reports that the evolution of its acceleration program passed through four phases: (1) acceleration program for any innovative idea in the digital field; (2) acceleration program for innovative ideas on targeted topics within the digital field; (3) acceleration program for innovative ideas in vertical areas and sectors where H-Farm had specific competence; and (4) acceleration program for innovative ideas in digital themes considered relevant by H-Farm's big partners/clients.

The experience of the **Inclusive Phyrtual Accelerator (IPA)** is the most recent and different given that its focus is not startup acceleration but the diffusion of digital skills and an entrepreneurship

culture and learning in the Italian schools system and society. Of all the accelerator spaces, the InnovationGym used by the IPA is the most equipped with a diversity of digital labs including robotics, FabLab, VideoLab, GameLab, ImmersiveLab, etc. The structure, timing and content of its acceleration program shows two phases: (i) the *pilot FMD-sponsored phase* (May-November 2017) and (ii) the *grant-sponsorhip-based phase* (September 2018-April 2019).

The first-phase accelerator program was simultaneously a development phase since not all the material for the formal lessons was entirely available. The program lasted six months with ten formal 4-hour sessions that used interactive frontal lessons, group exercises and games (e.g., Lego Serious Play and a variety of canvasses) covering problem-solving and entrepreneurship themes key to Education for Life in the 21st Century. These ten 4-hour sessions were: (1) self-awareness and self-entrepreneurship; (2) complex world: new technological and global challenges and exponentiality; (3) problem-solving: facing challenges, obstacles and opportunities; (4) team-building and leadership, emotional intelligence; (5) innovation and entrepreneurship; (6) communication and promotion (marketing); (7) financing; (8) organization and governance; (9) measuring economic and social impact; (10) negotiation. Simultaneously, the teams worked on the development of their projects having access to all the labs of the InnovationGym. They also had informal sessions with technical mentors and business coaches and met in the InnovationGym as needed to discuss their ideas, test their solutions, and converse with the other groups. The final month saw the Demo Event with the projects pitching and showing their prototypes to a jury. The winning project got a prize of €3000.

The second-phase acceleration program took advantage of a project funded by Ericsson (5G4School) focused on schools orientation on 5G technology applications and entrepreneurship. The content of the acceleration program was adapted to the requirements of the project, offering a set of learning activities and resources similar to those of the first IPA pilot phase. This adapted program had two parts: the first included formal lessons and experiential training provided by Ericsson personnel on 5G technologies and cloud robotics, and their application. The participants also engaged

in processes of ideation, hackathon, and pitching their projects in a Demo Day competition that selected the projects that went through to the second part. In the second part, the selected participants had webinars on innovation, design thinking, business development and communication with coaches from different companies and accelerators (Ericsson, Comau, TIM, Luiss Enlab). The students also had access to the innovationGym or Phyrtual Factory space in Rome. The program ended with an exhibition and challenge during the large FMD event, the Rome Cup, leading to the selection of the overall winning project

Finally, based on the new project Open Space, the FMD is not only building 4 new InnovationGyms in schools, it is also implementing a programme of activities based on the experience and materials accumulated through the IPA. The activities are customized according with the age of the students, this time mostly primary school kids.

8.2.2.4 Learning approaches/processes

The review of the four cases above has revealed commonalities and differences in their learning processes and environments. They all tend to share some of the elements identified at the end of Chapter 3 (Review of Literature) in the section "Accelerators and Pre-accelerators Learning Environments and Activities." There it was written: "One key aspect of accelerators and pre-accelerators is their role as learning environments with a time-limited intensive set of learning practices blending experiential activities with formal and informal knowledge transfer, all around a startup or pre-startup project that provides focus and a clear evaluation mechanism." True, the IPA is not startup-driven but can be included in the category of pre-startup project. In addition, the last section of Chapter 3 identified two types of content also found in the experience of the NUMA, MindCET and H-Farm (i) general advice, for instance, about running a company, raising additional funding, hiring people, etc., and (ii) specific advice typically product-focused, for instance, specific value of product for customers, product/service pricing, etc. It was not the purpose of IPA to impart such startup-specific knowledge. The four cases also confirm that there is no universally accepted formula regarding the balance of time spent between the different activities making up the

programmes of diverse accelerators. For instance, the time spent on diverse activities may depend on the state of progress of the startup venture regarding both networking and strategy and, also, on the purpose and characteristics of the accelerators themselves. Thus, the IPA devoted an important amount of time to formal learning sessions on a variety of topics relevant for entrepreneurship and, more generally, 21st century education. This was because the aim of the IPA is essentially educational and open to all. On the other hand, the H-Farm program gave no importance to formal frontal lessons.

An aspect of major importance found in the 4 accelerators is the variety of learning content, activities, approaches and environments. Together, they reveal a completely different form of learning as compared with the traditional approaches of the school and university systems. First are the dedicated coworking and accelerator spaces, and the highly-equipped space of the InnovationGym; then is the mix of formal and informal learning, blending experiential project work, frontal lessons on general and specific technical and business topics, group work, mentorship and coaching sessions, online sessions, networking, demo/pitching days, and so on. As some programs evolved, the mix of learning elements also evolved, sometimes passing from standardized programs, for instance, for early-idea startup projects to more customized programs for proactively selected startups.

Put together, all these learning elements lend support to the concept of Education for the 21st Century proposed by the FMD and found in the case study of IPA. Figure 18 in Chapter 7 shows the broad elements of the concept of Education for the 21st Century. The three broad areas of knowledge shown on the left of the diagram: *standardized knowledge*, *life skills*, and *values* are present in one or another of the case studies. In particular, technological and entrepreneurship knowledge, life skills and entrepreneurial values have been essential to the content of the programs. Some project teams have shown direct concern for environmental, social and educational problems. Regarding the three broad areas of learning shown on the right of the diagram, an attitude towards *lifelong learning* is essential to entrepreneurship, particularly as many of the skills learned in the programs tend to be transversal and long lasting; likewise, *lifewide learning* is intrinsic to the acceleration programs since

the teams are engaged with the outside world rather than being enclosed in the environments of traditional learning; equally intrinsic to the programs is *lifedeep* or transformational learning, since the nurturing and polishing of an entrepreneurial attitude changes people's positioning in the world from passive to proactive, potentially, becoming team-builders and leaders in their own worlds. At the center of Figure 18 shows the learning methods most commonly associated with Education for Life in the 21st Century: *personalized and collaborative*; *brain-based, blended, formal and informal*; *project-problem-inquiry-based*, *experiential, authentic*; self-*organized, autonomous*. It is easy to identify the presence of these learning methods in the great variety of learning elements making up the accelerator programs of the four organizations together. Suffice to say that the brain-based method that seeks to align the learning experience to knowledge on the workings of the brain, finds its expression, for instance, in the use of motivating learning environments such as the InnovationGym.

One final comment is that the evolution of the acceleration programs of all four organizations, NUMA, MindCET, H-Farm, and IPA, has clearly supported the trend towards the diffusion of an entrepreneurship culture and learning in society. In fact, three of the experiences have reached the educational system, which is perhaps the strongest way to secure the permanence and deepening of such a trend.

Chapter 9 Conclusion

This thesis has studied the apparent emergence of a trend towards a growing diffusion of an entrepreneurship culture and learning in society. The discussion has shown that the phenomenon is recent and associated to the rise of new types of entrepreneurship support organizations such accelerators, pre-accelerators and other organizations. The birth of the startup accelerator YCombinator in 2005, barely 15 years ago, is commonly acknowledged as the beginning of the new entrepreneurship acceleration activity, although it was the financial crisis of 2008 that gave it a significant impulse for growth. This growth saw an expansion in the number and geography of accelerators and other entrepreneurship support organizations, including their diversification from the original startup accelerators focused on early-idea and/or more mature startup projects. Thus, the thesis discussed vertical and corporate startup accelerators, as well as pre-accelerators aiming to prepare early-idea projects for acceptance into more competitive accelerators. Of particular importance for this thesis was the Inclusive Phyrtual Accelerator (IPA) proposed by the Fondazione Mondo Digitale (FMD). The inclusive accelerator is pursuing the goal of taking the trend towards a wider diffusion of an entrepreneurship culture and learning into the school world, and, more generally, to the reach of all. In this respect, a very interesting result was the fact that three out of the four case studies researched in this work have taken their entrepreneurship learning activities into the world of schools. This and other aspects of the thesis have supported the main proposition of this thesis, namely, that there is a trend towards a growing diffusion of an entrepreneurship culture and learning in society.

In the following, this conclusion focuses on some of the key findings and issues emerged during the argument leading to the confirmation of the main proposition of the thesis, briefly including the way the argument was structured, the difficulties encountered during the research, and the selection of research method. The research questions presented in the Introduction (Chapter 1) are also addressed.

The recentness of the phenomenon played a very influential role in the structure, methodology

and research difficulties of the study. In the latter respect, the study confirmed the wide agreement existing in the literature that the field of accelerators, pre-accelerators, is at early stages of development and shows a lot of variety, data-gathering difficulties, and lack of theoretical common ground. In fact, the academic research on accelerator programs is embryonic and more is needed to get a clearer picture about the various approaches, activities, evolution in various contexts and so on. In the present study, apart from facing the variety and lack of common theoretical ground, it was quite difficult to engage and establish a research communication with accelerator experiences. Fortunately, through direct personal contacts, I was able to engage three top accelerators from France, Israel and Italy, and the fourth accelerator was under the organization I direct, the FMD. In addition, an important finding of this thesis is the fact that accelerators not only show a lot of variety and no single standard model, they also evolve so that a single accelerator can change its model in accordance with its sustainability and growth requirements.

The methodology applied in the study also responded to the recentness of the phenomenon under research and was a mix of exploratory and descriptive research, with some element of quantification. The exploratory approach was fundamental since the research confirmed that the existing knowledge is certainly not highly structured and in continuous evolution; the descriptive approach was essential to tell what has been happening and how in the field of accelerators and other entrepreneurship support organizations; quantification was used mainly to show the evolution in the numbers of accelerators over time, including some graphics. This mix proved effective to gather and process all the necessary elements to produce a consistent picture and argument regarding the evolution of accelerators and other entrepreneurship organizations. In particular, the main sources were an extensive review of the literature and the empirical research of three case studies of leading accelerators from France, Israel and Italy, respectively, in addition to the case of the inclusive Phyrtual accelerator, also in Italy. This combination helped generate, on the one hand, an overview of developments happening in the field under research and, on the other, an in-depth knowledge of how this is happening empirically in specific cases. The results of this combination is reflected in the

structure of the thesis in two Parts, the first, including three chapters: Introduction, Methodology and Review of Literature and, the second, dealing in six chapters with the four case studies and their comparative analysis and, also, including this conclusive chapter. The resulting argument confirmed the main proposition of the thesis, namely, the existence of a trend towards a growing diffusion on an entrepreneurship culture and learning in society.

In pursuing the research on the main proposition, a number of specific questions were raised in *Chapter 1 – Introduction*. Here, it is fitting to provide concise answers to these questions, avoiding the repetition of lengthy explanations given in the various chapters. The specific questions were grouped under three main problem areas, as follows:

First problem area: to explain why and how the realm of entrepreneurship support structures has changed markedly in recent years, leading to a notable expansion of new entrepreneurship programmes and instruments in society. The specific associated questions were:

(v) What were the established entrepreneurship support structures before the rise of the new structures, first in the form of accelerators? What were their business/operational models?

Answer: the review of literature went back in time to the historical origins of entrepreneurial programs in the form of *the incubator* around the late-1950. These programs emerged with a rent-based business model and allowed the host companies to stay for long periods of time. In this, they differed markedly from accelerators with their time-limited programs involving cohorts of startup projects, supported by formal and informal educational activities conducted by networks of mentors and coaches, preparing the startup for the Demo Days. In addition, accelerators provide funding and take equity. Incubators have however evolved, adopting some accelerator services such as mentors, coaches, and contacts with financial networks.

(vi) What events and developments have led to the emergence of the new breed of entrepreneurship support programmes?

Answer. The review of literature has shown that the emergence and diffusion of startup accelerators in the US, Europe and eventually the world were associated to a variety of economic, industrial and technological phenomena. Amongst the most influential are the spread of software and Internet-based technologies, the lowering cost of entry for startups, the impact of the 2008 financial-economic crisis that created a funding gap in investment and, also, the spread of the lean startup practice with its concepts of minimum viable product (MVP), rapid prototyping and continuous innovation. They converged to stimulate an entrepreneurial environment propitious for the growth and spread of accelerators across the world, particularly, in those areas in which ecosystem conditions are more favorable to the development of startups.

(vii) How has the new breed of support programmes grown quantitatively and geographically during a period of less than a decade and a half?

Answer. The review of literature has shown that since the birth of the first accelerator, YCombinator, in 2005 there has been a significant growth in the number of accelerators worldwide, particularly since 2008. Different sources tend to give different numbers since there is no agreed definition. The website f6s.com put at, 1,128 the number of 'accelerator/program' worldwide (end of 2019). The largest geographical concentrations were in North America with 463, Europe with 468 and Asia with 257. All other regions had less than 100. Another source, Seed-DB, listed 190 programs world-wide, with 8,117 companies accelerated and 1,191 companies exited. It is interesting to note that YCombinator has remained the top accelerator with close to $US40 billion investment in 1,801 startups and about $US6.2 billion in exits. The next is Techstars with just over $US8 billion investment in 1,336 startups and about $US3.6 billion in exists. By end of 2109, however, six accelerators had invested over $US1 billion and the next 27 accelerators invested amounts ranging from $US948 billion to $US108 million. Most of the big investments have happened in the US. Little quantitative information exists on other

entrepreneurship support programs.

(viii) *Do the new programs represent a true discontinuity and new entrepreneurship learning models?*

Answer. In my view, the answer is yes. Accelerators, pre-accelerators and other new entrepreneurship support programs seen in both the literature review and the empirical cases represent a discontinuity, particularly, regarding the traditional incubator. In fact, this is clearly visible in the new entrepreneurship learning models implemented by the new accelerator programs. Accelerators provide immersive experiential education, blending formal and informal approaches through mentoring, coaching and shared cohort experience for a limited period of intense activity that culminates in a public pitch event or demo day. The limited time is itself part of the learning process since it concentrates the teams towards a deadline so they must make the most of the networking opportunities and visibility with investors who may provide access to further funding. In addition, the application process for access to startup accelerators is highly competitive, and hence, tend to select the best startup projects and teams. This is a difference with the case of the Inclusive Phyrtual Accelerator and other less profit-oriented operations such as the early days of the NUMA accelerator focused on the build up of an entrepreneurship ecosystem and culture. In fact, the thesis has shown that accelerators come in various shapes and they also evolve in time. For instance, they can be for-profit or non-profit and vary in many aspects such as: amount of stipend, size of the equity taken, length of educational programs, availability of co-working space, etc. Regardless of differences, the key point is that entire set of new organizations has given rise to the trend towards a greater diffusion of an entrepreneurship culture and learning in society and this is a discontinuity with past experience.

Second problem area: to reveal in detail the variety of new programmes' mechanisms of operation, learning approaches, business models, and the evolution towards diversification and,

potentially, entrepreneurship support ecosystem. Here, the specific associated questions were:

(vi) what are the blends of approaches, content, mechanisms and people making up the operation and dynamics of the new breed of programmes?

Answer. The preceding answer has briefly touched on the diversity of accelerators. In fact, the thesis has confirmed that there is a wide variety of approaches and combination of mechanisms in action in the world of accelerators, pre-accelerators and other entrepreneurship support program. An author identified three accelerator archetypes: (i) *investor-led* where the key stakeholders are investors looking for investment opportunities (forprofit); (ii) *matchmake*r where the key stakeholders are corporate organizations looking to provide a service to the customer base and/or develop new business opportunities through the startup approach. The *matchmaker* accelerator tends to have a nonprofit orientation, but the cases of NUMA and H-Farm also showed that forprofit accelerators can act a mediators in the matchmaking without being corporate accelerators; and (iii) the *ecosystem archetype* where key stakeholders are government agencies looking to stimulate startup activity and stimulate the creation of entrepreneurship ecosystems (nonprofit). The discussion has also identified *vertical accelerators* that concentrate on a single sector to provide more in-depth services. In fact, the vertical and the corporate accelerators were seen to be part of the evolution of the more general accelerator, as it also was the attempt at internationalization, confirmed by the empirical cases of the leading accelerators from France, Israel and Italy. They all have developed international presence or networks. So accelerators, pre-accelerators and other entrepreneurship support organizations show a wide variety and this is not static since diversity is also created as these organizations evolve in terms of strategies, business models, awareness-creation, team application, selection criteria and screening process, blend of elements and length of education programme, funding structure, office space, demo day and post-demo follow up, brand and so on.

(vii) What types of business or sustainability models they implement? And how do they seek to measure their impact?

Answer. Answers to previous questions have already anticipated elements regarding this question. Apart from the forprofit, non-profit or hybrid models and the investor-led, matchmaker and ecosystem archetypes, the thesis has identified other models through the case study experiences, as well as the fact that organizations do not adhere statically to a single model, rather they change it in accordance with their sustainability and growth requirements. Thus the case of NUMA revealed an evolution through various models: (i) nonprofit association model, (ii) grant-sponsorship-based nonprofit model, (iii) forprofit model closer to the investor-led accelerator archetype. NUMA's startup accelerator did not succeed and closed down, but the organization has developed other lines of services that have enabled to continue in operation. In contrast, the case of MindCET showed a remarkable stability of its business model *sponsored-based vertical accelerator* (close resemblance to the *matchmaker accelerator archetype*), given the support of the mother company CET. MindCET need not worry about making business, although it has develop the capacity to engage sponsors for its activities. MindCET's distinctive path also included *multiple-target acceleration* involving startup acceleration, teachers' entrepreneurship learning and product development from outstanding researchers. The case of H-Farm also shows a notable stability of business model as a *forprofit capital investment model* (close resemblance to the *investor-led accelerator archetype*) led by a successful entrepreneur who was able to engage other investors in the incubator/accelerator experience. H-Farm has enriched its model with two additional services in industrial consultancy and education. It is aiming to become the largest innovation pole in Europe following a major investment of €101 million. The case of the FMD's Inclusive Phyrtual Accelerator (IPA) is the most experimental and has happened within a governance with public sector control in a context of protracted and profound crisis affecting the city of Rome and the

consequent availability of resources for the FMD and IPA. This has been reflected in the business or sustainability models implemented that are all nonprofit. The first model at the start of the experience was the *pilot FMD-sponsored,* when all the effort was supported by the Foundation, and this was followed by the *grant-sponsorhip-based model,* once project funding became available from companies. This latter model is closer to the first model applied by NUMA in its nonprofit era.

Regarding measurements of impact, the most developed accelerators seek to provide information on various criteria of performance as a way of promoting their attractiveness. Thus the review of literature drew attention that often accelerators often provide quantitative information such the number of programs per year and the total number of programs performed over the years; total number of events and participants; number of companies applying, selected, graduating, active or acquired; number of mentors, alumni, etc.; total amount of funds invested by the accelerator, amount raised by the more successful companies and the total market capitalization of these companies, etc. Not all accelerators and pre-accelerators, however, particularly those of more recent creation and less accumulated successes find it easy to give in detailed measurements. The case study experiences did not have a wealth of metrics and information regarding their performance and little is found in their websites. Most of the information is about the number of startups and exits and H-Farm also provide information about the performance of their investment given its presence in the market. The emergence of rankings has responded to the need to generate greater clarity about the comparative performance of accelerators.

(viii) What are the benefits for the diverse stakeholders converging into these programmes?

Answer. The review of literature has identified the value or benefits accruing to the main accelerators' stakeholders. These are as follows

- Startups benefit with access to investors, mentors and networks from Accelerators;
- Startups benefit with investment and capital from Investors;

- Startups benefit with information, increased human capital and access to networks from Mentors;
- Investors benefit with access to startups and potential deals from the Accelerator;
- Investors benefit with potential financial gains from successful Startups;
- Mentors benefit by contributing and associating themselves to the success of startups and by having access to networks; they also benefit from the Accelerator's matching of their expertise to suitable startups;
- Accelerators benefit from all the flows identified above to achieve consolidation and sustainability. The key is to maintain a constant flow of high-quality startups and this will depend above all on the quality of mentors, brand reputation, and networking opportunities offered.

The case studies have also shown that, in the case of NUMA for instance, local or regional governments are also beneficiaries of the stimulation of an entrepreneurship culture and the growth of entrepreneurship ecosystems. In the case of MindCET, the school system involving teachers, students, researchers and EdTech startups are also direct beneficiaries, of the organization's operation to diffuse a culture of entrepreneurship inside the educational world. H-Farm has also expanded to the world of education, integrating entrepreneurship to the international school curriculum; whereas the FMD's Inclusive Phyrtual Accelerator is pursuing the diffusion of digital skills and an entrepreneurship culture and learning in the Italian schools system and society. Of all the accelerator spaces, the InnovationGym used by the IPA is the most equipped with a diversity of digital labs.

(ix) How do these programmes evolve in time in terms of both diversification and changes in business or sustainability models?

Answer. This question has been largely answered in the preceding questions.

(x) Are these programmes leading to the emergence of entrepreneurship support ecosystems reflecting a growing diffusion of an entrepreneurship culture and learning in society?

Answer. Looking at the case studies, it is clear that NUMA was directly involved in the generation of an entrepreneurship support ecosystem, leading to a growing diffusion on an entrepreneurship culture and learning in society. In fact, NUMA was so successful that it helped change the competitive environment with the emergence of many other organizations that eventually occupied the space of NUMA's original activities, eventually leading to the demise of its startup accelerator. NUMA's own ecosystem, however, has enabled the organization to continue with programs that have internationalization and an important ecosystemic dimension such as the DataCity program that tries to bring together relevant stakeholders to work in improving the quality of life of a city. MindCET has also been highly successful in stimulating the emergence of an entrepreneurship support ecosystem dedicated to transform education through the growing diffusion of entrepreneurship culture and learning in the school world. This ecosystem involves schools, universities, research centers, startups, financial organizations, and a growing international dimension with alliances, awards and funding. H-Farm ecosystem was limited to startup incubation/acceleration and finance for most of its first decade. Then came its phase of *Transformation & Consolidation of the Business* that saw the expansion to industrial consultancy and to school and university education, in both cases integrating entrepreneurship in the curricula. This implied a growth in the ecosystem of organizations nationally and internationally and, if the goal to become the largest innovation pole in Europe materializes, H-Farm is likely to have a high impact on the diffusion of an entrepreneurship culture and learning in society. The Inclusive Phyrtual Accelerator the declared goal to contribute to the diffusion of an entrepreneurship culture and learning for the benefit of all, hence the use of the word *inclusive* in its name. For this purpose, the IPA has from the start pursued the formation of an entrepreneurship support ecosystem involving schools, companies and an Alliance for Self-entrepreneurship that provided volunteers mentors, coaches, and supporters and,

eventually, funders for the projects that are taking the experience forward. --- From the literature review perhaps the strongest evidence in favor of the confirmation of the emergence of entrepreneurship support ecosystems is given by a proliferation of new early-stage entrepreneurship models in the ecosystem such as pre-accelerators, startup weekends, startup schools, meetups, office and co-working spaces for startups, hackdays, entrepreneurship simulation activities, venture incubators and investment marketplace. Along with the growth and diversification of accelerators, altogether these manifestations reflect a growing diffusion of an entrepreneurship culture and learning in society.

Third problem area: what are the main factors behind the emergence of an inclusive entrepreneurship accelerator in Italy: vision, reasons, motivations for both its setup and the shape of the specific programme being implemented? The focus on this experience is due to the fact that it is the experience created by the organization I direct, the FMD, Here, the specific research questions were:

(vi) what are the main factors behind the emergence of an inclusive entrepreneurship accelerator in Italy: vision, reasons, motivations for both its setup and the shape of the specific programme being implemented?

Answer. The IPA is the result of a long-term educational vision that has taken shape and evolved since the early days of the Fondazione Mondo Digitale, whose mission is to work for an inclusive knowledge society. Over the years, the FMD has worked in scores of educational projects on digital, educational and social innovation, life skills and values for a responsible citizenship. Thus, a progression of events, concepts and projects led the Inclusive Phyrtual Accelerator (IPA), particularly, as entrepreneurship has been increasingly acknowledge as an important life skill in diverse policy programs. The main events leading to the creation of IPA were: (i) the start of the Educational City program and the concept of Education for Life in the 21st Century, (ii) the Phyrtual Concept and the creation of Phyrtual.org, (iii) the creation of the InnovationGym and the National

Network of InnovationGyms, and (iv) Project Office of New Jobs (ONJ) funded by Google.org. All these factors set the foundations for the launch of the IPA pilot, with the resources of the FMD and the support of volunteer mentors and coaches. The participants organized in seven teams were offered a six-month program in an experiential learning environment reminiscent of startup accelerators but much more educationally oriented, digitally equipped and inclusive. There was no requisite to pursue a startup (only prototyping), no seed-funding given, only the experiential learning process of entrepreneurship. Some of the important elements of the IPA offer were: (i) digital environments and coworking, (ii) formal training, (iii) project design and prototyping, (iv) mentoring and coaching – informal learning, (v) professional networking, and (vi) Demo Day and Award. Participants had open access to all the digital facilities of the InnovationGym, called Phyrtual Factory for this project, for the six-month period of the pilot. The formal educational program was made up of ten 4-hour sessions that included topics such as (i) complex world: new technological and global challenges and exponentiality; (ii) problem-solving: facing challenges, obstacles and opportunities; (iii) team-building and leadership, emotional intelligence; and (iv) innovation and entrepreneurship, and others seen in the chapter on the IPA.

(vii) *What has been the role of the local conditions (Rome, Italy) in facilitating or hindering the development of the FMD's inclusive accelerator?*

Answer. The local conditions are not favourable to the start and growth of an experience such IPA, given that the FMD is a non-profit organization controlled by the Municipality of Rome, entity undergoing a serious economic crisis and political turbulence. It is a number of years that the FMD does not receive the funding assigned in its statute, something that has made it difficult to fulfil the mission of public service with most of its activities delivered for free. Fortunately, the FMD has a strong reputation for innovativeness, territorial presence and quality delivery. This has helped attract project

funding from a variety of sources, particularly, large companies applying policies of corporate social responsibility. In fact, this has enabled the continuation of the IPA after the completion of the pilot, with due adaptations to the requirements of the projects supported by the companies.

(viii) What have been the results and the evolution of the business or sustainability model of the initial experience of the FMD's inclusive accelerator?

Answer. The results of the pilot experience and the subsequent company-funded project have been highly satisfactory in the circumstances. Both have proven that the program works in its experiential educational purpose making use of accelerator-type learning elements such cohorts of teams, mentoring, coaching, formal learning sessions, prototyping demo days and pitching. The youngsters may not be pursuing a startup, but they certainly become involved in building projects leading to product prototypes, and even pitching with elements of business plans.

In a sense, the IPA project has an intrinsic element of sustainability, as it is a strategic part of the mission of the Foundation. This however gives limited scope for growth, let alone to make progress towards making part of the school world. It is therefor encouraging that the Foundation has attracted funding from a company and a large national project that's supporting the construction of four InnovationGyms with programmes that will adapt elements of the IPA programme. The alliance with the CDTI (Club of IT Managers) is also an important addition to the build up of the ecosystem that will realize the original vision of an instrument for the growing diffusion of an entrepreneurship culture and learning in schools and society.

(ix) What are the prospects, challenges and strategies for further development and growth in quantitative and qualitative terms?

Now that the foundations of the IPA has been laid down, the prospects for further growth depend on the capacity of the FMD to create a powerful storytelling using the results

already achieved to continue to find resources, adapting the main programme to the shape, goals and requirements of project funders. An important possibility is to follow the diversification path of accelerators, creating vertical versions that could be offered companies and organizations from specific sectors. At the same time, to organize school sessions with teachers and students to stimulate both: the opening of schools to community projects and the start of internal innovation. This is to an important extent the objective of the project building the four InnovationGyms to tackle educational poverty in difficult city areas.

(x) What are the lessons of the initial experience of the inclusive accelerator in Italy and how can this be enriched with insights from the experience of other new programmes in Europe?

Probably, it is too early to extract some conclusive lessons about the future of IPA. It is clear though that the strategic alignment of the project to the mission of the Foundations is an essential element. The conviction that this program is essential to an Education for Life in the 21st century for the youngsters trying to build their capacities to succeed in life has been a source of sustained commitment. Without this, it is difficult to imagine the display of determination, additional work, and even sacrifice that the FMD has carried out to get the program going. Now, that the program is beginning to attract resources, the main lesson learnt is the importance of flexibility to adapt it to the circumstances and requests of project funders. At the same time, it is important to link the IPA programme with relevant results coming out of other FMD projects. It is important to respond rapidly to the opportunities that come along the way in a difficult environment such as the Italian. From the other case studies, the lesson of NUMA confirms the instability of the financial support form government institutions, but also the fact that it is not easy to evolve accelerators and less so pre-accelerators from a nonprofit to a forprofit model. Competition is high and risky when the organization is not protected and must raise most

if not all resources from external sources. This is confirmed by the cases of MindCET and H-Farm, the former has grown rapidly under the corporate protection of an important EdTech company, without facing the worries of having to make business to survive an grow, the latter started with the investment of a successful entrepreneur and other powerful organizations able to sustain the enterprise and, eventually, put the resources to try to create the largest innovation pole in Europe. The important element of these two stable experiences is that both are operating in the educational world, potentially producing programs and activities that could be adapted to the IPA.

To bring this conclusion to an end, it is worth to underscore some of the most interesting findings and limitations of this thesis.

First is the fact that accelerators not only show a lot of variety and no single standard model, they also evolve so that a single accelerator can change its model in accordance with its sustainability and growth requirements. The experiences of NUMA and FMD's IPA have clearly shown changes of model as part of their search for sustainability and growth. These two experiences did not have the financial stability shown by MindCET with its original corporate backing and H-Farm with its startup investment by a successful entrepreneur and other backers. NUMA and the FMD's IPA had to raise funding externally and this translated into changes in their business or sustainability models. Of course, the case of NUMA is the most revealing, given its long evolution, and it is also the one with the most dramatic ending given the abandonment of the startup accelerator experience. IPA is the youngest of all the experiences and it is flexibly adapting its content to the requirements emerged from its current project-based approach. MindCET and H-Farm, while stable in their original models, have evolved continuously, enriching their entrepreneurship support activities, nationally an internationally. An important aspect of the strategic approach of MindCET and IPA is that from the start they have had a focus on the school world, with H-Farm joining this educational activity in recent years.

Second is the fact that the people behind all the accelerators studied have worked with the

conviction that they are doing something worthwhile for their communities and regions. In fact, in their different ways, they have seen themselves as contributing to the diffusion of an entrepreneurship culture and learning in society. NUMA's startup accelerator began with a strong sense of helping the development of an entrepreneurship ecosystem in France, something that they maintained even as the adopted a forprofit model; MindCET from very early on saw entrepreneurship and the startup culture as the central feature of its strategy and work to transform the school system, and promote an ecosystems and culture of entrepreneurship in schools and society. Looking at H-Farm, the successful entrepreneur that created it, has also told that his objective was to help youngsters with good ideas to succeed in the world of entrepreneurship; the fact that H-Farm has taken entrepreneurship to the schools world confirms the wider interest in spreading a culture of entrepreneurship in society. Finally, the FMD's IPA has from the start pursued the objective to promote the diffusion of an entrepreneurship culture and learning for all; it is fully integrated with the FMD's mission to work for an inclusive knowledge society through and Education for Life in the 21st century.

Third is the richness of the accelerators' learning environments offering a rich and concentrated entrepreneurship learning process. This approach is very much in line with the FMD's concept of Education for Life in the 21st century and reason for the Inclusive Phyrtual Accelerator. Thus, accelerators offer an intensive and motivating experience that blends formal and informal learning (e.g., lessons, seminars, testimonials, etc.), relevant customized mentoring and coaching support ("personalized education"), autonomous, self directed learning and collaborative peer-to-peer learning through cohort of teams entering in, and graduating together from, in the programs. The time-limited period of acceleration finishing in a Demo Day is useful to: (i) facilitate the assembling of mentors, guest speakers, and other resources for the ventures, and (ii) concentrate the teams towards a deadline and the potential success with investors who may further funding. In short, accelerators provide immersive experiential education on entrepreneurship, and many of its elements are highly relevant to learning environments for 21st century education, such has been the case of the InnovationGym and the digitally-equipped entrepreneurship program of IPA. Here the objective was

not to pursue the startup but the ideation, designing, and prototyping of an innovation project, making the experience more inclusive and fit for the school world. Of course, this opens another challenge that's beyond the purpose of this thesis, namely, the innovation processes inside the school world.

Fourth is fact that the four case studies showed a limited formal activity of pre-accelerators. NUMA run a pre-accelerator programme for a year and then dropped it because it was not fulfilling its mission to prepare good teams for the proper accelerator providing some funding in exchange for equity. Once pre-accelerated the project teams were reluctant to concede the equity aspired to by NUMA. MindCET and H-Farm both quickly settled with the funding/equity model, even in the initial cases of early-stage project teams. The free accelerating activities could be considered as pre-acceleration, but the fact is that IPA is not pre-accelerating project teams to enhance its chances to enter a proper accelerators. IPA is just a different kind of inclusive educational accelerator, in the sense that it takes inspiration of the learning model to create an immersive educational experience of entrepreneurship.

Fifth is the confirmation that the field of accelerators and other entrepreneurship support programs is still at an early age and this generates limitations for its research. On the other hand, it is interesting to explore what is happening in a phenomenon that promise to have important consequences for society and education. The limitations

Limitations and need for further research

The limitations of the research largely coincide with what other studies in the literature review have reported:

First, there are significant problems to gather data from accelerators. In this research this meant difficulties in engaging accelerators to study and, also, limited access to a variety of people from the accelerators. This is not a matter of bad will, it seems to be above all the result of the fact that most accelerators have small amount of personnel who are busy running the many activities of their programs and lack the time and resources to collect data consistently over time.

Second, the review of literature has identified a sort of accelerator's generic model mostly based

on the experience of leading accelerators such as YCombinator. In practice there is a large variety of accelerators (without counting other entrepreneurship support programmes) in variegated contexts. This research also found that the models may evolve in time in response to the sustainability challenges faced by the different organizations in different contexts. This makes it difficult to generalize or develop grounded theory from a few case studies, as it has been the case of this thesis. At the end of Chapter 2 (Methodology), the discussion had raised the possibility of a contribution to grounded theory on accelerators. This was optimistic but not possible given the variety shown by the cases. In practice, the thesis has confirmed that the academic research on accelerators and other entrepreneurship research programs is still embryonic.

Third, the thesis has found clear supporting evidence for the proposition that a trend towards a growing diffusion of an entrepreneurship culture and learning is under way in society. The term society, however, is an abstraction and it is important to acknowledge that, while the phenomenon has certainly grown quantitatively and geographically across the world, it is not happening with the same breath and depth everywhere. As the strong predominance of the USA, Europe and Asia has shown (and even here not uniformly across all cities), the trend has been stronger in those places where the conditions for the emergence of entrepreneurship support programs have been more favourable.

It is clear therefore that there is a need for much further research, particularly, much more case study research to create the basis to develop generalizations that go beyond what the literature review has already identified. Ideally, these generalizations should be dynamic, in the sense that should account for the evolution of models, mechanisms and activities in response to the need for sustainability. There should also be more research on pre-accelerators preparing startup project teams to try to enter to proper equity-based accelerators. In this thesis, they appear more as a transitory phenomenon given the difficulties of sustainability, or, of really serving the purpose of accelerators, as in the case of NUMA.

In terms of education, the influence of accelerator models or approaches is even more

embryonic than the case of accelerators in general. Hence, a great deal of research is needed to generate knowledge and dissemination material useful to the incipient process of taking the trend towards a diffusion of an entrepreneurship culture and learning to the educational system. In fact, this would probably be the best way to reinforce the diffusion of the trend widely across society.

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APPENDIX - GUIDED INTERVIEW QUESTIONNAIRE

GENERAL DATA
Name of the accelerator

Country, city and year of birth
Cities and countries today

Number of people at birth
Number of people today

Initial funding and other resources

Are you an autonomous operation or are you based inside another organization, e.g., university, government, company?

Approximate annual income today
Proportions contributed by various sources of income and/or resources
(Services, grants, project funding, sponsorship, government support, company support, other)

Total space in m^2

Type of Working Space
- Coworking
- Coliving
- Offices
- Other

Does your space offer:
- Office for startups
- Office for professionals
- Training space
- Fablab
- Other labs
- Bar and other social facilities
- Other

ENVIRONMENT
How favorable or unfavorable were the local conditions to the birth and initial development of your operation?

How favorable or unfavorable are to your operation today's local conditions?

Is your operation part of a local/regional/international ecosystem? How strong is the ecosystem and does your operation play an important strategic role? What is this role?

What are the main players in the ecosystem?
- Companies

- Universities
- Research Centers and Labs
- Incubators
- Accelerators
- Coworking Spaces
- Hubs
- Technical Institutes
- Schools,
- Other

Are there strong working relations between these players, or the ecosystem is a rather loose set of organizations?

Do you have competitors inside the local/regional/national ecosystem? Who are they and how do you relate to them (competition and collaboration)?

Do you see a trend towards the wider diffusion of a culture of entrepreneurship in society?
If so, is this reaching the school system?

YOUR OWN ECOSYSTEM
Do you have a network of organizations and individuals supporting your operation?
Who are they? and Who are the main partners of your operation?

What type of working relation do you have with the main partners?

WORK PROGRAMME
Vision and motivation for the setup of your organization?

Are you a generalist operation or a dedicated operation (e.g., vertical, corporate)

MAIN PROGRAMMES (ACTIVITIES)
What was/were the main program/s you implemented when you started?

What are the main programs you are running today?
- Long (several months) acceleration program? How many months?
- One-month acceleration program?
- Less than 1 month program? How many weeks?
- Weekend program?
- Design Challenges, Hackatons, Jams, etc.
- University or School programs?
- Conferences, Events
- Other

OBJECTIVES, ROLES AND BENEFITS
What are the main objectives of the <u>long (several months) acceleration program?</u>

What are the roles and benefits for your organization?
- Create a local/regional/international entrepreneurial ecosystem
- Prepare and deliver the operation's program/s

- Stimulate a local/regional culture of entrepreneurship
- Generate income
- Create startups
- Create jobs
- Other

What are the roles and benefits for the direct beneficiaries (startup projects)?
- Financial (do start-up teams receive an initial investment? How much?)
- Knowledge/experience,
- Contacts/networks
- Other

What are the roles and benefits for partners who are direct contributors?
- Mentors. Are they visiting, in-house or both?
- Coaches
- Funders
- Other

What are the roles and benefits for other stakeholders?
- Role of Corporations (Sponsor, Investors, Perks sponsors, Hosts, Mentors),
- Role of Universities (Hosts, Mentors, Perks sponsors, Get Participants, Provide Training),
- Role of Government (Sponsor, Host)

TEAM REQUIREMENTS
What is your team selection process?

What is the stage of development of applicants' projects at the time of the application?
- Idea,
- Prototype
- Product
- Startup

What is the stage of development applicant teams accepted for the programs?
(Fully formed, partially formed, one individual)

What are the key requirements you ask to teams to be considered?

What are the key characteristics of selected teams?

What is the number of teams per edition (in each program),

MAIN COMPONENTS OF PROGRAMME
What are the main components of the acceleration program? Rationale behind the selection?
- Formal lessons? How many hours? What are the topics covered and the time devoted to each topic? Who are the teachers? How much is this activity appreciated by the beneficiaries?
- Informal learning? How many hours on average? Themes treated? Who are the trainers (mentors, coaches)? How much is this activity appreciated by the beneficiaries?
- Do you stimulate collaborative learning among projects? What are the mechanisms implemented for this to happen? How much is this activity appreciated by the projects?

- Do you run pitching sessions and Demo Days involving potential funders? How do project teams prepare for this?
- Other activities?

INTERNATIONAL DIMENSION
Is there an international dimension to your program? In what way?

- Expansion to other countries. Ask details (why, how, what countries, size and shape of the operation, costs and benefits).
- Adoption by organizations in other countries. Ask details (why, how, what countries, size and shape of the operation, costs and benefits).
- Joint projects. Details
- Part of a network. Details
- Personnel exchanges. Details
- Funding. Details
- Research support. Details
- Other. Details

Does your program provide startup projects (direct beneficiaries) with access to international connections or benefits such as: networks, mentors, coaches, investors, trips, or any other international benefit

RUN THE SAME QUESTIONS ASKED FOR "THE LONG ACCELERATION PROGRAMME" TO ALL OTHER PROGRAMMES – STARTING FROM: "What are the main objectives of ……. program?"

Are you intending to develop further programs in the future? What kind of programs?

Are you intending to diversify your operation? What direction of diversification?

SUSTAINABILITY/BUSINESS MODEL
What is the business or sustainability model of your operation?

What is your legal status?

Are you for profit or non-profit or a hybrid operation?

How do you fund yourself?

- Equity stake in the startups (how much?)
- Fee
- Investment (VC, Angel, Other)
- Grants
- Government sponsorship
- Company sponsorship
- Project funding (national, European)
- Paid Services

What are the prospects and challenges you face for the future development and growth of your operation?

EVALUATION AND MEASUREMENTS
How do you define success for your operation?

What specific metrics do you track to evaluate the performance and impact of your operation?

- Number of startup projects applying to and entering the program,
- Growth of resources attracted (funds, technology, people, other)
- Growth of operation's ecosystem
- Rate of completion of program by startup projects
- Startups created
- Jobs created during and after program
- Other

How do you define success for your beneficiaries?

- Completion of program
- Funds attracted
- Increase in startup's support ecosystem
- Product/service in the market
- First clients obtained
- Other

LEARNING APPROACHES
How would you describe your operation from the point of view of a learning environment?

What learning approaches are you implementing for your beneficiaries?

- Frontal lessons (formal learning)
- Teamwork (collaborative)
- Experiential learning
- Project-based (Lean Startup, Product/Service Innovation, Social Innovation, Other)
- Problem-based (Creative Problem Solving (CPS), Design Thinking
- Customized ("personalized") learning (mentoring, coaching). Informal or formal?
- Autonomous learning
- Adaptive learning (Intelligent Tutoring – AI)

Do you think there is an acceleration or an increase in society's learning about entrepreneurship?

If so, what evidence do you see for this process?

Are you implementing activities to stimulate this learning process and, hence stimulate a greater culture of entrepreneurship in society?

If so, what are these activities?

Who are the target beneficiaries?

- Schools
- Community organizations
- SMEs
- Other

LESSONS LEARNT

What lessons can you draw from your experience that could be useful for operations similar to yours?