

**STARTUP ACCELERATORS: AN OVERVIEW OF THE CURRENT STATE OF THE
ACCELERATION PHENOMENON ¹**

Igor Tasic ²

PhD Student

Universidad Complutense de Madrid

Ángeles Montoro-Sánchez

Associate Professor

Universidad Complutense de Madrid

Maria-Dolores Cano

Associate Professor

Universidad Politécnica de Cartagena

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² Contact author.

STARTUP ACCELERATORS: AN OVERVIEW OF THE CURRENT STATE OF THE ACCELERATION PHENOMENON

Abstract

The start-up acceleration phenomenon is a recent trend in the field of entrepreneurship, impacting academia, policy makers and practitioners, but not yet fully researched or comprehended. The existing literature on business incubators, technology transfer and corporate entrepreneurship provide few cues on how to interpret the acceleration phenomenon, justifying the case for an in-depth analysis on how accelerators (and its accelerated ventures) differentiate from existing initiatives. This work aims to contribute to this discussion by mapping the current research and definitions of the acceleration phenomenon and suggesting a number of potential investigation lines to be deployed in the upcoming years.

INTRODUCTION

The creation of new ventures is an uncertain endeavor, in which entrepreneurs pursue the construction of new artifacts by addressing information asymmetries in markets that more often than not have to be built (Knight, 1921; Sarasvathy, 2001; Schumpeter, 1934; Tasic & Andreassi, 2008). This effort typically leads to liabilities of newness that have to be overcome by aspiring entrepreneurs wanting to create enduring organizations (Hallen, Bingham, & Cohen, 2014).

In order to support entrepreneurs in this challenge, incubation programs traditionally have been created, providing entrepreneurs with a number of resources that aim to increase the odds of a startup survival, while de-risking the entrepreneurial venture (Clarysse, Wright, & Hove, 2015; Hoffman & Radojevich-Kelley, 2012).

Specifically, the “dot-com” bubble burst in 2000, associated with the decrease of operating costs to start a company (in particular, internet-related ones) and a shift of seed and early stage investment from venture capitalists towards angel investors have all created the basis for a new type of startup incubation program: the seed or innovation accelerators (Clarysse et al., 2015; Cohen & Hochberg, 2014a; Dempwolf, Auer, & D’Ippolito, 2014; Miller & Bound, 2011; Miller & Stacey, 2014).

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 (Cohen & Hochberg, 2014a; Dempwolf et al., 2014).

The first accelerator (Y Combinator) was originally created in Boston and Silicon Valley in 2005 by Paul Graham, former entrepreneur transformed into angel investor. With a very similar profile, the second accelerator (Tech Stars) was formed in 2007 in Boulder by Brad Feld and David Cohen, with an aim to promote local development in their region while supporting startups in a more active (“hands-on”) manner. These two accelerators quickly became benchmarks to be followed, inspiring hundreds of similar programs worldwide (Salido, Sabás, & Freixas, 2013). Some of the results to date achieved by these accelerators are described in the Appendix 1.

The novelty and impact of such programs in entrepreneurial ecosystems have led not only to an increase in the total amount of early-stage investments, particularly in the US and Europe, but also to an increase in interest by policy makers to promote regional development through new ventures creation (Clarysse et al., 2015).

Such recent phenomenon in the field of entrepreneurship has yet not been fully understood, opening a promising observation deck for researchers dealing with the problem of new ventures creation and its implications. However, the insufficient amount of theoretical and empirical research, the absence of available data and the lack of consensus around an appropriate typology to define such programs raise as key challenges to be addressed (Cohen & Hochberg, 2014a; Fehder & Hochberg, 2014).

This work aims to contribute to the advancement of the entrepreneurship field by mapping the current research and definitions of the acceleration phenomenon and suggesting a number of potential investigation lines to be deployed in the upcoming years. To accomplish this objective, we present the existing typologies that define acceleration programs, explaining in more detail how it works, then we offer a comprehensive review of the current research on the topic, and finally we layout an initial discussion on the implications and potential future lines of research.

STARTUP ACCELERATORS: ESTABLISHING THE BOUNDARIES

Definition: what is a startup accelerator

The decade in the aftermath of the “dot-com” bubble has seen the emergence of a new way to stimulate and invest in new entrepreneurial ventures: the seed or innovation accelerator (Dempwolf et al., 2014; Fehder & Hochberg, 2014; Miller & Bound, 2011).

In fact, Paul Graham and his partners, former internet entrepreneurs (pre dot-com bubble burst), founded Y Combinator in 2005 in Boston and Silicon Valley, which is recognized as the first accelerator (Miller and Bound 2011). This movement was quickly expanded to other regions in the US, being the second most prominent accelerator (Techstars) founded in 2007 by David Cohen and Brad Feld, also former internet entrepreneurs.

In the following years, accelerators and programs alike aggressively expanded all over the world reaching an estimate total of over 2.000 programs, spanning six continents (S Cohen & Hochberg, 2014a; Fehder & Hochberg, 2014).

The novelty of such phenomenon in the entrepreneurial ecosystem has brought significant challenges for entrepreneurship researchers, being the most critical, the lack of data and empirical research, and the absence of consensus around a proper definition or taxonomy (Dee, Gill, Weinberg, & Mctavish, 2015; Dempwolf, Auer, & Ippolito, 2014).

Miller & Bound (2011), later expanded by Clarysse, Wright, & Hove (2015), were among the first researchers to layout a generic definition that characterizes such accelerators:

- An application process that is open (to all, “in principle”) yet highly competitive;
- Provision of pre-seed investment (typically £10k – 50k), usually in exchange for equity (typically 5-10 percent);
- Focus on small teams, not individual founders;
- Time-limited support (typically 3 to 6 months) comprising programmed events and intensive mentoring;
- Startups are supported in cohort batches or “classes” rather than individually;
- Program finishes with a periodic graduation (demo day / investor day).

As pointed out by Dempwolf et al. (2014), some of the most recognized sources of information on accelerators (such as Seed-DB) advocates and applies most of these criteria for compiling key performance metrics in its database.

Attempts to provide a more succinct and operational definition were given by Cohen (2013) and Cohen and Hochberg (2014):

*A fixed-term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event or demo day.*³

In addition to this definition, Dempwolf et al. (2014) stress the differentiator aspect (in comparison to other startup support programs, described in section 2) that accelerators are private, for-profit organization with a clear business model:

*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.*⁴

Finally, although Dee et al. (2015) concur with such definitions, they advocate for a broader working typology that positions accelerators among other startup support programs in terms of their business model (seek financial returns based on startup growth and exit) and stage at which founders are accepted to the program (startup or early-stage).

Even though there is still no consensus on a more formal operating definition, in this work we concur with the typologies provided so far, in particular the one offered by Dempwolf et al. (2014) that highlights the private / for-profit component present in the type of accelerators described in this paper.

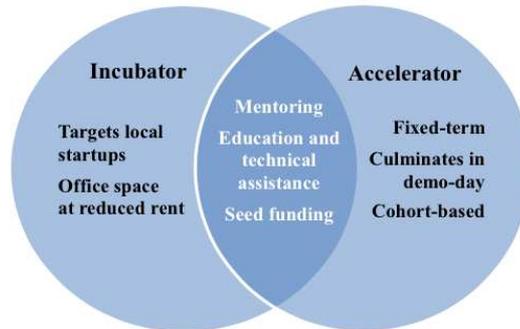
Incubators, in contrast, are usually associated a business model more similar to a tenant / service provider relationship with startups. They are typically (i) nonprofit organizations, frequently associated with universities, (ii) provide office space at reasonable rates for the startups they support, (iii) target local startups and (iv) do not invest in the startups (Dempwolf et al., 2014). A brief summary of these key differences with the acceleration model is presented on figure 1.

Another emerging perspective on how to differentiate such programs is provided by Dee et al. (2015), categorizing it according to the business model used (growth driven, fee driven or independent) and the stage in the entrepreneurial journey at which it best supports entrepreneurs. A summary of this typology is presented on figure 2.

³ Cohen and Hochberg (2014), italics in original

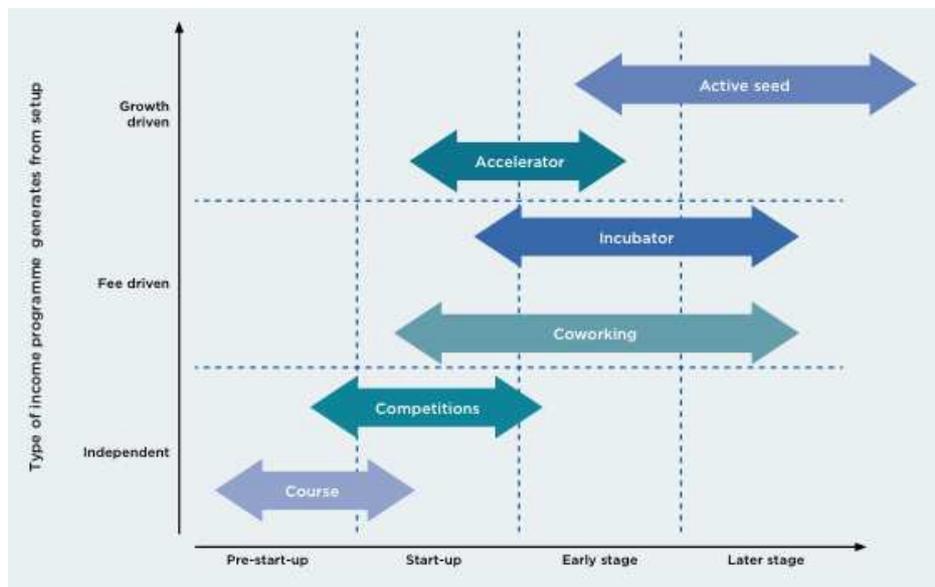
⁴ Dempwolf et al. (2014), italics in original

Figure 1. Incubator and Accelerator Characteristics



Source: Dempwolf et al. (2014: 14)

Figure 2. Typology of Startup Support Programs



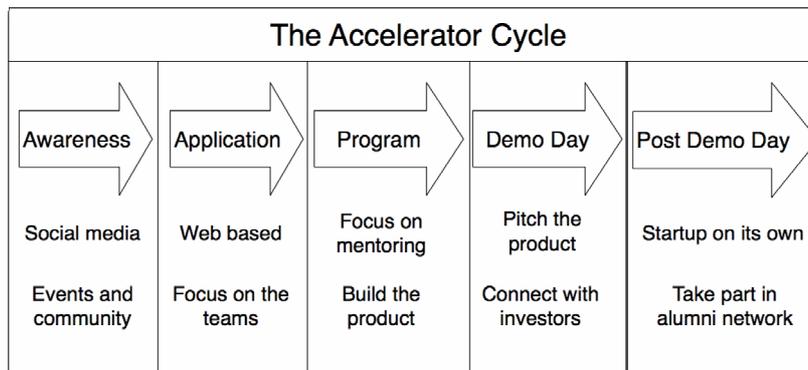
Source: Dee et al. (2015: 22)

How accelerators work

As a starting point, most acceleration programs are highly competitive and to guarantee a minimum quality level of the start-up batches accepted, it is typical to emulate the application process usually found in graduate courses (i.e. MBA). In figure 3 Barrehag et al. (2012)

summarize the main steps of a typical acceleration cycle (from founders awareness to startup “graduation”).

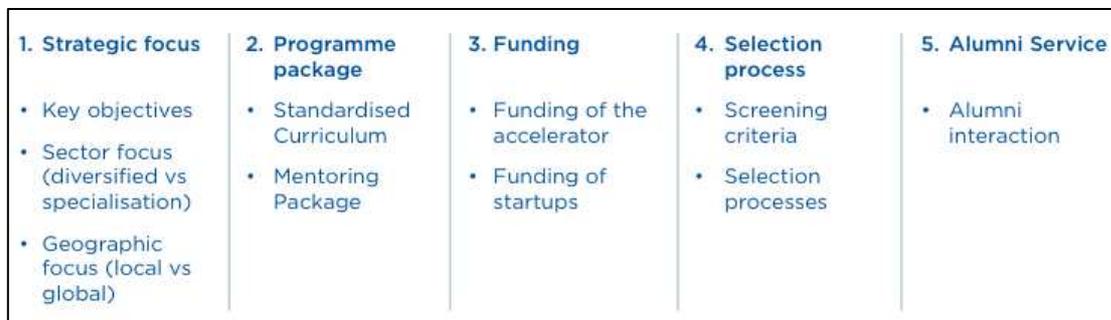
Figure 3 The Accelerator Cycle



Source: Barrehag et al. (2012: 51)

Whereas accelerator programs vary significantly in scope and depth worldwide, five important components can be highlighted (Clarysse et al. 2015): (1) strategic focus, (2) program package, (3) funding, (4) selection process, and (5) alumni services. This operating model is summarized in figure 4.

Figure 4. Accelerator’s Model



Source: Clarysse, Wright, & Hove (2015: 10)

1. *Strategic focus.* Accelerators differentiate themselves from other startup support programs in its (Clarysse et al., 2015; Dempwolf et al., 2014): (i) objective, private and for profit, being backed-up by investors that typically are private, public funders or large corporates; (ii) focus, that can range from being generic (no industry focus) to specific (specializing in one industry/vertical or technology); (iii) geography, ranging from local programs (running in only one location, such as Y Combinator in Silicon Valley) or in multiple locations (running “franchises” in parallel, such as the Techstars program).

2. *Program package.* The educational and social network components are cornerstones of all acceleration programs, being used as a competitive advantage to attract and retain the best

start-ups and founders. As described by Clarysse et al. (2015) and Cohen and Hochberg (2014), the “acceleration package” typically includes:

- Limited duration (typically 3 months), demanding complete focus of founder’s attention to building a minimum viable product (MVP) around a business idea.
- A “curriculum” or “educational program” that all accepted startups go through. Similar to business school courses, this can cover a wide range of topics from finance, marketing, logistics to legal and HR aspects among others.
- A program of events, expert workshops and inspiring talks (incidentally, Y Combinator organizes weekly dinners, inviting prominent Silicon Valley entrepreneurs to speak and using it as informal accomplishment milestones for founders).
- Structured mentoring, usually in the form of weekly “office hours”, when accelerator directors and program’s mentors (experienced professionals, entrepreneurs and investors) meet founders on a periodical basis to provide guidance, network opportunities and to create mutual trust with stakeholders that potentially could become later-stage investors and advisors.
- Co-location in a shared open office space, promoting peer-to-peer opportunities to learn and collaborate, while informally stimulating “peer pressure” to guarantee quality and time management while building the MVP.
- Investor day or demo day, which is the main milestone of all acceleration programs and typically marks the “graduation” of a startup to the market. In such occasions, potential investors and customers are invited to attend a full-day meeting where they will listen and assess startup pitches, with presentations of a MVP and their intended growth and organizational strategies.

3. *Funding.* Accelerators are usually funded (obtaining working capital to invest in startups) by shareholders such as private investors (angels, venture capitalists), large corporates and public authorities (i.e. universities or regional economic development agencies). Differently from what happens in venture capital firms, accelerators don’t charge “management fees” from investors, but expect to obtain significant returns when portfolio startups grow and pursue follow-on investments or an exit such as an IPO or acquisition (Dempwolf et al. 2014). Startups usually receive a small seed investment (\$ 22k on average with a range from \$0 to \$150k, as described in Fehder and Hochberg 2014) in exchange for an equity stake for the accelerator (6% on average, with a range from 5 - 8% as described in Cohen and Hochberg 2014). Although this initial funding is not sufficient to scale a typical high-growth startup, it is aimed to guarantee founders’ focus during the 3 months they are part of

the acceleration program building a MVP. After the demo day, most graduating startups will receive follow-on investments either pre-committed (as convertible notes) or secured in subsequent investment rounds with new investors. Additional descriptive statistics are presented on Appendix 2.

4. *Selection process and criteria.* The typical accelerated startup is formed by teams with the most promise that aim to build high-growth ventures (Dempwolf et al., 2014; Miller and Bound, 2011),. In fact, top accelerators (such as Y Combinator and Techstars) have typically an acceptance rate of 3% or less in each cohort batch (Miller and Bound 2011; Y Combinator 2014). As a result, it enforces a highly selective admission process (NESTA 2014) usually organized with (i) an online application, (ii) an executive or core team review, (iii) an initial interview with shortlisted candidates, and (iv) a final face-to-face interview. During this process, the teams are expected to present their initial business ideas and, most importantly, present themselves as founders. This latter aspect is considered the most important component of the selection process, since it is expected that during the program the initial business idea may change, requiring entrepreneurial-minded founders to be flexible enough to accept the feedback and pivot the business concept.

5. *Alumni service.* Alongside the mentorship component during the program, “graduated” startups form an important aspect in the acceleration process since they expand the resources and networks accessed by accelerated teams. For instance, in larger programs (such as Y Combinator) the alumni network is actively used by startups to test their MVPs in real customer scenarios, get support in recruiting new founding members or accessing complementary technologies that will enhance their competitive advantage in the short-term.

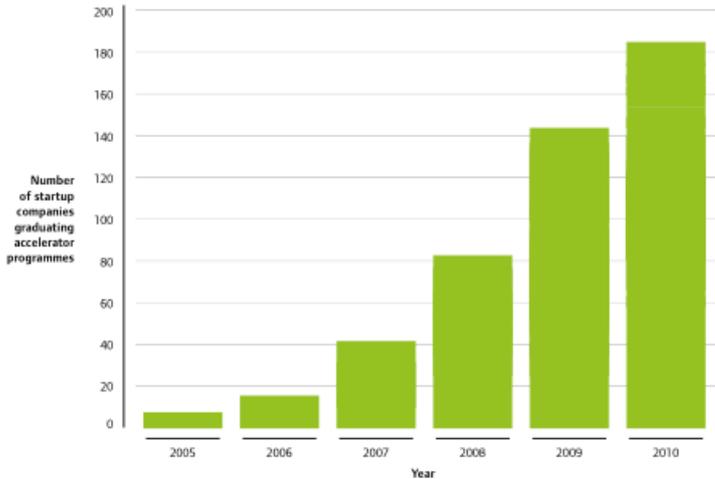
RELEVANCE OF THE ACCELERATION PHENOMENON

Accelerator Programs Growth

According to Miller & Bound (2011), in the decade since the dot-com boom, the environmental conditions for building tech startups has changed dramatically. In this sense, current 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. In this environment, accelerator programs seem to be addressing a growing opportunity in the market for innovative products and services. Such market conditions are rapidly and constantly changing, in part as a result of technologies and the reductions in the cost to start a company, promoted by the tech sector during the boom years (1995-2000). As Megan Smith, Vice President for Business Development at Google mentioned, “*they (accelerators) are an idea whose time has come*” (Miller & Bound, 2011).

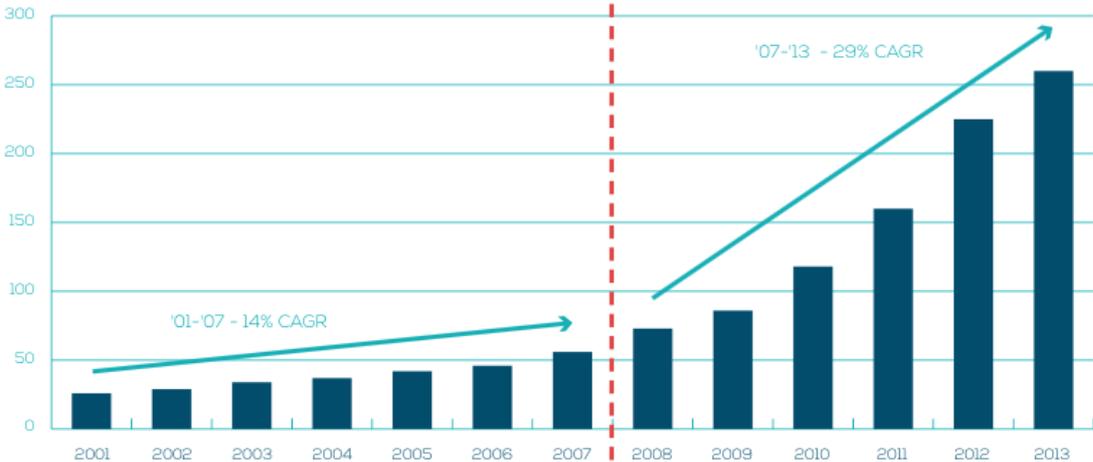
As a result, the number of new accelerator programs created yearly has grown on a steep rate as shown on figures 5 and figure 6. It is remarkable, though, the growth inflection point in 2007-2008 noted both in the US and Europe. It coincides with the beginning of the financial crisis and can be perceived as a clear way-out for alternative ways of startups to get funded (since financial borrowings dried-up alongside the capital markets) and entrepreneurs to start new ventures in a global economic scenario less robust in terms of employment alternatives.

Figure 5. Startups funded by accelerator programs in the US



Source: Miller & Bound (2011:4)

Figure 6. Accumulated number of incubators and accelerators in 10 European countries since 2001



Source: Salido, Sabás, & Freixas (2013: 5)

Current Research

Given the novelty of the accelerator phenomenon (whose foundation milestone dates back to 2005 with the creation of Y Combinator), existing research on the topic is scant and primarily conceptual, with only very early-stage empirical studies (Cohen & Hochberg, 2014a; Dempwolf et al., 2014; Fehder & Hochberg, 2014).

Lack of trusted and structured data is a major obstacle. The private nature of accelerators and startups results in the absence of large-scale datasets on accelerator programs, portfolio companies and the larger stakeholder ecosystem that gravitates around it. Initial attempts to collect and organize relevant data on accelerators are formed by initiatives such as seed-db.com (that aggregates publicly available data from Crunchbase) and the Seed Accelerator Ranking Project (Hochberg, Cohen, Fehder and Yee 2014).

Some of the most relevant research found on the topic is presented below and summarized on table 1. In this table we pinpoint the main research question, methodology, data and findings for each of the mapped work found.

Following, we comment in more detail each of the papers and reports included in table 1. For this, we followed a chronological order.

- Miller and Bound (2011) and Caley and Kula (2013) offer a thorough description of the accelerator model and phenomenon, based on case studies of Canadian and global (with emphasis in the US) programs respectively. Both reports suggest that accelerators have a positive impact on founders, helping them learn rapidly, create powerful networks and become better entrepreneurs, despite the existing lack of consensus around a typology that defines it.
- Hoffman & Radojevich-Kelley (2012) use exploratory case studies of accelerator programs in the US to assess the success rate of graduated startups, based on how such programs facilitate startups to connect and subsequently raise additional funding from angel investors and venture capitalists. The authors analyze the results in light of the RBV theory, suggesting that mentorship driven programs increase the overall success rates of start-ups by providing entrepreneurs with access to angel investors and venture capitalists, which tend to increase success rates.
- Kim and Wagman (2012) use a game theory based model to assess the dynamics of accelerator programs in a competitive market for venture financing. The authors provide cues on the signal effects (quality) it provides for its accelerated startups and the tension existing with investors when selecting and disclosing specific information (typically

positive) to potential follow-on investors. The propositions offered in this theoretical work investigates the inefficiencies that are introduced by the accelerator in terms of the participating class size, the equity fee charged to participating ventures, and information sharing with investors. The authors also studied some of the benefits of the accelerator, in terms of improving the quality of information, providing training, and facilitating access to investors, and discussed the potential inefficiencies when the accelerator can selectively disclose signals, and when entrepreneurs perceive receiving funding as success

- Barreahag et al. (2012) compared accelerators in Europe and in the US to map and describe the overall accelerator phenomenon and to confirm the research findings offered by Miller and Bound (2011).
- Cohen (2013) used multiple case studies of nine accelerators in the US to assess how organizational learning occurs and accelerate new ventures creation in such time-compressed programs. Among the key findings in this work, the author highlights the importance of four components in the learning / new venture creation process in accelerators: (i) mentor overload, (ii) accelerator director expertise, (iii) learning in divided teams and (iv) cohort peers learning. The results suggest that time compression enhances learning (contrary to previous theoretical predictions), firms delay “doing” until strategy emerges and begins to stabilize, teams dividing each member’s area of expertise enhance overall organizational learning, ventures accelerated in the same cohort (regardless of any industry focus) improve their aspirational goals and expand founders’ overall capabilities and knowledge, and finally it suggests that concentration of expertise among focal firms matters, in particular the knowledge transfer by accelerator directors to startups.
- Hallen, Bingham and Cohen (2013) offer one of the first empirical studies to assess the impact of accelerators on startups ability to raise follow-on investment through venture capital comparing accelerated and non-accelerated ventures. The authors found that startups backed by top accelerator programs are able to raise venture capital investment in shorter time, exit by an acquisition and gain initial customer traction. These results suggest that accelerators do accelerate. However, only top accelerators (older, more established programs) seem to have such effect, helping startups to overcome liabilities of newness by providing a unique form of learning and access to networks. Additionally, authors’ empirical findings suggest that this impact is neither due purely to credentialing nor to selection, but arises from the way accelerators improve the quality (through learning) of participating startups. It also suggests that accelerators are complements to (and not substitutes) experienced founders.

- Winston-Smith and Hannigan (2013) compare startups that went through two top accelerators (Y Combinator and Techstars) to equivalent startups (non-accelerated) that eventually raised angel funding. The results suggest that startups graduating from these leading programs typically have founders with educational background from elite universities, receive additional investments (after graduation) quicker and are more likely to be acquired or exit by quitting (fail).
- Isabelle (2013) compares accelerators and incubators, presenting five factors (stage of venture, fit with incubator/accelerator's mission, selection and graduation policies, services provided and network of partners) that are used by founders to assess the benefits of joining one type of support program or the other.
- Salido et al. (2013) map the accelerator and incubator ecosystem in Europe using multiple case studies in 10 key European economies, offering a first attempt to understand the differences, characteristics and needs of each ecosystem in order to provide cues for regional policy makers interested in stimulating entrepreneurial-related initiatives. The study identified seven key findings: Europe has a thriving early-stage startup scene, Europe and the US are comparable in number of accelerators per capita, dramatic increase of programs since the financial crisis (2007-2013), diversity of the accelerator ecosystem, lack of data available, large variability of equity taken from startups, European-level initiatives could improve the overall entrepreneurial ecosystem.
- Birdsall et al. (2013) identifies the key success factors and best practices of accelerator programs, examining the performance of participating startups, using company survivorship and acquisition data, compared to benchmark competitors. The authors also propose the development of accelerator funds as a new type of investment / asset class.
- Dempwolf et al. (2014) present taxonomy of startup assistance programs, differentiating it based on this value proposition (to startups) and business model. As a result, the authors identify three categories of startup assistance organizations, (i) incubators and venture development, (ii) proof-of-concept centers and (iii) accelerators, that are subdivided into innovation, corporate, university and social accelerators. The study also discusses the metrics that should be used to measure performance of such programs.
- Nesta (2014) presents a definition of acceleration programs, laying out its best practices and key benefits to startups and founders of both new ventures and accelerator programs.
- Cohen and Hochberg (2014) providing a first attempt to formally define what is an acceleration program, while pinpointing the difference among other startup support programs and investments, in particular incubators and angel investors. The authors also

review past and current research about such programs, presenting summary statistics on a number of basic accelerator outcomes: (1) Proportion of accelerator graduates that receive follow-on funding? (2) Proportion of graduates that have meaningful exits for founders? (3) How do programs differ in offerings, including mentorship and education? And finally, they discuss (4) what questions and data would be fruitful for informing further research and identification.

- Fehder and Hochberg (2014) offer a first empirical-based attempt to understand the impact, efficacy and role of acceleration programs on entrepreneurial ecosystems of the regions in which they are based. They analyzed the effect of accelerators on the overall funding pool (from seed and venture capital investors) present in the local region, providing cues for local authorities and accelerator founders aiming to promote local economic development through promoting entrepreneurial ecosystems. Their findings suggest that accelerators do have regional impact on the entrepreneurial ecosystem, by noticing an increase in seed and early stage venture financing activity, affecting accelerated and non-accelerated startups due to an increased attraction of VCs and mentors to accelerator activities (such as demo days). The authors, however, raise two critiques, suggesting that the increase in financing activity in new regions (other than traditional hubs such as the US west and east coasts) is a result of investment shifts from central to more peripheral areas, in detriment of other regions. They also point to the fact that companies funded locally would otherwise be funded in other regions, minimizing the local investment effect.
- Clarysse et al. (2015) present an inductive study of accelerators in Europe, analyzing its internal systems and creating a first attempt to categorize different types of accelerators in emerging archetypes, (i) investors, accelerators funded by private investors with a clear business model, (ii) ecosystem builders, typically funded by public authorities trying to reduce early-stage failure rates, and (iii) matchmakers, typically funded by corporates with a wide range of objectives towards its program
- Dee et al. (2015) present a thorough review of different startup support programs offering a typology to categorize it based on (i) how programs are funded and (ii) at what stage programs intervene in the startup formation process.

Table 1 – Summary of Existing Literature on Accelerators

Paper	Research Question	Methodology	Sample	Findings
(Miller & Bound, 2011)	What is the accelerator phenomenon?	Qualitative / Quantitative – case studies complemented with descriptive statistics	Interviews and descriptive data from accelerator programs	First comprehensive report to map the accelerator phenomenon globally and suggest a formal definition of what is an accelerator program (in comparison to other initiatives, like incubators). Early evidence derived from the report suggests accelerators have a positive impact on founders, helping them learn rapidly, create powerful networks and become better entrepreneurs.
(Hoffman, D. L. & Radojevich-Kelley, N., 2012)	How accelerator companies work and perform?	Qualitative - case studies, interviews, website analysis, and observation	Three extensive within-case and three between-case analyses were conducted.	Mentorship driven programs increase the overall success rates of start-ups by providing entrepreneurs with access to angel investors and venture capitalists which tend to increase success rates.
(Kim & Wagman, 2012)	How is the early-stage financing and information gathering dynamics in the context of accelerators?	Game theory framework	Theoretical model (no empirical evidence)	The authors provide cues on the signal effects (quality) it provides for its accelerated startups and the tension / inefficiencies existing with investors when selecting and disclosing specific information (typically positive) to potential follow-on investors.
(Barrehag et al., 2012)	What is the accelerator phenomenon? What are the characteristics of accelerators?	Qualitative – case studies, complemented with quantitative analysis	17 interviews, articles and blog posts of 7 European accelerator programs and universities, and 2 american programs	Validate initial definitions of what is an accelerator, providing additional features regarding the network of stakeholders surrounding the accelerator, the organization and frameworks used by accelerators, and the accelerator program cycle.
(Susan Cohen, 2013)	How firms can accelerate	Qualitative – case	Nine accelerators in the	Accelerator programs do accelerate startups

Table 1 – Summary of Existing Literature on Accelerators

Paper	Research Question	Methodology	Sample	Findings
	learning? And broadly, how entrepreneurship can be taught?	studies	US	learning through four major components – (i) mentor expertise transfer overload, (ii) accelerator director expertise transfer, (iii) learning through divided teams, and (iv) learning through cohort peers.
(Isabelle, 2013)	What are the key factors entrepreneurs should take into consideration before joining an incubator or accelerator?	Qualitative – surveys with Canadian and US managers	Two surveys of managers and users of incubators and accelerators	Five key success factors to be considered: (i) stage of venture, (ii) fit with incubator’s mission, (iii) selection and graduation policies, (iv) services provided, and (v) network of partners
(Caley & Kula, 2013)	What is the startup accelerator model in Canada and who are the key players in the ecosystem?	Qualitative / Quantitative – case studies complemented with descriptive statistics	18 interviews (60 minutes long) conducted with accelerator directors and entrepreneurs in Canada, complemented with descriptive data from Canadian accelerators webs	Canada’s accelerators are in their own “startup phase” and pivots, despite the variations on the accelerator model. The authors suggest that these continued iterations contribute to the refinement of best practices and may potentially lead to new, distinct models in the future.
(Salido et al., 2013)	How is the accelerator and incubator ecosystem in Europe?	Qualitative / Quantitative analysis - interviews, site visits and conference calls	Data from accelerators and incubators in 10 European countries	Map the differences, characteristics and needs of each European ecosystem in order to provide cues for regional policy makers interested in stimulating entrepreneurial-related initiatives.
(Birdsall, Jones, Lee, Somerset, & Takaki, 2013)	How accelerator programs have developed over time and what value they create for different parties within the ecosystem, including	Qualitative – case studies, complemented with quantitative analysis	Interviews with 14 accelerators, 15 investors, and a survey of over 130 entrepreneurs	Quality of the mentors, brand of the accelerator, and networking opportunities are the three major factors entrepreneurs consider when selecting programs. For follow-on funders, accelerator programs provide a filtered

Table 1 – Summary of Existing Literature on Accelerators

Paper	Research Question	Methodology	Sample	Findings
	founders, angel investors and venture capital funds?			source of dealflow, but have little impact on investment decision making. Accelerators have the potential to evolve into a new asset class.
(S Cohen & Hochberg, 2014b)	What is an accelerator and how it differentiates from previous and existing programs with similar or related goals?	Qualitative – case studies, past researches summary Quantitative – proprietary data analysis	Not disclosed	Accelerator programs form a different type of startup support (compared to angel investing and incubators) in a number of dimensions – duration, incentives, cohorts, business model, colocation, educational and mentorship programs and networking.
(Fehder & Hochberg, 2014)	Do accelerator programs have and impact on the entrepreneurial ecosystem of regions in which they are established?	Quantitative - fixed effects and hazard-rate matched models	Panel data set of 38 US Census Metropolitan Statistical Areas (MSA) regions across 10 years (2005-2012) in which 59 accelerators were founded	Accelerators do have regional impact on the entrepreneurial ecosystem, by promoting an increase in seed and early stage venture financing activity, affecting accelerated and non-accelerated startups.
(Hallen et al., 2014)	Do accelerators accelerate startups that engage in such programs?	Quantitative – matched sample analysis Qualitative – interviews with accelerator directors, founders etc.	328 internet-related ventures, being 164 accelerated and 164 non-accelerated. Additionally, there were 75 interviews with stakeholders involved in 11 accelerators worldwide	Accelerators do accelerate startups reaching specific success milestones. In particular, startups backed by top accelerator programs are able to raise venture capital investment in shorter time, exit by an acquisition and gain initial customer traction.
(Winston Smith & Hannigan, 2014)	How do accelerators impact exit and VC financing in new firms?	Quantitative – multinomial logit regression and competing risk cox	619 matched startups and their founders that participated in two US top accelerators from 2005 -	Startups graduating from these leading programs typically have founders with educational background from elite universities, receive additional investments (after

Table 1 – Summary of Existing Literature on Accelerators

Paper	Research Question	Methodology	Sample	Findings
		hazard models	2011	graduation) quicker and are more likely to be acquired or exit by quitting (fail).
(C. Dempwolf et al., 2014)	What defines an accelerator and how to distinguish the many types of accelerators from other startup assistance programs, such as business incubators?	Qualitative – literature review complemented with descriptive statistics	Thorough literature review and data analysis of accelerator and similar programs	Identify three categories of startup assistance organizations, (i) incubators and venture development, (ii) proof-of-concept centers and (iii) accelerators, that are subdivided into innovation, corporate, university and social accelerators. The authors also discuss the metrics that should be used to measure performance of such programs.
(NESTA, 2014)	What is an accelerator? Why consider an accelerator program?	Qualitative	N/A – practical report	Best practices and key benefits to startups and founders of both new ventures and accelerator programs.
(Clarysse et al., 2015)	How different accelerators operate, how they differentiate themselves from each other, and why?	Qualitative – case studies	Interviews with managing directors of 13 accelerators in Europe (London, Paris and Berlin)	In–depth insights on the accelerator models and the heterogeneity of their strategies and operations, providing (i) an adapted definition, (ii) a set of diverse features to describe the architectural blueprint of an accelerator and (iii) emerging archetypes that categorizes accelerators in, (a) <u>investors</u> (private funded), (b) <u>ecosystem builders</u> (public funded), (c) <u>matchmakers</u> (corporate funded)
(Dee et al., 2015)	How do support programs fulfill different roles for startups within startup ecosystems?	Qualitative - semi–structured interviews	50+ interviews with a range of ‘startup support programs’ in Europe and Israel	Provide some definitions and boundaries for terms related to startup support programs, map the startup ecosystem (particularly in Europe) and, finally, the results suggest there are links between how developed a startup ecosystem is and the ability of programs to be successful.

The existing literature on accelerators is recent and incomplete, given not only the novelty of the phenomenon but the difficulty to obtain reliable data, typically private owned by accelerators and startups.

A major effort in most of the non-academic works has been on providing a coherent typology about accelerators, while differentiating it from previous startup support programs. In fact, these works succeed in describing the phenomenon, how it works, what are the initial figures (descriptive statistics) and, potentially most importantly, what are the key business model characteristics that make accelerators unique.

The scant academic works have also focused on describing the phenomenon, while offering early attempts to understand what is the performance of such programs for all stakeholders involved, the accelerator itself, entrepreneurs and the ecosystems in which they are established.

DISCUSSION AND FUTURE RESEARCH

The objective of this work has been to engage in a first attempt to map the current state around the accelerator phenomenon. In particular, it maps the existing research on the topic and the different taxonomies available. To accomplish this objective, we presented the existing typologies that define acceleration programs, explaining in more detail how it works, then offered a comprehensive review of the current research on the topic, and finally presented an initial discussion on the implications and potential future lines of research.

It is clear that, to date, most of the existing studies are excessively descriptive, trying to create its own typology / taxonomy on the topic. As pointed out previously, the lack of available and reliable data, associated with the novelty of this phenomenon, has led to scant research, theoretical and empirical, leading to the existing flaws on a consensual definition of what is an accelerator and initial insights on how to measure performance of such programs, and of its accelerated startups.

An additional critique of such studies relies on the fact that most studies focus on US-based accelerators, leaving an open field for observation of the entrepreneurial ecosystems in other countries. Such observations may provide cues on how adaptive is the US or Silicon Valley accelerator model to other realities. It may also contribute to police makers and entrepreneurship practioners by defining specific requirements and performance metrics of such programs in regions with different levels of early-

stage investments and institutional environments (cognitive, normative and regulative).

Additional theoretical and empirical contributions are required to advance the existing knowledge of how accelerators can, in fact, contribute to enhance performance of all stakeholders involved, startups, accelerators and entrepreneurial ecosystems. In this sense, theoretical works could help to consolidate some of fundamentals around the acceleration model, building on the groundwork provided by previous researches in the fields of strategy (i.e. institutional analysis and network analysis) or entrepreneurship (i.e. effectuation). Empirical works can provide important insights on the performance of such programs, while contrasting explaining and predictive models about the way it operates. Such additional studies can benefit not only from various methodological approaches, but also from the unit of analysis itself that gives room to further investigate accelerators, startups, entrepreneurs and ecosystems.

- Finally, the research reviewed in this work provided a number of additional lines of future contributions worth noticing as the comparison among ecosystems and regions (in central and non central areas) in other countries and continents other than North America and Europe; the analysis of how different acceleration models evolve over time, absorbing the feedback from early results and failures, while adopting legitimating characteristics founded in other programs or required by stakeholders involved (most notably, investors); the study of the variability of performance and characteristics of accelerators focused on areas other than digital startups, such as social, hardware, health etc.; the analysis of the impact accelerators have on startups according to the phase they joined the program (idea, early-stage, startup) and the long-term performance of accelerated companies, and understand the impact accelerators have on the entrepreneurial process.

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APPENDIX 1

Table Ap1.1. Y Combinator statistics (2014)

Milestone	Value
Total market capitalization of all YC companies (USD)	>\$30 billion
Total money raised by all YC companies (USD)	>\$3 billion
Number of YC companies worth more than USD 1 billion	3
Number of YC companies worth more than USD 100 million	>20
Number of companies funded by YC so far	716
Number of companies in the current batch	85
Acceptance rate of the current batch:	<3%

Source: ycombinator.com

Table Ap1.2. Techstars - Overview performance of accelerated startups

Status	Number of companies accelerated	Percentage
Active	405	77.29%
Acquired	66	12.6%
Failed	55	10.5%
Impact		
Average Funding per Company (USD)		\$2,414,312

Source: techstars.com

APPENDIX 2

Table Ap2.1. Example of European accelerator program description

Accelerator	Location	Date created	Length of program	Investment size	Equity stake taken	Output (# active companies / follow-on funding)
Techstars London	UK, London	2013	3 months	£ 12.500 + option conv. loan	6%	22 / ~£10,4M
Healthbox Europe	UK, London	2012	4 months	£ 50.000	10%	7 / undisclosed
Fintech Innovation Lab	UK, London	2012	3 months	/	/	14 / undisclosed
Bethnal Green Ventures	UK, London	2011	3 months	£ 15.000	6%	34 / ~£9,3M
Climate-KIC Europe	Europe	2010	12-18 months	Max. of £ 75.500	/	45 / ~£46,5M
Microsoft Ventures Acc.	Germany, Berlin	2013	4 months	/	/	16 / undisclosed
Axel Springer Plug & Play Acc.	Germany, Berlin	2013	3 months	£ 19.900	5%	46 / £6M
ProSiebenSat.1 Accelerator	Germany, München	2013	3 months	£ 19.900	5%	26 / undisclosed
Startupbootcamp Berlin	Germany, Berlin	2012	3 months	£ 11.900	8%	16 / £4,9M
Le Camping	France, Paris	2010	6 months	£ 3.600	3%	72 / £14,8M
TheFamily	France, Paris	2013	indefinite	/	3%	Undisclosed
L'Accélérateur	France, Paris	2012	4 months	£ 7.900 + option for more	7-10%	49 / undisclosed

Source: Clarysse et al. (2015)

Table Ap2.2. Example of programs information

Accelerator	Launched	Batch Size	Length (days)	Acceptance Rate	Equity Required	Stake	Seed Funding
Y Combinator	2005	65	90	3%	2-10%		\$11K-\$20K
TechStars	2007	10	90	1%	6%		\$6K-\$18K
GSVA	2012	6	45-90	-	0		0
Springboard	2009	10	90	4.5%	6%		£5K - £15K
Startupbootcamp	2010	10	90	2.5%	8%		€15 000
Nordic Startups	2011	10	90	-	8%		not decided
betaFACTORY	2011	5	90	-	6-8%		€5K - €15K
Startup Sauna	2010	15	49	7%	0		€1 500

Source: Barrehag et al. (2012: 42)