

Article

Characteristics and Specificities of Local Innovation Accelerators: A Case of Poland

Konrad Szczukiewicz ^{1,*} and Marek Makowiec ²¹ ShelfWise, 33-332 Cracow, Poland² Department of Organizational Behaviors, Institute of Management, College of Management and Quality Sciences, Cracow University of Economics, 31-510 Cracow, Poland; makowiec@uek.krakow.pl

* Correspondence: szczukik@uek.krakow.pl

Abstract: Accelerators are one of the most recent and prominent institutions that support start-up development. The phenomenon of accelerators impacts academia as well as policy makers and practitioners. However, the research on accelerators is still very scant and the majority of research concerns the most prestigious and successful American accelerators. The purpose of this paper is to outline the characteristics of Polish accelerators and their specificities, with the focus on the differences between public and private accelerators. The collateral aim of the authors was to describe characteristics and components of an innovation accelerator and its placement in the ecosystem of institutional support for start-ups. The first part of the study focuses on the definition of an accelerator, the review of relevant literature and the differences between other well established institutions such as incubators and business angels. The second part of the study presents the current state of accelerators in Poland. It is observed that the majority of the accelerators in Poland are publicly funded and accelerators avoid taking equity in accelerated start-ups. This is an effect of the competition from public accelerators, which offer a sizable equity-free grant of 200,000 PLN. This study enriches the research on different models of local accelerators and their acceleration programs.



Citation: Szczukiewicz, K.; Makowiec, M. Characteristics and Specificities of Local Innovation Accelerators: A Case of Poland. *Sustainability* **2021**, *13*, 1689. <https://doi.org/10.3390/su13041689>

Academic Editor:
Katarzyna Szopik-Depczyńska
Received: 31 December 2020
Accepted: 1 February 2021
Published: 4 February 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: accelerators; start-ups; public accelerators; incubators; funding; venture capital; innovations

1. Introduction

Despite the fact that the accelerator institution was only introduced in 2005, it quickly became a prominent part of the start-up and entrepreneurship landscape. The creation and development of accelerators has been facilitated by a significant reduction in prototyping costs over the past decade [1]. The growing importance of accelerators is therefore a consequence of changes in technology and business philosophy. The costs of setting up a business, including infrastructure costs, have been significantly reduced, especially for cheap and easily scalable IT start-ups [2]. The current conditions for setting up businesses based on IT solutions, due to the low costs and rapid development potential, generate a lot of interest on the part of investors and potential customers. In such an environment and economic context, accelerators seem to effectively address the growing demand and supply for innovative services and products [3]. The first accelerators focused mainly on start-ups offering services or software, while in recent years more and more of them have also been focusing on other businesses [1]. At first, most accelerators had a general profile, i.e., they accepted start-ups from various industries. Currently, however, vertical accelerators are starting to develop in various industries, such as Kaplan in the education industry or Surge in the energy industry. Some accelerators only accept start-ups whose founders belong to specific social groups, such as those established by women or ethnic minorities, or start-ups originating from the academic community [4].

In 2007, there were only three accelerators in the world, while in 2013, more than 100 accelerators existed in Europe alone [2]. Only in the United States, it is estimated that

over 7000 start-ups took part in acceleration programs, raising a total of USD 30 billion in funding. It is also estimated that in 2015 as many as one third of all start-ups obtaining funding in the United States were previously part of one of the accelerators [5]. Start-ups that participate in top accelerators experience much faster “exit” (exit, i.e., company sales or stock exchange) compared to start-ups using the help of business angels [6]. On the other hand, the regions where accelerators operate have a higher level of private financing for both accelerated start-ups and non-accelerated start-ups, thus stimulating the entire local eco-system, not only accelerators’ participants [2]. Several start-ups taking part in accelerators have achieved spectacular success and recognition, such as AirBnB, SendGrid or Dropbox [5]. Most of the accelerators, including the three most popular ones—Y Combinator, TechStars and SeedCamp—do not participate in the next rounds of financing, except for the investment provided during the acceptance to the accelerator. Nevertheless, accelerator founders and mentors sometimes personally invest in accelerated start-ups [7]. Very often, accelerators’ managing directors are entrepreneurs themselves, having graduated from studies related to IT or high technologies and having successfully conducted their companies [6].

The environment of innovation accelerators also allows to more effectively approach the challenge of “open innovation”, i.e., the open process of developing and implementing innovations, especially important for large corporations [8]. Corporations struggle with attracting the most talented graduates and they do not adapt as fast as start-ups. This makes them willing to cooperate with start-ups and acceleration programs. As the education and prestige of the university completed by the candidate for work are the determinants of his qualifications for the employer, the brand of the accelerator completed by the start-up is the determinant of its attractiveness for corporations or venture capital funds [2]. Figures 1 and 2 show the increase in the number of start-ups that took part in accelerators and the total value of capital obtained by accelerated start-ups.

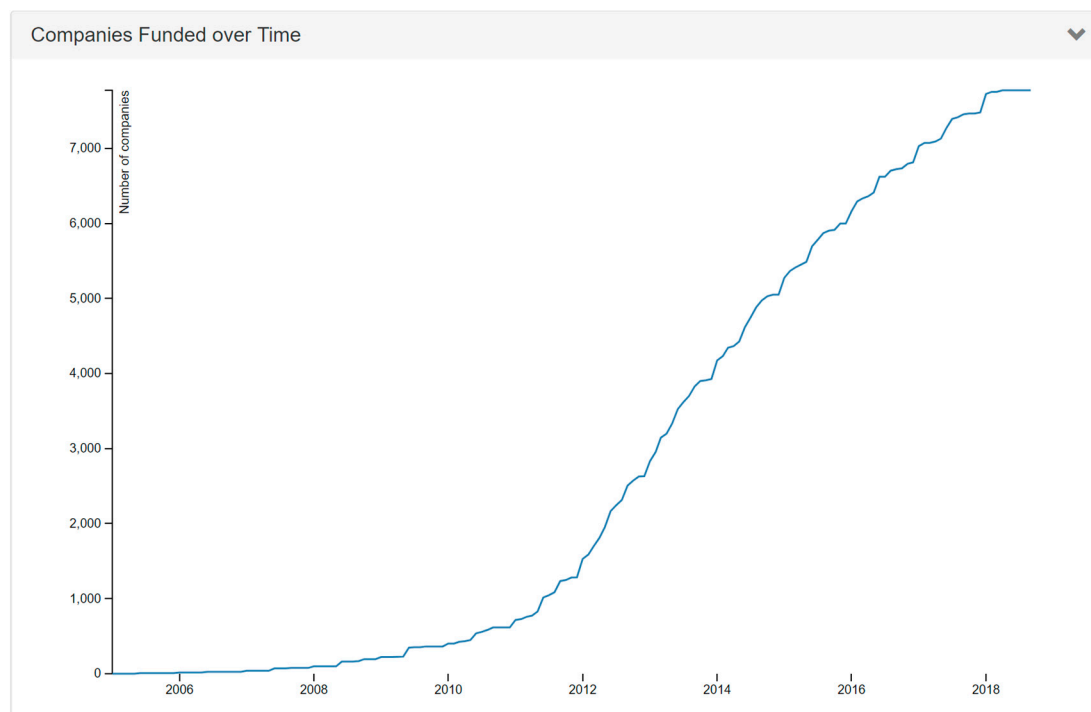


Figure 1. Number of companies who participated in accelerators and get funded over time. Source: <https://www.seed-db.com/chartsandtables>, [9] (accessed online on 6 May 2020).

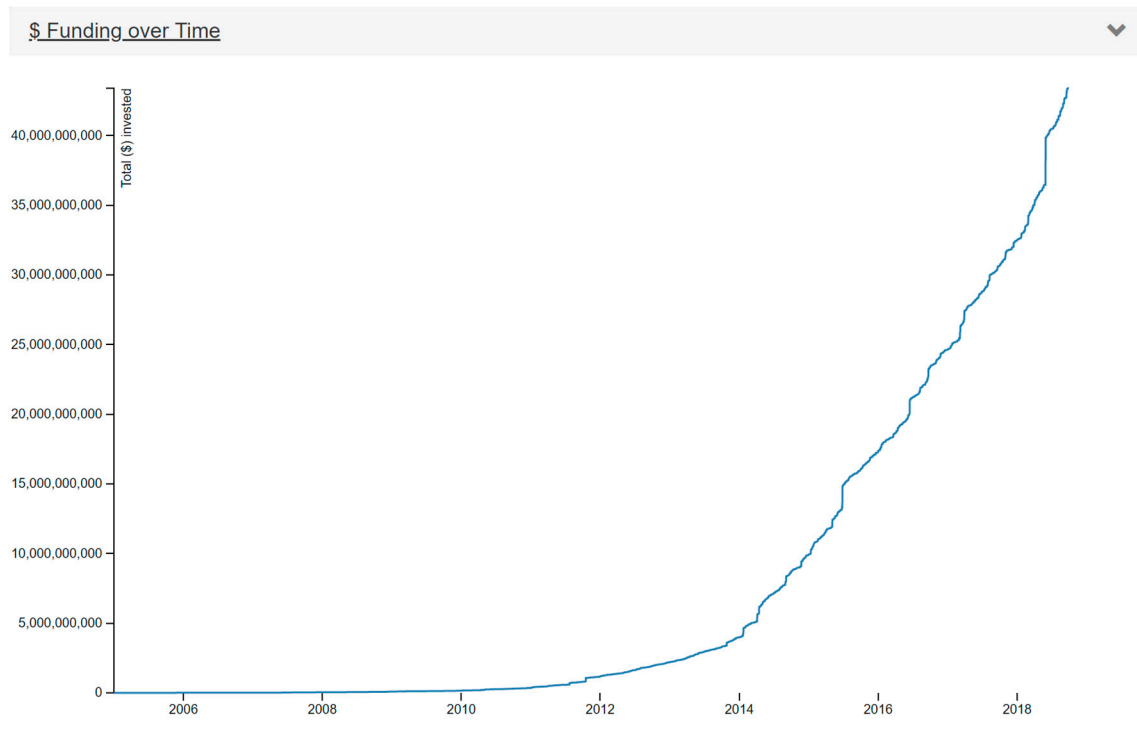


Figure 2. Funding (in USD \$) raised by start-ups which participated in accelerators over time. Source: <https://www.seed-db.com/chartsandtables>, [9] (accessed online on 6 May 2020).

The purpose of this study is to describe current state of research on accelerators as well as their definition and consequently discuss and analyze local specificities of Polish accelerators, especially differences between public and private accelerators. It is worth noting that the Polish accelerator ecosystem is uniquely interesting, as majority of well-known Polish accelerators are publicly funded. The study contributes to the theory and practice in two ways. Firstly, this study extends the literature on accelerators by providing a comprehensive and systematic analysis of a relatively new phenomenon in the literature and by placing accelerators in the context of other institutional forms of start-up support. Secondly, this study shows different approaches to running an innovation accelerator outside of United States, helping to fill the research gap where little is known about less famous accelerators. The added value of the analysis presented in the paper is the overview of operational models and specificities of Polish accelerators. The knowledge about different hybrid models of accelerators that emerged locally outside of United States is important for academia, policy makers and practitioners from around the world as literature on this topic is still very limited.

In order to achieve the goal of this research, the authors seek to answer the following research questions:

- Question 1: What definitions of accelerators are present in the literature and what are the features that can distinguish them from business angels and incubators?
- Question 2: What are the dominant components of private and public Polish accelerators and how do they compare?
- Question 3: What are the characteristics that can be distinguished in Polish accelerators compared to American accelerators?

The rest of this paper is divided into five sections. Section 2 discusses different definitions of accelerators along with a review of relevant literature. Section 3 describes the acceleration process with its components. Section 4 shows results of research on Polish accelerators with an emphasis on comparison between public and private accelerators. In Section 5 authors discuss the findings and draw final conclusions.

2. Accelerator

2.1. Definition of a Business Accelerator

Although the first accelerator was established in 2005, and most of the few scientific works on accelerators published so far have been devoted to determining its definition, there is still no consensus on a uniform definition of an accelerator [3]. There are many conflicting definitions and assumptions about the profitability of accelerators and the funding they offer. Some authors suggest that accelerators are reduced to the role of financial organizations investing in start-ups, mainly in exchange for shares in them [10]. This statement presupposes accelerators' profit orientation and adds an investment component to the definition. This is somewhat confirmed by another observation that the majority of accelerators are private companies, which in return for participation in the program take shares in accelerated start-ups [11]. An alternative possibility of presenting the accelerators is to define them as a model of intensive mentoring and capital investment, which allow for the effective launch of new ventures [6]. Almost every American accelerator offers financing, between USD 10,000–20,000, for roughly 5–10% of shares in invested companies. However, both the sum of investments and the percentage of shares taken up in companies may differ and exceed the defined limits. There are a few exceptions where accelerators only provide funding for living or accommodation costs during acceleration [7]. Funding is a specialty of American and Canadian accelerators, as the European ones usually do not offer financing [2].

Israel Drori and Mike Wright proposed their own definition of the accelerator, which presents it as a general organizational form that aims to stimulate entrepreneurship. They note that accelerator is structured to provide an intensive, limited-time education program, including mentoring and networking for participating start-ups. This is to increase the ability of start-ups to obtain investments after the so-called “demo day” at the end of the program, during which start-ups present their products to a wide audience consisting mainly of investors. According to Drori and Wright, accelerators are therefore, in a way, organizations that serve as validation of promising business innovations by embedding them in appropriate ecosystems. Thus, accelerators play an active and essential role in socio-economic and technological development [12].

Generally speaking, accelerators help start-ups create their products or services, identify promising market segments and obtain the necessary resources—including both financial and human ones. Typically, they provide a small amount of money invested in return for a stake in accelerated companies. They also provide a wealth of networking and mentoring, both with entrepreneurs, potential clients and investors. Most accelerators end the aforementioned “demo day”. Thus, it can be said that the accelerator is, in a way, an intensive business program, usually lasting three months [8]. Accelerators are characterized by the process of selecting start-ups, taking place on their website through which the application is sent. This application is first analyzed by the internal accelerator team and external partners such as mentors or investors in order to create a shortlist of candidates [13]. Then an application interview takes place with the selected group, mainly via Skype or—if possible—at the accelerator's premises. This process is aimed at ensuring the best adaptation of the start-up to a specific accelerator and selecting the most promising start-ups (and those that will benefit the most from acceleration).

One of the definitions of accelerators, which takes into account their heterogeneity, qualifies the accelerator as a program with a predetermined duration, containing mentoring and educational components, ending with a public event presenting the product or service offered by all accelerated start-ups (“pitch”) also known as “demo-day” [4]. “Pitch” is a short and concise presentation of a product or service offered by a start-up, consisting in particular of:

- The market need from which the idea of the start-up arises;
- Current achievements;
- Target market;
- Revenues;

- Business model;
- Level of financing;
- Founding team;
- Development plans and future financial needs.

Preparation for the “demo day”, ending accelerator, influences the experience of start-ups during the program from the very beginning—considering it as the culmination of several months of work and a chance to present the start-up to a wider audience [6]. It can therefore be concluded that accelerators serve as the first line of selection of start-ups in the due diligence [1] process and are a sort of a testing ground for venture capital funds, business angels and mentors. Throughout the duration of the program they have time to develop relationships with founders and evaluate them [2]. Accelerators operate based on “cohorts”—groups of start-ups accepted into the program and accelerated at the same time [1]. In the accelerator, each “cohort” is seen as a class at school and the entrepreneurs participating in it as graduates.

Time has passed since the creation of the first accelerator in 2005—and the operating model of accelerators has evolved since then or has been adjusted locally outside of the United States. Based on literature review, as well as participant observation in several Polish and international accelerators, the authors believe that the definition of accelerators should be inclusive and reflect their heterogeneity, focusing on the core characteristics distinguishing them from business angels and incubators. For the purpose of this paper, the authors define the accelerator as an intense, time-limited educational program for start-ups with a focus on testing business ideas, as well as acquiring clients or getting funded through utilization of accelerator’s network. The authors purposely omit in the definition: for profit or non-profit character of accelerator, private or public type, offer of funding, taking equity in accelerated start-ups, cost of the participation, concrete time duration and office space offering.

2.2. Current State of Research on Accelerators

Accelerators have not been discussed often by researchers—the scientific literature is modest and primarily American sources can be distinguished. Among the few scientific sources dealing with accelerators, there are several dominant aspects that are constantly discussed. They include mainly:

- Lack of many scientific sources and problem with citing peer-reviewed scientific articles;
- Novelty of accelerator institutions, which is a factor influencing the number of reviewed publications;
- The word *phenomenon* used to describe the meaning of accelerators and their history—related to the popularity of this occurrence in the media, in the popular science press, in everyday life, in the context of the importance of accelerators in the innovation ecosystem, as well as the speed with which the concept was adopted;
- Lack of reliable and complete data sources that would allow conducting empirical research;
- Lack of empirical research due to difficulties in accessing data;
- The fact that the dominant number of publications comes from the United States and relates to most prominent and successful American accelerators;
- The fact that existing research and scientific publications remain in the dominant conceptual part, and the main effort of researchers has been directed to define a uniform definition of accelerators and their typology.

The Table 1 below summarizes the opinions on the current state of research on accelerators, as expressed by some of the leading researchers dealing with the subject of accelerators.

2.3. Comparison of Different Institutional Forms of Start-Up Support

Accelerators, due to the short period of existence, are much less visible than other institutions supporting the development of start-ups. As a result, accelerators are often confused by the media, scientists or government institutions with institutions that have existed for years, such as incubators or business angels [6]. The emergence of accelerators

as one of the forms of supporting entrepreneurship is associated with several factors, including the ambiguous results of the current start-up support programs. The effectiveness of incubators is sometimes questioned, and the analysis of the Kauffman Foundation conducted on 35 different scientific articles about incubators showed no difference in the rate of survival on the market between incubated companies and those that have never been in an incubator [4]. It is also believed that the shift of early-stage start-up financing from Venture Capital funds to business angels has created the basis for the creation of a “new type of incubation program”: a seed accelerator or an innovation accelerator [3]. There is also an opinion that accelerators have emerged as an alternative source of formal external financing and mentoring [6].

Table 1. Current state of research on accelerators.

(Tasic and Montoro-Sanchez, 2015)	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 (. . .) It is clear that, to date, most of the existing studies are excessively descriptive, trying to create its own typology / taxonomy on the topic. (. . .) 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.
(Fowle, 2017)	This relative disciplinary youth means that there is a thin legacy of academic literature. However, the high levels of public and political interest in the impact of Accelerators have created a wave of very recent papers, many of them working papers, and often by younger researchers. Consequently, for an academic literature review, a higher-than-usual proportion of the material used in the outline review is sourced from websites and articles in general publications, rather than from academic journals.
(Bauer, Obwegeser and Avdagic, 2016)	In terms of methods, most scientific research on accelerators is of qualitative nature. These studies are often based on semi-structured interviews of accelerator managers and participants (startups). Accelerators are a relatively young phenomenon; hence science explores the field by qualitative studies.
(Cohen and Hochberg, 2014)	Little research has explored whether these programs are effective, which ones are more effective and what might drive results. Indeed, even descriptive research on these programs is scant. (. . .) Yet, research on the impact of accelerators has been anemic. There are several reasons for the lack of published research. In addition to the lack of comprehensive data sources mentioned above, the newness of the phenomena is also an issue. Not enough time has passed since the inception of many programs to assess outcomes, particularly since accelerators tend to focus on extremely early stage start-up ventures and most start-ups have graduated from accelerator programs within the last five years. (. . .) Given the newness of the accelerator phenomena, there is little published research on accelerators, and virtually no empirical research.
(Clarysse and Yusubova, 2016)	Concerning further research, this study shows that there is still much work to be done to improve the understanding of the business accelerators phenomenon and how they impact start-up companies. Large-scale studies from other geographical regions should be used to identify the best model of accelerator to achieve certain goals. In addition, research should be conducted to examine how the success factors of this model affect the performance of business accelerators.
(Dempwolf, Auer and D'Ippolito, 2014)	What is known about accelerators is based on the small number of peer-reviewed articles and secondary media sources. The dearth of peer-reviewed literature can be attributed not only to the newness of the accelerator phenomenon—scholars have only had a few years to study them—but also to the fact that accelerators are generally privately held and funded, meaning they have no obligation to disclose information about their programs. Due to the limited number of peer-reviewed articles, it is currently necessary to rely on media sources or “gray” literature to define and characterize accelerators. Indeed, secondary media sources, including online articles, policy briefings, and interviews and correspondence with experts, are commonly referred to in the few academic articles that exist.
(Smith and Hannigan, 2015)	Our study, of course, is not without its limitations. Foremost, we have intentionally studied two of the most well-known and longest established accelerators (and thus compared them to established angel groups). However, our study does not include the many other accelerators that are in existence. Our results suggest that top accelerators influence the trajectory and outcomes of the entrepreneurs and start-ups whom they mentor/select to work with. We cannot comment on the role of less established or lesser-ranked accelerators; instead, we leave that to future research.

Table 1. Cont.

(Hallen, Cohen and Bingham, 2016)	The objective of this study is to answer these calls and ask: Do accelerators benefit participating ventures? And if so, how? While the accelerator form is relatively young and will likely continue to evolve, answering these questions for the current generation of accelerators may offer important contributions to both practice and theory. Understanding the mechanisms underlying any observed benefits is especially important not only for entrepreneurs, but also for would-be accelerator founders, policy makers, and entrepreneurship educators.
(Hochberg, 2016)	While proliferation of accelerators is clearly evident, evidence on the role and efficacy of these programs is scant at best (. . .) Limited research exists on the accelerator phenomenon, primarily due to the newness of the phenomenon and limited data availability. The definition of an “accelerator” among practitioners itself remains discordant (. . .) The data challenges are also significant and affect both the ability of researchers to conduct rigorous program evaluation and the ability of entrepreneurs, investors, and policymakers to assess the relative quality of programs. There is a general absence of large-scale representative data sets covering accelerator programs. (. . .) While some programs encourage their graduates to report to publicly available databases such as CrunchBase, and other start-ups voluntarily report or are identified through CrunchBase’s own data collection efforts, other programs discourage public reporting for competitive reasons.
(Wright and Drori, 2018)	Given the economically important role of accelerators, scholars have begun to develop an understanding of what and how accelerators accelerate. (. . .) However, the processes through which accelerators foster the development of start-ups have yet to be described and explained. (. . .) We suggest that another interesting avenue for future research on accelerator governance relates to the differences across accelerators and their impact on portfolio companies’ trajectories.
(Cohen, Bingham, Hallen, 2018)	We rely on an inductive, nested multiple-case study to generate novel theory from data. Inductive methodologies are appropriate because we are exploring a complex phenomenon that includes inter- and intra-organizational interactions and because accelerators are novel and thus poorly understood but have the potential to make important contributions to theory as well as the “grand challenge” of how to improve new ventures’ outcomes.
(Cohen, 2013)	In sum, accelerators have much in common with incubators and angel investors. In particular, they all want to help fledging ventures. However, accelerators are a new type of organization and differ, sometimes substantially, from incubators and angel investors. Essentially, accelerators disaggregate the financial
(Bagnoli, Massaro, Ruzza, Toniolo, 2020)	Findings show that the literature on accelerators is still fragmented and under-investigated. (. . .) Notwithstanding the growing attention focused on this topic, the existing literature is fragmented, and there does not seem to be a generally recognized definition of an accelerator. (. . .) The global accelerator landscape is growing and changing at a rapid pace. It is becoming more and more challenging to reach a shared and precise definition of an accelerator. As new models emerge, the term accelerator describes an increasingly diverse set of programs and organizations and, often, the lines that distinguish accelerators from similar institutions, like incubators and early-stage funds, become blurred.
(Isabelle, 2013)	Over the last few years, a new model of providing assistance to new technology entrepreneurs has emerged, and it is generally referred to as a seed or venture accelerator. Although there is no clear consensus on a definition of accelerators, this incubation model has a more explicit focus on accelerating the growth of firms than an incubator. (. . .) in practice, the terms incubator and accelerator are often used interchangeably. Furthermore, these two models have some similarities and operate in overlapping spaces with technology entrepreneurs.
(Kanbach and Stubner, 2016)	Existing literature on accelerator programs only provides a limited and high-level understanding. (. . .) Only one study highlights additional strategic objectives of corporate accelerators, such as the rejuvenation of corporate culture and talent attraction (Kohler, 2016). However, these objectives are not linked to specific program configurations. An initial categorization of these configurations simply provides high-level design options. Companies must decide whether to build an accelerator program independently or outsource the activity to an external partner like TechStars. Alternatively, companies can partner with other companies to build a joint accelerator or join an existing accelerator as an additional partner (Hochberg, 2015). This categorization offers initial guidance, but lacks further conceptualization regarding specific company objectives and subsequent design choices. For example, further dimensions of the design choices, such as equity involvement, operational proximity, or organizational integration, are not addressed.

Source: Based on: [1–6,11–19].

Incubators are often confused with accelerators, although their operating models are different. Accelerators—if they were to be compared to incubators—can be described as a private and profit-oriented hybrid of incubators [20]. Incubators are often public

institutions related to universities [2]. As much as 93% of all incubators are non-profit organizations and about a third of them are related to universities [11]. For this reason, there is a natural conflict between universities, the government, public benefit organizations and accelerators due to the commercial nature of the activities of the latter [2]. Nevertheless, in recent years more and more accelerators are being developed and initiated by corporations or universities [1]. One of the characteristics of accelerators is that they select start-ups once or twice a year, while the process is continuous in the case of incubators [11]. Accelerators primarily support companies specialized in advanced technologies, with the potential of easy and quick business scaling [13]. The accelerator application process is open to everyone, but it is extremely competitive in comparison with incubators [13].

There are also differences in the main objectives of accelerators and incubators. The main goal of incubators is to provide start-ups with a safe environment away from the market and from potential sources of distraction, in order to develop the company and achieve business maturity. Accelerators, in turn, are designed to speed up contact with the market and the outside world, to help start-ups collide with the market reality and teach founders to adapt quickly [4]. Accelerators can offer space in their office to accelerated start-ups, but this is not a standard as in the case of incubators. In order to support young entrepreneurs, incubation programs have traditionally been designed to provide the necessary resources, increase the company's chances of survival and reduce risk [3]. These are the characteristics of incubators, for which the most important goal is the success of the incubated company and its survival on the market. Business angels—investing their money in the company—also expect that the start-up they invest in will be successful and will not close their business. The acceleration process looks quite different—the mentoring model offered by accelerators takes into account a very important aspect of quick failure, as novice entrepreneurs are too optimistic [6]. The results of the research show that accelerators allow to dispel doubts around the purposefulness of an idea and a product faster, thanks to which the founders are able to focus on other ideas or create new companies [10]. The goal of the accelerator is not the survival of the company, but the relative success of its founders, which can be measured by many metrics. The accelerators themselves therefore provide a low-cost environment for experimentation [10]. Accelerators offer relevant training, product feedback and business contacts. On the other hand, founders often have to reckon with giving up a part of the shares for a small investment sum, which may outweigh the benefits gained from participation in the accelerator [10].

Business angels, unlike accelerators or incubators, are primarily a less formalized and structured form of supporting the start-ups [5]. Both the frequency of mentoring and meetings as well as the degree of involvement in invested companies varies drastically between different types of business angels. In the context of substantive support, the educational program is not the main element of incubators, as is the case with accelerators [5]. There also exists a common opinion that one of the most important aspects of accelerators is networking, i.e., building a network of mutual contacts [13]. Sometimes the role of networking is emphasized to such an extent that it is placed next to financing as the most important aspect for which start-ups decide to join the accelerator [14]. The vast majority of accelerators are well embedded in the corporate ecosystem, which is why corporations cooperating with accelerators often become the first testers or clients of accelerated companies.

The founders of accelerated start-ups themselves, in addition to networking with mentors, become very close to each other during the program. They often help and motivate each other. Some founders even say that “they would do anything for the rest” (accelerated start-ups, by default) [11]. The best accelerators themselves emphasize the value of networking and a network of contacts: mentors and investors [1]. Y Combinator organizes weekly dinners with one or two guests from the world of Venture Capital funds, while TechStars much more often mainly due to the fact that almost all start-ups are in their office [7]. The presence of mentors and co-participating start-ups allows for faster feedback, quicker iterations, prototyping and testing with potential clients. In line with the

assumptions of the Lean Start-up concept, accelerators help in learning when and how to fail and withdraw from incorrect assumptions [10].

Lean Start-up, a book by Eric Ries, has made accelerators even more relevant in the context of trends in the approach to creating and scaling start-ups. The Lean Start-up approach has become the norm in the start-up environment, and most accelerators also base the content of their educational programs on it. Eric Ries primarily plans to build an MVP (Minimum Viable Product), i.e., a product or service that meets the minimum needs of the first customers [21]. They become the first testers, provide valuable feedback and allow to refine the product on an ongoing basis. If the MVP is not successful, it will be possible to change the idea or even abandon it without incurring high costs. The assumption of Lean Start-up is primarily to reduce the costs of prototyping and continuous contact with users to verify how the market reacts to the product. The most important differences between accelerators, incubators and business angels are summarized in Table 2 below.

Table 2. Summary of the differences between incubators, angel investors and accelerators.

	Accelerators	Incubators	Angel Investors
Duration	3 months	1–5 years	Ongoing
Cohorts	Yes	No	No
Business model	Investment, non-profit	Rent, non-profit	Investment
Selection frequency	Competitive, cyclical	Non competitive	Competitive, ongoing
Venture stage	Early	Early or late	Early
Education offered	Seminars	Ad hoc, hr/legal	None
Venture location	Usually on-site	On-site	Off-site
Mentorship	Intense, by self and others	Minimal, tactical	As needed, by investor

Source: S. Cohen, Y.V. Hochberg, *Accelerating Start-ups: The Seed Accelerator Phenomenon*, SSRN 2418000, 2014 [4].

As noted, accelerators differ from other institutional forms of entrepreneurship support. Accelerators also offer services that have not been provided by incubators or business angels so far. The vast majority of institutional aid is directed to the groups of young people, mostly students, graduates or scientists, who later become start-up founders. A characteristic feature of these groups is little or no experience in running a business, no network of contacts and no capital to set up a company. In this context, accelerators allow to recruit the most promising start-ups and help them develop faster through an intensive educational and mentoring program, network of contacts and potentially financing. The existence of incubators or business angels does not completely solve the problem of lost novice entrepreneurs, who sometimes not only do not know where to look for help, but also what help they should seek. In this context, a very interesting comparison is to define accelerators as “an MBA-like program”, but only for start-up founders, not for managers [15]. A definition constructed in this way allows you to easily find the right place for accelerators on the map of the start-up ecosystem.

3. Scheme of Acceleration

The acceleration scheme was developed in the United States, with Y Combinator and TechStars, which are also considered the most successful and profitable accelerators [13]. There are very few scientific sources describing exactly what can be considered an accelerator model and, in particular, what components it should consist of. This is mostly descriptive information about the typology of accelerators, the content of the acceleration program or the method of financing, without clear research into its model or acceleration scheme. The proposed dissertation will therefore use the definition attempt used by Clarysse, Wright and Van Hove (2015), which assumes a five-element accelerator model as presented in Table 3.

Table 3. The accelerator model.

1. Strategic Focus	2. Program Package	3. Funding	4. Selection Process	5. Alumni Service
Key objectives	Standardised Curriculum	Funding of the accelerator	Screening criteria	Alumni interaction
Sector Focus (diversified vs. specialisation)	Mentoring Package	Funding of start-ups	Selection processes	
Geographic Focus (local vs. global)				

Source: B. Clarysse, M. Wright, J. Van Hove, *A look inside Accelerators. Building Businesses*, Nesta 2015 [22].

A slightly different view on this issue is proposed by Fernandes (2016), who divides acceleration into five elements: financing, start-up founders (mainly small teams consisting of engineers), the fact of supporting “cohorts” for a specified period, educational program and networking [8]. This view, however, does not take into account aspects of program management.

It should be emphasized that accelerators build their reputation and position by creating and adopting a successful acceleration scheme. First, they need to define selection criteria to attract promising start-ups. Well-developed structures and activities such as mentoring programs or networking opportunities allow them to attract the highest quality stakeholders, including investors, start-ups, mentors, corporations and members of public administration [13]. Maximizing the success of an accelerator is the ultimate goal, so the accelerator should meet the characteristics that will lead to this success, such as [2]:

- Locating accelerated start-ups close to clients;
- Focus on start-ups and group learning;
- Creating a strong internal and external network of contacts;
- Offering financing as a reward, not as a certainty;
- Integration with the network of investors;
- Building your brand through innovative ideas, positive associations and inspiring stories of graduates;
- Selecting the best start-ups and signalling exclusivity;
- Having a high-quality program with trainers who are entrepreneurs and applying time pressure to achieve results.

Yet another approach to defining an accelerator model may be to look at the accelerator success factors, including [2]:

- Connecting with financing sources;
- Accelerator brand;
- Business expertise;
- Product expertise;
- Financial assistance;
- Time-limited framework;
- Program quality;
- Internal networking;
- Mentoring;
- Action orientation.

The above-mentioned components of the accelerator and its cycle do not, however, answer the question of how to measure its success. The difficulty of assessing the impact of accelerators on accelerated start-ups is therefore a challenge due to the difficulties associated with assessing the achievements and successes of start-ups. This is due to the very young age of the accelerated companies and the novelty of the acceleration phenomenon [1]. There is no consensus on how to best measure the company’s growth. Various scientific studies cite metrics such as sales, number of employees, assets, and cash flows [23]. There is also a perception that perhaps the most important aspect of accelerator companies’ long-term success is simply gaining investor contacts [7].

An interesting aspect is the fact that taking part in an accelerator does not necessarily have to be focused on the survival of the company or business idea. Instead, accelerators accelerate the business creation cycle, including both abandoning the business and growing faster. A quick failure is valuable for the entrepreneur, the ecosystem and the economy. Verifying an inadequate idea allows founders to focus on other, potentially more successful initiatives in the future [11]. This is an interesting approach, because the failure of an accelerated start-up due to a missed business idea may turn out to be the accelerator's success—consistent with the assumption that its goal is the verification of the business idea. However, there is no measure of success in the current scientific literature which would be “abandoning an inadequate business idea”. Undoubtedly, this thread could provide an interesting look at the role of the accelerator, the measure of success and ultimately the impact on the operating model.

It should be emphasized that start-ups are a special form of a company and traditional measures of success are not applicable to them. Hence the accelerator's program will differ from incubator's program, which is designed for traditional companies. One example is the valuation of start-ups, which in no case has to be tied to income or assets. Facebook, which bought Instagram for a billion dollars when it had no income, is a good example [24]. Paul Buchheit, the creator of Gmail, also commented on this topic in *The New York Times*. He stated that “They're mystified how a company with no revenue can be worth a billion dollars. It's because of this power law: If a company has a 1 percent chance of being a hundred-billion-dollar company, then it's worth about a billion dollars. That kind of thing doesn't happen in your normal life experience. If I get a cup of tea, it's a cup of tea—there isn't a chance that it's actually made out of solid gold. But that's how this works [25]”. Table 4 below provides a summary of differences that distinguish a traditional SME company and start-up, developed by the US Department of Commerce.

Table 4. Differences between a start-up and an SME.

Start-Ups	Traditional SMEs
Unconstrained by geography—aggressively pursue growth regardless of national boundaries	Narrow scope for growth—little aspiration to go beyond specific geographic or customer base
Focused on growth—achieving rapid scale is main strategic focus	Building value—the focus is on building sustainable long-term value
Changing business model—iterate multiple times to find model that is repeatable and scalable	Traditional business plan—planning based on executing defined and established business processes
Additional measures—indicators include firm age, number of employees, ownership, revenue levels, etc.	Additional measures—defined metrics include number of employees, level of revenue, etc.

Source: *A Strategic Primer on Accelerating Start-ups to International Markets*, Department of Commerce, United States of America [26].

There are two types of advice in the educational program for start-ups—applicable to all start-ups and targeted at the special needs of one of the start-ups. General advice can include those on how to run a business, how to raise additional capital, how to recruit new employees, legal advice etc. Targeted advice concerns a specific product or service offered by a start-up, its business model or looking for competitive advantages for which customers would buy a product or service, etc. [7]. Most companies exchange knowledge and experience related to various phases of business development during the accelerator. Although these companies have different products and technologies and address their services to other target markets, they evolve through the same stages of development. The challenges they face and the experience they gain are similar and transferable. In addition, they are able to share the same resources, e.g., accounting or cost optimization methods. Networking between accelerated start-ups boils down to exchanging knowledge

in areas such as technology transfer management, preparation for talks with investors, accounting and taxes, and negotiations with clients and stakeholders [8]. Therefore, there is a substantive basis allowing for the assumption that accelerators affect the development of start-ups and their acquisition of financing, regardless of their specialization.

Regarding the length of the educational program, most accelerators adopted a three-month acceleration period, coinciding with the duration of the first Y Combinator accelerator. It is also worth noting that the first edition of Y Combinator, being the world's first accelerator, consisted of eight companies, several of which accomplished spectacular successes, such as Reddit or Loopt [5]. However, there is a lot of flexibility in an innovative approach to the accelerator's length. The three-month period was created mainly for graduates or students of higher education institutions who could then participate in the accelerator during the summer break in their studies [7]. Initially, Paul Graham, the founder of Y Combinator, focused on working with students, which is why he worked with them during the three-month summer break. It also provided the students with a similar level of funding that they would receive on summer university scholarships. Today's start-up founders are not only students, so the three-month period has no substantive basis. There is therefore a reason to argue that copying Y Combinator without cause is an unreasonable and not the best choice [7]. Consequently, there is a basis to conclude that there is a theoretical and methodological gap regarding research on accelerators on many levels, including the adaptability of the model created by Paul Graham from Y Combinator in other countries and the condition of less known local accelerators.

4. Characteristics of Polish Accelerators

4.1. Public Funding of Polish Ecosystem

The Polish start-up ecosystem is very young and many solutions that have been long known in the United States are just beginning to be adopted in Poland. One of the most important facts about the Polish start-up world is the role of the state. Over the last few years the Polish state, through the Polish Development Fund Ventures (PFR Ventures), the National Center for Research and Development (NCBR) and the Polish Industrial Development Agency (PARP), systematically supported and stimulated the development of the Polish ecosystem. PFR Ventures is primarily a "fund of funds", investing public money in Venture Capital funds. The way in which PFR invests funds means that the potential risk for VC fund investors is definitely lower than the market risk. There is also a significant profit asymmetry in favour of private investors [27]. There are several PFR Ventures programs as presented in Table 5.

Table 5. Polish Development Fund Ventures (PFR Ventures) programs for venture capital funds.

Program Name	Budget	Private Contribution	Focus
PFR Starter	593 million PLN	20%	Incubation and start phase, before first commercial sale
PFR Biznest	151 million PLN	50%	Seed stage, aimed at stimulating activity of business angels which must invest alongside VC
PFR Open Innovations	321 million PLN	40%	Early stage start-ups and growth phase, must include R&D component
PFR KOFFI	324 million PLN	50%	Growth and expansion phase
PFR NCBR CVC	485 million PLN	50%	Growth and expansion phase, aimed at stimulating corporate funds
PFR Private Equity	600 million PLN	75%	Buyout, growth

Source: Own analysis based on: [27].

The chief aim of the NCBR is to support the creation of innovative solutions and technologies that increase the competitiveness and innovation of the Polish economy. NCBR finances research and development for both corporations and start-ups, with up to 80% funding for the project [28].

PARP manages funds from the state budget and the European Union, intended for supporting small and medium-sized enterprises and the development of human resources. In 2016, PARP announced one of the first acceleration programs in Poland called Scale Up. The main intention of the program was to accelerate the development of start-ups by organizing accelerations lasting several months, including consulting and mentoring activities and funding of the product development. It is worth noting that in 2016 there were few examples of successful cooperation between large enterprises and start-ups and the market lacked experience and knowledge about acceleration models. The Scale Up program did not follow the existing solutions, but built and promoted a new model of cooperation between economic entities. Large companies opened up to external innovation and developed cooperation with start-ups—almost 70 large companies and nearly 300 start-ups participated in the program through 10 different accelerators. As a result, large companies received innovative solutions that were implemented during the program or shortly thereafter. PARP consequently funded three more pilot competitions—Elektro Scale Up, Poland Prize and Acceleration Programs and funded second edition of Scale Up.

4.2. Publicly Funded Accelerators in Poland

Most of the accelerators in Poland, including those funded by PARP, copied the model of the first accelerator—Y Combinator—as well as the accelerators developed elsewhere in the world. However, there are no empirical studies on verification of this model, possible adaptation factors that would affect its effectiveness and the results of acceleration. There are many local conditions, vertical specializations or even potential conditions for the development of start-ups in a given country that may affect the accelerator. It should be noted that the United States deviate from Poland in many aspects, and some of the key differences in the context of accelerators and their functioning are presented in the Table 6 below.

Table 6. Comparison of factors influencing start-ups in Poland and USA.

Factor	Poland	USA
Ease of doing business	27/190 (rank 27th among 190 countries)	6/190 (rank 6th among 190 countries)
Starting a business	120/190	49/190
Getting credit	29/190	2/190
Global Innovation Index	39/124	6/124
GNI per capita	55/184 (\$12,680)	7/184 (\$56,180)
Population	36/241 (38 million)	3/241 (323 million)

Source: Own analysis based on: [29,30].

The data used in this paper for the analysis of public accelerators in Poland can be found online [31,32]. The first edition of Scale Up was the first public start-up acceleration support program in Poland which started in 2016 as a pilot for such programs. Its aim was to combine the potential of beginners, creative entrepreneurs with the infrastructure and experience of large enterprises. Hence, the program was aimed at B2B start-ups (business-to-business), offering their services or products to business rather than consumers. Its additional function was to collect knowledge and experience related to the acceleration of start-ups for use in subsequent activities of PARP. The criteria for entities wishing to run an accelerator under the Scale Up pilot were set out to be very generic. The organizer of the accelerator funded by Scale Up could be an entity that:

- Conducts business activity in Poland;
- Has a team with experience in the implementation of acceleration activities;
- Has demonstrated the ability to implement the project;
- Contributed to the project budget at a minimum level of 10% of the assumed operating costs.

As a result, 61 different entities applied to run the accelerator under Scale Up and 10 of them were selected and financed which could be found in Table 7 below.

Table 7. Accelerators in the first Scale Up edition.

Accelerator	Organizing Entity	Occupation of the Entity	Base	Number of Start-Ups Accelerated
AIP INDUSTRYLAB	DGA	Consulting Firm	Poznan	23
GammaRebels	HardGamma Ventures	Venture Capital Fund	Warsaw	20
Huge Thing	Huge Thing	Accelerator	Warsaw	20
Idea Global	Ideo	IT Company	Rzeszow	22
Impact Poland	FundingBox Accelerator	Financing Platform for Start-ups	Warsaw	24
KPT ScaleUp	Krakowski Park Technologiczny	Technology Park	Cracow	23
MITEF Poland	Fundacja Przedsiębiorczości Technologicznej	Foundation for Entrepreneurship	Warsaw	46
Pilot Maker	techBrainers	Technology Broker	Warsaw	44
Space3ac	Pomorska Specjalna Strefa Ekonomiczna	Special Economic Zone	Gdansk	27
StartUp Spark	Łódzka Specjalna Strefa Ekonomiczna	Special Economic Zone	Lodz	27

Source: Own analysis based on: [31].

According to the assumptions of the Scale Up pilot, the total budget of the accelerator could not exceed 6 million PLN. The budget consisted of three types of spending:

- 4 million PLN for grants for start-ups;
- 1 million PLN for consulting services for start-ups;
- 1 million PLN for the operating costs of the accelerator.

Within this budget, each organizing entity faced the same requirements:

- Conduct a 15-month project, under which 2 or 3 rounds of acceleration will be carried out (with a length of 3 to 6 months);
- Involve at least 1 large enterprise, including at least 1 state-owned company;
- Ensure the completion of the acceleration program by minimum 20 start-ups;
- Allocate up to 200,000 PLN for the development of each start-up product;
- Spend up to 50,000 PLN on consultancy services provided for a single start-up.

Detailed rules for allocation of grants for start-ups were not defined in advance—organizing entities had freedom in this regard. This led to various approaches to budget division among individual start-ups. The basic differences between individual accelerators in this regard concerned the amount of grants awarded to particular start-ups and the form of their awarding. The entire program, from the application to receiving grants and consultancy services, was free for start-ups. Accelerators did not have the right to require participation in equity—it was prohibited in the contracts with PARP under Scale Up program. The lack of detailed guidelines regarding the shape of acceleration programs was supposed to allow for the creation and development of individual solutions. As a result, each of the implemented projects was different, which created a wide spectrum of approaches used.

Each of the organizing entities used a specific set of tools to promote their accelerator and recruit start-ups. Among the promotional activities used, three types of activities stood out:

- **Information activities**—including promotion in the media, visits at the universities;
- **Scouting activities**—searching for valuable start-ups or teams using a network of contacts (own or partners’);
- **“Open days” activities**—hackathons, open days.

The start-up selection process in most of accelerators consisted of two stages:

- **Submission and evaluation of application forms** (on-line form or sent by e-mail)—the forms were assessed by the organizing entity (in some cases with the involvement of representatives of large enterprises).
- **Start-up interviews and presentations**—depending on the accelerator, interview or presentation took place in front of the /representatives of organizing entity, large enterprises and optionally experts and representatives of investment funds.

The type of start-ups scouted and recruited by accelerators as well as the profile of accelerator was mainly determined by the large enterprises that cooperated with particular accelerators. Out of the total of 276 start-ups, 100 start-ups (36%) started running their business no earlier than 1 month before signing the contract with the accelerator. Nearly two-thirds of the accelerated start-ups were not more than 1 year old at the time when the acceleration was launched. Due to regulatory requirements, individuals and teams without legal entity could apply to Scale Up accelerators, but once accepted they needed to set up a company before signing the contract with accelerator.

Individual accelerators provided advisory and consultancy services in various forms, adjusting their offer both to their profile and the needs of the recruited start-ups. Among all provided services three main types can be distinguished:

- Developing solutions for start-ups—including both industry and legal consulting;
- Business school—including services related to educating start-ups on how to run and develop a business;
- Developing presentation skills—including services related to developing skills in terms of presentation to investors.

It is worth noting that some of accelerators drew attention to the threat of over mentoring—transferring too much knowledge and ideas from several different experts in too little time. Each start-up has its own boundary of absorbing knowledge and advice. When building an offer of consulting services, accelerators should take into account the possibility of the presented problem, both in terms of the number of training/workshop hours as well as time for start-ups to think through and apply transferred knowledge in their start-ups.

In total, the budget allocated to grants for start-ups could reach a maximum of 40 million PLN (10 accelerators with 4 million PLN each for grants for start-ups). Taking into account the actual number of Scale Up participants, which amounted to 276 start-ups, the average value of the grant in the Scale Up scale, per 1 start-up, could be a maximum of 145,000 PLN. Particular accelerators differed significantly in terms of the division of the budget dedicated to grants for start-ups—two main models can be distinguished among them:

- (Relatively) equal—each participant of the accelerator received a grant of a relatively equal amount. This model was used, among others, by GammaRebels, HugeThing (in both accelerators, each of the 20 start-ups received about 200,000 PLN) and StartUp Spark (most of the 27 start-ups received about 160,000 PLN);
- Differential—each participant received a grant of a different amount. This model was used, among others, by Pilot Maker and MITEF Poland.

The second significant difference between accelerators in terms of managing the budget for grants for start-ups were the rules for granting them. Based on the observation of the work of accelerators, three schemes can be distinguished, but in practice they were

most often mixed variants (part of the grant was available on the basis of one scheme, another part under the terms of another scheme):

- Unconditional lump sum—part of the grant awarded after reaching a given acceleration stage (i.e., 50% of the grant after the start; 50% of the grant in the middle of the acceleration program);
- Conditional lump sum—part of the grant awarded for achieving a given stage of work resulting from the development schedule (specifying the amount and schedule of grant attribution);
- Returnable—part of the grant awarded in the form of reimbursement for actual costs (upon presentation of invoices).

Out of 190 implementations in large enterprises which took place during or immediately after the acceleration, 46 of them finished with a signed contract between start-up and large enterprise (24%), 83 of them finished on the proof-of-concept level (44%), 30 of them finished with a pilot implementation in large enterprise during limited period (16%), 8 of them finished with a sale of the solution to the network of partners of a large enterprise (4%) and 23 of them finished with a cooperation between start-up and large enterprise based on revenue sharing, capital investment in start-up or licensing (12%).

Participating start-ups also took part in a survey, in which they expressed their views on importance of elements of the accelerator and their level of satisfaction on the scale of 1–5 (1—not satisfied, 5—satisfied). The most important factor in the acceleration was usefulness of cooperation with a large enterprise (73% of respondents stated it was important; satisfaction note of 4.3) closely followed by the choice of the large enterprise (68%; 4.5 note) and flexibility in terms of spending money from grant (62%; 4.3 note). It is interesting to note that the flexibility of spending the grant was more important than the sum of grant itself—46% considered the latter as important and attributed a note of satisfaction of 4.0. Other factors were: level of preparation and knowledge of mentors (45%; 4.3 note), usefulness of consulting services for the development of the company (35%; 4.1 note), selection of topics covered during the program (33%, 4.5 note), criteria for receiving the grant (31%; 4.3 note), time allocated for the acceleration—program length (19%; 3.9 note) and usefulness of consulting services for the implementation of the solution in large enterprise (20%; 4.0 note). The Scale Up program and 10 accelerators funded by it were solely focused on B2B start-ups. Since B2B start-ups struggle more significantly than B2C start-ups with acquiring first customers, it is not surprising that they considered the cooperation with a large enterprise and its choice as most important factors in the accelerator.

Due to relative success of the Scale Up program—both in terms of cooperation between start-ups and large enterprises, as well as feedback from start-up founders—PARP decided to continue with other publicly funded acceleration programs. The extent of the importance and amplitude of the publicly funded accelerators in Poland is best measured by the proportion of Polish start-ups that were granted funding by them. In the 2020 yearly report prepared by Foundation Startup Poland, 25% of 1400 start-ups that participated in survey declared that their source of funding was a “domestic accelerator” [33]. Since private accelerators do not offer funding in Poland (with the exception of InCredibles which offer few prizes for best start-ups and Let’s Fintech with PKO which pays for the development of a custom-made proof-of-concept) almost entirety of respondents referred to public domestic accelerators funded by PARP.

4.3. Private Accelerators in Poland

Data on private accelerators is much more difficult to obtain for two reasons. Firstly, this data is sensitive, confidential and may constitute a competitive advantage of the accelerator or start-ups that participate in acceleration. Most of accelerators do not want to share information about their revenue. Secondly, private accelerators are not obliged to conduct such research or to share it publicly—most of them simply do not collect or analyze such data.

Poland does not have a long tradition of acceleration and almost all accelerators have been created in the last few years. There are 7 private accelerators in Poland that are widely recognizable in the start-up area, and they are listed in Table 8 below.

Table 8. Most prominent Polish private accelerators.

Accelerator	Type	Length	Funding Offered	Equity Taken	Entrance Fee	Base
ReaktorX	Private	10 weeks	No	2% for accelerator + 1% for leading mentor	2990 PLN	Warsaw
Waw.ac	Private	3 days + 5 months (intensive on-site sprint phase and remote marathon phase)	No	No	Free	Warsaw
Orange Fab	Corporate	12 weeks	No	No	Free	Warsaw
PwC Collider	Corporate	6 months	No	No	Free	Warsaw
InCredibles	Private	6 weeks	Yes, 50,000 USD for best start-ups	No	Free	Warsaw
Foodtech.ac	Private	8 weeks	No	3%	1000 PLN	Warsaw
Let's Fintech with PKO	Corporate	Flexible	Yes, for the Proof-of-concept developed for the PKO	No	Free	Warsaw

Source: Own analysis based on accelerators' websites and their statutes: [34–40].

It is easy to notice that all private accelerators are located in the capital of Poland, as well as in the main economic center, Warsaw. This shows the economic strength of Warsaw, but also the potential lack of sufficient number of teams—both organizers and start-ups—to successfully run a private accelerator without public funding outside of Warsaw. Three out of those accelerators are run by corporations: PwC Collider by PwC (consulting firm), Orange Fab by Orange (telecommunication corporation) and Let's Fintech with PKO by PKO Bank Polski (bank).

PwC Collider is a B2B quick scaleup program run from Warsaw but seeking start-ups from Central and Eastern Europe (CEE). The criteria of acceptance is a validated B2B or B2B2C solution which is market ready and start-up should have an intent to scale up in CEE. This condition is imposed due to the fact that PwC's main goal is to act as partner and use its CEE network to sell accelerated start-ups solution. As explained by Beata Cichocka-Tylman, director in the innovation and R&D team at PwC Poland: "Our common task and goal is to create such an offer, such a business plan, such an operating model that the start-up becomes a reliable partner for PwC, as well as for our clients and partners" [41]. Almost 200 start-ups from 23 European countries applied for the 3rd edition of the PwC Startup Collider program in 2018. 92 applications from 20 countries were analyzed, and 34 of the most promising start-ups were included in the shortlist, of which experts chose the final 11 for the acceleration. The acceleration itself does not provide funding, but PwC continues cooperation with chosen start-ups and facilitates sale of their solution to their clients with a revenue sharing model. The whole PwC Collider acceleration program lasts 6 months and is one of the longest accelerators in Poland.

A similar model was adopted by Orange Fab. Orange Fab Poland is part of a wider network of 18 Orange accelerators around the world. As a corporate accelerator, its purpose is to select start-ups that could provide solutions for Orange or for Orange customers. In this case, Orange acts as a representative or partner in the revenue sharing model. Start-ups also gain access to Orange resources and infrastructure, as well as the possibility of

financing by corporate Venture Capital, i.e., Orange Ventures. The Orange Fab acceleration program lasts 12 weeks.

Let's Fintech with PKO Bank Polski is a program of partnerships with start-ups under which PKO is looking for solutions from the Fintech industry, ready to carry out internal pilots and to scale up their business in partnership with the Bank. PKO is one of the largest financial institutions in Central and Eastern Europe—the Bank provides a scale of 9 million clients, 2.5 million mobile clients, over 1000 branches and 8 million bank cards. They recruit start-ups on a continuous basis. The model of the Bank's cooperation with selected start-ups is based on three consecutive, although independent of each other, elements:

- (1) Pilot solution—the so-called Proof of Concept (POC),
- (2) Commercial implementation,
- (3) Capital investment.

If the solution is ready for implementation, PKO helps to identify the right recipient in the Bank and go through the purchasing process. Accelerated start-ups gain access to PKO's technological sandbox and the full package of API services—they can use data and banking services to develop their solution. The acceleration duration is flexible and adjusted to both start-up and PKO needs. The first step in recruitment is sending the application via the form available on the website. Within a month start-ups receive feedback—if PKO is interested, the start-up is invited for a meeting at the Bank. Regardless of business cooperation opportunities, the application is reviewed by Corporate Venture Capital fund, who may consider the investment. In 2019 over 300 start-ups from Poland and abroad applied for the program. Over 1/3 of the applications came from abroad. 150 companies had the opportunity to present their technology to a dedicated team of experts. Over 250 h of workshops with business units were held to select ideas that best meet the needs of the Bank and its customers. As a result, 10 solutions were implemented that are already used by PKO's customers, employees and the entire banking sector. One of them is the Polish-British company Coinfirm. Together with PKO Bank Polski, it is responsible for the largest implementation of blockchain technology in European banking in terms of scale, enabling the verification of the authenticity of digital documents.

Amongst private Polish accelerators, there are only two who take equity from participating start-ups. One of them is Foodtech.ac, focusing on the food and agricultural industries (they take 3% equity). They have a particular interest for solutions in the following categories:

- Food—healthy and high-quality ingredients;
- Alternative proteins—plant-based, from insects, cultured;
- Packaging—smart, biodegradable, edible;
- Food waste—technologies helping to tackle food overproduction and waste;
- Lifestyle—retail products, healthy eating, restaurant concepts;
- Agritech—clean technologies for cultivating and producing food.

Foodtech.ac is looking primarily for projects with a prototype or finished product that can be tested with clients. The accelerator starts with a 3-day pre-acceleration weekend, during which the organizers want to get to know founders and projects, see how they work and cope with challenges. The accelerator decides about the acceptance to the program only after this pre-acceleration weekend. Most of the workshops, meetings and sessions with mentors take place 2 days a week (Tuesdays and Wednesdays) during business hours for 8 weeks.

ReaktorX is the second accelerator that takes equity in accelerated start-ups (2% equity for accelerator and 1% equity for the leading mentor working with the start-up). ReaktorX calls itself a pre-acceleration program for the first time founders. The whole program lasts 10 weeks with online workshops once a week for the duration of the program. Additionally, there are networking events with developers, designers, marketers and mentors. Sessions with the lead mentor are conducted at least once in two weeks (at least 5 sessions for the duration of the program). Additionally there are online mentoring sessions with ReaktorX

mentors (independent of the lead mentor) and pitching sessions with the Demo Day and pitch contest in front of investors. It is quite uncommon to see accelerators charging start-ups for the participation in the program, however, as ReaktorX explains: “We believe that by charging each start-up a minimal amount for the program, we will be able to filter out people who are not thinking seriously about their business. Building a company is hard work and a huge commitment” [42]. In 2017 over 100 start-ups applied for the second edition of the program, and only 11 best projects were showed on the Demo Day in front of investors. ReaktorX is quite unusual in its approach, since majority of accelerators in Poland—both public and private—are destined for start-ups which already have a product or prototype. As explained by ReaktorX founder, Borys Musielak: “Hardly anyone in Poland deals with start-ups at such an early stage. Most of the accelerators in operation (e.g., those from PARP’s Scale Up program) focus on companies that have already developed their product and are ready for the first implementation in corporations. Most often we are approached by people with an idea for a company and only working on their first product. (. . .) Over a hundred investors from practically all Polish investment funds and several foreign funds, many business angels and innovation leaders from the largest corporations appeared on the demo night of ReaktorX. These are people who constitute to be or not to be a start-up at an early stage of development” [42].

Waw.ac is another private accelerator that focuses on very early stage start-ups. It is a private accelerator run by a Foundation and funded by corporate partners, but its very first edition was financed by the city of Warsaw. Each edition lasts 5 months. Waw.ac recruits projects using the network of contacts of partners and through an online form available to everyone. Together with mentors and partners, they select 6–10 companies from the submitted teams that will participate in the program. The first stage of each batch is a Sprint Workshop for all teams. It is intensive 4 days of workshops divided into different areas including: sales, financing, IP, management, social media, design thinking. The next stage is Matchmaking, during which each company has individually selected mentors according to the subject matter and business needs. They then jointly develop the product in accordance with the principle of radical collaboration. Additionally, they organize thematic training with experts throughout the program. Waw.ac founders draw inspiration from the world’s most effective acceleration programs—including StartX at Stanford University. During the Marathon, participants work individually with selected mentors, independently shaping the intensity of meetings. Accelerator summarizes the effects of the entire program during the Final Gala. This event is not a presentation competition as such, but focuses more on showing the progress of companies and their further path.

The InCredibles accelerator is run by Sebastian Kulczyk, one of the richest Poles, through his investment vehicle Kulczyk Investments and the Venture Capital fund—Manta Ray. In the first edition in 2017, 426 start-ups entered the competition. 10 finalists were selected to present themselves to the jurors at Campus Warsaw. Each start-up was given five minutes to present their idea. The winning start-ups received financial support in the form of non-returnable grants of up to 100,000 USD—these grants are coming exclusively from the private funds. In subsequent editions, the amount of award for start-ups was \$ 50,000, as in 2018. It is worth noting that the accelerator didn’t take equity from the awarded start-ups. The winners were also provided with mentoring, training and networking. The detailed program and schedule of acceleration include workshops with Silicon Valley mentors, meetings with experts from Singularity University, consultations with investors and numerous exercises with specialists from every area of the company’s activity. As part of the acceleration process, the winners also visited Campus London, where they could benefit from the knowledge of international experts and hold individual meetings with local investors. From among the final ten, the jury selected 5 winners who participated in the 6-week original acceleration.

All seven mentioned accelerators are based in Warsaw. Apart from the corporate accelerators, they all finish with a demo day—which could take different forms but serves its purpose of showing the start-up/product to investors and clients. The length of the

program differs from 6 weeks to 6 months, and its intensity is also varied—sometimes it is one workshop per week, sometimes it could be a few intensive days of training. It is quite unusual to see accelerators charging start-ups for the participation in the acceleration program, but it shows a difference in approach and funding between American accelerators and Polish accelerators.

5. Conclusions

The Polish scene of innovation accelerators is significantly different than the American one. Although Polish accelerators were inspired by the American experience, there are many differences between two countries. USA has a longer tradition of supporting start-ups and the first accelerator was created in 2005. In Poland this process is still taking place and accelerators started to emerge in the last few years. In order to accelerate the development of the start-up ecosystem and start-up support institutions, many funds have been mobilized in Poland, including publicly funded VCs and accelerators. Several dozen public accelerators have been created in the last few years, including both the Scale Up program and others. These accelerators offer non-returnable financing of 200,000 PLN and take no equity. Such strong competition for private accelerators from public accelerators made it practically impossible for the former to take equity for participation in the acceleration program. The offer of a private accelerator would have to be undoubtedly better, if public accelerators financed by PARP ensure 200,000 PLN, access to specialist consultations worth 50,000 PLN and cooperation with a large enterprise—without taking equity and for free.

As much as 25% of start-ups in 2020 in Poland were financed by public accelerators, which shows their importance. Nevertheless, what is positive for start-ups in terms of obtaining a funding offer better than the market one—is rather negative for private accelerators. Private accelerators in Poland find it difficult to compete with public accelerators. Hence, duplicating the Y Combinator model in Polish conditions is challenging. The 200,000 PLN equity-free money (equivalent of around 50,000 USD as of 2020) offered by Polish public accelerators is more than what American accelerators offer—taking into account the difference in purchasing power parity and GDP per capita. Private accelerators in Poland would not be able to raise the funding that would allow them to provide such grants for start-ups. Moreover, due to the difference in the valuation of start-ups in the US and in Poland, this business model might not work in terms of payback. Only two notable private accelerators decided to copy the American Y Combinator model in Poland and take equity—these are Foodtech.ac and ReaktorX. Both of them decided to stand out from the public accelerators and differentiate substantially. Foodtech.ac is an industry-specific accelerator that thanks to its network is able to offer start-ups connections and knowledge that would be difficult to obtain in a public accelerator. In turn, ReaktorX accepts start-ups at the idea stage—practically no Polish public accelerator accepts start-ups at such an early stage of development. This allows it to have a relative monopoly at this stage of start-up development, which enables successful implementation of its business model. Therefore, there is still a gap in Poland for private accelerators willing to operate in the equity acquisition model. However, these accelerators would have to focus on a specific industry such as Foodtech.ac or on the B2C segment—the B2B accelerators segment is very saturated with public accelerators. The authors believe that this paper could serve practitioners and policy makers in assessing risks and opportunities in funding and creating programs for public accelerators. Additionally, the paper shows that even with a market crowded by public equity-free accelerators offering considerable grants, there is a place for niche accelerators that manage to find appropriate vertical or horizontal specialization.

The interesting fact is that all of private Polish accelerators are based in Warsaw, the main economic center of Poland and the biggest city in Central and Eastern Europe. A total of 29% of startup respondents in a survey conducted by Foundation Startup Poland came from Warsaw, but there are other cities in Poland that also have a strong presence of start-ups such as Wrocław (12% of respondents in the survey), Cracow (10%), Poznan (6%)

and Gdansk (6%) [43]. For the future research, it could be interesting to assess what was the basis for such a decision to locate in Warsaw, taking into consideration that the competition outside of Warsaw is smaller and the number of potential start-ups relatively high.

Due to the fact that most of the accelerators in Poland do not take equity, many start-ups choose to participate in several of them. Especially in the case of public accelerators, the possibility of establishing cooperation with large enterprises and implementation is very important and valuable for start-ups. Hence, start-ups participate in several accelerators which have different corporate partners, which allow them to extend their client base. Moreover, participation in each edition of an acceleration can be funded up to 200,000 PLN without giving out any equity. Was this one of the goals or assumptions of the creators of acceleration programs to allow start-ups to participate several times in public accelerators? Probably not, but it made the Polish acceleration work in a somewhat hybrid way, slightly different than most of foreign accelerators. The authors' definition of an accelerator—an intense, time-limited educational program for start-ups with a focus on testing business ideas, as well as acquiring clients or getting funded through utilization of accelerator's network—emphasizes the educational part of an accelerator. It is unclear what added value, in terms of entrepreneurial education, could create a participation in second or third accelerator for the same start-up, notably if these accelerators have relatively standardized operating model. Nevertheless, the Polish start-up ecosystem is still very young and is developing rapidly, hence different models of behaviours and accelerators' programs can emerge.

This paper has several limitations, which can lead toward new directions for future research. Firstly, the collected data comes only from Poland. Poland is the biggest country of the rapidly developing Central and Eastern Europe, but it would be interesting to analyze operating models of accelerators in other countries of the block. Secondly, the study focuses on accelerators themselves, without analyzing trajectories of accelerated start-ups. However, it is still early to study the trajectory of accelerated start-ups or the accelerators themselves. In many cases, no more than 1–3 years have passed since acceleration, which makes it impossible to evaluate the influence of acceleration on start-ups or profitability of the accelerator.

Author Contributions: Conceptualization, K.S. and M.M.; formal analysis, K.S. and M.M.; investigation, K.S. and M.M.; methodology, K.S. and M.M.; visualization, K.S. and M.M.; writing—original draft, K.S. and M.M.; writing—review and editing, K.S. and M.M. All authors have read and agreed to the published version of the manuscript.

Funding: This publication was financed by funds granted to the Cracow University of Economics, within the framework of the subvention for the maintenance of research potential.

Data Availability Statement: Publicly available datasets were analyzed in this study. This data can be found here: <https://popw.parp.gov.pl/storage/publications/pdf/20190123134917fec5k.pdf>.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Hochberg, Y.V. Accelerating Entrepreneurs and Ecosystems: The Seed Accelerator Model. In *Innovation Policy and the Economy*; Lerner, J., Stern, S., Eds.; University of Chicago Press: Chicago, IL, SUA, 2016; Volume 16.
2. Fowle, M. Critical Success Factors for Business Accelerators: A Theoretical Context. In Proceedings of the 31st British Academy of Management 2017 Conference at Warwick Business School, Coventry, UK, 5–7 September 2017.
3. Tasic, I.; Montoro-Sanchez, A.; Cano, M.D. Startup accelerators: An overview of the current state of the acceleration phenomenon. In Proceedings of the XVIII Congreso AECA “Innovación e Internacionalización: Factores de éxito para la Pyme”, Cartagena, Spain, 30 September–2 October 2015.
4. Cohen, S.; Hochberg, Y.V. Accelerating Start-ups: The Seed Accelerator Phenomenon. 2014. SSRN 2418000. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2418000 (accessed on 26 April 2020). [CrossRef]
5. Hallen, B.; Cohen, S.; Bingham, C. Do Accelerators Accelerate? If so, how? The Impact of SSRN Intensive Learning from Others on New Venture Development. 2016. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2719810 (accessed on 26 April 2020). [CrossRef]

6. Smith, S.W.; Hannigan, T.J. Swinging for the fences: How do top accelerators impact the trajectories of new ventures? In Proceedings of the Conference DRUID2015 on The Relevance of Innovation, Rome, Italy, 15–17 June 2015.
7. Christiansen, J.D. Coping Y Combinator. Master's Thesis, University of Cambridge, Cambridge, UK, 2009.
8. Fernandes, S. Innovation accelerators as entrepreneurial and interdisciplinary engines: The Portuguese case. *J. Spat. Organ. Dyn.* **2016**, *4*, 3.
9. Charts and Tables. Available online: <https://www.seed-db.com/chartsandtables> (accessed on 5 February 2020).
10. Yu, S. How Do Accelerators Impact High-Technology Ventures. 2016. SSRN 2503510. Available online: <https://dx.doi.org/10.2139/ssrn.2503510> (accessed on 26 April 2020).
11. Cohen, S. What Do Accelerators Do? Insights from Incubators and Angels. *Innov. Technol. Gov. Glob.* **2013**, *8*, 19–25. [CrossRef]
12. Wright, M.; Drori, I. *Accelerators: Successful Venture Creation and Growth*; Edward Elgar Publishing: Cheltenham, UK, 2018.
13. Clarysse, B.; Yusubova, A. Success Factors of Business Accelerators. In *Technology, Entrepreneurship and Business Incubation*; Phan, P.H., Mian, S.A., Lamine, W., Eds.; Imperial College Press: London, UK, 2016.
14. Bauer, S.; Obwegeser, N.; Avdagic, Z. Corporate Accelerators: Transferring Technology Innovation to Incumbent Companies. In Proceedings of the Tenth Mediterranean Conference on Information Systems, Paphos, Cyprus, 4–6 September 2016.
15. Cohen, S.L.; Bingham, C.B.; Hallen, B.L. The Role of Accelerator Designs in Mitigating Bounded Rationality in New Ventures. *Adm. Sci. Q.* **2019**, *64*, 810–854. [CrossRef]
16. Dempwolf, C.S.; Auer, J.; D'Ippolito, M. Innovation Accelerators: Defining Characteristics Among Startup Assistance Organizations 2014. Available online: <https://www.sba.gov/sites/default/files/rs425-Innovation-Accelerators-Report-FINAL.pdf> (accessed on 24 April 2020).
17. Bagnoli, C.; Massaro, M.; Ruzza, D.; Toniolo, K. Business Models for Accelerators: A Structured Literature Review. *J. Bus. Models* **2020**, *8*, 2.
18. Isabelle, A.D. Key Factors Affecting a Technology Entrepreneur's Choice of Incubator or Accelerator. *Technol. Innov. Manag. Rev.* **2013**, *3*, 2. [CrossRef]
19. Kanbach, K.D.; Stubner, S. Corporate Accelerators as Recent Form of Startup Engagement: The What, the Why, and the How. *J. Appl. Bus. Res.* **2016**, *32*, 6. [CrossRef]
20. Mishigragchaa, B. Accelerators as a tool to support startup ventures: Assessing their performance and success factors. Literature Review. *Stud. Pr. WNEiZ* **2017**, *48*, 9–19. [CrossRef]
21. Ries, E. *The Lean Startup*; Crown Business: New York, NY, USA, 2011.
22. Clarysse, B.; Wright, M.; Van Hove, J. *A Look Inside Accelerators. Building Businesses*; Nesta: London, UK, 2015.
23. Lall, S.; Bowles, L.; Baird, R. Bridging the "Pioneer Gap" The Role of Accelerators in Launching High-Impact Enterprises. *Innov. Technol. Gov. Glob.* **2013**, *8*, 105–137. [CrossRef]
24. Business Insider. How a Startup with No Revenue Can Be Worth a Billion Dollars. Available online: <https://www.businessinsider.com/startup-with-no-revenue-worth-1-billion-2013-5?IR=T> (accessed on 20 July 2020).
25. New York Times. Silicon Valley's Startup Machine. Available online: <https://www.nytimes.com/2013/05/05/magazine/y-combinator-silicon-valleys-start-up-machine.html?pagewanted=all&r=2&> (accessed on 3 July 2020).
26. Department of Commerce, United States of America. A Strategic Primer on Accelerating Startups to International Markets. Available online: <https://www.trade.gov/industry/assets/Global%20Ignition%20-%20A%20Strategic%20Primer%20on%20Accelerating%20Startups%20to%20International%20Markets.pdf> (accessed on 11 August 2020).
27. PFR Ventures. Available online: <https://pfrventures.pl/> (accessed on 5 October 2020).
28. NCBR. Available online: <https://www.ncbr.gov.pl/> (accessed on 5 October 2020).
29. World Bank Group Flagship Report. Doing Business 2018. Available online: <http://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB2018-Full-Report.pdf> (accessed on 26 January 2020).
30. Global Innovation Index 2018. Available online: <https://www.globalinnovationindex.org/Home> (accessed on 27 January 2020).
31. Polish Agency for Enterprise Development. Raport Scale Up. Available online: <https://popw.parp.gov.pl/storage/publications/pdf/20190123134917fec5k.pdf> (accessed on 15 October 2020).
32. PARP. Available online: <https://en.parp.gov.pl/component/grants/grants/scale-up> (accessed on 29 September 2020).
33. Fundacja Start-Up Poland. Raport Polskie Start-upy 2020. Available online: <https://uploads.strikinglycdn.com/files/7a01d99b-ce32-402c-8986-49a5d1026001/Raport%20Polskie%20Startupy%202020%20COVID%20EDITION.pdf?id=3349226> (accessed on 15 October 2020).
34. Foodtech. Available online: <https://foodtech.ac> (accessed on 6 October 2020).
35. ReaktorX. Available online: <http://reaktorx.com> (accessed on 7 October 2020).
36. Let's Fintech with PKO. Available online: <https://fintech.pkobp.pl> (accessed on 7 October 2020).
37. Waw. Available online: <http://waw.ac> (accessed on 10 October 2020).
38. Orange Fab. Available online: <https://www.orangefab.pl> (accessed on 10 October 2020).
39. PwC Collider. Available online: <https://www.pwc.pl/en/startupcollider.html> (accessed on 10 October 2020).
40. InCredibles. Available online: <https://incredibleinspirations.com> (accessed on 10 October 2020).
41. PwC. Available online: <https://www.pwc.pl/pl/media/2019/2019-03-13-finalisci-III-edycja-pwc-startup-collider.html> (accessed on 28 January 2021).

-
42. Przerabiają Start-upy na Prawdziwych Przedsiębiorców, Mam Biznes. Available online: <https://mambiznes.pl/wlasny-biznes/przerabiaja-start-upy-prawdziwych-przedsiębiorcow-82017> (accessed on 26 November 2020).
 43. Fundacja Start-Up Poland. Polish Startups Report 2018. Available online: https://drive.google.com/file/d/1eeofGRVryyuwMuiEMdBm_YblMCz5CjNG/view (accessed on 27 January 2021).