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Local Accelerator Programs Towards Increasing Innovation Within Smart Cities

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Abstract

As every part of our life changes due to digital transformation, innovation is the key enabler for radical transformation towards smart cities. Innovation is a process of generating, applying, testing, improving and up-scaling new ideas, concepts or products. Even though it cannot be planned, it can be guaranteed if it is embedded in the best available environment that allows rapid prototyping/testing, provides real-time feedback and encouraging great ideas so they become resilient new offers towards the market, triggering demands and interests. Former industry-driven cities nowadays increasingly step-up as active agents to drive and support local innovation through co-working areas, accelerators, open data policies and other areas of action. They intrinsically push for sustainable, digital and inclusive innovation that benefits the greater wealth of society. In this research, the links between cities and local innovation ecosystems are investigated. The self-referential and autopoietic capability to Smart City innovation ecosystems distinguishes it from industry-led innovation. It can only be understood with the new theme which digital transformation brings into play. By driving local innovation, cities can support the growth of local companies, solving societal challenges by referring back to market dynamics.

Keywords: Smart City, Startups, Innovation, Accelerator

1. Introduction

1.1. Definition and Initial Situation in Smart Cities

There is a wide range of conceptual variants to describe “smart cities”. Very often “smart” is simply being replaced by “intelligent” or “digital” [1]. Nevertheless, there are similarities in the definitions [2,3,4].

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Table 1. Definitions of Smart City.

Reference	Column A (*t*)
1. Dept Business	A Smart City should enable every citizen to engage with all the services on offer, public as well as private, in a way best suited to his or her needs. It brings together hard infrastructure, social capital including local skills and community institutions, and (digital) technologies to fuel sustainable economic development and provide an attractive environment for all.
2. Mohanty, Choppali, Kougianos	A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operations and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspect
2. Kaczorowski	Smart cities will become innovative places with efficient, effective and sustainable services where people can enjoy a high quality of life. They are cities with a "digital heartbeat", a high level of connectivity and intelligent services for the benefit of their populations and businesses.

Despite the fact that the references describe Smart City slightly different, some aspects like “innovation”, “digital technologies” and “sustainability” are common and seem to be important to all. Therefore the authors understand a “Smart City” as a development concept to make cities more efficient, technologically progressive, climate neutral and socially inclusive, environmentally friendly and future oriented. Smart Cities exist on the intersection of digital technology, disruptive innovation and urban environments. They are exciting places to work and live and a breeding ground for new ideas which should help in answering the question of the future identity of the city. The answer will not only define the identity of the city, but it also will show the path of transformation, which must be taken to live up to this identity. A city needs a strategic concept to develop towards its goal.

1.2. Challenges in Innovation in Smart Cities

In order to diversify their economies, cities must support innovation at all levels, create a favorable business environment and at the same time address employment, education and social issues to prevent the exclusion of vulnerable groups [5]. The most important prerequisite for driving the change towards smart cities is innovation. It is a process in which new ideas, concepts or products are generated, applied, tested, improved and scaled. A city that wants to equip itself with innovative, intelligent technology and enter the process of digital transformation sees its future in different innovative ideas of tomorrow. A Smart City must therefore be an innovative city.

There is a consensus that the innovation process has changed. Innovation cannot be planned, but measures can be taken to support innovation efforts. Now the paradigm of an "open innovation process" prevails. Since this process must be organized and infrastructurally supported, the establishment of innovation and creative labs (living labs) is another task in a Smart City [4].

1.3. Solution approach

One of the most important carriers of innovative ideas for cities and municipalities are startups. Following the definition of Kollmann et all, startups are young companies, not older than 5 years, they are (highly) innovative with their technology and/or their business model and have significant employee and/or sales growth (or are striving for it) [6]. Therefore the safest strategy for a city to secure long-term innovations is to support local startups. By doing so new businesses can be created, existing product ideas can be expanded and the entire urban economic system can be strengthened, which is reflected, for example, in jobs created or patents applied for as startups work with methods and management approaches that can also be applied in established companies to achieve more flexibility, speed, innovation and ultimately growth [7].

To become a smart and innovative city, it should support startups, because they bring new ideas and guarantee innovation. Through close cooperation with startups, cities receive sufficient first-hand opportunities to implement innovations immediately. But where do the startups come from? Universities, colleges, research institutes and technological institution generate many entrepreneurs [8]. However, in order to be able to develop startups in an optimal way, they need a specific startup-friedly environment and culture. To become successful and thus fulfil their role as drivers of innovation, startups must be embedded in the best possible environment. They

need an efficient startup ecosystem with strong partners from business, politics and science, as well as tailor-made programmes [9,10,11]. To make the best use of these innovation resources, cities must strive to create the requisite conditions. Only then will startups be able to effectively develop and timely test their new solutions, to receive immediate feedback from professionals and experts and establish their products in the shortest possible time so that major innovations can be made possible and the investment in the startup support will on long sight pay off and make the city more innovative, more attractive and smarter.

2. The Study

2.1. Contents and objectives

With the study, the research team has examined the role of local accelerator programs and their ability to support startups and innovations in smart cities to verify the hypothesis that municipal engagement is a key criterion for successful local innovation, which highlights why cities need to actively manage the process of local innovation and startup accelerators to ensure long-term success. Among a variety of definitions regarding the role of accelerators the authors of this paper follow the definition of Dempwolf at all: "Accelerators select and invite a small group of entrepreneurs to startup boot camps, providing mentoring, resources, and, most important, industry connections during these programs" [12]. Successful startups need an efficient ecosystem with a resilient infrastructure. Accelerators are one of the most important support mechanisms for startups, which have become an important element of innovation systems around the world [13].

In the framework of this research, the authors define an accelerator as follows: "an institution that helps startups develop rapidly over a period of time through intensive support. Accelerators act as supporters for startups, which they then support with both knowledge and resources. In addition, they are limited in time". During the accelerator program, the business idea is to be developed into a marketable product or service. In order to be able to participate in such accelerator programs, the founding teams must first apply in most cases, whereby in the case of open applications in particular, very strong selection takes place and only a handful of startups are actually included in such a program. The support of the accelerator program can range from the provision of workspaces, strategic and technical support, network mediation and coaching in all important areas. Often a program ends in so-called demo days, at which the teams can present their company or product to investors. Accelerator programs are usually found in startup centers or so called "business incubators", which can be described as "facilities established to nurture young firms during their early months or years. It usually provides affordable space, shared offices and services, hand-on management training, marketing support and, often, access to some form of financing" [14].

A startup center serves as a network platform for startups, companies and science. It is the combination of three components: The ideas of the startups combine with the basics of current research and the experiences of industry. This results in new business ideas, services, products and new markets. To guarantee this transfer of innovation, suitable coaching programs, networks and individual mentoring are made available to the startups.

A city that actively promotes accelerator programs and startup centers usually has a number of local startups with innovative business models. By supporting accelerator programs and startup centers, the attention of startups with a specific focus can be drawn to the region. Startups with the desired specialization would settle in the region, develop further by supporting the offered programs and finally produce innovative products, services and models, which the city needs in favor of carrying out the transformation to a Smart City.

2.2. Approach and Methodology

For the sake of gaining the best possible insight of the topic the authors defined a methodology of investigation how the local accelerators programs impact the innovation in smart cities in four main phases as follows, see Fig. 1:

- Phase 1: Preliminary study aiming at definition of research criteria and determination of the cities to be investigated. Initial research and comparison of the startup and innovation activities of six previously defined smart European cities.
- Phase 2: Reflection study aiming at verification of the results of the preliminary study, extension of the criteria and simultaneous focus on three selected cities.
- Phase 3: Main study aiming at internationalization. Worldwide research of smart cities with reference to already verified criteria.
- Phase 4: Final works: Validation, refinement and final conclusion. Publication.

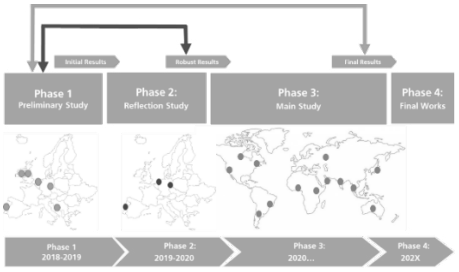

Fig. 1: Method

The contents of this paper are limited to Phase 1.

2.3 Preliminary study: Phase I

The preliminary study described in this paper was carried out to verify the hypothesis that local accelerator programs play an important role in increasing innovation within smart cities. To prove this, several expert interviews were conducted. The survey contained two semi-standardized questionnaires for two different expert groups, included in Annex [A, B], which were developed to ensure a theory-based, objective and precise measurement of political and economic factors in the qualitative methodological tradition to prove the hypothesis that supporting local startup ecosystems has a positive impact on a city. The questionnaires contained open and closed questions, which allowed a qualitative and quantitative survey method. The semi-standardised expert survey method was chosen, because despite the fact that all the questions were the same for all respondents, the experts were still able to formulate freely so that additional information could be collected. The results of the questionnaires were first summarized individually and then compared and analysed [15].

Two questionnaires were developed to optimally prepare for expert interviews with two different expert groups. The first questionnaire was prepared for expert interviews with cities officials [A], the other one for expert interviews with members of accelerator programs [B]. Both questionnaires were composed very similar and included some of the same questions, so that one could see, if the city officials and the accelerator staff had the same opinion about the situation. Other questions were specific and could only be answered by a particular expert.

The used current data and information provided by the experts related to the cities have been verified by secondary research. Six case studies were prepared for cities in different European countries. The selected cities were: Amsterdam, Porto, Leipzig, Manchester, Dublin and Zagreb.

With regard to conduct comparative case studies in the context of startup ecosystems of the chosen cities had to meet all following criteria: Smart City concept, functioning startup ecosystem, pre-formulated goal to establish innovation within the city.

In addition, the cities investigated had to cover Europe geographically, and thus serve the purpose of gaining a first impression of European startup ecosystems. In the future, other cities across the globe shall be studied using the same method. Based on these criteria, interviews were conducted with representatives of these cities as well as internet and literature research. During the preparation of the questionnaire, factors were defined which startups find attractive in cities. These were e.g. tax advantages for startups, special study courses in the Smart City area, or focusing the city on a relevant topic for the startups. In addition, the question was addressed whether there are local startups that deal specifically with the problems of the city and actively participate in the transformation to Smart City. In order to assess the impact of successful startups on the city, the number of jobs created by startups and the number of high-tech patent foundations registered in a city were examined.

The impact of the accelerator programs on a city was determined by designing questionnaires for the programs. The extent to which the programs support startups, how long they have been maintained and how many startups have been supported so far were examined. In addition, funding and selection criteria for startups were asked. With respect to characterize the impact of the managed startups on the development of a city, it was determined how many startup remained in the city after the program, how many jobs were created by startups and which products were implemented in a city.

3. Research output

3.1. Netherlands Study: Amsterdam

Amsterdam´s excellent quality of life and the established infrastructure of progressive thinkers, networks and business accelerators is a magnet for talent, startups and international companies. All relevant contacts are nearby and Amsterdam is well connected by land, water and air. The city offers special tax advantages for startups and highly skilled migrants moving to Amsterdam as well as special study programs in the field of Smart City. Most of the startups work in High Tech areas like Software, Smart energy, Financial Tech or Digital Tech and many of them offer solutions for current issues of the city.

In Amsterdam, there are many accelerators. Some of them offer programs with a focus on a specific area. Startupbootcamp, for example, offers programs for Artificial Intelligence, Commerce, FinTech & Cybersecurity, Media and Smart City & IoT. The Smart City & IoT accelerator program selects 10 startups in the area of Smart City or IoT from over 440 international applicants and supervises them for 3 months. Each startups gets 15,000 EUR, free of charge working areas and software and is supported by mentors from the Smart City and IoT industry. The accelerator also offers different events and seminars. 34 of the 39 alumni startups are still active.

Startupbootcamp takes an 8% equity share of its startups and the selected startups are required to locate to Amsterdam for the duration of the program. Many teams decide to stay and run their business from Amsterdam after the program and some of the startup products already have been implemented in Amsterdam.

Amsterdam benefits from their thriving innovation ecosystem by the 100 to 200 international companies that settle in the city every year. Netflix, Uber and Tesla recently decided to establish their European headquarters or development teams in Amsterdam. Furthermore, the city hosts some of the world-leading tech & funding events and are very attractive to international talents. In 2016, startups in Amsterdam created 2,215 jobs. [16, 17, 18].

3.2. Portuguese Study: Porto

Porto has a strong startup network with lots of supporting infrastructure like incubators and co-working spaces as well as an active startup and tech community with regular events and meetups. Because of its high quality of life paired with a low cost of living Porto is attractive to startups. Although just 2% of the Portuguese live in Porto, they have 36% of Portugal´s startups. In the last years, the Municipality of Porto has made a big bet on entrepreneurship, developing a handful of initiatives to allow startups to use Porto as a living lab, which is particularly helpful for Smart City startups.

Portugal offers tax advantages for startups as well as for family and friends who invest in them. Most of Porto's startups are in the area of Mobile, E-Commerce or Social Media, there are many who deal with current issues of the city, and some of their products are already implemented in Porto and offer solutions for problems faced daily by the people living in or visiting Porto. The city also benefits from the startups, because their excellent talents from the local top universities stay in Porto and new high-qualified jobs are created for them. The startups also attract investors and support the competitiveness of the local ecosystem.

An important accelerator in Porto is the Startup Porto Accelerator, which supports its startups for 12 weeks with financial resources, free of charge working areas, software and mentors. It also offers seminars to lean startup methodologies and many events. The Startup Porto Accelerator has so far supported 20 startups, about 80% of which are still active. The accelerator is being financially supported by partners, which is why the startups can benefit from the program without paying fees. One of the selection criteria is that the company should be created in the Northern Region of Portugal [19, 20].

3.3. German Study: Leipzig

Leipzig´s startup ecosystem is not as well-known as the ones of the bigger German cities like Munich or Berlin, but they strive to attract more startups and offer a lot of support for local startups. Leipzig benefits from being close to the important startup hub Berlin and from its own unified startup scene, since there are just three key players in Leipzig's startup scene and they all work together to support their startups. Their excellent educational facilities and big corporates with major facilities like Amazon and Porsche, as well as the low cost of living compared to Munich and Berlin make Leipzig attractive for entrepreneurs.

Leipzig benefits from Germany's tax advantage offers for startups, but there are no special study programs in the field of Smart City in Leipzig. Even though Smart City is one of the fields, in which most of the startups are active. Others are Software as a Service, Energy and e-Health. Apart from this, there are many startups dealing with current issues of the city. Leipzig profits from the local startups, because they keep the innovation potential in the city and secure jobs for the future. It participates in the Digital Hub Initiative by the German Government with the specializations Energy, Smart City and e-Health.

Leipzig´s most important accelerator is the SpinLab. It supports startups for six months with free of charge working areas, many different events and seminars, contacts and mentors as well as financial resources and a lot more. Since the start of the program in

2015, the SpinLab supported 51 Startups most of which are still active. The SpinLab does not take any shares or a participation-fee, their partners finance it.

In addition to the financial resources from the accelerator, the city of Leipzig offers 4,000 EUR for every startup moving to Leipzig, which is in addition to the fact that Leipzig is much cheaper than most other cities in Germany and good access to employees a reason, why many startups stay in Leipzig after they finish the program. Leipzig benefits from the 350 jobs, which the Alumni of SpinLab created so far and from various innovative products, which have been implemented in the city. Apart from that Leipzig has become a part of the German DE-Hub initiative which boosters the city's marketing [21].

3.4. British Study: Manchester

Compared to London other capital cities Manchester attracts startups with affordable property and low costs of starting up. Furthermore, the access to talent due to three universities and the access to investment in Manchester, as the second largest economy outside of London, is attractive to startups. Manchester is a digital city, which has the highest number of digital tech workers outside of London. In addition, most of the local startups work with Digital Technology, Social Media or Software as a Service. Startups get tax advantages, but there are no special study programs in the field of Smart City in Manchester. Some of the startups offer solution for current issues of the city and products, which are already implemented in Manchester.

Manchester's startups help the city to reinvent itself from the industrial revolution leader to a digital tech city, because the digital tech sector grew steadily between 2006 and 2016 with a 130% increase in the number of businesses formed per year. That also makes it easier for local companies to find other businesses to collaborate with and attracts global businesses.

The AccelerateME program in Manchester has been running since 2015 and is open to current students and recent alumni at the University of Manchester. They offer financial resources and free of charge working areas as well as 12 intensive weekend sessions with seminars and training. AccelerateME does not take shares from startups, because it is financed by partners and successful Alumni. The startups have to be located in Manchester, but most startups apply to bigger accelerators in other cities after the program [22].

3.5. Irish Study: Dublin

Dublin initiated a number of initiatives to better leverage the innovation ecosystem after the economic crisis and 2007, which helped it to establish a strong startup ecosystem. There are 1,200 startups in Dublin, which raised 888 Million EUR in 2016. The Irish government, through its agency Enterprise Ireland, plays a vital role in early stage investment. The globally connected tech hub Dublin is a bridge between Europe and the US. It is not only where innovative startups from the US, like Airbnb and Stripe, come to scale globally, but also the jumping off point into the US for aspiring startups from across Europe. Global tech giants like Google, Facebook, Amazon and 250 more have facilities in Dublin.

Significantly cheaper than London in terms of salaries and cost of living, Dublin is where young tech talents from around the world love to live, study and work, which is another factor that makes Dublin attractive for startups. Dublin is the world capital of Travel Tech and it strives to be Europe´s center of B2B Software as a Service. Other major areas of Dublin´s startups are Enterprise Software and Fintech.

Startups in Dublin benefit from a number of tax reliefs across all sectors and the Smart Dublin program, which aims to position Dublin as a world leader in using open data and the city region as a test bed for innovative ideas. The DCU Ryan Academy is based in Dublin and Ireland's most successful privately funded accelerator. It was formed in 2005 as a partnership between the Dublin City University and Dr. Tony Ryan, the founder of Ryanair and one of the country´s most successful entrepreneurs.

In exchange for 7.5% of ordinary equity shares, the startups get 45,000 EUR, access to a selected group of mentors and investors, different workshops and a structured development plan to give the startups the foundation for growth. It also gives to startups access to office space during the three months of the program and was ranked the seventh best accelerator in Europe. Their 29 alumni companies have raised over 10,000,000 EUR and most of them are still active. Dublin benefits also from the local startups in terms of creation of new jobs and invention of new products [23].

3.6. Croatian Study: Zagreb

Zagreb is located in the heart of Europe, yet living here is cheaper than in the major startup cities like Berlin or London. The startup ecosystem in Zagreb with their new players is young and thriving. Startups are attracted, because Zagreb is known for its diverse economy, high quality of living, museums, sporting and entertainment offers. The welcoming startup ecosystem with a supportive community and plenty of startup events is another factor, which makes Zagreb interesting for them.

The city of Zagreb offers a lot of support to develop a strong startup ecosystem. It provides education, infrastructure, mentorship and financial support for startups and implements entrepreneurial strategies. It´s vision is to become a gateway to Croatian technologies as an urban incubator and accelerator for commercialization and innovation. A key success was the Startup Factory Zagreb, a pre-

acceleration program initiated in 2016 by the Development Agency Zagreb. Also the City´s University is one of the oldest in Europe and there are many educated specialists in almost any field. The most common areas for startups in Zagreb are Social Media, Digital Tech and Mobile.

The goal of the program is to strengthen the innovation ecosystem and stimulate the development of startup entrepreneurship. It makes it easier for startups to do business, especially during the development stage, as well as assist them with expanding into new markets, increasing revenue and creating high-quality innovative products.

It´s program runs for 10 weeks and is available for young startups, which operate for less than 12 months and have a registered office in the Zagreb area. The accepted startups get up to 25,000 EUR, for which they do not have to give away any equity. They also benefit from utilization of the infrastructure of the Technology Park in Zagreb, events and networking opportunities, access to mentors and the intensive 10-week educational program. The thematic areas of the program are Smart Tourism, Smart Living, Smart Energy and Smart Mobility. In return Zagreb benefits greatly from the investment into the startup support. Not only do they create new jobs and invent new products, it also increases the attractiveness and confirms the image of the city as smart and innovative. Thus not only more startups feel attracted, but also international companies and investors [24].

4. Results and Conclusions

4.1. Results

Thematic Focus: All cities offer accelerator programs with a range of Smart City topics. Therefore a large number of startups focus on software, smart energy, digitization, E-health. Social media and technological innovation are likewise often mentioned. In every city, startups contribute to the goal of climate neutrality. With the exception of Amsterdam, none of the cities surveyed has a special study program for "Smart City", nevertheless with their Smart City approach the cities attract startups that are close to this topic, see Fig. 2a.

Accelerator Programs: The duration of startup support differs, see Fig. 2b. Three out of six of the examined accelerators offer a 3 months-support. Leipzig's accelerator SpinLab has the longest support time of 6 months. Most accelerators are specialized in early-stage startups. Amsterdam's accelerator Startupbootcamp is the exception where startups are only accepted after the MVP/prototype phase. As a rule, no shares are taken as payment for the program, with the exception of Amsterdam's accelerator Startupbootcamp and Dublin´s accelerator DCU Ryan Academy. These programs takes 8% respectively 7.5% of the shares. The workplace for startups is free of charge at all accelerators. The amount of supported startups is at least 20 and at most 51 startups in the last 3 years, whereby the Leipzig accelerator SpinLab with 51 supported startups represents the peak value.

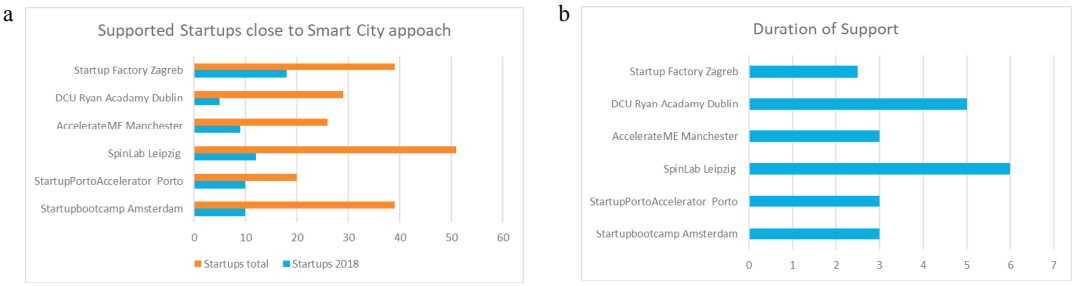

Fig. 2. (a) Supported Startups with Smart City approach; (b) Duration of Support.

Financial support: In all cities surveyed, there are tax advantages for startups, in Porto the tax advantage applies additionally for family members. In each city, there are financial advantages for startups, within a total payment of at least EUR 2,000 but no more than EUR 45,000, see Fig. 3a.

Success of startups: If, as described in chapter 1.3, successful startups are defined as young companies which, after successfully completing the Accelerator Program, were able to establish themselves on the market as independent companies and thus fulfil their role as innovation drivers, then all cities have produced a large number of "successful startups", see Fig. 3b. However, none of the examined factors seem to have a significant influence on the success of the startups on its own. There is no clear correlation between one single factor and the success of startups. Accordingly, it must be inferred that there is not “one influencing factor” that makes startups successful, but that it is a combination of different factors.

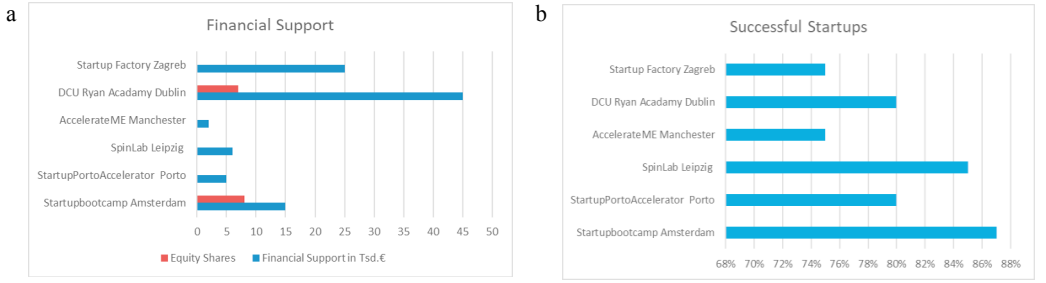

Fig. 3. (a) Duration of Support; (b) Successful Startups.

Return of invest: In all cities surveyed, the investment in startup support seems to pay off. Various factors were mentioned as benefits for the cities. The creation of new jobs plays the most important role. This benefit was called by every city, whereby it can be achieved both: directly by the startups and as a result of other benefits, for example, because the Smart City approach attracts international innovative companies to the location. In second place were called: increasing the attractiveness and image of the city and invention of new products solving current issues. Both benefits were called by 4 of the 6 surveyed cities. 3 of the cities called more (international) investors as an important benefit for the city. Other benefits, which have been mentioned, were e.g. new industrial focus or resurgence of local industry, see Fig. 4.

Return of invest

	Amsterdam	Porto	Leipzig	Manchester	Dublin	Zagreb
New Jobs by Startups	✓	✓	✓	✓	✓	✓
Settlement of innovative international companies	✓					✓
New Products solving current issues		✓	✓		✓	✓
More / international Investors		✓			✓	✓
Increasing Attractiveness and Image of the City	✓		✓		✓	✓
World leading tech & f unding events	✓					
New industrial focus / resurgance of local industry				✓		

Fig. 4. Return of invest.

4.2. Conclusions

At the beginning of this work, the hypothesis was made that cities, that provide an accelerator with a Smart City focus are successful in piloting innovations. The comparative case study has shown that European cities with a successful Smart City concept including several factors attach great importance to supporting startups and an ample evidence has been made that smart cities have a strong commitment toword startups. The most successful way to support startups seems to be to establish accelerator programs in dedicated startup centers, adding free of charge working spaces and network, tax advantages for startups and financial support in order to create a perfect basis for for startups on their way to generate innovative products in the context of the transformation towards Smart City.

Overall, it can be stated that cities investing in startup support experience a return of investment in various ways. The cities benefit from the innovative ideas, products and services of the startups. The more the cities support startups, the better results can be achieved: be it in the creation of new jobs, the number of patent applications or the implementation of innovative products. The startups create new jobs and help to increase the attractiveness and image of the cities which leads to more international investors and attracts international companies to settle in the city, this on the other side attracts young talents, which increases the chance for more startups with more innovative ideas.

Due to the small number of interviews, an objective and representative conclusion is not possible, but the collected data are sufficient to induce valuable results supporting the hypothesis that local accelerators have positive impact on increasing innovation in Smart Cities.

5. Next steps

As shown in the methodology Fig. 1 this paper describes only the first phase of the study: the premiliminary study. Next, the authors plan to validate the method by adding new factors and expanding criteria in order to confirm the results. Based on then current results of the investigated six cities, the authors plan to perform the same study by reducing the number to a half, chosing the most significant cities. The second phase aims to identify reflection aspects on a longer duration and deliver improved results. Additionally, the authors plan to expand the study in the third phase to an international dimension. The number of interviews will then be significantly increased for the sake of gaining more valid data from cities all over the world. In the forth and final phase validation, refinement and final conclusion as well as publication will be performed.

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We would also like to extend our thanks to the experts in the different city departments and accelerators for taking their time for the interviews as well as offering us useful background information and further sources.

Appendix A. Questionnaire for city officials
Appendix B. Questionnaire for accelerator staff

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