smart cities

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Smart Economy and Startup Enterprises in the Visegrád Countries—A Comparative Analysis Based on the Crunchbase Database

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Abstract: The present study seeks to explore the concept of "smart economy" through the definition of the smart city. It also presents smart city subsystems and the smart city model. It focuses on smart and creative startups within the smart city model. The research examines medium-sized cities in the Visegrád countries (Czech Republic, Slovakia, Poland, Hungary) with a population ranging from 100,000 to 1 million inhabitants for startups. The research question is: Where are the medium-sized cities in the Visegrád countries that are both startup centers and smart cities? In the course of the research, the term "smart cities" was based on the definition set by the European Commission and the definition of startup centers was made using data analysis of the American Crunchbase database. As a result of the two studies, it can be concluded that there are no cities in the Visegrád countries with an above average level of both startup presence and smart cities.

Keywords: smart city model; smart economy; startup; Visegrád countries; urban research; comparative analysis

1. Introduction

In the 21st century, one of the challenges of urbanization is that around 70% of people in the European Union live in urban areas. More than 70% of the EU's gross domestic product (GDP) is produced in cities [1]. Another important challenge is that the population of the 27 European Member States as of 1 January 2019 was estimated at 446.8 million; among them, the elderly population (aged 65 or over, 91 million people) had a 20.3% share, an increase of 0.3 percentage points compared with the previous year and 2.9 percentage points compared with 10 years earlier [2]. The distribution of population by the age group 65-x in the Visegrád Countries is a bit lower than the EU average [3]. Among them, the highest proportion is in the Czech Republic (18.8%), the second highest in Hungary (18.7%), followed by Poland (16.5%), and the lowest in Slovakia (15.5%) [4].

It can be said that in the coming decades, significant demographic changes are to be expected, e.g., the number of elderly people, so universal design and/or assistive technologies are crucially important to people's opportunities for a healthy and active life. A solution to these demographic changes could be ambient assisted living (AAL) technologies, because people want a superior quality of life at

every age. AAL can be defined as 'the use of information and communication technologies (ICT) in a person's daily living and working environment to enable them to stay active longer, remain socially connected and live independently into old age' [5]. According to Monecosso et al.'s research [6] on aging and age-related conditions, the means to support an aging population has become a priority for many governments around the world. Policymakers see science, technology, and innovation as a key part of these efforts to meet sustainable development goals with scientific, technological, and innovation-based startups [7–12]. City dwellers expect better and higher quality services and living conditions, and more efficient operation by the city and its leaders. At the same time, the availability of resources is constantly shrinking. The financial framework required to acquire resources is also increasingly limited and enduring, with complex problems and intertwined environmental, economic, social, and cultural challenges. Digital technological solutions have been launched as a way to make our cities more sustainable [13].

According to Jakab et al. [14], the general goal is to make cities friendlier, more livable, more lovable, and more attractive, which requires developments and solutions that make residents, including elderly and disabled people, feel better, which will help to solve the problems of cities. In order to achieve this goal, however, 'in addition to the available resources, it is necessary to exploit the new opportunities provided by ICT' [15]. Törnqvist [16] stated that the successful city in the 21st century is surrounded by a 'creative milieu' characterized by the rapid and efficient flow of information between people, knowledge from the storage of accumulated information, and competence, using these three elements for creativity.

In a study by Woetzer et al. [17], the operation of smart cities was compared to the 'invisible hand' model of Adam Smith [18]. In their view, smart cities have the opportunity to take advantage of new tools in digital intelligence to do less with less [17]. Giffinger et al. [19] depicted the relationship between the smart city and innovative enterprises. Innovation is a useful tool in the development of a smart city, and startups create value by introducing new innovations, and thus are an important vehicle for innovation [20,21]. Anttiroiko [22] stated that entrepreneurship and innovation are the major concerns for an economy within the boundary of a city, therefore, the competitiveness of the city is determined by its innovativeness and economic strength. According to Lombardi et al. [23] and Richter et al. [24], researchers have realized that smart cities are more entrepreneurial than others. Harrington [25] defined the relationship between the four smart city elements (leaders, champions, entrepreneurs, and ecosystem development activities), which are important to discover the economic and social innovations that are possible with smart cities. He determined that the ecosystem is a key part of this innovation cycle, which uses high-velocity collaborative relationships between leaders, champions, and entrepreneurs. Hajikhani [26] stated that although cities can serve as a good representation of a nation's economic success or failure, an analysis of the detailed characteristics accounting for this higher entrepreneurial activity within smart cities has not been conducted. Lozano and Petros [27] agreed that startups that offer smart solutions are more resourceful than ever.

As a matter of fact, there exist a number of studies that have discussed smart cities and entrepreneurship [22–26,28], however, we did not find any paper discussing the relationship between the smartness and startup attraction of cities in this region. Considering the importance of such a framework can deepen our knowledge of the subject. This paper aims to address this research gap by presenting a framework for the interconnection of smart cities and startups in the Visegrád countries, an emerging region of Europe and an economically important region of Central and Eastern Europe. Cities are the engine for economic growth, and innovations are diffused along the hierarchy of cities. Because there are not many metropolitan regions, besides capital cities, medium-sized cities may have a role in spatial growth and innovation potential in the V4 countries. For this reason, it is important to identify which medium-sized cities are smart cities, and can also be characterized as startup centers. The analysis is based on the European Smart City Rankings [29] and the American Crunchbase database [30].

The remainder of this paper is structured as follows: the first part of the study is a literature review, which interprets the concept and determinants of the smart city, with special regard to smart city subsystems, the concept of smart economy, and the smart city models. Section 3 discusses the research methodology, and Section 4 presents the results of the comparative analysis, which examines the smartness and startup capability of medium-sized V4 cities. Section 5 presents a discussion and the limitations of the study. Section 6 provides the conclusion, with several research suggestions.

2. Literature Review

This section provides definitions and a background summary of the interpretation of previous research on smart cities, smart city subsystems, smart economy, and the smart city model, with evidence from the literature.

2.1. Smart City

There are many popular publications under the topic of "smart city." If we examine only the scientific search engines (Elsevier, Scopus, Springer, ResearchGate), we get more than 2,600,000 search results for the keyword 'smart city.' Many definitions of smart cities exist. O'Grady and O'Hare [31] stated that a range of conceptual variants can be obtained by replacing 'smart' with other adjectives, for example, 'intelligent' or 'digital.' The label 'smart city' is a fuzzy concept and is used in ways that are not always consistent. There is neither a single template for framing a smart city nor a one-size-fits-all definition.

The term was first used in the 1990s. At that time, the focus was on the significance of new information and communication technology (ICT) solutions with regard to modern infrastructures within cities. The California Institute for Smart Communities was among the first to focus on how communities could become smart and how cities could be designed to implement information technologies [32]. Dameri [33] noted that 'a smart city is a well-defined geographical area, in which high technologies such as ICT, logistics, energy production, and so on, cooperate to create benefits for citizens in terms of wellbeing, inclusion and participation, environmental quality, intelligent development; it is governed by a well-defined pool of subjects, able to state the rules and policy for the city government and development' [33]. 'Some years later, the Center of Governance at the University of Ottawa started criticizing the idea of smart cities as being too technically oriented' [34]. Allam et al. [35] redefined the smart city paradigm by focusing on the three pillars of metabolism, culture, and governance, and proposed optimizing the use of ICT as part of the solution to problems rather than causing additional challenges.

Due to the extensive amount of publications, there is no uniformly accepted definition of the smart city concept. Based on a literature review, there is significant research on the topic of what constitutes a city that monitors and integrates all critical infrastructure, including roads, bridges, tunnels, railways, subways, airports, ports, communications, water, energy, and major buildings. In doing so, such a city better optimizes its resources, plans its activities, and controls security considerations while maximizing public services [36–38].

According to the Organisation of Economic Co-operation and Development (OECD), the smart city concept is still in flux and subject to debate. The definition of what a smart city is varies across OECD countries and institutions according to the geopolitical context and the specific issues at hand. However, in most cases, smart cities revolve around initiatives that use digital innovation to make urban service delivery more efficient, thereby increasing the overall competitiveness of a community [39]. The European Commission has defined the smart city as follows: 'A smart city is a place where traditional networks and services will be more efficient through the use of digital and telecommunications technologies for the benefit of citizens and businesses. A smart city goes beyond the use of information and communication technologies (ICT) to make better use of resources and reduce emissions. It means smarter urban transport networks, improved water and waste facilities, and more efficient ways to light and heat buildings. It also means more interactive and responsive city

management, safer public spaces and meeting the needs of an aging population' [40]. This study uses the term 'smart cities' based on the definition set by the European Commission.

2.2. Subsystems of the Smart City

In the period since the first smart city research, many variations in the components and subsystems formed by them have emerged in the field of urban evaluation. Six main groups emerged, some of which have several subsystems, broken down into additional subsystems [34].

Based on the components of the concept and the triple-helix matrix approach [41,42], a framework for classifying smart city performance indicators was developed that includes both the main components and the main actors of the triple-helix matrix. The smart city framework incorporates smart governance with participation, smart human capital with people, a smart environment through natural resources, a smart lifestyle through quality of life, and a smart economy with competitiveness [23].

Giffinger et al. [19] identified the six main axes (dimensions), along which 70 medium-sized European cities were ranked in their research on smart cities (Table 1). These axes are: smart economy, smart mobility, intelligent environment, smart people, intelligent life, and smart governance. These six axes are linked to traditional regional and neoclassical theories of urban growth and development. In particular, they are based on the theories of the axes: regional competitiveness, transport and ICT economics, natural resources, human and social capital, quality of life, and the participation of urban societies. Caragliu et al. [43] believe that a city is smart when investment in human and social capital and traditional (transport) and modern (ICT) communication infrastructure promotes sustainable economic growth and a high quality of life through the wise management of natural resources through participation and governance.

Table 1. Six characteristics of the smart city.

Smart City Characteristics	
Smart economy	Smart people
Smart governance	Smart mobility
Smart environment	Smart living

Source: Giffinger et al. [19].

2.3. Smart Economy Terminology Interpretation

Examining the search results of the 'smart economy,' we find nearly 7000 publications. Apostol et al. [44] analyzed the concept, facts, and aspects of the smart economy. As a result of their research, they stated that the smart economy is a concept of both the present and the future. In their view, this is due to the fact that smart economy encourage innovation and creativity, linked to scientific research, high technology, and environmental protection, through the concept of sustainability, which benefits both the present and the future economy. Vinot and Bharat [45] argue that the relationship between the smart economy and the smart city is difficult to determine. It is not clear whether a city is smart because of its smart economy or whether smartness is the reason for the city.

The 2007 Smart City Report defined the smart economy as an economy that 'incorporates factors surrounding economic competitiveness, such as innovation, entrepreneurship, trademarks, labor market productivity and flexibility, and the integration of the (international) national market' [19]. In a study by Tóth et al. [34], a smart economy was understood as e-business and e-commerce, increased productivity, production and delivery of ICT-compatible and advanced services, ICT-compatible innovation, and new products, services, and business models. In addition, it creates smart clusters and ecosystems (e.g., digital businesses and entrepreneurship). In their view, a smart economy means the interconnection of local and global markets, resulting in international embedding along with the physical and virtual flow of goods, services, and knowledge. According to the study, smart cities include services and support for entrepreneurship and innovation ecosystems

under the smart economy, training and incubation environments to support entrepreneurship and productivity, tools to support local and global market integration of companies, ICT platforms, open data, urban laboratories, and other solutions [46].

According to Giffinger et al. [19], the smart economy subsystems (Table 2) include e-economy and innovation (measured by new startups, research and development (R&D), employment, and innovation activity), productivity and efficiency by GDP, and local and global connections (these are exports and can be measured on the basis of international turnover). The economic life of a settlement is determined by the innovativeness and modernity of the enterprises established there. Its level can best be described by the emergence of new startups, but important information can be gained from the weight of R&D and innovation activity, which is reflected in the spread of e-commerce, e-business services, the existence of websites, etc. In this type of comparison of settlements, the evaluation of the entrepreneurial activity of the local population is significant.

Table 2. Smart sustainable economy.

Smart Economy
Innovation environment
Entrepreneurial tendency
Economic image and trademarks
Productivity
Labor market flexibility
International embeddedness
Ability to transform/change

Source: Giffinger et al. [19].

In terms of employment modernity and flexibility, in addition to the evaluation of basic information, this is mostly confirmed by the presence of alternative forms (e.g., part-time work, telework). An important service that is well connected to the settlement and measurable appears in the tourism market. This locally based industry is able to provide digital assistance to visitors in a number of ways (e.g., navigation, booking, city marketing), in which the settlement also plays a significant role through destination management [47].

2.4. Smart City Model

Kok-Chin et al. [48] published a smart city model (Figure 1), showing that the Smart Initiative and the Garuda Smart City Framework for the Development of Smart Cities, Smart and Creative Startups play important roles in the smart economy besides smart small businesses, tourism, maritime, mobility, payment and banking, commerce, and industry.

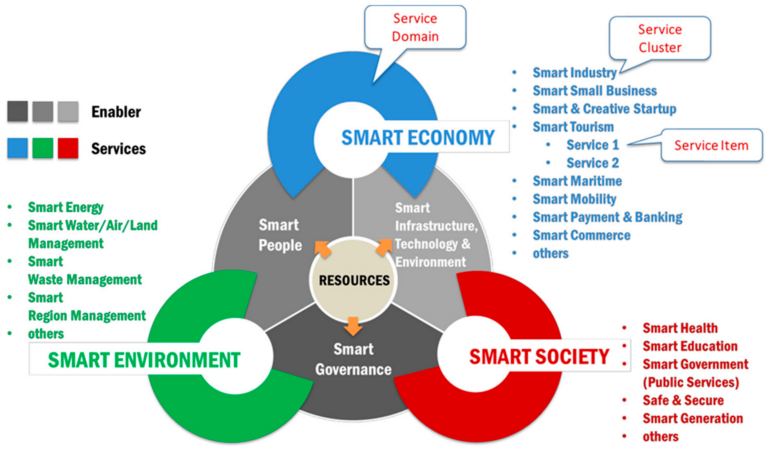

Figure 1. Smart city model and mandala (source: Kok-Chin et al. [48]).

Cooper et al. [49] stated that startups can enable innovative development and experiment with smart city solutions. Startups offer newer, better, and more efficient solutions, technologies, and business models for problems in cities than the technologies available on the market. As described by Giffinger et al. [19], the smart city mandala (Figure 2) also shows that the smart city, the smart economy, innovation and enterprises, and startups are closely related.

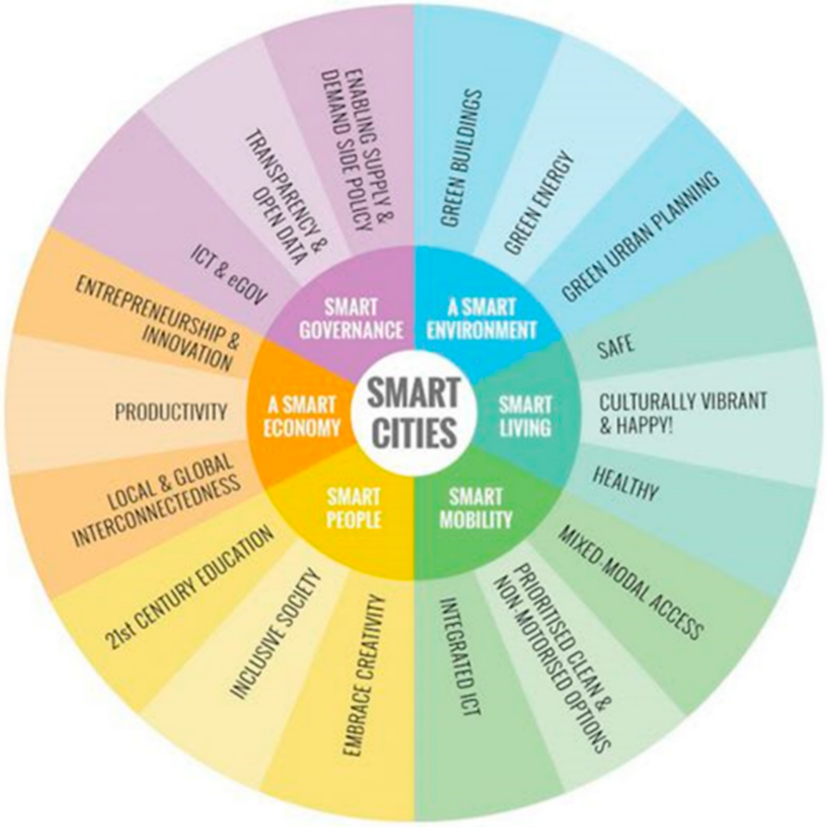

Figure 2. Smart cities mandala (source: European Union and Giffinger et al. [19]).

3. Materials and Methods

The study tries to identify medium-sized smart cities in V4 countries that also indicate intensive development of innovative startups at the same time. This section clarifies the choice of study area and identifies the application of medium-sized cities. To analyze the density of innovative startups in medium-sized cities in the region, we utilized the American Crunchbase database. This database was used because currently there is no other official database aggregating startups and there are no recent official startup statistics available in the V4 countries besides the latest official report, Visegrád Startup Monitor [50].

3.1. Research Area

The Visegrád countries, also called the Visegrád Four or Visegrád Group, have existed since 1991. The group serves as a forum for dialogue and close cooperation between three (later four, with the split of Czechoslovakia) Central European countries: the Czech Republic, Hungary, Poland, and Slovakia. V4 reflects the efforts of the countries of the Central European region to cooperate in a number of areas of common interest throughout Europe [51]. The V4 countries have a total population of 64 million people [52–55], representing approximately one-tenth of the EU economy and hosting almost 5420 startup companies [30].

'The Visegrád countries settlement network consists of settlements of various sizes and with various functions, usually having as a node a town fulfilling important social, economic and territorial

roles. In the last decade the central economic development projects had also served settlement policy and settlement network development aims. Large state investments sometimes intentionally and significantly modified the centers of historically developed settlement networks, thus transforming their inter-settlement relations' [56].

Kola-Bezka et al. [57] examined smart cities in Central–Eastern Europe (CEE: Budapest, Tallinn, Vilnius, Riga, Sofia, and Poznan). The study assumed that disseminating the smart city idea in CEE cities would bring a lot of positive effects (improve the functioning of public administration, offer the possibility of shaping the provision of public services in line with residents' preferences, lower the cost of rendering public services, or reduce combustion emissions and air pollution). For CEE cities, a particular advantage resulting from the implementation of the smart city concept may prove to be creating the image of a modern and functional city.

The present study, similar to a study by Gupta and Hall [58], chose the city level, given the focus of the Smart City Monitor on transforming cities across the Visegrád countries. The examined cities do not belong to the larger group of metropolitan cities, which have better access to smart city expertise and resources. According to Hajdú et al. [56], small- and medium-sized towns in the Visegrád countries have historical tradition and innovative capabilities. The sustainable development and future of rural areas depend on these cities [56]. That is why we found it important to examine them in light of startups and smartness.

There are 52 medium-sized cities with a population of 100,000 to 1 million in the Visegrád countries [52–55]. Among these cities, 4 can be found in the Czech Republic, 7 in Hungary, 38 in Poland, and 2 in Slovakia (see Appendix A), and these were examined in this study.

3.2. Identification of Medium-Sized Cities

The first methodical question is how we approach medium-sized cities. Policymakers of the European Union set up the document of *European Spatial Development Perspective* (ESDP) in the late 1990s (1999). The key concept of ESDP is *polycentricity*, to ensure regionally balanced development. Based on the ESDP [59], a series of research has started, which has been funded by the ESPON program since the early 2000s. The ESPON 1.1.1 study [60] on the potential for polycentric development in Europe identified and mapped the hierarchy of European urban centers, calling them functional urban areas (FUAs) and metropolitan growth areas (MEGAs). FUAs were broken down into two groups: transnational/national, and regional/local. The second level takes into consideration FUAs that have a population of 20,000, bringing small- and medium-sized cities into the European picture of an urban network. According to the ESPON 1.4.1. study [61], the definition of a medium-sized city varies among European countries and ranges from 5000–50,000 up to 200,000–250,000 people.

The FUA concept refers to agglomerations of municipalities that are grouped together according to their functional orientation in order to reflect the actual daily operational conditions of people, enterprises, and community organizations. The FUAs concept is also useful when analyzing regional development from a functional viewpoint, like urban mobility. The most important quality of the concept is thus the capacity to extend beyond administrative boundaries of core cities. As a result, the needs of economic activity and service production can be more efficiently mapped. This leads to more coherent strategic planning and visioning.

In the second half of the 2000s, the ESPON 1.4.3 study on urban functions [62] revised ESPON 1.1.1. [60]. This study separated FUAs into three categories: large, with a population of more than 250,000; medium, with a population of more than 100,000; small, with a population of more than 50,000.

The OECD also developed an approach in the early 2010s, classifying functional urban areas (2012) into four types according to population size: small, with a population of less than 200,000; medium, with a population between 200,000 and 500,000; metropolitan, with a population between 500,000 and 1.5 million; large metropolitan, with a population of 1.5 million or more.

To study the smartness of medium-sized cities, Giffinger et al. [19,29,63] applied the revised ESPON classification but extended the population range to 500,000. The last study on ranking smart

medium-sized cities by Giffinger et al. [64] changed the range of investigated cities from 300,000 to 1,000,000 inhabitants. This change rejected all Czech, Hungarian, and Slovak cities from the research. For this reason, our study utilizes the initial approach of Giffinger et al.'s studies regarding medium-sized cities. In this case, all V4 capitals are out of the scope of study.

3.3. Database and Methods

That is why this study examines medium-sized smart cities in V4 countries that indicate intensive development of innovative startups at the same time. The first goal is approached by the evaluation of Giffinger et al.'s studies [19,29,63]. To analyze the density of innovative startups in medium-sized cities in the region, we utilized the American Crunchbase database.

3.3.1. European Smart City Rankings: Smart Cities in V4 Countries

In Europe, the development of smart city rankings is particularly important for medium-sized cities, as it generates extensive consultation between cities when drawing up regional development plans. It provides an incentive for local governments to accelerate development. Favorable rankings confirm the activities of cities and local governments. Poorly performing cities ignore the results [65].

Many smart city rankings have been developed by academics and multinational IT companies across the world and Europe. Most of them focus on large cities. The only cross-European study targeting medium-sized cities was developed by Giffinger et al. [19,29,63,64]. As stated above, the latest analyses by Giffinger et al. [64] rejects cities below 300,000 inhabitants. For this reason, this study utilizes and evaluates smart city rankings of medium-sized cities 3.0 by Giffinger et al. [29].

3.3.2. Crunchbase Database

We adopted the qualitative data analysis method in this research. The data were gathered from the American Crunchbase database, a new commercial database on innovative companies maintained by Crunchbase Inc., an innovative startup in San Francisco, California. The database was created in 2007 but its scope and coverage have increased significantly over the past few years [30]. As reported by the Kauffman Foundation, the database is increasingly used by the venture capital industry as 'the premier data asset on the tech/startup world' [66]. Crunchbase is one of the biggest and most well-known databases of startup companies, and is the leading platform for professionals to discover innovative companies, connect with the people behind them, and pursue new opportunities. Over 55 million professionals, including entrepreneurs, investors, market researchers, and salespeople, trust Crunchbase to inform their business decisions [30]. Besides Hungary, startup companies from around 198 countries in the world are registered in this database. Crunchbase is the most comprehensive database, with information on high-tech companies and investors around the world [67]. It is a paid database, and is accessed free of charge by researchers only. The present research analyzed the data in the database as of 20 March 2020. Data analysis was conducted with the help of IBM SPSS Statistics 21.

This paper examines the territorial differences of startups located in the mentioned cities and compares them with cities in the European Smart Cities 3.0 ranking [29]. The research seeks to answer the following question: Where are the medium-sized cities in the V4 that are both listed as smart cities and have above average startup presence?

4. Results

4.1. Smartness of Medium-Sized Cities in V4 Countries

Based on the most currently available smart rankings of the latest medium-sized cities (2014), cities in the Visegrád countries achieved the following results (Figure 3).

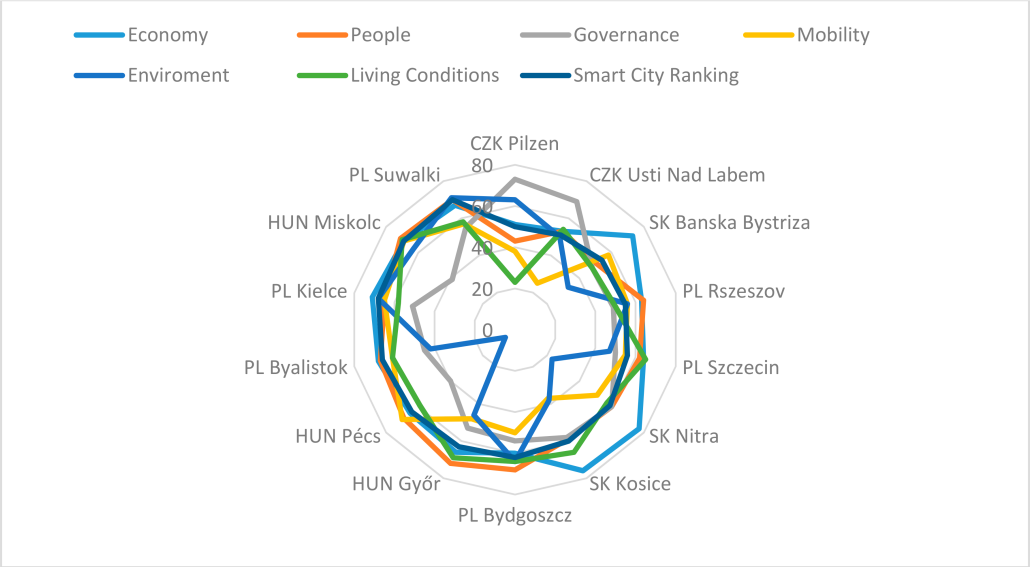

Figure 3. Medium-sized smart cities in Visegrád countries (source: Giffinger et al. [29]).

Examining medium-sized cities in the V4 countries, 14 cities (ranked 50–70; Figure 4) were among the 77 European cities included in the study by Giffinger et al. [29]. Figure 3 details the results achieved by each city.

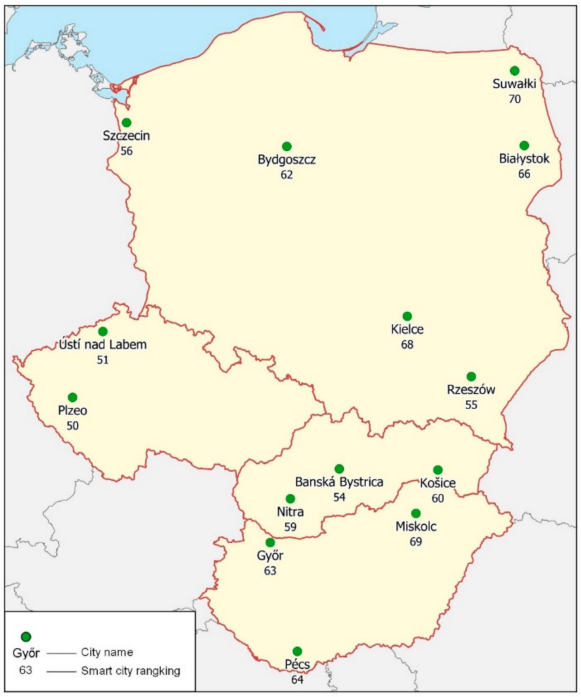

Figure 4. Smart cities ranking in Visegrád countries (source: Giffinger et al. [29]).

4.2. Startups in V4 Countries

In the primary research, the study analyzed 5450 registered startups from V4 countries in the Crunchbase database. Figure 5 illustrates the relative proportions of startups in member countries.

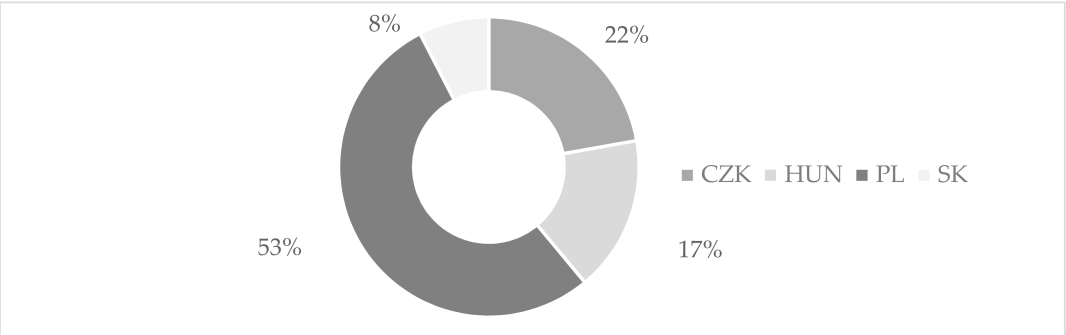

Figure 5. Percentage of startups in V4 countries based on Crunchbase database (source: own calculation).

In terms of the population of V4 countries, the proportion of startups is the highest in the Czech Republic, and the lowest proportion is in Slovakia and Poland. In Hungary, the proportion of startups is approximately similar to the V4 average.

There are 5450 registered startups in the V4 countries according to the Crunchbase database, of which 98% are operating (only 113 companies are closed). Table 3 shows the headquarters of non-operating enterprises.

Table 3. Closed startups. CZK, Czech Republic; HUN, Hungary; PL, Poland; SK, Slovak Republic.

Headquarters Region	Headquarters Location	Closed Startups
CZK	Habartov, Karlovarsky kraj	1
	Prague, Hlavni mesto Praha	19
	Praha, Hlavni mesto Praha	4
Total CZK		24
HUN	Balatonalmádi, Veszprém	1
	Budapest, Budapest	29
	Pér, Győr-Moson-Sopron	1
	Zalaegerszeg, Zala	1
Total HUN		32
PL	Bielsko-biala, Slaskie	1
	Chyby, Wielkopolskie	1
	Gdansk, Pomorskie	2
	Gdynia, Pomorskie	1
	Gora Kalwaria, Mazowieckie	1
	Grodziec, Wielkopolskie	1
	Katowice, Slaskie	3
	Krakow, Malopolskie	3
	Olsztyn, Warminsko-Mazurskie	1
	Poznan, Wielkopolskie	6
	Raszyn, Mazowieckie	1
	Szczecin, Zachodniopomorskie	3
	Warsaw, Mazowieckie	18
	Warszawa, Mazowieckie	4
	Wejherowo, Pomorskie	1
	Wroclaw, Dolnoslaskie	3
	Zagorz, Podkarpackie	1
Total PL		51
SK	Bratislava, Bratislava	6
Total SK		6
Total Closed Startups		113

Source: own calculation.

The study found that in the V4 countries, 52% of startups are profit-oriented businesses and only 0.5% are nonprofits, and startups are typically in the seed stage of life, which also confirms the young age of the V4 startup ecosystem (Figure 6). At the same time, it can be seen that the Czech and Polish ecosystems are more developed than the others, because in Poland and the Czech Republic, several startups have already survived the seeding phase and are in the merger and acquisition (M&A) phase. According to Malik, Anuar, and Khan [68] and Goyal and Joshi [69], mergers and acquisitions represent a very important tool for business expansion in different countries, and researchers from all over the world are taking interest in working in this field. If we go into the history of M&A, it started in the United States back in the 18th century. In Europe, M&A began in the 19th century [70]. The most research on M&A has been done in the United States and European markets. Comparatively little research work had been done on M&A in developing countries like Pakistan, India, Malaysia, and Bangladesh [68].

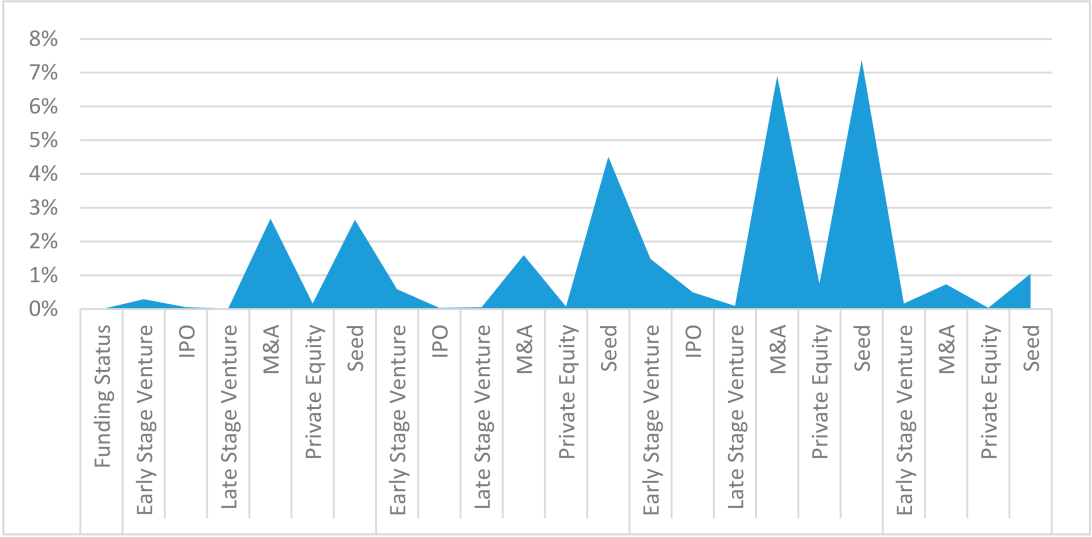

Figure 6. Life stages of startups in V4 countries (source: own calculation.).

4.3. Territorial Differences in Medium-Sized Cities of V4 Countries

In the V4 countries, the examined medium-sized cities have a total population of 11,452,091, according to 2019 data from the Czech, Hungarian, Polish, and Slovakian Statistical Offices [52–55]. The average population of the cities is 220,232. In the 52 cities, a total of 1440 startups were operating at the time of the study (20 March 2020), for an average of 27 startups per city. There were 1494 startups in the cities and their agglomerations. An average of 28 startups operate in the examined cities, where the average number of startups per 1000 population is 0.1257. Startup presence is over the V4 average in Bratislava, Slovakia; Brno, Czech Republic; Szeged and Debrecen, Hungary; and Gliwice, Bielsko-Biala, Katowice, Gdynia, Gdansk, Wroclaw, and Poznan, Poland (Figure 7). Besides the capitals, these medium-sized cities can be considered as startup hubs in the V4 countries.

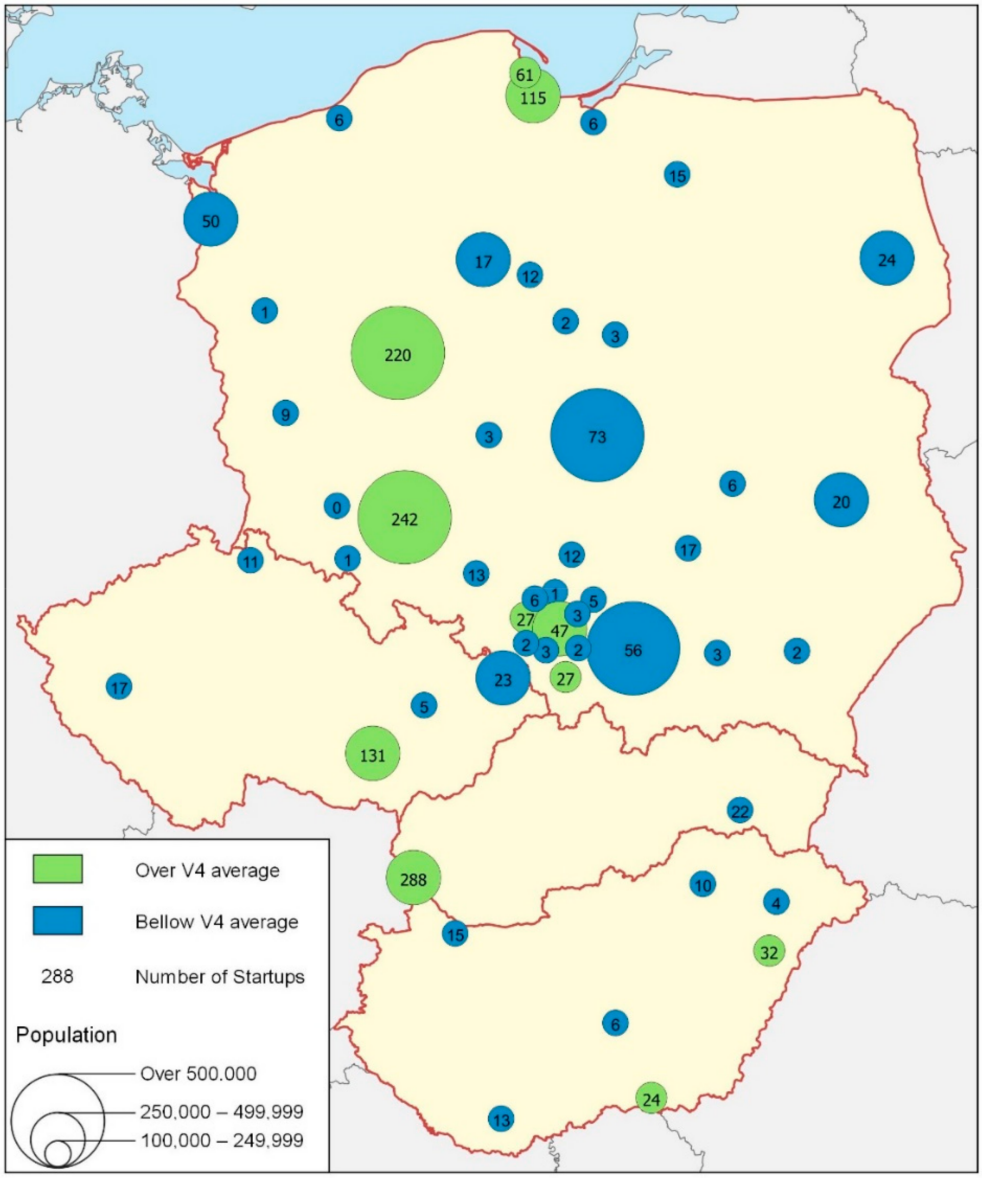

Figure 7. Medium-sized cities in V4 with startup presence (source: own calculation based on Giffinger et al. [29]).

5. Discussion

Recently the concept of smart cities and the measurability of their performance has become a focus of interest [19,29,71,72]. 'Measuring smart city performance is a complex task but is critically required. Advancing the measurement agenda calls for a comprehensive, multi-sectoral and flexible framework that is aligned with local and national strategic priorities and embraces efficiency, effectiveness and sustainability dimensions' [73]. 'Moreover, it can create strong impacts on the local job market—for example, new ways of delivering public services may provide an opportunity for start-ups, service providers and consultancies related to digital innovation, and attract skilled workers' [74].

However, a wide range of factors that can make smart performance measurable; the set of indicators in research, often differ by region. Giffinger et al. [19,29] conducted examinations based on the Urban Audit, a Europe-wide database on cities. Around 1600 cities across Europe are considered medium-sized. Urban Audit uses benchmarks and represents around 100 cities in the database. One study [19] validated 70 cities from this set, and after some changes, another study [29] had

already validated 77 cities. Nagy et al. [71] examined the smart technologies in the settlements of the Northern Hungary region. Nagy et al. [72] explored the smart performance of some cities in the Visegrád countries (two cities each in the Czech Republic, Hungary, and Slovakia, and four in Poland, including capital cities), by creating another complex index based on the six components. Szendi et al. [75] examined the smart performance in the capitals of countries that joined the EU after 2004. There is no uniform measurement system for the Visegrád countries or for the EU that could give a comprehensive overview of the smartness of all medium-sized cities.

6. Conclusions

Technological entrepreneurship and venture capital are critical components in the transformation from a traditional city to a smart city [76]. Startups are not only the primary drivers of job creation necessary for economic growth, with venture-backed companies being the main force behind technological innovation over recent decades, but the solutions offered by technology-oriented startups can meet the challenges caused by demographic changes [77]. 'Richard Florida, the proselytizer-in-chief of the 'creative class' and the requisite 'startup cities,' has now become the main cheerleader for 'startup districts,' drawing up (as one would expect) rankings of districts based on their 'smartness' and 'startuppiness" [77].

This paper is concentrated on understanding the interconnection of smartness and startup capability in medium-sized cities in the Visegrád countries, to add to the existing knowledge about startups and the smart city paradigm. As elaborated upon in this paper, the interconnection was analyzed based on smart city ranking studies and data from the Crunchbase database. It can be concluded that startup presence is above average in 19% of medium-sized cities. Significant cities for startups are Brno in the Czech Republic, Bratislava in Slovakia, Debrecen and Szeged in Hungary, and Bielsko-Biala, Gdansk, Gliwice, Gdynia, Katowice, Poznan, and Wroclaw in Poland. Giffinger et al. [29], based on the results of their smart city study, showed that Banska Bystriza, Byalistok, Bydgoszcz, Győr, Kielce, Kosice, Miskolc, Nitra, Pécs, Pilsen, Rzeszow, Suwalki, Szczecin, and Usti Nad Labem were included in the smart city ranking. Besides capital cities, Nagy et al. [71] analyzed Byalistok, Gdansk, Kosice, Krakow, Miskolc, and Ostrava. Horváthné Barsi et al. [15] evaluated Debrecen, Győr, Kőszeg, Miskolc, Pécs, Szeged, Székesfehérvár, Tatabánya, and Veszprém. Because of the limited number of cities included in the rankings, only four medium-sized cities—Debrecen and Szeged in Hungary, and Byalistok and Gdansk in Poland—qualify as smart cities and, at the same time, are cities with significant startups.

6.1. Limitation

Regarding the territorial differences in startup companies in the V4 region, it can be assumed that analyzing only one database, here the Crunchbase database, does not give a comprehensive overview of the entire startup ecosystem of the region. Building an official startup database for the V4 region to support these innovative ideas could be a worthwhile enterprise.

6.2. Suggestions for Future Research

6.2.1. Suggestion for Researchers

The data from the present study were analyzed during the European outbreak of COVID-19, so it will be the task of future studies to examine startups and smartness in the V4 region. Since the startup itself is, by definition, a highly innovative and high-risk enterprise, it would be especially worthwhile to assess how startups have been affected by the economic crisis caused by the pandemic. In particular, in which industries were startups the winners during the pandemic crisis, and which businesses were weighed down by the crisis? Second, it is also worth examining what crisis management measures have been taken in each member state of the Visegrád countries, how these measures have affected individual ecosystems, and what kind of cooperation can be observed between the member states in

the current situation. Third, the research approach can be extended to the capital cities, Bratislava, Budapest, Prague, and Warsaw, which may have access to better resources but are also struggling to manage the challenges that come with rapid urbanization. Lastly, the research can be expanded by studying AAL-related best practice startups, like Robart [78], a startup in Linz, Austria, focusing on a new vision.

6.2.2. Suggestions for Policy Making

As a policy recommendation, we urge cooperation among municipalities, public–private partners, startups, and investors to build together the smart cities of tomorrow in the V4 region. We expect that this study can act as a guide to implications for future perspectives, which could be helpful for policymakers who aspire to leap into the 21st century.

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Appendix A

Selected Cities

Czech Republic (4): Brno, Liberec, Ostrava, Plzen

Hungary (7): Debrecen, Győr, Kecskemét, Miskolc, Nyíregyháza, Pécs, Szeged

Poland (38): Bialystok, Bielsko-Biala, Bydgoszcz, Bytom, Czestochowa, Chorzów, Elblag, Dabrowa, Gdansk, Gdynia, Gliwice, Górnicza, Gorzów, Katowice, Kielce, Krakow, Kalisz, Koszalin, Legnica, Lublin, Lodz, Opole, Plock, Poznan, Radom, Ruda Slaska, Rybnik, Rzeszów, Sosnowiec, Szczecin, Tarnów, Tichy, Torun, Walbrzych, Wielkopolski, Wloclawek, Wroclaw, Zielona Góra

Slovakia (2): Bratislava, Kosice

References

1. ESPAS. Global Trends to 2030: The Future of Urbanization and Megacities. Available online: https://espas.secure.europarl.europa.eu/orbis/sites/default/files/generated/document/en/Think%20piece%20global%20trends%202030%20Future%20of%20urbanisation.pdf (accessed on 18 September 2020).
2. Eurostat. 2019. Available online: https://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_ageing (accessed on 19 October 2020).
3. Statista. Available online: https://www.statista.com/statistics/253408/age-distribution-in-the-european-union-eu/ (accessed on 19 October 2020).
4. Hungarian Statistic Office 2019. Available online: https://www.ksh.hu/docs/eng/xftp/idoszaki/ev4_fobbadatok.pdf (accessed on 29 October 2020).
5. AAL. Available online: www.aal-europe.eu (accessed on 21 October 2020).
6. Monekosso, D.; Florez-Revuelta, F.; Remagnino, P. Ambient Assisted Living. *IEEE Intell. Syst.* **2015**, *30*, 2–6. [CrossRef]
7. Acs, Z.J.; Desai, S.; Hessels, J. Entrepreneurship, economic development and institutions. *Small Bus. Econ.* **2007**, *31*, 219–234. [CrossRef]

8. Audretsch, D.B.; Grilo, I.; Thurik, A.R. Handbook of Research on Entrepreneurship Policy. 2007. Available online: https://d1wqtxts1xzle7.cloudfront.net/38323555/intro_handbook_entrepreneurship_policy_framework.pdf?1438163075=&response-content-disposition=inline%3B+filename%3DM876_Audretsch_TEXT_qxd_1.pdf&Expires=1606988954&Signature=E2pCGlQL6JfKrQyp~vnyTdOdSchryxrnJ9~HPw8ZI-8Gn97knLQ9tHdEto8qYSwji8qWuXgB2lm8RJkQBBXKStX2o94fMdJlPb9qqhEqTUj5rDzbHQH99ZRMvHS7\mmWIVealHENAwr8kN01McFTkawYkQnpIhJybhXGOsnAT7kIBtnxtbndQ260ZVKoNYxHkvTjPGbo~fsJqq~u4ChQYH~okMeIKjpbBTeYDk7SNXLtPkv3pDENcrSKprg6bMNnWEewDBOYgNA37BPandYS6Y6\KpM7Okpx9aED-nFfjnQn173pfAp1RlLmdaz~MR-rTFgATcECYARKT4CKWr4GGF1Q__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA (accessed on 19 October 2020).
9. Naudé, W. Entrepreneurship, developing countries, and development economics: New approaches and insights. *Small Bus. Econ.* **2007**, *34*, 1. [CrossRef]
10. OECD. Innovation for Development. 2012. Available online: https://www.oecd.org/innovation/inno/50586251.pdf (accessed on 15 April 2020).
11. Szirmai, A.; Naudé, W.; Goedhuys, M. *Entrepreneurship, Innovation, and Economic Development*; Oxford University Press: Oxford, UK, 2011.
12. Surana, K.; Singh, A.; Sagar, D.A. Strengthening science, technology, and innovation-based incubators to help achieve Sustainable Development Goals: Lessons from India. *Technol. Forecast. Soc. Chang.* **2020**, *157*, 1–17. [CrossRef]
13. Colding, J.; Barthel, S.; Sörqvist, P. Wicked Problems of Smart Cities. *Smart Cities* **2019**, *2*, 512–521. [CrossRef]
14. Jakab, L.; Sallai, G.; Kovács, K. A Smart City megoldások technológiai háttere és fenntartható komplex modellje. The Technological Background and Sustainable Complex Model of Smart City Solutions. *Magy. Tudomány* **2018**, *179*, 1304–1314. [CrossRef]
15. Horváthné Barsi, B.; Lados, M.; Baranyai, N.; Baráth, G.; Jóna, L.; Velinszky, B. *"Smart Cities" Tanulmány*; MTA Regionális Kutatások Központja Nyugat-magyarországi Tudományos Intézet: Győr, Hungary, 2011; p. 119. ISBN 978-963-08-1739-4. Available online: https://www.academia.edu/41905277/_Smart_cities_tanulmany (accessed on 15 April 2020).
16. Törnqvist, G.; Buttimer, A. Creativity and the renewal of regional life. In *Creativity in Context: A Seminar Report*; Buttimer, A., Ed.; Lund studies in Geography. B. Human Geography; Gleerup: Lund, Sweden, 1983; pp. 91–112.
17. Woetzel, J.; Remes, J.; Boland, B.; Lv, K.; Sinha, S.; Gernot Strube, G.; Means, J.; Law, J.; Cadena, A.; Von der Tann, V. Smart Cities: Digital Solutions for a more Livable Future. McKinsey Global Institute. June 2018. Available online: https://www.scribd.com/document/383165205/MGI-Smart-Cities-Full-Report (accessed on 21 March 2020).
18. Smith, A. A nemzetek gazdasága (An Inquiry into the Nature and Causes of the Wealth of Nations). In *The Wealth of Nations (A Nemzetek Gazdagsága)*; Smith, A., Bilek, R., Eds.; Közgazdasági és Jogi Könyvkiadó: Budapest, Hungary, 1992.
19. Giffinger, R.; Fertner, C.; Kramar, H.; Kalasek, R.; Pichler-Milanovic, N.; Meijers, E. Smart cities Final Report ranking of European Medium-sized Cities Final Report 2007, Edited by the Centre of Regional Science, Vienna UT. Available online: http://www.smart-cities.eu; http://www.smart-cities.eu/download/smart_cities_final_report.pdf (accessed on 11 March 2020).
20. Mason, C.; Brown, R. Entrepreneuraial Ecosystems and Growth Oriented Entrepreneurship. Background Paper Prepared for the Workshop Organised by the OECD LEED Programme and the Dutch Ministry of Economic Affairs on. 2014. Available online: http://www.oecd.org/cfe/leed/Entrepreneurial-ecosystems.pdf (accessed on 10 February 2020).
21. Eveleens, C.P. Interfering with Innovative Entrepreneurship: How Business Incubation Impacts the Performance of Start-Ups (Doctoral dissertation, Universiteit Utrecht). 2019; Available online: https://iris-utrecht.nl/wp-content/uploads/sites/312/2020/07/2-IRIS-WP3_Smart-City-Start-ups-Performance-after-Business-Incubation-in-Utrecht-and-Gothenburg_Imke-Nijland-1.pdf (accessed on 10 October 2020).
22. Anttiroiko, A.V. City-as-a-platform: The Rise of Participatory Innovation Platforms in Finnish Cities. *Sustainability* **2016**, *8*, 922. [CrossRef]
23. Lombardi, P.; Giordano, S.; Farouh, H.; Yousef, W. Modelling the smart city performance. *Innov. Eur. J. Soc. Sci. Res.* **2012**, *25*, 137–149. [CrossRef]

24. Richter, C.; Kraus, S.; Syrjä, P. The Smart City as an opportunity for entrepreneurship. *Int. J. Entrep. Ventur.* **2015**, *7*, 211. [CrossRef]
25. Harrington, K. Smart City Leaders, Champions, and Entrepreneurs—The People Part of Vibrant Smart Cities. In *Smart Economy in Smart Cities. Advances in 21st Century Human Settlements*; Vinod Kumar, T., Ed.; Springer: Singapore, 2017. [CrossRef]
26. Hajikhani, A. Impact of Entrepreneurial Ecosystem Discussions in Smart Cities: Comprehensive Assessment of Social Media Data. *Smart Cities* **2020**, *3*, 112–137. [CrossRef]
27. Lozano, M.; Petros, P. Startups, Know-How and Sustainability in the Emerging Addis Ababa Smart-City: How an Improved Mind Frame for Glocal Startups in Addis Ababa Can Lead to a Smarter Sustainability and Governance. *Int. J. Afr. Asian Stud.* **2018**, *45*, 23–29.
28. Beattie, A. *False Economy: A Surprising Economic History of the World*; Penguin Books: London, UK, 2009; Available online: https://www.nature.com/articles/480005b (accessed on 10 October 2020).
29. Giffinger, R.; Fertner, C.; Kramar, H.; Kalasek, R.; Pichler-Milanovic, N.; Meijers, E. European Smart Cities 3.0. 2014. Available online: http://www.smart-cities.eu/?cid=3&ver=3 (accessed on 21 March 2020).
30. Crunchbase Database. Available online: https://about.crunchbase.com/about-us (accessed on 20 March 2020).
31. O'Grady, M.; O'Hare, G. How Smart Is Your City? *Science* **2012**, *335*, 1581–1582. [CrossRef] [PubMed]
32. Alawadhi, S.; Aldama-Nalda, A.; Chourabi, H.; Gil-Garcia, J.R.; Leung, S.; Mellouli, S.; Nam, T.; Pardo, T.A.; Scholl, H.J.; Walker, S. Building Understanding of Smart City Initiatives. In *Electronic Government*; EGOV.; Lecture Notes in Computer Science; Scholl, H.J., Janssen, M., Wimmer, M.A., Moe, C.E., Flak, L.S., Eds.; Springer: Berlin/Heidelberg, Germany, 2012; Volume 7443, pp. 40–53. [CrossRef]
33. Dameri, R.P. Searching for smart city definition: A comprehensive proposal. *Int. J. Comput. Technol.* **2012**, *11*, 2544–2551. [CrossRef]
34. Tóth, J.; Esztergár-Kiss, D. *Smart City 2019*; Akadémiai Kiadó: Budapest, Hungary, 2019. [CrossRef]
35. Allam, Z.; Newman, P. Redefining the Smart City: Culture, Metabolism and Governance. *Smart Cities* **2018**, *1*, 4–25. [CrossRef]
36. Barrionuevo, J.M.; Berrone, P.; Ricart, J.E. Smart Cities, Sustainable Progress: Opportunities for Urban Development. *IESE Insight* **2012**, 50–57. [CrossRef]
37. Van Soom, E. Measuring Levels of Supply and Demand for E-Services and E-Government: A Toolkit for Cities. Smart Cities Research Brief. 2009. N. 3. Available online: http://www.smartcities.info/research-briefs (accessed on 21 March 2020).
38. Fusco Girad, L.; Lombardi, P.L.; Nijkamp, P. Creative Urban Design and Development (special issue). *Int. J. Serv. Technol. Manag.* **2009**, *13*, 111–115.
39. OECD. Smart Cities and Inclusive Growth. 2020. Available online: http://www.oecd.org/cfe/cities/OECD_Policy_Paper_Smart_Cities_and_Inclusive_Growth.pdf (accessed on 20 October 2020).
40. Smart City. 2020. Available online: https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en (accessed on 21 March 2020).
41. Etzkowitz, H.; Zhou, C. Triple Helix twins: Innovation and sustainability. *Sci. Public Policy* **2006**, *33*, 77–83. [CrossRef]
42. Etzkowitz, H.; Zhou, C. *The Triple Helix: University, Industry and Government*; Routledge: London, UK, 2017.
43. Caragliu, A.; Del Bo, C.; Nijkamp, P. Smart cities in Europe. *J. Urban Technol.* **2009**, 45–59. [CrossRef]
44. Apostol, D.; Balaceanu, C.; Constantinescu, E.M. "Smarteconomy Concept-Facts and Perspectives". International Conference "European Perspective of Labor Market-Inovation, Expertness, Performance". 2015. Available online: http://www.ipe.ro/RePEc/WorkingPapers/wpconf141113.pdf (accessed on 28 August 2020).
45. Vinod, K.; Bharat, D. Smart Economy in Smart Cities. In *Smart Economy in Smart Cities, Advances in 21st Century Human Settlements*; Vinod, K., Ed.; Springer Nature: Singapore, 2017; pp. 35–36. [CrossRef]
46. Smart City. 2020. Available online: http://okosvaros.lechnerkozpont.hu/hu (accessed on 12 March 2020).
47. Nagy, A.; Sain, M.; Sárdi, A.; Vaszócsik, V. Településértékelés és Monitoring. Módszertani Javaslat. 2015, pp. 15–16. Available online: http://okosvaros.lechnerkozpont.hu/sites/default/files/2018-10/telepulesertekeles-es-monitornig-modszertani-javaslat.pdf (accessed on 12 March 2020).
48. Kok-Chin, T.; Supangkat, S.H.; Cornelius, G.; Arman, A.A. The SMART Initiative and the Garuda Smart City Framework for the Development of Smart Cities. In Proceedings of the 2018 International Conference on ICT for Smart Society (ICISS), Semarang, Indonesia, 11–13 October 2018; pp. 1–10. [CrossRef]

49. Cooper, C.; Davis, N.; Whittington, T. Smart City Startups: Market Landscape. In *Embracing technology Entrepreneurship to Build the Cities of Tomorrow*; Singularity University: Santa Clara, CA, USA, 2018; Available online: https://su.org/wp-content/uploads/2018/02/Singularity-University-SU-EB-NCT-Smart-City-Startups-Market-Landscape-EN.pdf (accessed on 21 March 2020).
50. Beauchamp, M.; Skala, A. Visegrád Startup Report 2016/2017. Available online: https://s3.eu-central-1.amazonaws.com/uploads.mangoweb.org/sharedprod/aspeninstitutece.org/uploads/2017/06/Visegrad-Startup-Report-5.pdf (accessed on 20 January 2020).
51. Visegrád Group. 2020. Available online: http://www.visegradgroup.eu/ (accessed on 5 February 2020).
52. Hungarian Statistical Office. Stadat 2019. Available online: http://www.ksh.hu/docs/eng/xstadat/xstadat_annual/i_wnt001c.html (accessed on 21 March 2020).
53. Demographic Yearbook of Poland. 2019. Available online: https://stat.gov.pl/en/topics/statistical-yearbooks/statistical-yearbooks/demographic-yearbook-of-poland-2019,3,13.html# (accessed on 21 February 2020).
54. Czech Statistical Office. 2019. Available online: https://www.czso.cz/csu/czso/home (accessed on 21 March 2020).
55. Statistical Office of the Slovak Republic. 2019. Available online: https://slovak.statistics.sk (accessed on 21 March 2020).
56. Hajdú, Z.; Horeczki, Z.; Rácz, S.Z.; Lux, G. Changing settlement networks in Central and Eastern Europe with special regard to urban networks. In *The Rouletdge Handbook to Regional Development in Central and Eastern Europe*; Lux, G., Horváth, G., Eds.; Routledge Taylor and Francis Group: London, UK, 2018; pp. 123–140.
57. Kola-Bezka, M.; Czupich, M.; Ignasiak-Szulc, A. Smart cities in Central and Eastern Europe: Viable future or unfulfi lled dream? *J. Int. Stud.* **2016**, *9*, 76–87. [CrossRef]
58. Gupta, K.; Hall, R.P. Understanding the What, Why, and How of Becoming a Smart City: Experiences from Kakinada and Kanpur. *Smart Cities* **2020**, *3*, 232–247. [CrossRef]
59. European Commission. ESDP European Spatial Development Perspective. 1999. Available online: http://ec.europa.eu/regional_policy/sources/docoffic/official/reports/pdf/sum_en.pdf (accessed on 24 October 2020).
60. NORDREGIO. ESPON 1.1.1 Study on Potentials for Polycentric Development in Europe. 2005. Available online: https://www.espon.eu/export/sites/default/Documents/Projects/ESPON2006Projects/ThematicProjects/-/fr-1.1.1_revised-full.pdf (accessed on 24 October 2020).
61. ÖIR. ESPON 1.4.1 The Rola of Small and Medium Sized Towns (SMESTO). 2006. Available online: https://www.espon.eu/sites/default/files/attachments/fr-1.4.1_revised-full.pdf (accessed on 24 October 2020).
62. ESPON. ESPON 1.4.3 Study on Urban Functions. 2007. Available online: https://www.scribd.com/document/351017730/ESPON-fr-1-4-3-April2007-final-pdf (accessed on 24 October 2020).
63. Giffinger, R.; Fertner, C.; Kramar, H.; Kalasek, R.; Pichler-Milanovic, N.; Meijers, E. European Smart Cities Version 2.0. 2013. Available online: http://www.smart-cities.eu/?cid=01&ver=2 (accessed on 10 March 2020).
64. Giffinger, R.; Fertner, C.; Kramar, H.; Kalasek, R.; Pichler-Milanovic, N.; Meijers, E. European Smart Cities 4.0. 2015. Available online: www.smart-cities.eu/?cid=01&ver=4 (accessed on 10 March 2020).
65. Péter, B. *Smart City (Okos Város)*; Dialóg Campus Kiadó: Budapest, Hungary, 2018.
66. Dalle, J.-M.; Besten, M.; Menon, C. Using Crunchbase for Economic and Managerial Research. OECD Science, Technology and Industry Working Papers 2017/08. Available online: https://www.oecd-ilibrary.org/docserver/6c418d60-en.pdf?expires=1594218904&id=id&accname=guest&checksum=DBDBEC0A22013AAE3E51222DC368260F (accessed on 8 July 2020).
67. Pisoni, A.; Onetti, A. When startups exit: Comparing strategies in Europe and the USA. *J. Bus. Strategy* **2018**, *39*, 26–33. [CrossRef]
68. Malik, M.F.; Anuar, A.M.; Khan, S.; Khan, F. Mergers and Acquisitions: A Conceptual Review. *Int. J. Account. Financ. Report.* **2018**, *4*. [CrossRef]
69. Goyal, D.K.A.; Joshi, V. Mergers in Banking Industry of India: Some Emerging Issues. *Asian J. Bus. Manag. Sci.* **2011**, *1*, 157–165.
70. Focarelli, D.; Panetta, F.; Salleo, C. Why Do Banks Merge? *J. Money Credit Bank.* **2002**, *34*, 1047–1066. [CrossRef]
71. Nagy, Z.; Sebestyénné Szép, T.; Szendi, D. The Performance of Smart Cities in the Visegrad Countries. *Erdélyi Társadalom* **2018**, *XVI*, 59–82. [CrossRef]
72. Nagy, Z.; Tóth, G.; Szendi, D. Opportunities for Adaptation of the Smart City Concept—A Regional Approach. *Theory Methodol. Pract.* **2016**, *12*, 87–93. Available online: http://tmp.gtk.uni-miskolc.hu/volumes/2016/02/TMP_2016_02_08.pdf (accessed on 21 March 2020). [CrossRef]

73. OECD. Redefining "Urban". A New Way to Measure Metropolitan Areas. 2020. Available online: https://read.oecd-ilibrary.org/urban-rural-and-regional-development/redefining-urban_9789264174108-en (accessed on 24 October 2020).
74. OECD. Enhancing the Contribution of Digitalisation to the Smart Cities of the Future. 2019. Available online: https://one.oecd.org/document/CFE/RDPC/URB(2019)1/REV1/en/pdf (accessed on 20 October 2020).
75. Szendi, D.; Nagy, Z.; Sebestyén Szép, T. Can the performance of the smart cities be measured? Case study of the capitals of the EU member states that joined after 2004. *Reg. Stat.* **2020**, *60*, 249–271. [CrossRef]
76. Smart City Overview 2018. Available online: https://su.org/wp-content/uploads/2018/02/Singularity-University-SU-EB-NCT-Smart-City-Startups-Market-Landscape-EN.pdf (accessed on 30 September 2020).
77. Morozov, E.; Bria, F. Rethinking the Smart City. In *Democratizing Urban Technology*; Stefanie Ehmsen, S., Scharenberg, A., Eds.; Rosa Luxemburg Stiftung: New York, NY, USA, 2018; pp. 2–56. Available online: http://www.rosalux-nyc.org/wp-content/files_mf/morozovandbria_eng_final55.pdf (accessed on 30 September 2020).
78. Robart. Available online: http://www.robart.cc/de/ (accessed on 24 October 2020).