

INNOVATIVENESS IN AN URBAN CONTEXT. MEASURES, APPROACHES, PLACE OF POLISH CENTRES

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Purpose: The main aim of the article is to highlight the importance of city located sources of innovativeness. The literature review was done to describe the measures, approaches and indicators which are the most often present in elaborations dealing with the issue of innovativeness in an urban context. What is more, the article made it possible to recount the place of polish centres mentioned in those rankings.

Design/methodology/approach: The paper is based on the terminological foundations constituted by the terms of: change, difference and development. Much as they are all essential to the economy, none of them could be realized without another crucial factor which is innovativeness. The term introduced hereinbefore has been described in many publications, for instance those written by Joseph Schumpeter, Peter Drucker, Oskar Lange and John K. Galbraith – just to mention the most classical ones. What may be seen as surprising, innovative potential is often measured on the regional level but rarely on the municipal level. In order to fill in this gap, shed some more light on the problem, a literature review was conducted.

Findings: Whereas innovativeness on the national and regional level is often measured, there is only a few studies tackling the title phenomenon on the city level. What is more, available rankings are relatively often published by the private sector institutions, which sometimes may be seen as a quality questioning their objectiveness.

Research limitations/implications: The review of data and sources included in the article is limited to the rankings which are relatively popular and the most often proposed by the search engines of web browsers. It is highly recommended that further research studies include and examine a wider selection of rankings – even those not widely recognized.

Practical implications: The paper highlights the need for establishing comprehensive scientific city innovation rankings. The majority of currently available rankings is established by the business sector and use a varied and incoherent list of indicators. It is therefore recommended for the scientific sector to try and develop a more universal, widely recognized and highly objective ranking.

Originality/value: The paper summarizes data which are scattered throughout different sources of information. What is more, according to this summary it tries and recounts the place of Polish centers.

Keywords: innovativeness, innovations, cities, rankings.

Category of the paper: Viewpoint.

1. Introduction

An immanent feature of the physical and social order is being subject to transformation. Although this statement may be accused of over-simplification, it is legitimized by the number of stories indicating human reflection on the inevitability of transformations of the experienced world and their irregular nature. The Ionian philosophers, based on observations of nature (including the behaviour of fire and water), saw the basic principle governing reality in changeability (Reale, 1994). The heritage of antiquity in this regard is also the Old Testament parable of seven fat and lean years, which can be interpreted as an early formulation of the law of economic business cycles.

More recent research provides additional support for these early ideas. Pitirim Sorokin (2009, pp. 7-10, 27-35) in his monumental work on social mobility quoted historical data proving the permanence of fluctuations within geographical and social space. Despite the subjectively recorded moments or times of stagnation, in the long-term perspective, reality is far from a steady state, as evidenced by the moments of “boom” and “decline”, accumulation and plundering of wealth, business cycles of various lengths, or the law of diminishing profits (Sorokin, pp. 32-33). Relatively recent publications make bold statements about the extension of the thermodynamic principle of entropy (energy dissipation) to social reality (Suzman, 2020, p. 326). From an anthropological perspective, it is the striving for changeability and chaos that overwhelms it that becomes the basis for the emergence of organized forms of collective life (in other words, forms of resource accumulation) in the form of families, tribes, the state or the city - to name but the most important of them (Suzman, p. 327).

2. From change to development - significant terminological foundations

It is therefore not surprising that many analyses of reality are largely focused on the concepts of “change”, “difference”, “development”, “progress” or “transformation”. The above terms, although different in their meaning, show one of the main features of social sciences, which is not only being satisfied with a static description of the nature of phenomena, but also the formulation of dynamic observations (Turowski, 2000, p. 73). As already suggested by the previously cited terms, the description of the phenomena affecting society is undertaken using different terminological keys, which is often not accompanied by an attempt to hierarchize them or reflect on their meaning.

Although literature on the subject does not fully agree on the above matter, reconstructing the available voices, one can introduce a division into the following issues: difference, change, process and development. In turn, they mean “differences in aspects of the social system, within

specific situations and facts, observed at a given moment” (difference), “a sequence of structural transformations of the social system observed in the perspective of time” (change), “a train of sequences following each other observed in the perspective of time and causally conditioned changes in the social system” (process) and finally “the process of accumulation of individual changes of a progressive nature observed in the perspective of time that take place in the social system” (development) (Krzysztofek, Szczepański, 2005, pp. 11-13; Sztompka, 2004, pp. 437-439; Turowski, 2000, p. 73). It is worth noting that the progressive nature of development is manifested in the fact that its direction is valued and evaluated positively by bringing it closer to a state of society defined as desirable (Sztompka, 2004, pp. 441-442).

The terminological order described above justifies the greatest interest in the issue of development assumed by the author of this text. The accumulation of directional changes of a progressive, expected and highly valorised nature is important from the point of view of regional and local studies and the formation of public policies. Regardless of whether we consider these issues from positions closer to socio-economic geography (strengthening socio-economic regions) or from positions closer to the sociology of the city (mechanisms of social creation of space), one of the basic determinants of progressive changes is technical and technological potential (Tkocz, 2008, pp. 147-173; Majer, 2010, pp. 67-69).

3. Innovativeness from a scientific point of view - a cross-section of the issue

At this point we come to the key concept for the entire publication, which is innovativeness. The title term already at the level of common collocations reveals a high connection with both development and technology. Moving from the plane of collocation of everyday life to more scientific definitions, it is worth pondering for a moment on the semantic practices occurring here. Among the numerous synonyms of innovation, there are terms such as: “novelty”, “technical novelty”, “invention”, “improvement” and “enhancement” (Dictionary of the Polish Language PWN, 2022). The associations with the previously mentioned progressive changes are therefore clear in this case. Innovativeness itself at the dictionary level is defined as “newness”, “introducing something new” (Dictionary of the Polish Language PWN, 2022).

Obviously, the most valuable scientific definition of innovation and innovativeness for further discussion is more complex. In literature on the subject, references to the four most frequently quoted theoretical assumptions dominate in this regard: Joseph Schumpeter, Peter Drucker, Oskar Lange and John K. Galbraith. For Schumpeter (1960, p. 34), who is accredited with the status of the precursor of the theory of innovation, innovation is “the introduction of new products, new methods of production, finding new markets, acquiring new sources of raw materials and introducing a new organization”. We also owe the

economist the famous comparison of innovation to “creative deconstruction” or “creative demolition”, as a change so radical that it pushes away the old solutions (Wojtasik, 2013, p. 134).

According to Drucker (1992, p. 126), innovations are “creative changes in the social system, in the economic structure, in technology and in nature”. For the cited author, the status of innovation can be granted to any idea, procedure or thing that is qualitatively different from the existing ones and thus constitutes a novelty. At the same time, it should be noted that “transforming innovations into products and market activities is (...) undertaking a complex activity with a high degree of risk and uncertainty” (Drucker, p. 126).

Lange (1973, p. 665) considered innovations in the context of their impact on the final efficiency of the input of the production factor and the final cost of the product. The researcher stated that as a result of the application of innovation, the final cost of the product or its final production cost changes (Musiał, Chrzanowski, 2018, p. 47). Thus, two ideal-typical possibilities can be distinguished here. Firstly, if the final cost increases, then the company, wanting to maintain the current level of profitability, is forced to increase production. On the other hand, the reverse situation is also possible. The use of innovation reducing the final cost allows the company to maintain the achieved level of profitability, even with reduced production volume. Between the two extreme situations described above, there are a number of intermediate configurations which, in Lange’s opinion, show various possible combinations of change (Musiał, Chrzanowski, 2018, p. 47).

The fourth of the classics of shaping thoughts about innovation discussed here, Galbraith (1979, p. 245), points out that innovations in the sector of large enterprises are of an organized nature. This means that the improvements in production processes that need to be made are determined well in advance. The implementation of these improvements is supported by properly established schedules and budgets. The author noted that innovations in the field of production processes result in the replacement of labour with capital. This entails increasing the certainty of the company’s income (Musiał, Chrzanowski, 2018, p. 49).

It should be noted here that in its modern form the notion of innovation is often perceived as open innovations. The mentioned term is described as purposively managed knowledge flows across organizational boundaries. In other words, it is assumed that the most beneficial for businesses is when innovations easily transfer and circle between different firms as well as between firms and creative consumers. The bottom line is that applying open innovation gain increased consumer satisfaction, increased employee productivity and development of new products and services (Kuzior, Sira, Brożek, 2023). What is important from our point of view is that the notion of open innovation can be applied not only to the commercial sector but also to organizational purposes and even politics (Bogers, Foss, Lyngsie, 2018).

On the sidelines of the considerations presented here, it is impossible to omit the Oslo Manual (GUS, 2018, p. 48), often quoted in literature on the subject. In its latest edition, innovation was defined as “more than just an invention”, but also the need to “implement”

a new or significantly improved product or process, a new method of marketing or a new method in terms of business practices, workplace organization or relations with the external environment. In the Oslo Manual (GUS, 2018, p. 48) we also find the statement that innovation is “a dynamic and ubiquitous activity that occurs in all sectors of the economy”. Thus, it is not an exclusive function of the enterprise sector, and may be undertaken by other organizations or individuals – i.e. all entities capable of collecting and disseminating knowledge and, on this basis, proposing changes in products or processes (GUS, 2018, p. 48).

Importantly, the Oslo Manual describes four dimensions of innovation that can provide measurement recommendations. They are knowledge (understanding information, processing it for various purposes), novelty (potentially new applications that can be measured by objective measures and subjective opinions), implementation (systematic efforts to make innovations available to potential users) and value creation (providing direct and indirect benefits – mainly in terms of profitability) (GUS, 2018, pp. 48-52).

4. Significant measures of innovation

Recalling the issue of measurement inevitably brings us to the next point, which is the quantification of innovation processes. For this purpose, standardized tools in the form of indexes are used, which are then used to prepare rankings. Probably the most frequently cited sources in this regard are the Global Innovation Index, Innovation Indicators, the European Innovation Scoreboard, along with its accompanying Regional Innovation Scoreboard. Both Innovation Indicators and EU indices are based on the previously described Oslo Manual. The first measure mentioned above, GII, which has been successively developed for 14 years, includes 132 economies in its parameterization, which account for over 94% of the world's population and 99% of global GDP. This measure is composed of two sub-indexes, inputs (Input Sub-Index) and outputs (Output Sub-Index), which are additionally divided into detailed parameters. On the input side, these are elements of the economy that are conducive to undertaking innovative activities: institutions (political environment), social capital and research (education), infrastructure (communication and innovation technologies), advanced market mechanisms (availability of loans), advanced business mechanisms (absorption of knowledge). On the side of outputs, there are results in the field of knowledge and technology (creation, impact, diffusion of knowledge) and results in the field of creativity (creative goods and services). According to the latest available list for 2021, Poland closes the table of the 40 most innovative economies in the world, among the European Union countries, ahead only of Romania and Bulgaria, remaining far behind Switzerland, Sweden and the United States, which lead the ranking (Global Innovation Index, 2021, p. 4).

The main innovation indicators are grouped into four sections: 1) science, technology and industry; 2) innovation and technology; 3) business innovation; 4) tax support for R&D and innovation. Within each section, detailed statements are regularly published, covering such parameters as access to broadband Internet per capita, employment dynamics in the IT sector, the role of foreign headquarters in the IT sector, or expenditure on higher education (OECD, 2017). Among the many detailed indicators available here, which due to limited space will not be presented here, it is worth paying attention to the basic chart available in the general report *Innovation Indicators 2019* (2020, pp. 1-2). It contains information on the percentage of enterprises reporting at least one innovation in the perspective of 2014-2016 and the share of employment in innovative companies. Also this time, Poland ranks low, both in the case of the first and second parameter. Among the 39 OECD countries, companies from Canada, Switzerland and Norway were named the most innovative (OECD, 2017, p. 2).

The European Innovation Scoreboard is a ranking comparing the level of innovation in Member States and European countries that are not members of the United Community. The indicator in question takes into account such component measures as: human resources, digitization, company investments, the use of information technologies, the state of intellectual resources. By providing the results, the European Innovation Scoreboard assigns the countries included to four categories - emerging innovators, moderate innovators, strong innovators and innovation leaders. The latest edition of the ranking places Poland in the first category – somewhat euphemistically named – a category of European innovation laggards: right next to Romania, Bulgaria and Lithuania. At the other end of the scale are innovation leaders: Denmark, Finland and Sweden (European Innovation Scoreboard, 2021, pp. 2-3).

What is even more important from our point of view, as an extension of the above index, is the fact that data on regional innovation diversity in the EU is published - referred to as the *Regional Innovation Scoreboard* (2021, pp. 17-18). Based on an indicator framework similar to the EIS, the *Regional Innovation Scoreboard* also adopts the division into four categories of innovators from the former. Again, Poland does not look very favourably in the ranking under consideration. Virtually all regions of the Republic of Poland are marked with the category of emerging innovators (more on this topic see also: Kuzior, Pidorycheva, Liashenko, Shvetsova, Shvets, 2022). The only two regions officially meeting the criteria of moderate innovators are the Lesser Poland voivodeship and the Warsaw capital subregion, statistically separated from the Masovian voivodship (Kuzior, Pidorycheva, Liashenko, Shvetsova, Shvets, 2022, pp. 19, 30).

5. City innovation rankings

In addition to indicators measuring innovation at the global or local level, there are also those that rank the most innovative urban centres. Such classifications sometimes appear in the opinion-forming press. At this point, one can point to the rankings of the Polish edition of *Forbes* (2018) or the *American Newsweek* (2019) published in recent years. In the first case, the national editorial office of the magazine indicated the ten most innovative Polish urban centres. The list from 2018 opens with Częstochowa, which was appreciated by the magazine, among others, for social programs and real estate tax exemption for entrepreneurs creating jobs. The following places were occupied by: Warsaw and Kraków, Toruń, Wrocław, Gdańsk and Rzeszów, Poznań and Białystok. In the second case, the editorial office of the *American Newsweek* focused on identifying the most innovative cities in the world. According to the magazine, these were: Amsterdam, Copenhagen, Barcelona, Helsinki, Hong Kong, Fukuyoka, Chicago and Oslo.

Although we do not undermine the cognitive value of these rankings, the author of the article intends to focus more on the description of more comprehensive rankings, less based on the expert method, opinions and selected indicators, and more on broader sets of indicators and quantifiable data. Interestingly, a significant part of the available studies are those that are signed by the business sector and its environment institutions; the subject of innovativeness of cities is less often taken up by the science sector. This can be interpreted as the deep rooting of the issue of innovation in the repertoire of issues important for business, while possibly diminishing the importance of this term in the scientific community.

The main objective of the City Innovation ranking, developed jointly by Bloomberg Philanthropies and the OECD, was to determine how cities invest in innovation and to check to what extent innovation expenditure generates results for the well-being of city residents. The base of centres included in the study covered over 140 cities from OECD countries and beyond. On the innovation capacity side, the researchers took into account parameters such as innovation building strategies and attitudes, measures and funds targeted at the development of urban innovation capacities, or the way cities obtain and share data. As mentioned above, the ranking was characterized by the fact that, in addition to estimating the innovative potential, it also addressed the issue of translating this potential into the well-being of city residents. Indicators of urban well-being include: percentage of households spending less than 25% of their income on rent, air pollution, turnout in local elections, unemployment rate and percentage of the population satisfied with their lives. Another specific feature of the list is not indicating cities with higher or lower places, but a separate descriptive assessment of the strengths and weaknesses of each city included in the ranking. The study also points to several universally observed trends. Satisfaction of city residents reveals the connection with, among others, the size of the public innovation sector, the size of the open data set and the involvement of

stakeholders. It is worth noting that the 2020 list does not include any of the Polish cities. From Central Europe, only Bratislava and Vilnius have made the list.

The Innovation Geographies ranking, signed by the real estate agency JLL, aims to identify global leaders in innovation and talent concentration in the post-pandemic reality. In this case, the following innovation indicators were used: foreign direct investment in high-tech industry, expenditure on R&D, number of patent applications and attractiveness for venture capital. As mentioned above, in addition to addressing the issue of innovation, this list also includes a separate index of talent concentration. Among the detailed parameters constituting it, there are the level of education of the population and the level of employment in the high-tech industry. No Polish cities or urban centres from Central Europe made the ranking. The global innovation leaders are: San Jose, Tokyo, San Francisco, Boston and New York. However, if we are talking about the second dimension of the study, i.e. the world's top cities concentrating talents, these are: San Jose, Boston, San Francisco, London and Tokyo. The presented list is another one that omits both Polish cities and cities from Central Europe.

However, the representation of Polish cities appears in the report of the Australian analytical company think2know. Dated for 2021, the Innovation Cities study contains a list of 500 cities ranked in terms of the innovation potential attributed to them. It indicates the same three cities as leaders: Tokyo, Boston and New York. Among the extensive indicator layer, we will find parameters belonging to the following categories: cultural resources (festivals, shopping malls, availability of newspapers), social infrastructure (access to water, universities, government stability), market networking (city brand, embassies, direct foreign investments) (Ibid.). Among the cities of Central Europe, the highest place was awarded to Prague (59). The list includes four Polish centres: Warsaw (89), Katowice (215), Wrocław (221), Gdańsk (248) and Kraków (258).

Signed by the HSE Institute for Statistical Studies and Economics of Knowledge, the HSE Global Cities Innovation Index from 2021 is prepared on the basis of three sets of indicators: technological development (largest enterprises, R&D expenses of companies, startups, leading universities), creative industries (fashion brands, film and gaming sector, industrial design leaders), and urban environment (costs of running a business and living, transport and digital infrastructure, tourist attractiveness). Information for the list is obtained from such world-renowned sources as: Web of Science, StartupBlink, ArtReview, Passport Euromonitor or World Values Survey (Ibid., pp. 13-14). Unfortunately, although the ranking refers to itself as global, it omits cities from Central Europe, Africa and the Middle East in the parameterization. Thus, we will not find any Polish centres there. Let us mention, however, that for the HSE GCII ranking, the three most innovative cities of 2020 are New York, London and Tokyo (Ibid., p. 24).

The 2021 Global innovation Hubs Index was developed by the Centre for Industrial Development and Environmental Governance (CIDEG) at Tsinghua University and Nature Research. It consists of three detailed lists on innovation in research, economy and innovation ecosystem. The first list deals with the issue of urban human resources, the presence of research institutions and scientific infrastructure. The second list takes into account such component measures as GDP growth and the presence of innovative enterprises. The innovative ecosystem, i.e. the last of the detailed indexes presented here, covers topics such as support for start-ups, public services, and openness to cooperation. In terms of the adopted parameters, the following stand out as global innovation leaders: San Francisco, New York, London, Beijing and Boston. This is yet another ranking in which there are no cities from Poland or Central Europe.

A wide representation of the region, despite the same large base of cities (50), is present in the case of another frequently quoted study - The Most Innovative Cities in the World signed by Paymentsense. The global city index prepared in 2022 is based on five key indicators. These are: the number of patents registered by Google, the number of new business registrations in 2021, the number of universities and their ranking in the RUR World University, the average monthly number of searches for “how to start a business” and the number of business activities registered on the Kickstarter platform. According to the ranking, the global innovation leaders are Washington D.C., Berlin, Paris, Canberra and Beijing. As already mentioned in the study, it includes cities from Central Europe. These are: Bucharest (29th place), Prague (32nd) and Warsaw (34th).

Table 1.*Review of city innovation rankings*

No.	Name, year of last release and authors	Methodology	Ranking leaders	Position of Polish cities
1	City innovation, 2018-2020 Bloomberg Philanthropies & OECD	<p>Main objective: Determining how cities invest in innovation and checking to what extent innovation spending generates results for the well-being of city residents.</p> <p>The database consists of over 140 cities from OECD and non-OECD countries.</p> <p>Innovative capacity:</p> <ul style="list-style-type: none"> • The importance of innovation for the city, strategies and attitudes to build innovation; • How innovations are organized and used in administration; • Measures and funds directed at the development of urban innovative capacity; • How cities acquire, store and share data for innovation work; • Whether and how cities evaluate the results of their innovation strategies <p>Prosperity outcomes:</p> <ul style="list-style-type: none"> • Households spending less than 25% on rent; • Air pollution; • Deviation of income from the national average; • Turnout in local elections; • Unemployment and employment rates; • Percentage of the population satisfied with their lives; • Life expectancy, percentage of the population without health problems; • Percentage of the population satisfied with their lives; • Walkability index; • Percentage of the population with tertiary education; • Percentage of violent crimes 	<p>The list does not indicate cities ranked higher or lower, but it contains a separate assessment of the strengths and weaknesses of each city included in the ranking, and also describes several universal trends. Residents' satisfaction with the city seems to be related to:</p> <ul style="list-style-type: none"> • The size of the public innovation sector; • Dedicating part of the administrative staff to dealing with innovation; • More open data; • Stakeholder involvement 	<p>No Polish cities in the list. From Central Europe, only Bratislava and Vilnius were included</p>

Cont. table 1.

2	<p>Innovation Geographies, 2022</p> <p>JLL</p>	<p>Main objective: Determining global leaders of innovation and talent concentration in the post-pandemic reality.</p> <p>Innovation indicators:</p> <ul style="list-style-type: none"> • Foreign direct investment in high-tech industry; • R&D expenses; • Patent applications; • Attractiveness for venture capital <p>Talent Concentration Index:</p> <ul style="list-style-type: none"> • Quality of higher education; • Level of education of the population; • Level of migration of the working age population; • Level of employment in the high-tech industry 	<p>Global innovation leaders (from the list of 25):</p> <ol style="list-style-type: none"> 1) San Jose; 2) Tokyo; 3) San Francisco; 4) Boston; 5) New York; 6) Seoul; 7) Paris; 8) Beijing; 9) London; 10) Seattle <p>Global leaders in talent concentration:</p> <ol style="list-style-type: none"> 1) San Jose; 2) Boston; 3) San Francisco; 4) London; 5) Tokyo; 6) Beijing; 7) Washington DC; 8) Austin; 9) Seattle <p>Categories resulting from the intersection of the dimensions of innovation and talent:</p> <ul style="list-style-type: none"> • Global leaders: Beijing, Paris; • Rich in talent: Stockholm, Denver, Hong Kong; • Focused on innovation: Chicago, Barcelona, Singapore; • Emerging innovators: Mumbai, Guangzhou; • Skilled centres: Brisbane, Hamburg, Nashville • Local hubs: Leeds, Busan, Tampa 	<p>No Polish cities in the list. No city from Central Europe was included</p>
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Cont. table 1.

3	<p>Innovation Cities Index, 2023</p> <p>THINK2NOW</p>	<p><u>Main objective:</u> Published since 2007, the ranking of the 500 most innovative cities in the world.</p> <p>162 indicators assigned to three thematic blocks:</p> <ul style="list-style-type: none"> • Cultural resources (NGOs, museums, art galleries, music events, political protests, information availability); • Social infrastructure (mass transport, universities, hospitals, railways, roads, start-ups, healthcare, telecommunications infrastructure); • The strength of the city, its connection to global markets (geography, city economy and its size, geopolitical factors, diplomacy) 	<p>Global Innovation Leaders (from the list of 500):</p> <ol style="list-style-type: none"> 1) Tokyo; 2) London; 3) New York; 4) Paris; 5) Singapore; 6) Los Angeles; 7) Boston; 8) Seoul; 9) San Francisco – San Jose; 10) Houston 	<p>Among the cities of Central Europe, the highest place was awarded to Prague (59). The list includes four Polish centres: Warsaw (89), Katowice (215), Wrocław (221), Gdańsk (248) and Kraków (258)</p>
4	<p>Global Cities Innovation Index, 2023</p> <p>HSE Institute for Statistical Studies and Economics of Knowledge</p>	<p><u>Main objective:</u> presenting a reliable measurement tool to assess the competitive advantages of cities in terms of their attractiveness for the leaders of the innovative economy.</p> <p>The analysis included 200 agglomerations from 53 cities.</p> <p>The ranking is based on 74 indicators grouped into 22 sections assigned to three thematic blocks:</p> <ol style="list-style-type: none"> 1) Technological development (innovation infrastructure, technology companies, start-ups and venture capital, universities and R&D organizations); 2) Creative industries (film and animation, fashion, industrial design, computer games, advertising and PR, art, music, architecture, literature); 3) Urban environment (business costs, housing costs, mobility, availability of broadband internet, safety, tourist attractiveness, ecology, international connections) 	<p>Global Innovation Leaders (from the list of 200):</p> <ol style="list-style-type: none"> 1) London; 2) New York; 3) Tokyo; 4) Beijing; 5) Paris; 6) San Francisco; 7) Los Angeles; 8) Shanghai; 9) Seoul; 10) Moscow 	<p>In the ranking, Warsaw was 43rd, the highest among Central European cities. Budapest is ranked 47th and Czech Prague is ranked 50th</p>

Cont. table 1.

5	<p>Global Innovation Hubs Index, 2021</p> <p>the Centre for Industrial Development and Environmental Governance (CIDEG) at Tsinghua University and Nature Research</p>	<p>The general ranking consists of three detailed lists:</p> <ul style="list-style-type: none"> • Research innovation (science and technology, human resources, research institutions, scientific infrastructure, knowledge creation); • Innovation economy (ability to create scientific innovation, economic growth, emerging industries, innovative enterprises); • Innovation ecosystem (culture of innovation, support for start-ups, public services, openness to cooperation); 	<p>Global Innovation Leaders (from the list of 50):</p> <ul style="list-style-type: none"> • San Francisco – San Jose; • New York; • London; • Beijing; • Boston; • Tokyo; • Hong Kong • Paris; • Seattle; • Baltimore 	<p>No Polish or Central European cities included in the list</p>
6	<p>The Most Innovative Cities in the World, 2022</p> <p>Paymentsense</p>	<p>The global city index is based on the following metrics:</p> <ul style="list-style-type: none"> • Number of patent applications registered by Google; • Number of new business registrations in 2021; • Number of universities and their ranking in RUR World University; • Average monthly number of searches for “how to start a business”; • Number of businesses registered on the Kickstarter crowdfunding platform and their average value 	<p>Global Innovation Leaders (from the list of 50):</p> <ul style="list-style-type: none"> • Washington D. C.; • Berlin; • Paris; • Canberra; • Beijing; • Ottawa; • Rome; • London; • Madrid; • Brasilia 	<p>Among the cities of Central Europe, only Bucharest (29th place), Prague (32nd) and Warsaw (34th) can be found in the ranking</p>

Source: the author’s elaboration based on data from: <https://cities-innovation-oecd.com/>; <https://www.us.jll.com/en/trends-and-insights/research/innovation-geographies>; <https://innovation-cities.com/worlds-most-innovative-cities-2022-2023-city-rankings/26453/>; <https://gci.hse.ru/en/>; <https://www.nature.com/articles/d42473-021-00579-5>; <https://www.paymentsense.com/uk/blog/most-innovative-cities-report-2022/>.

6. Instead of conclusion. Innovativeness in the urban aspect – the need for scientific rankings

The example of the Warsaw subregion given earlier clearly shows that although Poland is not ranked high in innovation rankings, and its urban centres are absent from global rankings, individual cities - if they are statistically separated - may differ positively from this pattern in a more local (continental) perspective. This perspective coincides with the definitions of urban centres as poles of growth, development and change (Bierwiazonek, Szczepański, 2013, pp. 11-12). In other words, as places that accumulate flows of people, energy, resources and knowledge, and thus significantly contributing to the creation of new values - both in the sphere of culture and economy (Castells, 2007, p. 390). A separate and extensive selection of literature on the subject is devoted to the description of individuals living in cities, and in particular the characteristics of those individuals that inhabit the most prosperous metropolitan areas. Thus, in the statements of various authors, the urban lifestyle is associated with the need to achieve, with hubristic motivation (the need to exalt oneself), transgression, overcoming one's own shortcomings, empathy, tolerance, talent and creativity – that is, a conglomerate of characteristics sometimes difficult to define and measure, but always valorised positively (Bierwiazonek, Szczepański, 2013, pp. 13-14; Landry, 2013; Florida, 2010; Jałowicki, 2007). It is worth mentioning here that the importance of the title issue was reflected in the conclusions of the last Urban Policy Congress 2021. One of the adopted recommendations concerned taking action to build an integrated innovation ecosystem - e.g. by attracting and promoting human capital in the form of young talent (Frontczak, Sobala-Gwosdz, Gruszecka-Spychała, 2021).

The significance of cities can be seen both on the side of development inputs and development outputs. On one hand, urban units - especially the largest ones with a global node character - provide the necessary human, knowledge, material and energy resources for any innovation to take place. On the other hand, as centres of flows, they also become the largest default beneficiaries of innovative implementations, even if they are first implemented within their functional areas. A smart city remains the most far-reaching and most desirable outcome of city development on the path of innovation, which at the most general level is sometimes defined as a city investing in systems using the latest information and communication technologies in the sphere of production, education, transport and administration - to name only the most important of them (Kryński, 2020, pp. 157-158).

Moreover, the prominent significance of cities in considering the issue of innovation is not diminished even by the recently fashionable appreciation of the role of the state in generating development impulses (Mazzucato, 2016). As evidenced by historical examples, numerous manifestations of planned state interference in the economic structure have always been located

in a specific place, significantly contributing to the modification of the trajectory of city-forming processes (usually intensifying them) (Matyja, 2021). Moreover, bearing in mind the geographical and institutional context of the functioning of the Polish economy, it is impossible to ignore the European Union's strategy of building a globally competitive knowledge-based economy. In such a case, identification of the innovative potential appears to be a necessary step for undertaking appropriate regional policy tools (Nowakowska, 2009, pp. 207-210).

A review of the relatively recently published and more frequently cited city innovation rankings allows us to draw a few general conclusions and point out their shortcomings. The measures and indicators used in the rankings, although similar in terms of their topic, are not the same. This is one of the reasons why the presented ranking lists differ from each other. Attention is also drawn to the fact that a significant part of the reports referred to above has a strictly commercial source, less often a scientific one. In view of the above, there is a need for academic studies dealing with the title issue, as well as taking into account national urban centers.

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