

## Sustainable Creative Economy in Cities: Comparative Analysis of Capital Cities in the EU

### Zrównoważone gospodarki kreatywne w miastach: analiza porównawcza stolic państw UE

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#### **Abstract**

This article compares levels of creative economies in capital cities in European Union (EU), identifies groups of cities with similar characteristics, and approaches to developing a sustainable creative cities. At the urban level, creativity represent an important element of economic activity, enable the development of creative cities and contribute to all pillars of sustainable development. An essential aspect of creative economy is its quantity and quality in a particular area, which is often measured by the extent of cultural and creative industries and some other indicators. Therefore, in the article, creative economy is analysed by three indicators (Cultural vibrancy, Creative economy and Enabling environment) to assess and compare its levels in capital cities in EU. Data were collected from the database of the Cultural and Creative Cities Monitor. The comparison of capital cities by three indicators identified four groups of cities according the differences in their developmental levels of creative economy. The findings show that the differences and the relative performance regarding the creative economy among capital cities in EU are still remarkable, and that particular groups of cities focus and consequently sustainably develop specific aspects of creative economy.

**Key words:** creative economy, cultural and creative cities, sustainable development, cluster analysis, capital cities, European Union

#### **Streszczenie**

W artykule porównano poziomy osiągnięte przez gospodarki kreatywne w stolicach państw Unii Europejskiej (UE), wskazując na miasta o podobnych cechach i podejściach do tworzenia zrównoważonych miast kreatywnych. Na poziomie miasta kreatywność stanowi istotny element aktywności ekonomicznej, prowadzący do rozwoju miast kreatywnych i powiązany ze wszystkimi trzema filarami rozwoju zrównoważonego (społecznym, ekonomicznym i ekologicznym). Istotnym aspektem gospodarki kreatywnej jest jej ilość i jakość w określonym obszarze, która jest często mierzona m.in. przez poziom osiągnięty przez aktywność kulturową i kreatywną. W tym artykule gospodarka kreatywna jest dyskutowana w oparciu o trzy wskaźniki (kulturowość, ekonomię kreatywną i sprzyjające środowisko), co umożliwia ocenę i porównanie ich poziomów osiągniętych w stolicach UE. Wykorzystane dane pochodzą z bazy Cultural and Creative Cities Monitor. Porównanie stolic w oparciu o trzy istotne wskaźniki pozwala sklasyfikować grupy miast w oparciu o występujące różnice odnoszące się do poziomu rozwoju kreatywnej gospodarki. Uzyskane wyniki pokazują, że różnice i względna wydajność w kontekście kreatywnej gospodarki, występujące wśród stolic krajów UE jest ciągle znacząca, przy czym nie brakuje miast, które konsekwentnie – i w sposób zrównoważony – rozwijają określone aspekty kreatywnej gospodarki.

**Słowa kluczowe:** Gospodarka kreatywna, kulturowe i kreatywne miasta, zrównoważony rozwój, analiza klastrów, stolice, Unia Europejska

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## Introduction

In knowledge societies, creative economies are increasingly being developed and are becoming an important aspect of development of cities, regions and countries. Not only are industries in creative economies replacing obsolete industries, they are also innovating immensely and producing new products and services that are used in other industries. Because of their significant development, they have become a central point of interest in many developed countries and the concept of creative economies has become popular. Creative economies are determined by the extent of creative and cultural industries (Howkins, 2001). The development of creative and cultural industries is determined by the creative class (Florida, 2002), which is a group of professional, scientific and artistic workers whose outputs create economic, social and cultural dynamics, especially in urban areas. In the era of creativity, economic growth is influenced by three factors, namely technology, talent and tolerance, otherwise known as the 3T-theory (Florida, 2002). According to this theory, talent promotes growth and attracting human capital to a specific geographic area requires tolerance.

The importance of creative economy and its support have enabled it to develop and to see above average growth. Creative economy development has even attracted the attention of national economies; as such creativity represents a central pillar of new economies in all aspects of life. Therefore, it is also reasonable and necessary to support the development of creative economy in general and its expressive parts (creative and cultural industries, supportive environment). This is also one of the objectives of the European Commission as covered in the *Europe 2020 strategy for growth and jobs* (European Commission, 2010a, 4). The European Commission has identified several priorities in the field of (creative and cultural industries (CCIs), among which are (European Commission, 2010a): (1) fostering changing skills needs by promoting innovation in education, (2) supporting mobility of artists, (3) coordinating with EU member countries to reform environments for CCIs, and (4) developing policies and initiatives to promote market access for and investment in CCIs. These priorities are complemented through a variety of actions and initiatives. In order to increase support for cultural and creative industries, in 2010 the European Commission issued the Green Paper *Unlocking the potential of cultural and creative industries* (European Commission, 2010a) to facilitate appropriate conditions for the development of creativity and innovation in a new entrepreneurial culture throughout the EU. It represents an invitation to EU Member States to realize the importance of promoting and developing culture and creativity as drivers of local and national development. Such an emphasis on supporting CCIs places it as one of central industries in the EU. Countries use different approaches to

implement policies aimed at supporting and developing creative economy and can be grouped into several categories (United Nations/UNDP/UNESCO, 2013, 53), namely: (1) CCI policy in accordance with human development thinking, (2) consumption driven CCI policy, (3) limited sector-driven CCI policy, (4) awareness about CCIs but without formal CCI policy, and (5) countries that did not recognize CCIs as such.

Creative economies contribute to economic, social, cultural and sustainable development in several ways. Economic impact is seen through promotion of economic diversification, revenues, trade and innovation. Social impact of creative economy is seen through its contribution to employment, particularly for disadvantaged groups, and through fostering social inclusion. On the local level, creative economy link different social groups and contribute to social cohesion and contribute to individuals' education, culture, happiness and well-being. As such, creative economy plays an important role in the economy and influences individuals' lives. This paper aims to unveil the extent of creative economies in capital cities in EU. Capital cities, because of their size, economic, cultural and social impact should have well-developed different aspects of creativity, which contribute significantly to the cities' economic activity. The article starts with an overview of creative economy with an emphasis on creative cities. Second, the role of creative economy in creating sustainable development is analysed. Further, in the empirical part of the paper, creative economies in capital cities in EU are compared regarding three indicators, namely Cultural Vibrancy Index, Creative Economy Index and Enabling Environment Index as contributors to sustainable development of creative economy in cities. The final section presents the conclusion and recommendations for further research.

## The concept of creative economy and creative cities and their relationship with sustainable development

Creativity and its importance for economic development are raising attention and research in the academic and policy fields. Creative economies are developing fast and are influencing the rest of the economy. The value of trade of creative products and services doubled from 2002 to 2011 and amounted to USD 624 billion in 2011 (United Nations/UNDP/UNESCO, 2013). Consequently, the concept of the creative economy emerged. The scope of the creative economy is defined by the size of activity and industries that are considered cultural and creative. CCIs are variously defined mainly regarding the scope they cover. However, creative industries are those industries that are based on individual creativity, skill and talent, and which have the potential to create wealth and jobs through developing intellectual property (DCMS, 2009). The DCMS

(2009) definition includes the following activities as creative industries: advertising, architecture, art and antiques markets, computer and video games, crafts, design, designer fashion, film and video, music, the performing arts, publishing, software, television and radio, excluding the heritage sector. Other definitions of CCIs are broader, defining it as a part of the whole creative economy that generates growth and development (e.g., van der Pol, 2013). Howkins (2001, xiii) defined four sectors of the creative industries: industrial copyrights, patents, trademarks and designs. According to this definition, the revenue of the creative economy industry should have been USD 2.2 billion in 2000 and should continue to grow 5% annually (Howkins, 2001).

Simultaneously with the development of the creative economy concept, the concept of creative cities has evolved. Creative cities represent a complex urban centre as the venue for various creative and cultural activities and are an important part of social and economic functioning of the city (Landry, 2012), the city's economic and social life, and include intellectual capital applied to products, processes and services (Deisbury, Basu, 2010; Bielińska et al., 2014). The dynamics of urban life, design and type of functioning allows for greater diversity, expressive autonomy and represents a larger market compared to a rural type of life. The link between culture and creative industries in city life is represented through varieties of cultural activities that move between the commercial and the non-commercial, the subsidized and the entrepreneurial with great fluidity (O'Connor, 2007, 35). Cities are places where people and ideas mix most effectively. Consequently, creative cities can establish two types of strategies (Smith, Warfield, 2008): (1) culture-centric orientation and (2) econo-centric orientation. The first perceives the creative city as a place with strong prosperous arts and culture, creative and diverse expressions and inclusivity, artistry and imagination in which creativity is related to identity, rights, beliefs and social well-being. The second perceives the creative city as a place that is driven by strong, innovative, creative, competitive, cultural and creative industries and economically sustainable artists and arts organizations. The importance of developing creative cities is increasing; therefore, various initiatives appear to promote their development. Among them is the *Creative Cities Network* founded in 2004, whose purpose is to promote the development of creative clusters around the world. Key features of creative cities (Petrikova et al., 2015) are that they enable interaction and openness at all levels of city's functioning, promote innovative cluster interactions that could lead to unexpected synergies and outcomes, and encourage the development of creative universities and their partnerships with other innovative clusters. The UNESCO Creative Cities Network (2016) was set up in 2004 to promote cooperation with and among cit-

ies that have identified creativity as a strategic factor for sustainable urban development.

There exist several reasons why creative industries are concentrated in urban areas. The main factors are: (i) importance of specific local labour markets; (ii) spillovers from one specific creative industry to another; (iii) firms' access to dedicated infrastructure and collective resources; (iv) project-based work; (v) synergistic benefits of collective learning; and (vi) development of associated services, infrastructure and supportive government policies. (European Commission, 2010b). Additionally, national policies pay an increasing amount of attention to CCIs, led by the United Kingdom, followed by other developed countries, such as Australia, New Zealand and the USA. Recently, additional countries, i.e., Brazil and many African and Asian countries have recognised the importance of creativity in all levels of life. As policy makers and researchers strive to quantify each phenomenon, several indexes have been developed to measure CCIs on particular levels of analysis (e.g., national, cities), among the most-recognised are Florida's Creative Index (2002), the Euro Creativity Index, the Hong-Kong Creative Index, the Czech Creative Index, the Composite Index of the Creative Economy, the Creative City Index, the European Creativity Index, that Baltimore Creativity Index, Landry's Creative City Index and the Global Creative Index (Landry, 2012; Hartley et al., 2012). One of the most-used creative indexes is Florida's 3T-theory or framework – talent, technology and tolerance (Florida, 2002). According to this framework, cities must focus not only on building infrastructure and industrial locations, but also on capturing the imagination of talented individuals by successfully attracting them. Additionally, the successful transformation of creative class activities into creative economic outcomes, such as new ideas, new businesses and regional growth, is needed. Cities with greater numbers of artists, musicians, professors, scientists, high-tech workers, foreigners, homosexuals and high bohemians will have higher levels of economic development (Florida, 2002, 12). Extensions of the framework have added a fourth T–territory (territorial, infrastructural and communal facilities, e.g., universities, water, transportation (rail and airports), affordable housing and historic buildings, proximity to jobs, etc.) (Acs, Zegyesi, 2009; Marlet, van Woerkens, 2004). The Global Creativity Index, based on the 3T-theory, ranks 139 included countries (Florida et al., 2015) and rankings of EU countries are provided in Table 1.

As seen in Table 1, the most creative countries in EU are Denmark and Finland, ranking 5<sup>th</sup> on the Global Creativity Index. On the other side, the worst ranked EU country is Romania, in 68<sup>th</sup> place. Although all EU countries rank relatively high on the list, there are notable differences in sub-indexes, namely talent, technology and tolerance. They are quite differ-

Table 1. Global creativity index for some characteristic countries (Florida et al., 2015)

Country	Technology rank	Talent rank	Tolerance rank	Global creativity index	Global creativity index rank
Austria	12	26	32	0,788	20
Belgium	28	18	14	0,817	18
Bulgaria	78	38	47	0,505	48
Croatia	60	39	81	0,481	58
Cyprus	96	44	45	0,446	66
Czech Republic	29	30	80	0,609	35
Denmark	10	6	13	0,917	5
Estonia	33	16	87	0,625	33
Finland	5	3	20	0,917	5
France	16	26	16	0,822	16
Germany	7	28	18	0,837	14
Greece	39	43	101	0,484	54
Hungary	34	33	41	0,673	28
Ireland	23	21	7	0,845	13
Italy	25	31	38	0,715	21
Latvia	54	22	77	0,563	40
Lithuania	65	12	105	0,490	51
Luxembourg	20	48	32	0,696	25
Malta	73	49	25	0,550	43
Netherlands	20	11	6	0,889	10
Poland	46	25	101	0,516	46
Portugal	35	36	22	0,71	23
Romania	65	60	76	0,425	68
Slovak Republic	69	42	66	0,484	54
Slovenia	17	8	35	0,822	16
Spain	31	19	12	0,811	19
Sweden	11	8	10	0,915	7
United Kingdom	15	20	5	0,881	12

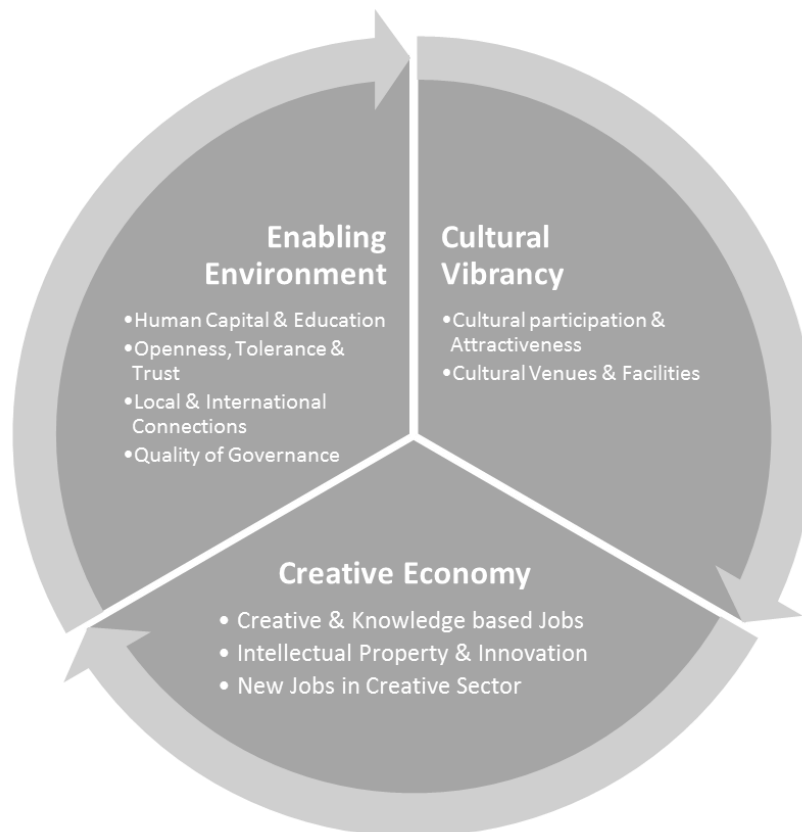
ent for particular countries, such as for example in Poland, where talent and technology are relatively high, while the tolerance is low ranked.

As the creative economy is determined by the extent of CCIs, the CCIs are directly connected to entrepreneurship and expressed through creative ideas and their development towards commercialization to enable profit (HKU, 2010, 54). However, in creative and cultural economic activities, the profit itself is not a driver, but rather it is creativity, self-fulfilment, and the ability to create something and to perform one's own creative ideas that drive entrepreneurship. It is, therefore, a combination of entrepreneurship and creativity is the most successful, because an artist's creativity needs to be combined with an entrepreneurial spirit and with the specific environment in which creative companies operate. Entrepreneurs in creative industries use their inner creativity (Howkins 2001). Entrepreneurs in CCIs typically operate in challenging market conditions and enabling framework conditions, produce outputs that are by their nature *cultural* and cooperate with individuals who are primarily targeted at the content of a particular product or service, rather than in its commercialization. Consequently, entrepreneurial activity in creative and cultural economic activities often takes place in small business entities, operating on the basis of long-term cooperation with others (HKU, 2010, 58). Achieving a balance between creativity

and entrepreneurship is not easy because the entrepreneur needs to find the right balance between internal artistic value and external market success. Small- and medium-sized enterprises (SMEs) dominate in CCIs (UNCTAD, 2011, 83) and many entrepreneurs are self-employed. In some countries (e.g., the United Kingdom), SMEs have to compete with very large companies in industries such as advertising, film production and software. Therefore, various policies have prepared specific measures for different sized groups of companies and focuses in particular on supporting SMEs. Among the biggest obstacles for SMEs in CCIs is the access to financing (UNCTAD, 2011, 84) for creative projects. Extensive financial resources that require long-term investment are often required for the development of creative ideas, and the positive effects of those projects take a while before they are apparent. As companies in CCIs are considered to be above-average risks, traditional funding with loans is hard to obtain even in the most developed countries. Therefore, large companies represent one source of funding for creative ideas of SMEs, while a second one represents measures of a supportive environment, which can be differently enabling.

The concept of sustainable development became widely recognized after the well-known report *Our common future* or the *Brundtland Report* (World Commission on Environment and Development,

Figure 2. The Cultural and Creative Cities Monitor's conceptual framework (European Commission, 2017)



1987). It introduced the most widely used definition of sustainable development into the policy discourse: *Development which meets the needs of the current generations without compromising the ability of future generations to meet their own needs*. This definition is based on achieving balanced development by equally implementing economic growth, environmental protection and social equity and developed into the triple-bottom line or the three pillars of sustainability, namely economic, environmental and social (Elkington, 1994). However, sustainable development is a dynamic process that helps people to realise their potential and improve their quality of life while simultaneously protecting and enhancing the life support systems (Bennie, Sherwin, 2010). During its development, the concept was criticized for the tri-partitions of the model, instead of being praised for its connections, interdependencies and relationships (e.g., Vanclay, 2004; Boström, 2012; Milne, Gray, 2013). Some others exposed the shortcomings of the three pillars model and added more pillars in efforts to make it more robust (e.g., Godschalk, 2004; Seghezze, 2009), but the meaning and associated objectives of the social pillar remained vague. However, there is an approach developing that adds a missing dimension to the three pillars of sustainable development, namely culture, which is considered as a fundamental dimension (Hawkes, 2001; Litting, Griessler, 2005; Murphy, 2012; Dahl, 2012). A broader definition of culture

(cultural vitality), as the complex of distinctive spiritual, material, intellectual and emotional features that characterize social group or a society (Hawkes, 2001, 25), should represent a fundamental missing dimension of a healthy society in the sense of well-being, creativity and diversity. Links between creative and cultural activities and sustainable development can be well seen from a territorial perspective, as all activities take place in the community, neighbourhoods and cities. As provided in Table 2, they contribute to all three pillars of sustainable development, but the cultural and creative aspects are the bottom line or link between all the pillars.

As exposed by United Nations (2015), the CCIs shall include principles that will guide through its values and the economic dynamics of the sustainable development. Those values will support a fair redistribution of income, better quality of life, access and citizenship for the inhabitants, etc. To measure creative economy of cities from the sustainability point of view, there exist several approaches. One of the newest is the Cultural and Creative Cities Monitor (European Commission, 2017) which assess the performance of cultural and creative cities in 168 cities (93 European Capitals of Culture, 22 UNESCO Creative Cities and 53 cities hosting international cultural festivals) in 30 European countries (the EU-28 with Norway and Switzerland), using both quantitative and qualitative data.

Table 2. Contribution of CCIs to the pillars of sustainable development

Economic pillar	Environmental pillar	Social pillar
Income, added value, profit	Innovative solutions on the level of lessening inputs, using alternative resources (e.g., recycled resources)	Social inclusion
Jobs creation, employment	Innovative solutions of products and services (e.g., design)	Well-being
Innovativeness, innovations	Lessening the environmental impact in total product life-cycle	Aesthetic pleasures, happiness, satisfaction and other psychological effects

The above-mentioned model measures the creative economy from three aspects, broader than just economic impact of creativity, considering also two additional aspects. They are in line with the sustainable development, namely, the Creative Economy Index is related to the economic pillar of sustainable development concept, the Enabling Environment Index is related to environmental pillar, and the Cultural Vibrancy Index to the social pillar. The Creative Economy Index is focused mainly on the contribution of cultural and creative sectors to a city's economy in terms of employment, job creation and innovation. The Enabling Environment Index is focusing on the tangible and intangible assets that help cities attract creative talent and stimulate cultural engagement (European Commission, 2017). This index is focused on the social pillar of sustainable development. Namely, the creative people contribute to the long-term development of creative and cultural activities in different sector, but they have to be motivated to act in such a way and to stay in a particular location (in our case in particular city). However, the third index, the Cultural Vibrancy Index, measures the cultural *pulse* of a city in terms of cultural infrastructure and participation in culture. It means that there has to be not only the offer of creative and cultural activities and their outcomes, but also the critical level of demand in the particular area (again in the city in our case). In addition, this index is related to the social pillar of sustainable development. Namely, the supply of cultural and creative activities and outcomes will develop long-term in a particular area only, if there will be enough demand. Additionally, supply and demand are leveraging each other and therefore raising their levels.

### Methodology

To make the comparison of creative cities in EU, used was the database from European Commission,

The Cultural and Creative Cities Monitor (European Commission, 2017). It is a tool to promote mutual exchange and learning between cities to boost culture-led development. The data is available for year 2017. Monitor's quantitative information is captured in 29 indicators relevant to nine dimensions reflecting three major facets of cities' cultural, social and economic vitality (European Commission, 2017):

- Cultural Vibrancy Index measures the cultural *pulse* of a city in terms of cultural infrastructure and participation in culture;
- Creative Economy Index captures how the cultural and creative sectors contribute to a city's employment, job creation and innovative capacity;
- Enabling Environment Index identifies the tangible and intangible assets that help cities attract creative talent and stimulate cultural engagement.

From the database used were several data, which are collected in Table 3 as initial data for further analysis:

- Countries and city name: obtained were data for 27 capital cities from EU (data for Luxembourg is missing);
- C3 Index: data on composite index for 27 capital cities of EU;
- Cultural Vibrancy: data on index for 27 capital cities of EU;
- Creative Economy: data on index for 27 capital cities of EU;
- Enabling Environment: data on index for 27 capital cities of EU;
- Demographic data on population, GDP and employment.

To ascertain similarities or differences among capital cities of EU countries in terms of creative economy in a broader sense, a cluster analysis was employed to group cities with similar characteristics. The cluster analysis is an explorative analysis that tries to identify structures within the data and is a method, generally used to group data with similar characteristics. According to the literature (e.g., Cramer, 2003; Hair et al., 2006; Xu and Wunsch II, 2008), a cluster analysis is often applied to determine how cases can be grouped together. The cluster analysis procedure creates clusters from the observations supplied that display similar characteristics. The classification of similar objects into groups has always played an essential role in science. Not only for identifying a structure already present in the data, but also for imposing a structure on a more or less homogeneous data set that has to be split up in a rational way. The cluster analysis in the article was performed to reduce the complexity and compare capital cities' creative economy levels. Clustering offers the opportunity to determine which capital cities are similar and explore the relationships between variables driving cluster membership. Understanding heterogeneity between EU capital cities makes it

Table 3. Initial data on creative cities (European Commission, 2017)

	Country	City	Popu- lation*	GDP**	Employ- ment***	C3 Index	1. Cultural Vibrancy	2. Creative Economy	3. Enabling Environment
1	Austria	Vienna	1	1	3	35,002	37,855	28,52	42,258
2	Belgium	Brussels	1	1	4	36,023	26,756	49,027	28,547
3	Bulgaria	Sofia	1	3	2	20,721	8,968	36,97	11,727
4	Croatia	Zagreb	2	3	4	25,878	23,193	28,34	26,325
5	Cyprus	Nicosia	4	4	4	22,394	32,142	13,53	20,625
6	Czech Republic	Prague	1	2	1	38,439	44,106	40,568	22,848
7	Denmark	Copenhagen	2	1	1	49,876	53,851	50,027	41,626
8	Estonia	Tallinn	3	3	1	30,038	30,124	30,563	28,815
9	Finland	Helsinki	2	1	1	34,564	26,172	41,538	37,4
10	France	Paris	1	1	2	63,205	56,641	77,41	47,924
11	Germany	Berlin	1	3	1	34,648	28,699	40,766	34,311
12	Greece	Athens	2	3	5	25,659	33,051	18,645	24,905
13	Hungary	Budapest	1	2	3	30,069	31,538	30,76	25,751
14	Ireland	Dublin	2	1	3	42,076	46,854	33,67	49,331
15	Italy	Rome	1	2	4	26,825	22,735	33,543	21,567
16	Latvia	Riga	2	3	1	19,11	15,906	22,307	19,124
17	Lithuania	Vilnius	2	2	1	31,759	19,506	45,25	29,281
18	Malta	Valetta	4	4	4	20,753	22,499	16,19	26,387
19	Netherlands	Amsterdam	2	1	1	45,512	46,558	47,42	39,606
20	Poland	Warsaw	1	1	1	27,311	18,929	40,04	18,614
21	Portugal	Lisbon	2	3	3	42,581	54,326	36,407	31,438
22	Romania	Bucharest	1	1	4	27,716	11,653	46,597	22,084
23	Slovak Republic	Bratislava	3	1	1	34,237	21,731	50,734	26,253
24	Slovenia	Ljubljana	3	3	3	32,729	35,088	33,307	26,858
25	Spain	Madrid	1	2	4	28,611	21,881	29,803	39,683
26	Sweden	Stockholm	2	1	1	42,123	39,257	44,877	42,345
27	United Kingdom	London	1	1	1	34,705	22,889	38,11	51,527

Notes:

	*Population	**GDP	***Employment
1	> 1 million	> 35,000	> 74%
2	500,000 - 1 million	30,000 - 35,000	71-74%
3	250,000 - 50,000	25,000-30,000	68-71%
4	100,000 - 250,000	20,000-25,000	65-68%
5	50,000 - 100,000	< 20,000	< 65%

Table 3. Results of Cluster analysis for all indicators – cluster centres and number of cases

Clusters	Number of cases in each cluster	Cluster centres			
		C3_index	Cultural Vibrancy Index	Creative Economy Index	Enabling environ- ment Index
Cluster 1	1	63.21	56.64	77.41	47.92
Cluster 2	7	42.23	46.12	40.21	38.49
Cluster 3	10	31.03	20.72	41.88	29.94
Cluster 4	9	25.94	27.36	25.24	24.48

easier to diagnose creative and cultural activities and their contribution to sustainable development. Such a cluster-based approach offers a new way of dividing and understanding cities in these particular areas to formulate enhanced policy measures and actions. The first step in the analysis used the agglomerative hierarchical clustering process. In the second step, a *k*-means non-hierarchical clustering process was employed. All indicators in Table 2 were used simultaneously in the cluster analysis. The clusters were formed using Ward's minimum variance approach to ensure the least within-cluster variation.

### Empirical results and discussion

The hierarchical cluster analysis using squared Euclidean distance and Ward linkage was performed on a sample in order to determine the appropriate number of clusters. According to the initial process of the hierarchical clustering process, we decided to use four clusters for each indicator. In the next step, we used a *k*-means cluster analysis to extract four clusters. The results are represented for each indicator used in the analysis. Clusters are indicated from 1 to 4, where Cluster 1 includes cities with the highest

result and Cluster 4 includes cities with the lowest results. The summarized results of the cluster analysis for all indicators are presented in Table 3.

The results show that at the least countries are in the Cluster 1, which has all four indicators with the highest cluster centres. In the Cluster 2, there are 7 countries and in the Cluster 3 are 10 countries. In the Cluster 4 there are 9 countries with the lowest cluster centres. However, Table 4 provides cities' membership for each cluster.

Table 4. Cluster membership of analysed cities

Clusters	Cities with countries
Cluster 1	Paris, France
Cluster 2	Vienna, Austria; Prague, Czech Republic; Copenhagen, Denmark; Dublin, Ireland; Amsterdam, Netherlands; Lisbon, Portugal; Stockholm, Sweden
Cluster 3	Brussels, Belgium; Sofia, Bulgaria; Berlin, Germany; Madrid, Spain; Helsinki, Finland; Vilnius, Lithuania; Warsaw, Poland; Bucharest, Romania; Bratislava, Slovak Republic; London, UK
Cluster 4	Nicosia, Cyprus; Tallinn, Estonia; Athens, Greece; Zagreb, Croatia; Budapest, Hungary; Rome, Italy; Riga, Latvia; Valletta, Malta; Ljubljana, Slovenia

The results indicate that the Paris forms its own Cluster 1, because it represents a unique environment and differs immensely from all other compared cities in EU with the highest scores in all three indexes, namely Cultural Vibrancy Index, Creative Economy Index and Enabling Environment Index. The city of Paris represents a creative hub in Europe with its own particular access to cultural and creative services with supportive framework, which accelerate its performance. Synergies of enabling environment and cultural vibrancy leverage creative economy and sustainably contribute to Paris development in the area of creative economy.

In the Cluster 2 are seven cities (Vienna, Prague, Copenhagen, Dublin, Amsterdam, Lisbon and Stockholm). Those cities on average the best performed in Cultural Vibrancy Index, while the worst in the Enabling Environment Index. It means that they offers many cultural services and events, but their engagement in developing and stimulate cultural activity lacks behind. For example, Vienna has outstanding offer of museums, concert halls, art nouveau buildings and high-profile fashion and design events. However, Vienna's companies in CCIs contribute significantly to the value of city's economic area, with supportive environment for creative entrepreneurship in fields as diverse as design, music and architecture. Prague, for example offers hundreds of concert halls, museums, galleries, movie theatres, music clubs and internationally acclaimed festivals. The same is truth for Copenhagen and Dublin, where there are numerous museums, galleries, architectural

works, and music venues available. Amsterdam performs best in two indicators, namely Cultural Vibrancy Index and Creative Economy Index. The city has new and renowned cultural centres and they turned warehouses into offices for creative start-ups, which enable long-term development of new enterprises. For Lisbon, characteristic are sustainable long-term international events in fashion and film industry, as well as creativity-related events. Stockholm, on the other site, actively supports access to culture for all interested and invests in education in art. As it can be seen through short presentations of each city in Cluster 2, all of them are developing unique approaches to sustainably develop cultural liveliness.

In the Cluster 3 are ten cities (Brussels, Sofia, Berlin, Madrid, Helsinki, Vilnius, Warsaw, Bucharest, Bratislava and London). Those cities on average perform the best in the Creative Economy Index, while other two indexes show lower performance. The results indicate that cultural and creative sectors as well as innovative capacity importantly contribute to employment and job creation in this group of cities. Brussels achieves a notable performance in new jobs creation in CCIs (they should represent more than 6% of employment in the city). Similarly, Sofia promotes and supports access to funding for the CCIs. Berlin also supports growth of creative economy by several measures and supporting programmes, and by long-term international events in fashion and music. Madrid is not as important as other Spanish cities in terms of creativity, with lower levels of all three indicators compared to for example Barcelona. Nevertheless, it also contributes to cultural activity in the city. Helsinki contributes importantly to jobs in CCIs and to development of enterprises in those industries (e.g., shops, restaurants, showrooms, galleries, design studios etc.). In Vilnius CCIs provides majority of new jobs in the city as well as CCIs represent a half of these sectors in the country. Similarly, Bratislava performs well in new jobs creation in CCIs. Warsaw developed special programme to support CCIs in the city. Bucharest promotes culture as a driver of sustainable economic development and social cohesion. London represents a cultural powerhouse and as such mostly contributes to CCIs with high productivity. All cities in the Cluster 3 mainly support and help to develop CCIs in those cities with various approaches and measures. However, the most important is that all are long-term and sustainably oriented.

In the Cluster 4 are nine cities (Nicosia, Tallinn, Athens, Zagreb, Budapest, Rome, Riga, Valletta and Ljubljana). Most of them perform the best in the Creative Vibrancy Index, and some in the Creative Economy Index. However, all scores are considerably lower than in Clusters 1 and 2. This group of cities the worst performs in index the Enabling Environment Index. It means that they lack behind leading capital cities in Europe (e.g., cities in Cluster 1



and 2) regarding all three aspects of cultural and creative elements, which shows the developmental levels of cities in this area. Nicosia, for example, performs best in cultural vibrancy with some important museums and churches, but in smaller amount compared to cities in other clusters. Tallinn has a significant number of cultural attractions (e.g., theatres, cinemas, museums), but is relatively small city, therefore its contribution is less significant than for example in cities from Cluster 2. Athens has very rich cultural and historical heritage, but its capitalization and exploitation is not as good as in other capital cities from the best-performed clusters. Zagreb best performs in creative jobs and identifies CCIs as key factors to boost its competitiveness. Budapest is the city with well-developed cultural vibrancy with museums, theatres, galleries and exhibitions. Rome is compared to other cities in Italy (e.g., Milan) performing lower. However, the city is working to make its rich heritage more attractive for tourists as well as for entrepreneurs. Generally, Latvia is among countries that started to develop its creative economy relatively late. However, Riga has importantly developed creativity in all its forms. Valletta on the other side provides support to CCIs. Ljubljana performs best in cultural vibrancy with thousands of cultural event. However, cities in the Cluster 4 are mainly smaller than in other three clusters with lesser impact of creative economy. It does not mean that in those cities creative economy is not present, but those cities are lagging behind the leading cities because of their size, approaches of supportive environment or the timing of starting to support it.

## Conclusions

This article has compared the key attributes of creative economy of capital cities in EU. The discussion has outlined how important different aspects of creative economy are in promoting economic activity, and sustainable development of creative cities. The article compared creative economies in selected cities by three indexes, namely - Cultural Vibrancy Index, Creative Economy Index and Enabling Environment Index.

Regarding the sustainable development of creative economy in the cities, our results show several implications. First, the majority of capital cities in EU focuses, supports and develop only one aspect of three measured in the article. The exception is the city of Paris, where all three measured indexes are equally developed and supported. Consequently, it could be stated that only Paris managed to implement sustainable development of its creative economy. Its performance of all three indicators is so different from other compared cities that it builds its own cluster. Unfortunately, all other compared cities are not able to equally successful develop all three

aspects. Second, as already mentioned, all other capital cities (except Paris) are more or less focusing on and sustainably developing only one or two indicators. This is seen in cities from Cluster 2, where they are performing best in Cultural Vibrancy Indicator. The short overview of cities' most developed and supported part exposed that they are focused on cultural liveliness, services and events. However, on average they perform worst in Enabling Environment Index. Cities in Cluster 3 perform best in Creative Economy Index, while other two indexes are at much lower level. Those cities are supporting and developing cultural and creative sectors, which importantly contribute to cities' employment and job creation. Majority of them also offer some measures and funding for CCIs. However, cities in Cluster 4 have on average similar results of all three indexes but at importantly lower levels. It means that creative economy is in those cities less developed and does not represent as important factor of cities' life as in other cities. However, all these cities have a potential to develop creative economy with exploring their heritage, attracting different events, and attract and support people with creative potential to exploit and capitalize it in different entrepreneurial behaviours. Results of analysing each cluster indicate that cities use different approaches and support particular aspects of creative economies. It means that cities are focusing mainly on development of one or two of measured aspects of creative city. Regarding the support of creative economy's sustainable development, cities should build initiatives and measures that will sustainable support creative economy, motivate creative people to stay and develop their talent and creativity in their home cities or even attract new ones, protect and present the historical, cultural, social and spiritual values, knowledge and skills. On the other side cities should develop a financial background for investments in creative economy and support small innovative entrepreneurs in creative and cultural economy, and last but not least create conditions for development of cooperation among different stakeholders, improve cross culture cooperation, which support the creative activities, dialog and cooperation.

It could be concluded, that cities should support creative development on all three pillars of sustainable development. First, from the economic aspects, creative activity should be supported to enable individuals and enterprises in CCIs to develop, innovate and grow, because they generates more jobs. In addition, small, innovative and independent entrepreneurs in CCIs should be supported. Individuals in CCIs need appropriate education possibilities, need to be motivated to stay and develop their creativity in their home location. Second, the role of cities as supportive environments and policy creators is to develop appropriate urban living conditions that will enable individuals to express their creative potential, net-

working possibilities among various actors/stakeholders of creative economy, and last but not least to develop the open-minded and tolerant culture of the city. Such measures can have various broader impacts, including attracting foreign investments, creating a tolerance environment and increasing the employment, regional GDP and more.

As presented research has some limitations and shortcomings, they represent a foundation for further research of creative economy in the cities. First, the number of compared cities could be broader in Europe or extended to global level. Second, in-depth analysis of each city creative economy could provide valuable insight into its specific characteristics. Third, the analysis could be based on more indicators to get broader picture of creative economies in the cities. Fourth, the present study is static, but the longitudinal analysis would give an important insight into the sustainability of supporting and developing creative economies on the city levels.

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