
Competitiveness of Regions Versus Accessibility of Cultural Infrastructure: A Case Study of Poland

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Abstract:

Purpose: The study discussed in this article revealed the extent of connections between the variables that identify the degree of regional competitiveness and accessibility of the cultural infrastructure in Poland, thereby suggesting the direction of changes that should be implemented in this field.

Design/Methodology/Approach: To achieve the research aim, results of a study on regional competitiveness done by the European Commission and compiled in the form of the RCI (Regional Competitiveness Index) data were employed. Based on the RCI's concept, a synthetic index was developed, called the CII (Culture Infrastructure Index), whose purpose is to determine the potential of cultural infrastructure in a given region through the prism of the availability of institutions whose purpose is to satisfy the cultural needs of the community.

Findings: The research results presented in this article allowed us to distinguish four groups of provinces in Poland, which differ in the relationship between cultural infrastructure availability and competitiveness.

Practical Implications: The distinction of the above groups should serve as a recommendation to make an in-depth analysis of this state of matters and an indication for local authorities about how to mold directions in the region's development, including the allocation of funds, to satisfy the expectations and needs of residents regarding the availability of cultural infrastructure.

Originality/Value: The current research expands the existing knowledge stream on regional competitiveness about available cultural infrastructure. This study adds potential to the implementation of the management practices in local government units.

Keywords: Competitiveness, regional competitiveness, regional development, cultural infrastructure.

JEL codes: E32, O52, R10, R11, Z19.

Paper Type: Research paper.

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1. Introduction

The critical aspect of research on the processes of economic growth in the countries and regions is to indicate their conditions and determinants. The prevailing opinion is that the improvement of the economic situation of spatial units and the increase of the population's affluence is determined by complex correlations between many factors, phenomena, and processes of both measurable and non-measurable nature. Some form the level of economic competitiveness, and only once it has been improved over an extended period, it may, but does not have to translate to accelerated economic growth. Furthermore, it should be remembered that the hierarchy of factors determining the competitiveness of national and regional economies varies, depending on the prevailing economic paradigm and the accomplished level of development. Competitiveness is a crucial factor determining the development of a region and hence the standard of living of its inhabitants.

The term 'region' carries many connotations. It is used to define a territory distinguished by its culture or history, delineated by administrative and political divisions, or identified within some economic space (Snieška and Bruneckienė, 2009). Hence, we can distinguish natural, administrative, socio-economic, urbanistic, social, demographic, landscape regions, to name just a few.

Building a competitive region takes time as it is a lengthy and complex process. Unlike the case of a competitive company, there are no constant and unequivocal measures to visualize the competitiveness of a region.

The concept of competitiveness originated at the firm level (Krugman, 1994a; 1994b, 1996; Porter, 1990). Competitiveness is inextricably bound with competition, as 'it can only occur in a competitive environment' (Jankowska and Sulimowska-Formowicz, 2010). Thus, competition, which is the original notion relative to competitiveness, cannot exist with the latter, and vice versa – there is no competitiveness without competition. The complexity of these phenomena means that the two notions are difficult to be assessed unequivocally. Furthermore, they are often mutually confused and defined ambiguously. One of the sources of diverse interpretations is the wealth of concept approaches to competitiveness and competition, which are a consequence of the fact that different studies focus on the different subject matter. Competitiveness and competition are not the same conceptually (Swab and Johnson, 2019). The fundamental difference in the general interpretation of these concepts is that competitiveness is the property of a competitive entity, while competition refers to activities pursued by competing entities (Kilduff, Elfenbein, and Staw, 2010). Nowadays, competitiveness is one of the significant issues in regional and local development.

Competitiveness of regions is a process arising directly from the drive to enhance the economy's competitiveness (Poot, 2000). Assuming that the competitiveness of the economy is 'the ability to produce and offer goods and services with such technical

and usefulness parameters, prices, quality and marketability that allow these products to find buyers in the domestic and international markets (Markowski, 1999; Blavasciunaite, Garsviene, and Matuzeviciute, 2020), then the competitiveness of a region can be defined as the region's advantage 'over other regions being the outcome of the attractiveness of the region's services offer addressed to current and potential users of the regions, that is the inhabitants, companies, investors, visitors, etc.' (Stawasz, 2004).

Competitiveness arises from assets, that is, the region's strengths, which originate, for example, from the education system, economic structure as well as the material, institutional and intellectual infrastructure of the region (Camagni, 2002; 2008; Camagni and Capello, 2013; Bristow, 2005; Rusu and Dornean, 2019; Yue and Zhao, 2020). This outlook on regional competitiveness per se leads to a business approach to competitiveness scrutinized through the prism of distinguishing features of a given region, which determine its attractiveness as a site for locating investments or a place of residence. It is also the manifestation of technological advantage or lower prices of products and services generated in this region compared to other regions.

The definitions of a region's competitiveness provided in the literature implicate several vital elements, i.e., the living standard of residents, conditions for conducting business activity by companies, and localization of institutions and events with a national or international reach (Begg, 1999; Góralski and Lazarek, 2012; Eskelinen *et al.*, 2002; Porter, 2001). Competitiveness can also be viewed in the capacity to adopt positive trends occurring in the environment, creating internal and external benefits (growth of entrepreneurship, creating the regional growth) (Filipiak, Kogut, Szewczuk, and Ziolo, 2005). A *competitive region* can be defined as an area where the level of human knowledge (interpreted as the ability to identify needs, uncover new combinations of such needs, and use the existing or new tangible resources) is sufficient to create the region's structural advantage and capitalize on its products (Bałtromiuk, 2003; Durlauf and Quah, 1998; Malecki, 2000; Lysenko, Stepenko, and Dyvnych, 2020; Kiseľáková, Šofranková, Onuferová, and Čabinová, 2019). The competitiveness of regions is also seen as the ability to attract capital and assistance funds and retain the production means located in the region (Banaszewska, 2018; Aivazidou, Cunico, and Mollona, 2020). It also entails attaining a permanent, high, and continually growing standard of living and a high employment rate (Kot, 2004).

According to Gorzelak (1997), the competitiveness of regions is affected by such elements as the diversity of economic structures, transport, and communication accessibility, developed research and development facilities, and business environment. These elements favor entrepreneurship development, whereas their shortage or generally poor management means that the region in question has a weaker position than other regions. A region's competitiveness factors are identified in yet another way by Markowski and Stawasz. They divide them into two categories: factors necessary to maintain the ability to compete and factors creating a competitive advantage that arises from additional characteristics unique to the region and

challenging to replicate, which play a decisive role in investors' acquisition (Markowski and Stawasz, 2001). Finally, Winiarski (1999) distinguishes several significant conditions that determine a region's competitive potential. These comprise:

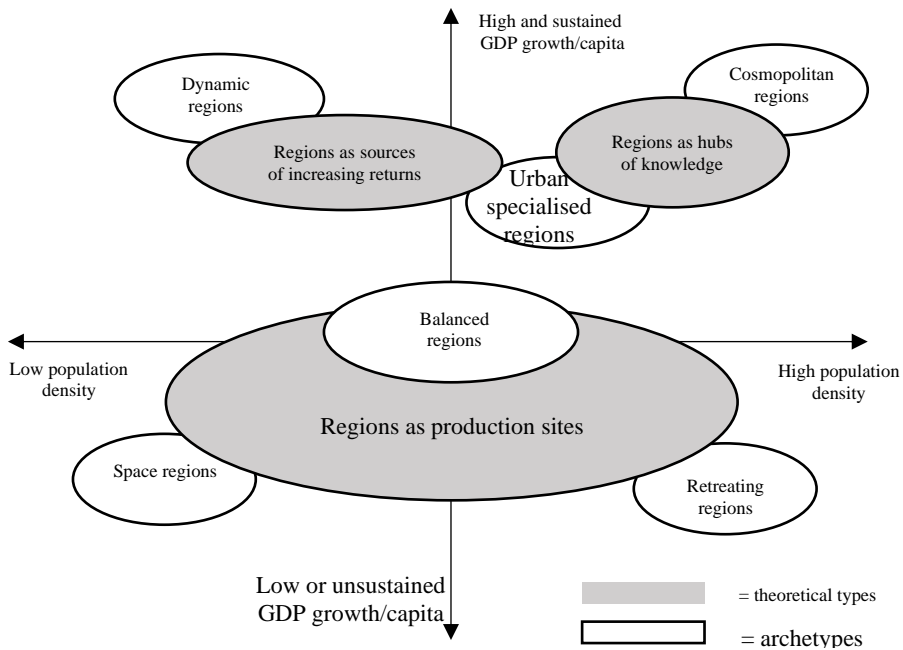
- a) diverse structure of economy (branches and companies able to compete in international processes of production and trade);
- b) technical infrastructure, e.g., an efficient telecommunication system, transportation, water supply, electric power grid;
- c) social infrastructure, e.g., social welfare system, education system, health care system;
- d) domestic and foreign, private and public investments;
- e) research and development, e.g., R&D centres and institutions, colleges and universities;
- f) natural environment resources;
- g) business environment institutions – local development agencies, commerce chambers, collateral funds.

The higher competitiveness entails better opportunities for development, which directly stimulates an increase in the living standard of the region's population. This, in turn, becomes a catalyst of the emergence of new expectations, including ones connected with entertainment and arts. The current level of development of industrialized economies endows this aspect with greater importance (Heller and Bogdański, 2014; Kuc-Czarnecka, 2019). Leisure time is becoming an increasingly important value, standing in contrast to the allocation of time to work. A change in the relation between the income and substitution incomes, to the advantage of the former one, observed in highly developed economies, necessitates an appropriate economic policy to develop broader cultural infrastructure. It is worth mentioning that a more significant role in highly developed economies is attributed to the cultural education of children, resulting in the growing knowledge about culture and better capabilities of being in touch with culture (Towse, 2011; Malczyk, 2013; Jagodzińska, 2013), which translates into a growth in the demand for cultural services now and in the future. The competitiveness of a given region should be viewed not only in the context of turning the region into a production site but also – and possibly first and foremost – of treating this area as the place where demand appears (Bogdański, 2018). These considerations gain particular importance in large urban agglomerations, where well-educated persons play the dominant role with high earnings. Such regions are often called 'hubs of knowledge' (Martin, 2003; Merło and Michalak, 2015), (Figure 1).

Regions of this type are indicated as places of residence for the so-called creative class (Florida, 2002; 2014). Members of this class search for unique sites characterized by a broad and varied cultural offer. According to Florida, this class includes scientists, engineers, artists, designers, and highly qualified managers (he estimates that about 30% of those in the USA can be classified as representatives of this creative class). Consequently, it is suggested that a critical factor in the success of a city is the ability to attract such people and ensure that they will have access to a suitably rich and

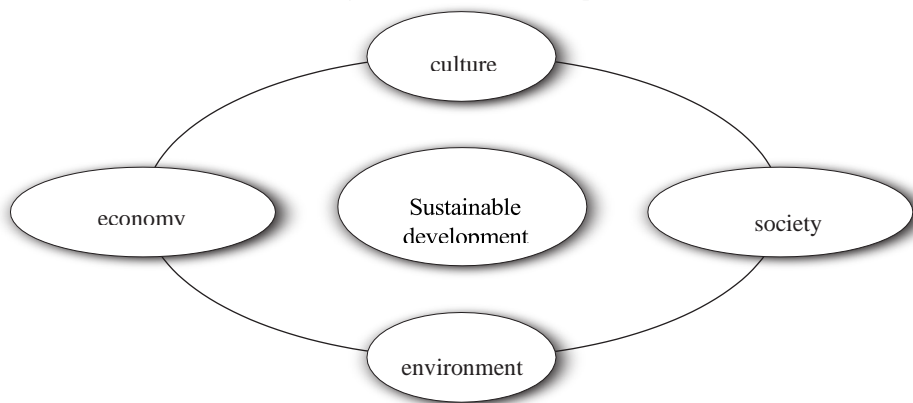
diverse range of cultural and environmental events. There are also opinions that the sphere of culture should be a component of ‘the idea of sustainable development, which (as expressed during the 1992 Rio de Janeiro Earth Summit) should be based on the integration of environmental, economic, and social policies (Senetra-Szeliga, 2013), (Figure 2).

Figure 1. Types of regions



Source: Martin, 2003.

Figure 2. Culture in the model of sustainable development



Source: Senetra-Szeliga, 2013.

A rich and diverse cultural offer is more than just a way to attract new residents. It is also pivotal to improving the tourism attractiveness of the region. It is a sign of the times that the idea of ‘subsidizing culture,’ which thrived in communist Poland, has been abandoned in favor of the notion of ‘investing in culture.’ It is also worth mentioning that most cultural institutions in Poland respond to local governments. Hence crucial measures should be taken by these local authorities.

According to Throsby, cultural policy should focus on the creation of new resources, management of existing resources in order to attain their more efficient use, and on the restoration or revitalization thereof (Throsby, 2001; 2002; 2005; 2010). Many cities around the world perceive it as their priority to increase the investment into cultural infrastructure. Examples in Europe are the measures highlighted in the program European City of Culture. The program is implemented in cities that have already earned some cultural potential and in typically industrial cities where various measures have been taken to re-value ultimately their image (e.g., Glasgow, Dublin). Examples of global centers that strongly emphasize cultural development are Hong Kong, Singapur, Shanghai, or Melbourne (Arts Victoria, 2008).

The development of cultural infrastructure extends beyond the effect of improved competitiveness of the region; it also entails the growth of the private business sector, which can provide both cultural services and other services associated with culture. Consequently, there is a boost to local entrepreneurship, which can catalyze the influx of creative class representatives to this region (Montgomery, 2008).

In the light of the above information, it is difficult to refute the connections between regional competitiveness and available cultural infrastructure. With this borne in mind, an evaluation of the level of accessibility to cultural infrastructure has been made, alongside an attempt to determine existing relationships with the competitiveness of regions in Poland. For this purpose, the spatial differentiation of the above variables among Polish regions was assessed.

2. Research Methodology

To achieve the research aim, results of a study on regional competitiveness done by the European Commission and compiled in the RCI (Regional Competitiveness Index) data were employed. Based on the RCI’s concept, a synthetic index was developed, called the CII (Culture Infrastructure Index), whose purpose is to determine the potential of cultural infrastructure in a given region through the prism of the availability of institutions whose purpose is to satisfy the cultural needs of the community.

In line with the methodology developed to construct the RCI, competitiveness on the regional scale is perceived as the ability to ensure an attractive and stable environment for companies and local communities to live and work in. Competitiveness determinants can be identified in three areas, as suggested by Annoni, Dijkstra, and

Kozovska. These are basic factors, factors contributing to improved competitiveness, and factors of innovation and development (Dijkstra, Annoni, and Kozovska, 2011; Annoni and Dijkstra, 2019; Annoni, Dijkstra, and Gargano, 2016; Annoni and Dijkstra, 2013; Annoni and Kozovska, 2010).

Particular areas are described by so-called competitiveness pillars, which are composed of the quality of institutions, macroeconomic stability, quality of infrastructure, health, primary and secondary education, tertiary education and professional education, the efficiency of the labor market, size of the market, technological readiness, quality of the business environment, and innovativeness.

The Culture Infrastructure Index has been constructed based on primary data describing the condition of fixed cultural infrastructure in every province in Poland. Such data are made available by Statistics Poland GUS (data and reports on ‘Culture’ published by Statistics Poland in 2008-2016). They include information like the number of:

- libraries and library branches – as institutions serving to develop and satisfy the reading needs of local communities;
- places in reading rooms – as above;
- culture centres, civic clubs, daytime centres, etc. – that is institutions with a broad range of social and cultural offer addressed to the local community; as practically every municipality has such an institution, together they enable integration of particular cultural events, in addition to which they prepare own, diverse offers addressed to people of all ages, thereby creating and instilling a need for active participation in the social and cultural life of a given community;
- museums – whose chief objective is to collect and popularize artefacts created in different cultures;
- permanent exhibitions – that is exhibitions dedicated to specific subjects and displayed in separate parts of museums, halls, divisions, etc.
- art galleries – whose main purpose is to display, promote and popularize contemporary arts by holding exhibitions, artistic happenings, and other events;
- seats in theatres and philharmonics – that is seats in space own and leased by theatres, philharmonic halls, etc. serving such institutions as:
 - drama theatres (including satire theaters or theatres of small theatrical forms),
 - puppet theatres,
 - music theatres (operas, operettas, and others)
 - philharmonics
 - orchestras (symphonic and chamber)
 - choirs
 - song and dance ensembles,

- entertainment and show business agencies;
- seats in permanent cinemas, i.e. cinemas located permanently in a facility adapted to showing films regularly, at a specific frequency;
- expressed per 1,000 inhabitants in the region.

The aggregated synthetic index including eight variables listed above was derived from the formula (1).

$$H_j = 1/8 \sum_{i=1}^8 H_{ij} \quad (1)$$

where:

j – index for a given region NUTS 2 (values from 1 to 16),

i – number of the partial index used to calculate the CII (values from 1 to 8).

In order to ensure the comparability of variables, z-score standardization was applied, using the mean and standard deviation:

$$x_{std} = \frac{x - \bar{x}}{\sigma} \quad (2)$$

where:

\bar{x} - arithmetic mean,

σ - standard deviation

Determination of the two indices, RCI and CII, on the same scale enables one to scrutinize the structural differentiation of regions in terms of the potential of cultural infrastructure and regional competitiveness. Because the RCI is determined every three years (starting in 2010), this index is built on data collected between the determinations. The CII has been calculated for one-year- and three-year-long intervals, which ensured better comparability of the results.

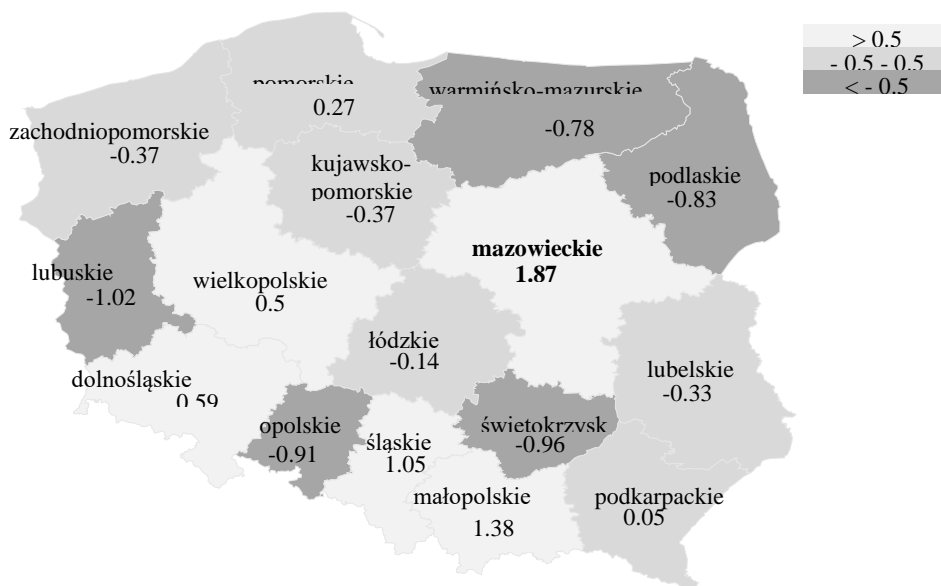
3. Results and Discussion

The analyses conducted by the authors of this article led to the distinction of three groups of provinces in Poland, according to the values of the CII (Figure 3, Table 1).

The provinces with the highest value of this index were, mazowieckie, małopolskie, śląskie, wielkopolskie, and dolnośląskie. The second group of provinces comprises pomorskie, podkarpackie, łódzkie, lubelskie, zachodniopomorskie, and kujawsko-pomorskie. The lowest scores of this index were determined for the provinces, warmińsko-mazurskie, podlaskie, opolskie, świętokrzyskie, and lubuskie, where the accessibility to the cultural infrastructure facilities is the poorest. Changes in values of the CII over the analyzed period were not very big, especially in the third group of

Polish provinces with the lowest CII scores, where the availability of the cultural infrastructure did not change (Figure 4, Table 1).

Figure 3. Potential of cultural infrastructure measured by the CII score (raw data, z-score) in 2019, in the layout according to the NUTS-2 division of Poland



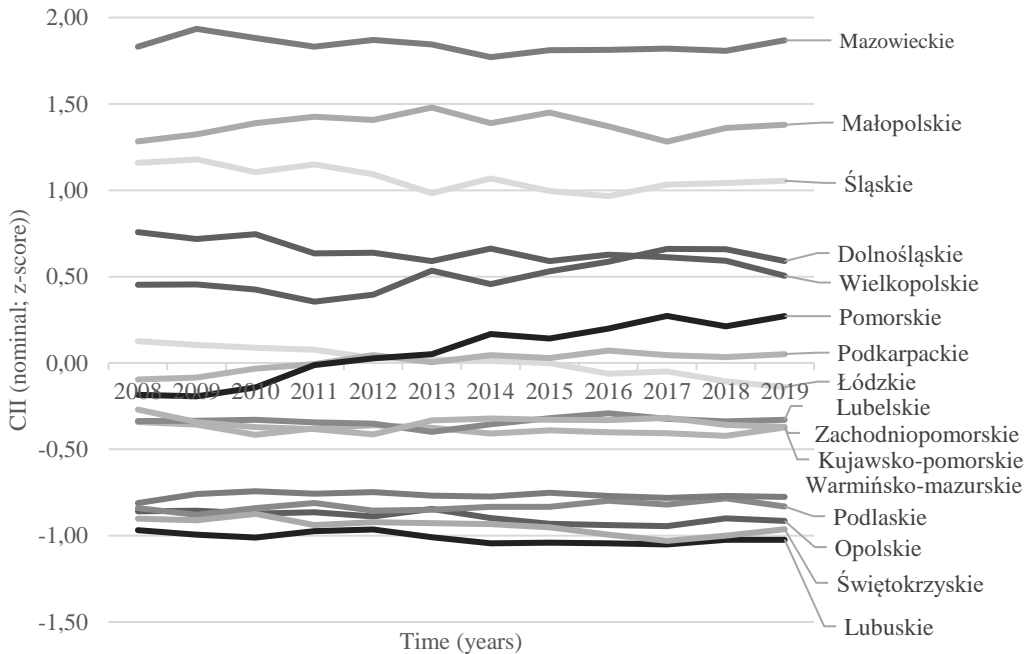
Source: Developed by the authors.

Table 1. Values of the CII (nominal, z-score) in 2008-2019 in the NUTS-2 regional division of Poland

Provinces:	Years:											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Dolnośląskie	0.45	0.45	0.43	0.35	0.40	0.53	0.46	0.53	0.59	0.66	0.66	0.59
Kujawsko-pomorskie	-0.34	-0.36	-0.42	-0.38	-0.36	-0.38	-0.41	-0.39	-0.40	-0.41	-0.42	-0.37
Lubelskie	-0.34	-0.33	-0.33	-0.34	-0.35	-0.40	-0.36	-0.32	-0.29	-0.32	-0.34	-0.33
Lubuskie	-0.97	-0.99	-1.01	-0.97	-0.96	-1.01	-1.04	-1.04	-1.04	-1.05	-1.02	-1.02
Łódzkie	0.13	0.11	0.09	0.08	0.03	0.02	0.01	0.00	-0.06	-0.05	-0.11	-0.14
Małopolskie	1.28	1.32	1.39	1.43	1.41	1.48	1.39	1.45	1.37	1.28	1.36	1.38
Mazowieckie	1.83	1.93	1.88	1.83	1.87	1.84	1.77	1.81	1.81	1.82	1.81	1.87
Opolskie	-0.86	-0.86	-0.87	-0.87	-0.89	-0.85	-0.90	-0.93	-0.94	-0.95	-0.90	-0.91
Podkarpackie	-0.10	-0.08	-0.03	-0.01	0.05	0.00	0.05	0.03	0.07	0.05	0.03	0.05
Podlaskie	-0.84	-0.88	-0.84	-0.81	-0.86	-0.85	-0.83	-0.83	-0.80	-0.82	-0.78	-0.83
Pomorskie	-0.18	-0.19	-0.14	-0.01	0.03	0.05	0.17	0.14	0.20	0.27	0.21	0.27
Śląskie	1.16	1.18	1.10	1.15	1.09	0.98	1.07	1.00	0.97	1.03	1.04	1.05
Świętokrzyskie	-0.90	-0.91	-0.87	-0.94	-0.92	-0.93	-0.93	-0.95	-0.99	-1.03	-1.00	-0.96
Warmińsko-mazurskie	-0.81	-0.76	-0.74	-0.76	-0.75	-0.77	-0.77	-0.75	-0.77	-0.78	-0.77	-0.78
Wielkopolskie	0.76	0.72	0.75	0.63	0.64	0.59	0.66	0.59	0.63	0.61	0.59	0.50
Zachodniopomorskie	-0.27	-0.34	-0.37	-0.38	-0.41	-0.33	-0.32	-0.33	-0.33	-0.32	-0.36	-0.37

Source: Developed by the authors.

Figure 4. Dynamics of the CII (nominal, z-score) in 2008-2019 in the NUTS-2 division of Poland



Source: Developed by the authors.

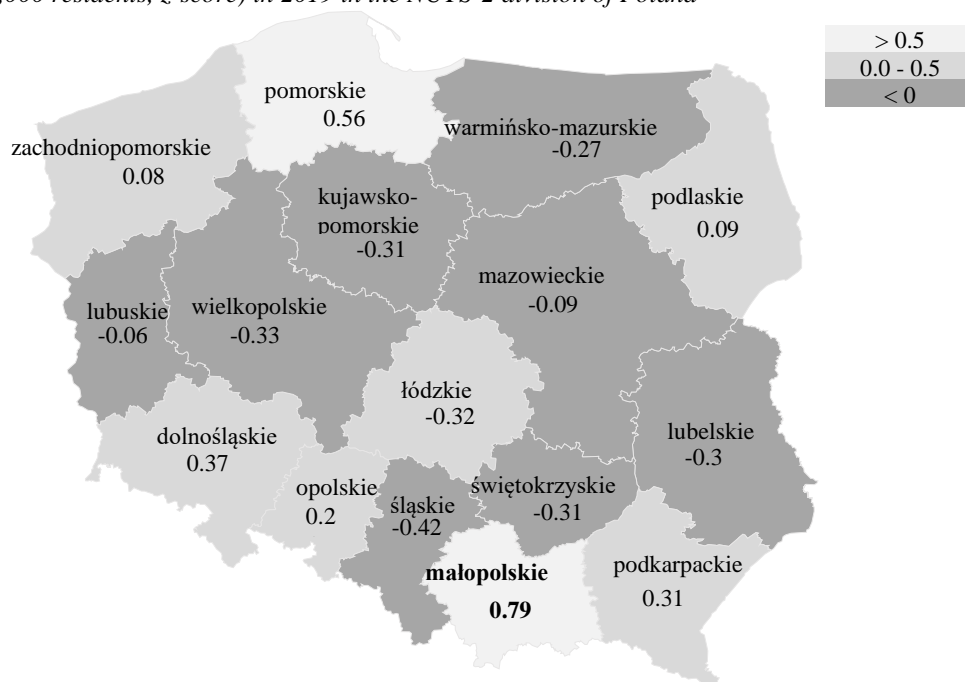
However, these provinces are characterized by a relatively low degree of urbanization, low level of income, and lower level of education among the population compared with the other provinces. Furthermore, these provinces are also affected by the high quality of human capital migration to other regions, where chances for development are better (Merło and Bogdański, 2017; Skibiński, 2017; Zdrojewski and Toszewska-Czerniej, 2016). The province mazowieckie makes an outstanding region relative to all other Polish provinces, having the most significant economic and cultural potential, high incomes, and a large percentage of the population with higher education. The province małopolskie comes close second, having an asset such as the city of Kraków, a large national cultural and economic center. Kraków determines the development of the whole region.

However, it would be erroneous to explore the availability of cultural infrastructure only in terms of absolute values. The Polish provinces represent different degrees of urbanization and different population densities, which are fundamental to the accessibility of any services, including cultural ones. The analysis of the availability of cultural infrastructure per 1,000 residents shows that the province with the distinctly highest potential in this respect is małopolskie (Table 2, Figure 5).

Table 2. Values of the CII (data converted per 1,000 residents, z-score) in 2008-2019 in the NUTS-2 division of Poland

Provinces:	Years:	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Dolnośląskie		0.31	0.24	0.22	0.07	0.11	0.33	0.17	0.30	0.33	0.44	0.48	0.37
Kujawsko-pomorskie		-0.23	-0.29	-0.39	-0.32	-0.28	-0.33	-0.37	-0.35	-0.37	-0.40	-0.41	-0.31
Lubelskie		-0.43	-0.30	-0.36	-0.36	-0.39	-0.49	-0.37	-0.29	-0.20	-0.30	-0.33	-0.30
Lubuskie		0.13	0.01	-0.13	0.10	0.15	-0.03	-0.11	-0.07	-0.10	-0.08	-0.07	-0.06
Łódzkie		-0.03	0.01	-0.05	-0.03	-0.13	-0.13	-0.14	-0.16	-0.22	-0.21	-0.27	-0.32
Małopolskie		0.88	0.91	1.00	0.94	0.91	1.03	0.87	0.90	0.78	0.68	0.78	0.79
Mazowieckie		0.19	0.09	0.17	0.09	0.05	-0.05	-0.13	-0.13	-0.15	-0.18	-0.14	-0.09
Opolskie		0.17	0.14	0.15	0.22	0.22	0.42	0.21	0.13	0.11	0.18	0.25	0.21
Podkarpackie		0.06	0.11	0.17	0.20	0.30	0.21	0.27	0.23	0.34	0.30	0.23	0.31
Podlaskie		0.01	-0.11	0.02	0.08	0.01	0.02	0.11	0.17	0.23	0.27	0.27	0.09
Pomorskie		0.02	-0.09	-0.01	0.17	0.22	0.27	0.46	0.38	0.46	0.57	0.43	0.56
Śląskie		-0.30	-0.31	-0.37	-0.34	-0.40	-0.53	-0.45	-0.53	-0.56	-0.53	-0.44	-0.42
Świętokrzyskie		-0.44	-0.32	-0.27	-0.44	-0.35	-0.37	-0.32	-0.34	-0.39	-0.51	-0.48	-0.31
Warmińsko-mazurskie		-0.55	-0.22	-0.23	-0.32	-0.24	-0.27	-0.23	-0.20	-0.24	-0.24	-0.25	-0.27
Wielkopolskie		0.09	0.04	0.04	-0.08	-0.12	-0.20	-0.08	-0.20	-0.14	-0.20	-0.20	-0.33
Zachodniopomorskie		0.13	0.10	0.04	0.02	-0.05	0.10	0.11	0.13	0.11	0.22	0.13	0.08

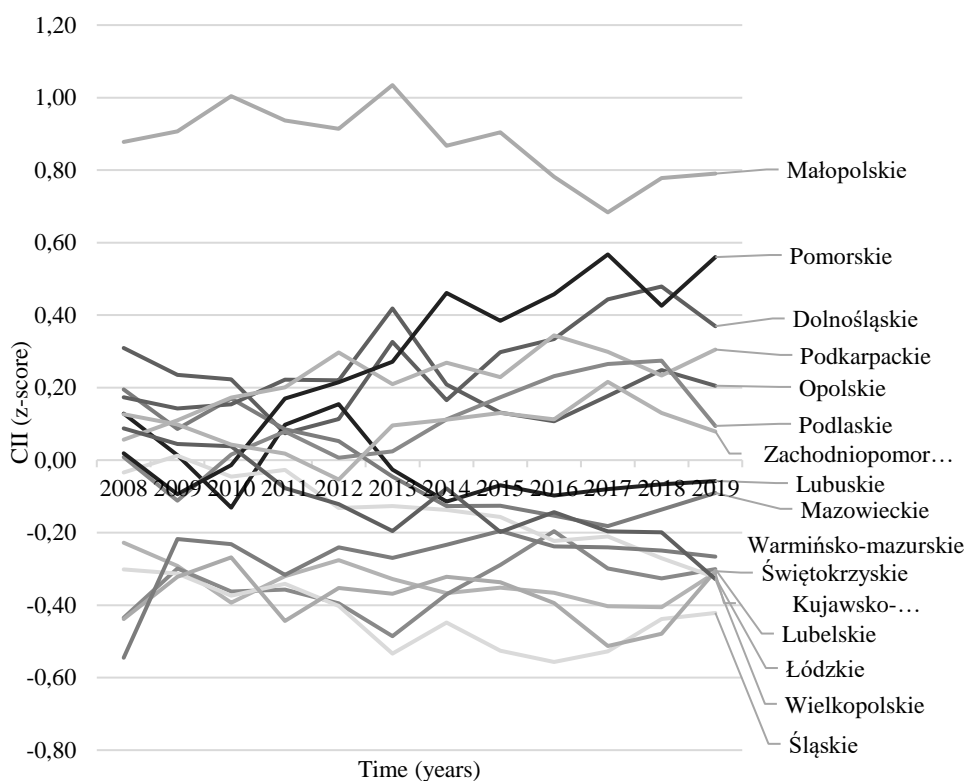
Source: Developed by the authors.

Figure 5. Potential of cultural infrastructure measured by the CII value (data converted per 1,000 residents, z-score) in 2019 in the NUTS-2 division of Poland

Source: Developed by the authors.

The main reason is the presence of Kraków, the second largest Polish city in population (after Warsaw) and the third-largest in population density (after Warsaw and Białystok), a city which in Poland has the highest cultural infrastructure potential relative to the population of this region. However, it is worth mentioning that the development of the cultural infrastructure in the mazowieckie province lags behind the economic growth rate of this province. Consequently, its level is lower than in such provinces as pomorskie, dolnośląskie, or wielkopolskie, and even in lubuskie, opolskie, zachodnio-pomorskie, podlaskie or podkarpackie, that is, the provinces with much smaller populations, population densities, or incomes per capita (fig. 6).

Figure 6. Dynamics of the CII (data converted per 1,000 residents, z-score) in 2008-2016 in the NUTS-2 regional division of Poland

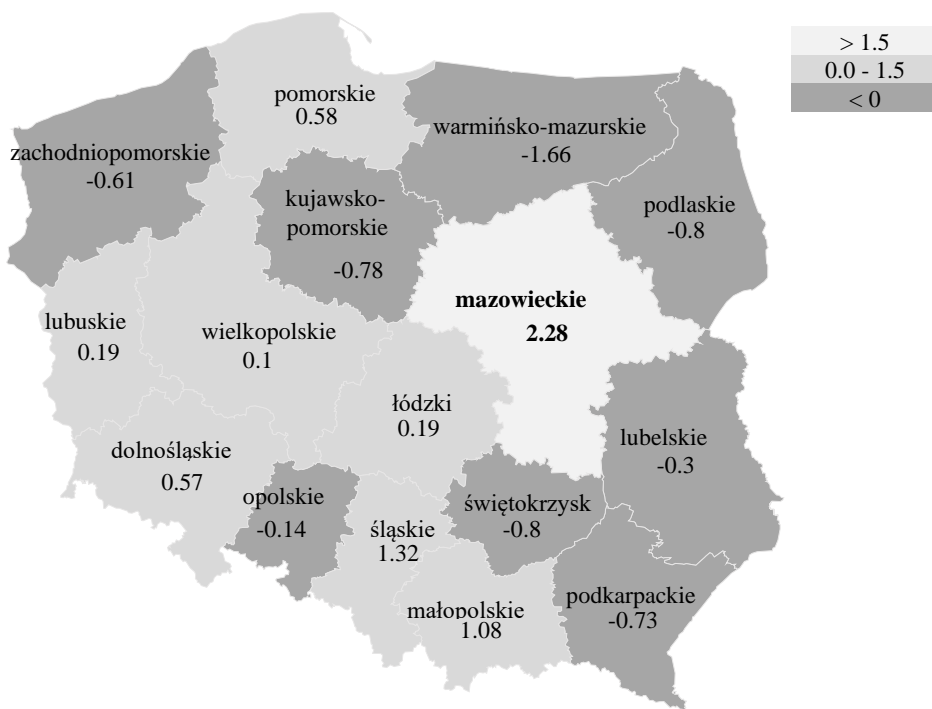


Source: Developed by the authors.

The competitiveness of the Polish regions is seen against the background of regions in other European Union member states, and hence the chances for rapid development of these areas are bound to be considered as highly inadequate. According to reports by the European Commission, the best of the Polish provinces, i.e., mazowieckie, occupies 150th place among all 276 Eu regions, while the weakest one, warmińsko-mazurskie, falls to the 215th position. The low level of competitiveness of the Polish regions is rooted mainly in their low competitiveness in such domains as efficiency

and innovativeness (Warzała, 2018). Most Polish provinces let their competitiveness rest on essential factors (first and second-tier education, health, infrastructure, macroeconomic stability, and quality of institutions), although even in this scope of competitiveness, values of most of the variables relevant to it achieved by Polish regions are below the EU average. The most severe deficits among the provinces in Poland emerge in the four last pillars mentioned above (Merło and Michalak, 2015, Merło and Bogdański, 2018). In Poland, it is evident that the province mazowieckie reaches the highest regional competitiveness level (2.28) (Figure 7).

Figure 7. Competitiveness measured by the RCI values (z-score) in 2019 in the NUTS-2 regional division of Poland



Source: Developed by the authors.

This is the largest and most populous region in Poland, which to a certain extent arises from the fact that it holds the only completely developed metropolis in Poland, the capital city of Warsaw, with a population of about 2.5 million. It is also a region with the highest number of working persons per 1,000 residents and the highest average remuneration. Lower levels of competitiveness were observed in the provinces śląskie (1.32) and małopolskie (1.08). The śląskie province is one of the smallest Polish provinces in the area (12,331 km²) but significant in the human potential (4,708,000 population, the second biggest population among the Polish provinces). It is the most densely populated area in the country (382 persons per km²). It also represents the highest urbanization level in Poland (78.6% of the region's population dwells in cities

and towns). Likewise, the małopolskie province is among the smallest Polish provinces (15,190 km²) and has a large population (3,256,000 people), which makes it a densely populated region (214 persons per km²), second only to the province śląskie.

Unlike the latter, the urbanization level is low (49.8% of the population lives in cities and towns). The province with the lowest competitiveness is the province warmińsko-mazurskie, one of the least developed Polish regions (-1.66). It is among the largest provinces in the area (covering 24,192 km², it is the fourth largest province in Poland), and this, coupled with the small population (1,428,400 inhabitants), means the province has a population density less than half the Polish average density (59 persons per km²). The urbanization index does not diverge much from the Polish average (57.8%). Both per capita income and average gross remuneration put the province in low positions compared to all Polish provinces (13th and 15th position, respectively). Because of the agricultural character of the province, the dominant industry in the region is agricultural and food processing. Improvement of the regional competitiveness, which is expected to facilitate a more rapid economic development, should enable the region's population to reach a higher standard of living. This, in turn, involves better access to the cultural infrastructure facilities. Persons with higher incomes and a higher education level expect better access to and a more diverse offer of cultural services.

Table 3. Values of the RCI (z-score) in 2008-2019 in the NUTS-2 regional division of Poland

Provinces:	2008 -2010 years	Position	2011 -2013 years	Position	Trend	2014 -2016 years	Position	Trend	2017 -2019 years	Position	Trend
Mazowieckie	2.30	1	2.66	1	-	2.51	1	-	2.28	1	-
Śląskie	1.55	2	1.30	2	-	1.29	2	-	1.32	2	-
Małopolskie	1.11	3	0.91	3	-	1.14	3	-	1.08	3	-
Dolnośląskie	0.53	4	0.48	4	-	0.54	4	-	0.57	5	□
Łódzkie	0.31	5	0.24	7	□	0.33	6	□	0.19	6	-
Wielkopolskie	0.24	6	-0.62	11	□	-0.04	7	□	0.10	8	□
Pomorskie	0.09	7	0.25	5	□	0.52	5	-	0.58	4	□
Opolskie	-0.03	8	0.24	6	□	-0.78	13	□	-0.14	9	□
Podkarpackie	-0.42	9	-0.71	14	□	-0.73	12	□	-0.73	11	□
Zachodniopomorskie	-0.43	10	-0.53	10	-	-0.49	10	□	-0.61	10	□
Lubelskie	-0.55	11	-0.25	8	□	-0.35	9	□	-0.77	12	□
Świętokrzyskie	-0.57	12	-0.66	13	□	-0.23	8	□	-0.80	15	□
Lubuskie	-0.73	13	-0.48	9	□	-0.67	11	□	0.19	6	□
Kujawsko-Pomorskie	-0.77	14	-0.72	15	□	-0.99	14	□	-0.78	13	□
Podlaskie	-1.22	15	-0.63	12	□	-1.00	15	□	-0.80	14	□
Warmińsko-Mazurskie	-1.42	16	-1.48	16	-	-1.04	16	□	-1.66	16	□

Source: Developed by the authors.

As the measurements of regional competitiveness by the European Commission are taken every three years (starting in 2010), data that serve to develop the CII have been converted in a comparable set of three, three-year-long periods (Tables 3, 4).

Table 4. Values of the CII (converted per 1,000 residents, z-score) in 2008-2019 in the NUTS-2 regional division of Poland

	2008 -2010 years	Position	2011 -2013 years	Position	Trend	2014 -2016 years	Position	Trend	2017 -2019 years	Position	Trend
Provinces:											
Mazowieckie	0.99	1	0.98	1	□	0.86	1	□	0.77	1	□
Śląskie	0.28	2	0.16	5	□	0.27	4	□	0.43	3	□
Małopolskie	0.20	3	0.03	8	□	0.14	6	□	0.20	6	□
Dolnośląskie	0.16	4	0.27	2	□	0.28	3	□	0.28	4	□
Łódzkie	0.09	5	0.24	4	□	0.11	7	□	0.13	7	□
Wielkopolskie	0.07	6	0.01	9	□	-0.14	10	□	-0.13	9	□
Pomorskie	0.07	7	-0.13	11	□	-0.14	9	□	-0.24	10	□
Opolskie	0.03	8	0.09	6	□	-0.18	11	□	-0.28	12	□
Podkarpackie	0.01	9	0.25	3	□	-0.10	8	□	-0.07	8	□
Zachodniopomorskie	-0.02	10	0.06	7	□	0.18	5	□	0.21	5	□
Lubelskie	-0.04	11	-0.10	10	□	0.45	2	□	0.53	2	□
Świętokrzyskie	-0.31	12	-0.32	13	□	-0.22	12	□	-0.25	11	□
Lubuskie	-0.34	13	-0.43	16	□	-0.37	15	□	-0.38	14	□
Kujawsko-Pomorskie	-0.38	14	-0.40	14	□	-0.52	16	□	-0.47	16	□
Podlaskie	-0.39	15	-0.29	12	□	-0.36	14	□	-0.43	15	□
Warmińsko-Mazurskie	-0.41	16	-0.42	15	□	-0.29	13	□	-0.31	13	□

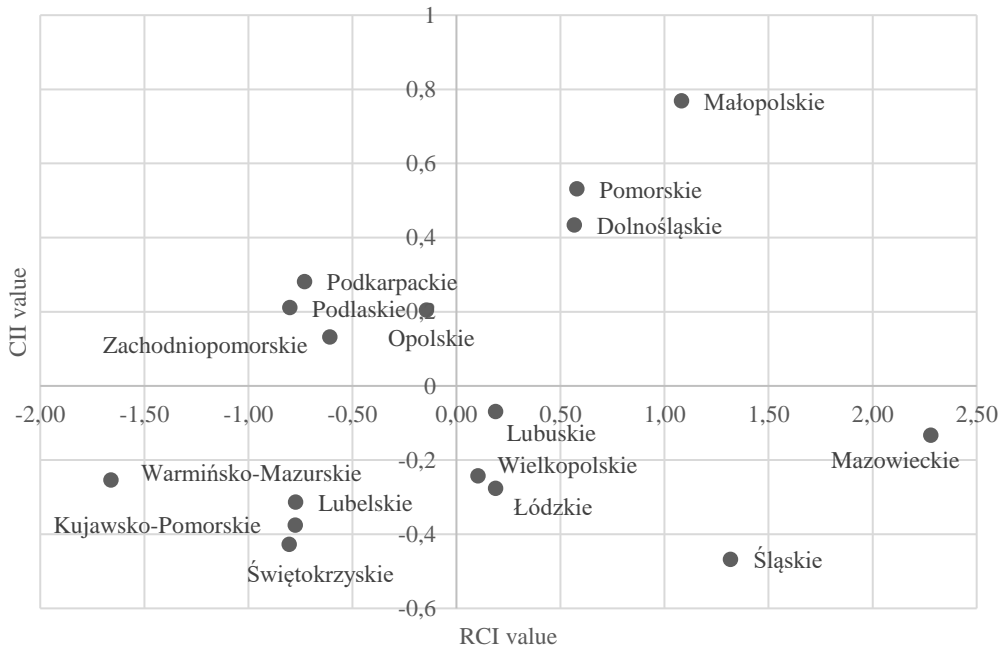
Source: Developed by the authors.

Based on such data, it became possible to evaluate the relationship between the cultural infrastructure potential in the analyzed regions and the regional competitiveness therein. The provinces were divided into four groups, depending on the relation between the RCI and CCI (Figure 8):

- a group of provinces with a positive value of the RCI and a positive value of the CCI – provinces with relatively high regional competitiveness, able to provide their residents with an appropriate level of availability of the cultural infrastructure (1st quarter fig. 8);
- a group of provinces with a positive value of the RCI and a negative value of the CCI – regions with high competitiveness but unable to ensure that their residents have an adequate access to cultural services (4th quarter fig. 8);
- a group of provinces with a negative value of the RCI and a positive value of the CCI – less developed provinces, with a relatively low competitiveness, which are able to ensure their inhabitants have a satisfying access to the cultural infrastructure (2nd quarter fig. 8);

- a group of provinces with a negative value of the RCI and a negative value of the CCI – poorly developed regions, where the access to cultural services must be considered as inadequate (3rd quarter Figure 8).

Figure 8. Spatial differentiation of CII relative to RCI in 2017-2019 in the NUTS-2 regional division of Poland



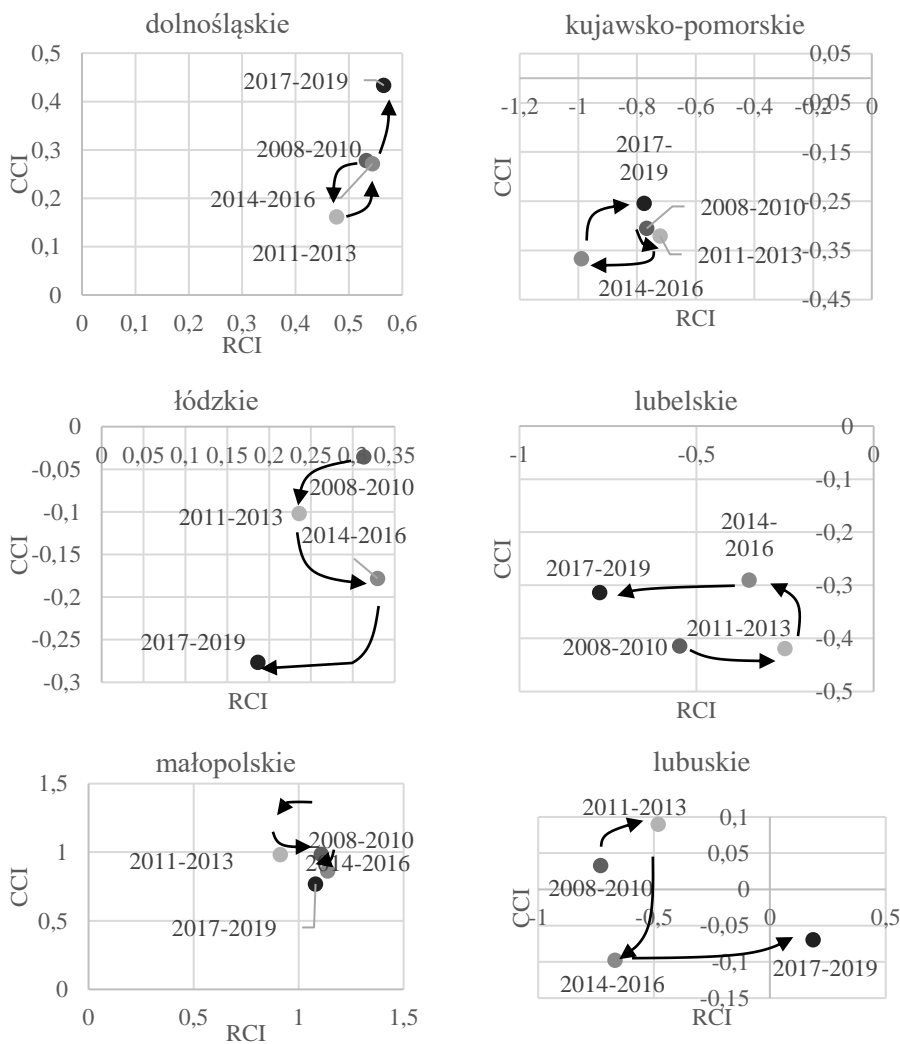
Source: Developed by the authors.

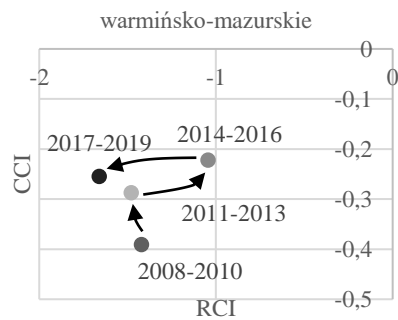
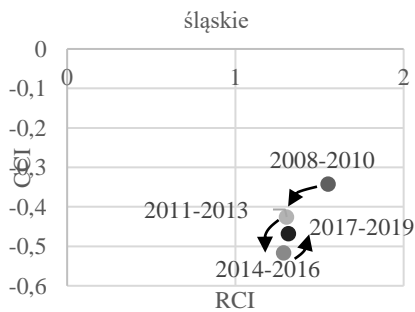
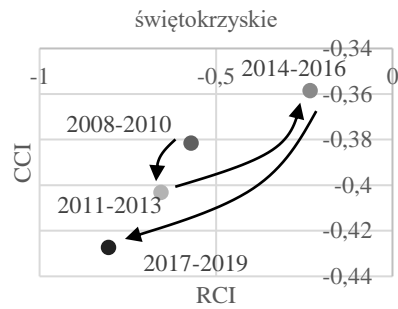
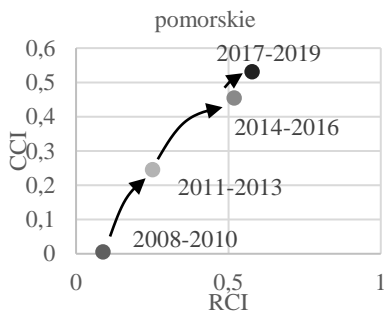
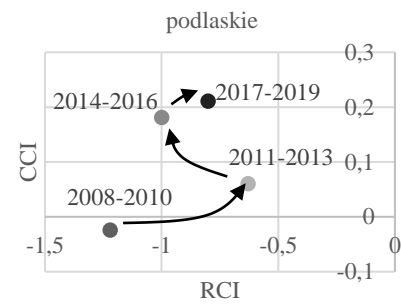
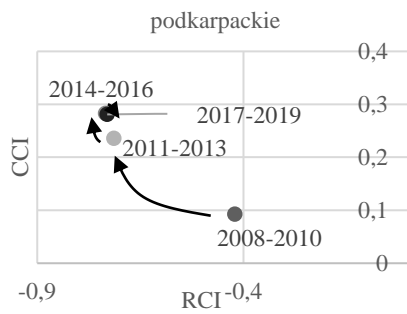
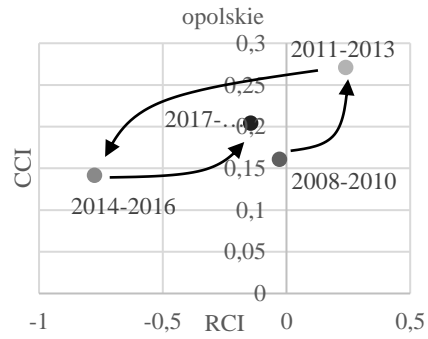
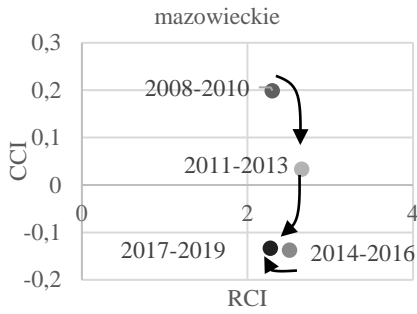
The analysis showed that only three provinces, i.e., małopolskie, pomorskie, and dolnośląskie, can be classified into the first group. As well as ensuring access to cultural services above the average for Poland, these provinces attain a level of regional competitiveness, likewise exceeding the country's average. The mazowieckie province, despite displaying the highest regional competitiveness in Poland, mainly because it is the capital province in the country, is unable to provide the residents with adequate access to cultural infrastructure, which might be a negative factor in an assessment of the standard of living in this province.

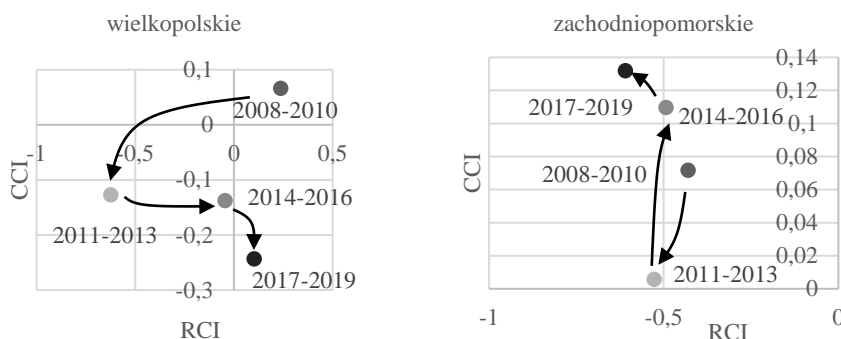
Thus, measures need to be taken to broaden the available cultural offer in this region. A similar situation has been observed in the provinces śląskie, łódzkie, lubuskie and wielkopolskie, that is in the regions which for decades have been connected with industries. Such historical background is one of the reasons why the accessibility to cultural infrastructure in the mentioned regions remains below the country's average. The third group of provinces ($RCI < 0$, $CCI > 0$) was determined to comprise the provinces podkarpackie, podlaskie, opolskie and zachodniopomorskie. Although scoring low in regional competitiveness, these regions, that is, having limited

development opportunities, can ensure an adequate level of accessibility to cultural services for their inhabitants. The worst situation in the analyzed scope was observed in the provinces *warmińsko-mazurskie*, *lubelskie*, *kujawsko-pomorskie* and *świętokrzyskie*. These regions are characterized by a low level of competitiveness and access to cultural infrastructure lower than the country's average (3rd quarter Figure 8). An analysis of changes in the values of the two indices demonstrated that the global crisis of 2007-2009 left its traces in Poland in terms of regional competitiveness and accessibility to cultural infrastructure. In most of the Polish provinces, the values of these two indices declined (Figure 9).

Figure 9. Changes in the spatial differentiation of the RCI and CII relationships in Polish provinces in 2008-2019







Source: Developed by the authors.

The province pomorskie was an exception as it continued to steadily improve its competitiveness and availability of cultural infrastructure (despite the global crisis). Therefore this region ought to be treated as a leader with little vulnerability to changes in the global economic situation. In two of the sixteen analyzed provinces, i.e., dolnośląskie and podlaskie, specific improvement in the analyzed indices relative to the first assessment was observed, despite adverse fluctuations in the second and third periods of assessment. Six of the sixteen provinces (łódzkie, małopolskie, mazowieckie, świętokrzyskie, śląskie, wielkopolskie) presented a decline in the values of the two indices relative to the first assessment period; these regions were unable to regain the previous values of either index, that is competitive position or availability of cultural infrastructure, over the analyzed period – in both aspects the results obtained in the last period of analysis were worse than in the first.

4. Conclusions

The availability of cultural infrastructure in today's economy is one of the critical determinants of the ability to attract a highly qualified labor force by ensuring the living space of adequate quality, by re-valuing the critical factors of a given region's success, and by defining a new development strategy or modifying the existing one. The analysis revealed some severe shortcomings in this sphere in Poland. In terms of the convergence between high regional competitiveness and adequately high availability of cultural infrastructure, only the małopolskie province positively distinguishes itself. A question arises whether this is achieved owing to the measures taken by the local authorities or is it the result of the region's historical heritage. The measures taken in the sphere analyzed in the research, according to the authors, are insufficient in most provinces. The province pomorskie is an exception, as it noted an increase in regional competitiveness throughout the analyzed period accompanied by a proportional increase in the availability of cultural infrastructure.

The research results presented in this article allowed us to distinguish four groups of provinces in Poland, which differ in the relationship between the availability of cultural infrastructure and the level of competitiveness:

- first group (RCI and CCI above the average) – such scores of the indices were noted in the provinces małopolskie, dolnośląskie and pomorskie; the results implicate that the development of the availability of cultural infrastructure is proportional to the relatively high competitiveness of the region (compared to all Polish provinces);
- second group (CCI above the average, RCI below the average) – the provinces podkarpackie, podlaskie, opolskie and zachodniopomorskie; In these provinces the availability of cultural infrastructure is relatively higher than would be indicated by the RCI scores;
- third group (RCI and CCI below the average in Poland) – this situation was observed in the provinces warmińsko-mazurskie, lubelskie, świętokrzyskie and kujawsko-pomorskie; in this case, although the availability of cultural infrastructure corresponds to the level of competitiveness in a given region, the value of neither of the variables can be deemed as satisfactory (below the country's average); fourth group (RCI above the average, CCI below the average for Poland) – the provinces mazowieckie, wielkopolskie, łódzkie, lubuskie and śląskie; in these provinces, the availability of cultural infrastructure is insufficient relative to the pace of development and regional competitiveness.

The distinction of the above groups should serve as a recommendation to make an in-depth analysis of this state of matters and an indication for local authorities about how to mold directions in the region's development, including the allocation of funds, to satisfy the expectations and needs of residents regarding the availability of cultural infrastructure.

References:

- Aivazidou, E., Cunico, G., Mollona, E. 2020. Beyond the EU Structural Funds' Absorption Rate: How Do Regions Really Perform? *Economies*, 8, 55. DOI: 10.3390/economies8030055.
- Annoni, P., Dijkstra, L. 2013. EU Regional Competitiveness Index RCI 2013. European Commission. Joint Research Centre EC.
- Annoni, P., Dijkstra, L. 2019. The EU Regional Competitiveness Index 2019. Publications Office of the European Union. Luxembourg.
- Annoni, P., Dijkstra, L., Gargano, N. 2016. The EU Regional Competitiveness Index 2016. European Commission. Joint Research Centre EC.
- Annoni, P., Kozovska, K. 2010. EU Regional Competitiveness Index RCI 2010. Joint Research Centre EC.
- Arts Victoria. 2008. The role of arts and culture in liveability and competitiveness. Inquiry into Enhancing Victoria's Liveability.
- Bałtromiuk, A. 2003. Peripheral regions in the perspective of the EU structural policy. Wydawnictwo Uniwersytetu w Białymstoku. Białystok, 77.
- Banaszewska, M. 2018. The determinants of local public investments in Poland. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 13, 105-121. DOI: 10.24136/eq.2018.006.

- Begg, I. 1999. Cities and Competitiveness. *Urban Studies*, 36, 795-809. DOI: 10.1080/0042098993222.
- Blavasciunaite, D, Garsviene, L, Matuzeviciute, K. 2020. Trade Balance Effects on Economic Growth: Evidence from European Union Countries. *Economies*, 8(3), 54. DOI: 10.3390/economies8030054.
- Bogdański, M. 2018. Evolution of economic base vs. economic growth of voivodship cities. *Research papers of Wrocław University of Economics*, 536, 21-38.
- Bristow, G. 2005. Everyone's a 'Winner': Problematising the Discourse of Regional Competitiveness. *Journal of Economic Geography*, 5, 285-304.
- Camagni, R. 2002. On the Concept of Territorial Competitiveness: sound or misleading? *Urban Studies*, 39, 2395-2411.
- Camagni, R. 2008. Regional Competitiveness: Towards a Concept of Territorial Capital. In: Capello, R., Camagni, R., Chizzolini, B., Fratesi, U. (Eds.), *Modelling Regional Scenarios for the Enlarged Europe*. Berlin and Heidelberg, Springer, 33-47.
- Camagni, R., Capello, R. 2013. Regional Competitiveness and Territorial Capital: A Conceptual Approach and Empirical Evidence from the European Union. *Regional Studies*, 47, 1383-1402.
- Dijkstra, L., Annoni, P., Kozovska, K. 2011. A new regional competitiveness index: Theory, Methods and Findings. *European Union Regional Policy Working Papers*, 2.
- Durlauf, S.N., Quah, D.T. 1998. *The new empirics of economic growth*. Centre for Economic Performance. London School of Economics and Political Science. Discussion Paper.
- Eskelinen, H., Hannibalsson, I., Malmberg, A., Maskell, P., Vatne, E. 2002. Competitiveness, localised learning and regional development: specialization and prosperity in small open economies. Routledge.
- Filipiak, B., Kogut N., Szewczuk, A., Ziolo, M. 2005. *Rozwój lokalny i regionalny. Uwarunkowania, finanse procedury* [Local and regional development. Conditions, finances of the procedure]. Fundacja na rzecz Uniwersytetu Szczecińskiego [Foundation for the University of Szczecin]. Szczecin, 264.
- Florida, R. 2002. *The Rise of the Creative Class*. Basic Books. New York.
- Florida, R. 2014. *The Rise of the Creative Class-Revisited: Revised and Expanded*. Basic Books (AZ).
- Góralski, P., Lazarek, M. 2009. Czynniki kształtujące konkurencyjność regionów [Factors influencing the competitiveness of regions]. *Zeszyty Naukowe SGGW, Polityki Europejskie, Finanse i Marketing*, 1(50), 307-315.
- Gorzela, G. 1997. *Przemiany polskiej przestrzeni* [Polish spatial transformations]. In: *Podstawy naukowo-badawcze polityki przestrzennego zagospodarowania kraju* [Scientific and research foundations of the country's spatial development policy]. Rządowe Centrum Studiów Strategicznych. Warszawa, 25.
- Heller, M., Bogdański, M. 2014. Economic Growth in the Warmia and Mazury Voivodship Compared to Selected Countries and Regions of the European Union. *Olsztyn Economic Journal*, 1, 5-16. DOI: 10.31648/oiej.3161.
- Jagodzińska, K. 2013. Edukacja kulturalna na rzecz kreatywności i innowacyjności [Cultural education for creativity and innovation]. In: Hausner, J., Karwińska, A., Purchla, J. (eds) *Kultura i rozwój*.
- Jankowska, B., Sulimowska-Formowicz, M. 2010. *Konceptcje konkurencji w ekonomii* [Concepts of competition in economics]. In: Gorynia, M., Łązniewska, E. (Eds). *Kompendium wiedzy o konkurencyjności* [A compendium of knowledge about competitiveness]. Wydawnictwo Naukowe PWN, Warszawa.

- Kilduff, G.J., Elfenbein, H.A., Staw, B.M. 2010. The psychology of rivalry: a relationally dependent analysis of competition. *Academy of Management Journal*, 53, 943-945.
- Kisieláková, D., Šofranková, B., Onuferová, E., Čabinová, V. 2019. The evaluation of competitive position of EU-28 economies with using global multi-criteria indices. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 14, 441-462. DOI: 10.24136/eq.2019.021.
- Kot, J. 2004. Raport zbiorczy z badań przeprowadzonych w zespole badawczym I - Gospodarka i Przedsiębiorstwa [Summary report on the research carried out in the research team I - Economy and Enterprises]. Retrieved from: www.ujk.edu.pl/iekon/zporr/raport/calosc%20raport.doc.
- Krugman, P. 1994a. Competitiveness: A Dangerous Obsession. *Foreign Affairs*, 73, 28-44.
- Krugman, P. 1994b. The fight over competitiveness: A zero sum debate: Response: proving my point. *Foreign Affairs*, 73, 198-203.
- Krugman, P. 1996. Making Sense of the Competitiveness Debate. *Oxford Review of Economic Policy*, 12, 17-25.
- Kuc-Czarnecka, M. 2019. Sensitivity analysis as a tool to optimise Human Development Index. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 14, 425-440. DOI: 10.24136/eq.2019.020
- Lysenko, I., Stepenko, S., Dyvnych, H. 2020. Indicators of Regional Innovation Clusters' Effectiveness in the Higher Education System. *Education Sciences*, 10, 245. DOI: 10.3390/educsci10090245.
- Malczyk, K. 2013. Kultura i rynek. In: Hausner, J., Karwińska, A., Purchla, J. (Eds) *Kultura i rozwój*.
- Malecki, E. 2000. Knowledge and regional competitiveness. *Erdkunde*, 54, 334-351. DOI: 10.3112/erdkunde.2000.04.04.
- Markowski, T. 1999. *Zarządzanie rozwojem miast [City development management]*. PWN. Warszawa.
- Markowski, T., Stawasz, D. 2001. *Ekonomiczne i środowiskowe aspekty zarządzania rozwojem miast i regionów [Economic and environmental aspects of managing the development of cities and regions]*. Wydawnictwo Uniwersytetu Łódzkiego. Łódź.
- Martin, R. 2003. *A Study of the Factors of Regional Competitiveness. A Draft Final Report for the European Commission. Directorate-General Regional Policy*. Cambridge Econometrics. ECORYS-NEI. Rotterdam.
- Merło, P., Bogdański, M. 2017. Regional Economy Competitiveness as a Determinant of the Human Capital Level of Exemplified by the Warmińsko-Mazurskie Voivodeship. *Olsztyn Economic Journal*, 4, 401-413. DOI: 10.31648/oiej.2840.
- Merło, P., Bogdański, M. 2018. Spatial disparities in the level of human capital in the European Union in the context of regional competitiveness. *Studia Regionalne i Lokalne*, 3(73), 5-26.
- Merło, P., Bogdański, M., Michalak, J. 2015. Kapitał ludzki a rynek pracy w województwie warmińsko-mazurskim. In: Merło, P., Michalak, J. (Eds). *Efekty inwestowania w kształcenie kadry menadżerskiej dla potrzeb regionalnego rynku pracy*. Chair of Macroeconomics. Faculty of Economic Sciences. University of Warmia and Mazury in Olsztyn. Olsztyn.
- Merło, P., Michalak, J. 2015. Konkurencyjność regionów. *Badania nad efektywnym inwestowaniem środków publicznych na poziomie NUTS2 w Polsce*. Chair of

- Macroeconomics. Faculty of Economic Sciences. University of Warmia and Mazury in Olsztyn. Olsztyn.
- Montgomery, J. 2008. *The new wealth of cities. City dynamics and the fifth wave.* Ashgate, Hampshire, Burlington.
- Poot, J. 2000. Reflections on Local and Economy - Wide Effects of Territorial Competition. In: Batey, P., Friedrich, P. *Regional Competition.* Springer.
- Porter, M.E. 1990. *The Competitive Advantage of Nations.* Free Press. New York.
- Porter, M.E. 2001. Clusters of innovation: Regional foundations of US competitiveness.
- Rusu, V.D., Dornean, A. 2019. The Quality of Entrepreneurial Activity and Economic Competitiveness in European Union Countries: A Panel Data Approach. *Administrative Sciences*, 9(2), 35. DOI: 10.3390/admsci9020035.
- Senetra-Szeliga, J. 2013. Sektor kultury a rozwój gospodarczy miasta [The cultural sector and the economic development of the city]. In: Hausner, J., Karwińska, A., Purchla, J. (Eds). *Kultura i rozwój.*
- Skibiński, A. 2017. Migration Processes and their Consequences for the Labour Market in the Visegrad Group Countries - Selected Aspects. *Olsztyn Economic Journal*, 1, 79-98. DOI: 10.31648/oiej.2786.
- Snieška, V., Bruneckienė, J. 2009. Measurement of Lithuanian regions by regional competitiveness index. *Inżynieria i Gospodarka Budowlana-Engineering Economics*, 61, 45-57.
- Stawasz, D. 2004. *Ekonomiczno-organizacyjne uwarunkowania rozwoju regionu - teoria i praktyka [Economic and organizational conditions for the development of the region - theory and practice].* Wydawnictwo Uniwersytetu Łódzkiego. Łódź, 203.
- Swab, R.G., Johnson, P.D. 2019. Steel sharpens steel: A review of multilevel competition and competitiveness in organizations. *Journal of Organization Behavior*, 40, 147-165. DOI: 10.1002/job.2340.
- Throsby, D. 2001. *Economics and Culture.* Oxford. Cambridge University Press.
- Throsby, D. 2010. *The economics of cultural policy.* Cambridge University Press. Cambridge.
- Throsby, D. 2002. *Cultural Capital and Sustainable Development: How Does Cultural Capital Promote Urban Development?* Unpublished paper presented at a seminar in the Faculty of Economics. Saitama National University, Tokyo.
- Throsby, D. 2005. *Cultural Heritage as Financial Asset in Strategies for Urban Development and Poverty Alleviation.* Unpublished paper presented at International Conference for Integrating Urban Knowledge and Practice. Gothenburg. Sweden.
- Towse, R. 2011. *A Handbook of Cultural Economics.* Edward Elgar.
- Warząła, R. 2018. Innovativeness of Polish regions and their business cycles. *Actual Problems of Economic Development and Management. Collection of scientific works. Immanuel Kant Baltic Federal University (Kaliningrad)*, 199-207.
- Winiarski, B. 1999. Czynniki konkurencyjności regionów. In: Klamut M. (Eds). *Konkurencyjność regionów.* AE im. Oskara Langego. Wrocław.
- Yue, Z., Zhao, K. 2020. Understanding the Effectiveness of Higher Education System: Evidences from Market Outcomes of Early University Graduates in Seven European Countries. *Sustainability*, 12, 7761. DOI: 10.3390/su12187761.
- Zdrojewski, E.Z., Toszewska-Czerniej, W. 2016. Formal Education of Polish Society as a Factor Affecting Human Capital. *Olsztyn Economic Journal*, 3, 249-264. DOI: 10.31648/oiej.2931.