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CORRELATION AND INTERACTION OF ECONOMIC CREATIVITY FACTORS AS A DETERMINANT OF SUSTAINABLE DEVELOPMENT (ON THE EXAMPLE OF THE EU COUNTRIES)

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Abstract. The creative economy is currently demonstrating quite intensive development indicators, and the share of the creative sector in GDP creation is constantly growing. The aim of this article is to reveal the interrelation and interdependence of socio-economic development factors and to clarify the place of the creative sector in ensuring sustainable economic growth. On the basis of 19 variables, the economies of the EU countries were analyzed by means of cluster analysis, which allowed the authors to single out 8 clusters in the constructed dendrogram, united by the nature and trends, as well as the role of the creative sector in these processes. In addition, the degree of correlation and interaction between the influencing factors themselves was described. Using RStudio, the authors built two multiple regression models, where the dependent variables were GDP and the global creativity index, and the factors were the indicators used to calculate the creativity index. Innovations and creativity are one of priorities of the program of socio-economic development of the European Union. There is a universal approach to understanding the importance of creative economy in the EU. However, the practical implementation of the strategy of development and activity of the creative industries by the EU countries is carried out in the following different directions – the foreign economic expansion of the creative industries themselves; the promotion of all national culture at the international level; export-oriented development of the creative sector of the economy; the lack of a separate comprehensive strategy of foreign economic activity for the creative industries, but the implementation of various programs and measures aimed at promoting exports of products of these industries as part of a national development strategy. Overall, the active functioning of the EU creative sector directly or indirectly affects the economy by improving its performance and creating jobs, stimulating innovation, and contributing to social and sustainable development. As a result, it was found that the global creativity index is largely dependent on the share of the creative class. It has also been proved that the creative and cultural industries determine the growth of a country's economy in terms of traditional economic and employment indicators. Investments in the creative economy will increase the qualitative and quantitative indicators of sustainable economic development.

Key words: cluster analysis, creative economy, cultural and creative industries, sustainable development.

JEL Classification: C15, C38, D87, J24

1. Introduction

The modern economic system is increasingly evolving toward the intellectualization of the economy, the main result of which are new ideas that are commercialized in innovation, especially in the creative sphere of human activity. The results of intellectual property rights are increasingly being used and applied in practice as the most valuable economic resource, and creativity is becoming a major source of economic value. Today creativity is becoming a qualitative characteristic of the development of most economic processes, which are characterized by innovation, a significant information load, digitalization, networking and the introduction

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of completely new business models in the framework of the fourth industrial revolution.

Comprehensive creativity has led to the transformation of socio-economic relations and changes in sectoral and regional structures. Since the speed of such changes in different countries depends on their level of development, there is a need to reconfigure the world economy under the influence of creativity. Thus, the study of the creative imperative of the reconfiguration of the global economy and the concept of creative economy is relevant and has important theoretical, methodological and practical significance.

The emergence and formation of the concept of creative economy was influenced by the results of scientific opinion of leading scientists who studied the features and trends of development of socio-economic systems from the late XX – early XXI centuries. One of the most influential is the concept of post-industrialism (D. Bell, 1999; J. Naisbitt, 1982; A. Toffler, 2003), which describes the new technological system, method of production, characteristic of new conditions, general trends in the transformation of various spheres of society. This concept continues to develop today. Its directions, such as information-cybernetic, technocentric and humanistic-noosphere and anthropocentric theories, are distinguished.

The theoretical heritage of the classics of economics M. Weber, W. Sombart, F. Hayek, J. Schumpeter, and others is important for understanding the essential characteristics of economic and anthropological aspects of modern society. J. Schumpeter defined the special role of the "new combination of production factors" that affect the entrepreneur giving him a competitive advantage in the market. The most famous and popular is his theory of "creative destruction", developed in the early XX century, which describes the process of economic transformation after the action of innovation. Companies that implemented changes through innovation and captured the market, then gave way to competitors who produced better or cheaper products.

A separate area of modern research is the study of the peculiarities of scientific and technological and innovative development, the impact of innovation on the national economy. In particular, R. Harrord, D. Robinson, R. Solow (Daubaraitė & Startienė, 2015) analyzed the contribution of scientific and technological development to economic growth, thus creating the theoretical and methodological foundations of innovative economy. Studies show that scientists have long noticed and theorized the priority of intangible resources in the formation of competitive advantages of enterprises. Intangible resources were considered as a totality of knowledge presented in a certain form, which has a business entity, providing it with organizational and legal opportunities for further stable development, the formation of high-level competitive advantages associated with qualified personnel, patents, modern management, long-term relationships with customers, good reputation, etc. The most important characteristic of intangible resources is the intangible form of their existence. It should also be noted that the consideration of intellectual resources as factors of economic growth, allowed to highlight their essential features in comparison with the material factors of social production, which does not allow to put them on a par with the latter.

Essential transformations of economic processes are reflected in the scientific literature through such terms as "innovation economy", "e-economy", "knowledge economy", "Internet economy", "network economy" (T. Johansson, M. Carlson, P. Westin, P. Kotler, etc.), "digital economy" (P. Dicken, T. Terranova, D. Tapscott), "sharing economy" (J. Weng, M. Cheng, B. Kremer, M.L. Gensky, M. Noreu, A. Sundararajan) and others. Another broad concept is the "new economy": it covers the various effects of the transformation of economic relations under the influence of innovation, intellectualization, informatization, networking, digitalization, etc.

Scientists explain the increased attention to the creative sphere by the integration of production (primarily related to the digital revolution) and society (social networks), which resulted in a fundamentally new channel of mass sales of creative products. As a result, the economy has found an innovative tool to expand the sphere of access to the mass consumer, which allows us to state the emergence of creative marketing as a "creative business model". In this situation, any technological innovation is accompanied by a chain of unpredictable long-term economic consequences, the lag in the development of which can throw the national economy back to the level of the "pre-digital" era. This means that the specificity of the creative products market lies in the stable nature of the formation of demand for the creative market commodity products. In addition, the macroeconomic importance of the demand for creative goods and services is determined by the fact that it is satisfied mainly at the expense of the domestic market. This also substantiates the necessity of introducing the concept of creative economy in connection with the crisis of national economies, where it acts as an anti-crisis factor due to the emergence and expansion of the creative market, which provides overall economic stability.

The main features of the creative economy are: continuous innovative development, the significant role of human capital in the innovative development of the country; investment in new goods, services, technologies, and the development of human potential; large share of knowledge-intensive products

in GDP; competition based on innovations; specialization and cooperation in the field of innovation activities of business entities; protection of intellectual property. The main growth factors of creative economy are human potential; innovations; investments. Relevant factors for the development of the creative economy format include the appropriate "soft" infrastructure (effective creative space), creativity (and its varieties), innovation, investment, production, social management.

It is also worth highlighting another approach to the interpretation of the features of the creative economy. In practice, this model is based on the methodology of non-standard, original, unconventional managerial decisions, both for strategic development and for overcoming emergencies and crises, when it is necessary to find and implement fundamentally new ways of survival, moving forward, achieving market competitiveness and, consequently, ensuring success in competition. Therefore, the concept of "creative economy" is associated, first, with the original specific form of economic thinking, different from the generally accepted logical standard schemes and the ability to find and implement new socio-economic relationships and models between phenomena and processes; second, with the ability to bring something new, original, un-copied in different areas of practical activity; third, the constant willingness to solve non-standard problems and situations (Cabra & Guerrero, 2022).

2. Methodology & findings

The creative economy contributes to income generation, job creation, and export earnings by promoting social adaptation, cultural diversity, and human development, including technological development and intellectual property issues. The creative economy is designed to create an attractive investment climate, promote the growth of social capital and social development, modernize education, and much more. New business models, new types of social relations, and new cultural paradigms are being formed within the creative economy.

The organization and implementation of the concept of creative economy provides innovative progress and socio-economic development. Creative development of the enterprise is carried out by initiating new ideas, constant renewal of production, entering the market with innovative products, which is also a reliable basis for long-term competitive advantage. The creative economy greatly expands the possibilities of traditional production of goods and services. Creative industries develop and interact only in connection with sectors of the traditional economy. Creative entrepreneurship is growing faster than the production and services market, providing jobs for some 8.3 million EU citizens, giving it the status of an effective economic model of self-employment. 1.2 million creative enterprises provide 155 billion euros of added value in the EU (Mittone et al., 2022).

The development of creative economy has an increasing influence on the socio-economic development of the enterprise, country, region and the world. Measures to support the creative industries play an important role in the socio-economic development of European cities and countries, as they have a significant impact on economic and socio-political processes. Innovation and creativity is one of the priorities of the socio-economic development program of the EU "Europe 2030", the main goal of which is to promote creativity through lifelong learning as a driving force of innovative development and a key factor in human development. The EU has a Creative Europe program, which includes working plans for culture, the most relevant of which is the 2019–2022 plan. The development of human potential and creative industries enterprises, which are effective subjects of the formation of sustainable socio-economic development of individual countries and regions as a whole, contributes to the formation of a quality creative environment. Assessment of the overall level of creativity of the country allows to predict the effectiveness of the development of creative industries and the activity of the practical implementation of the concept of creative economy as an innovative model of the economic system of the country.

The approach of defining the creative economy as one of the sectors of the economic system of the country, which together form the potential and contribute to socio-economic development, is widespread. The question of finding the relationship and interdependence between the creative sector of the economy and the key indicators of socio-economic development, including GDP, should be defined as relevant and innovative.

The main factors of growth of creative economy are: investments, innovations, human potential, external markets for creative goods, global market of intellectual property. At the same time it is possible to distinguish groups of factors determining the influence of creativity on the reconfiguration of the global economy:

– conjuncture on the creative goods market: demand, supply, peculiarities of pricing, cycles and dynamics, proportionality;

– Institutional factors: a focused public policy on the development of creative economy, the creation of creative clusters, the effectiveness of interaction between the authorities of different hierarchical levels (reflected in the relevant program and strategic documents), the level of intellectual property protection, favorable conditions for foreign

economic activity, working conditions, antimonopoly policy;
– infrastructural factors: Level of ICT, creative locations, network forms of creative business;
– innovation factors: the share of high technology in production and exports; the science intensity of GDP; the level of ability to absorb innovation and technology in society;
– resource factors: level of human capital, share of skilled and creative professionals in the total amount of people employed in the economy;
– financial factors: availability of financial resources, availability of programs of preferential financing of socially significant creative projects;
– social and communication factors: level of social capital, involvement of the population in social networks; level of perception of social projects.

The search for an algorithm of interdependence of GDP and the creative economy can be realized by studying the key indicators of socio-economic development and constructing on this basis a step-by-step linear multiple regression model, which will identify the factors of greatest influence. The purpose of the study is to identify the relationship and the degree of correlation between GDP as a key macroeconomic indicator of economic development and the creative sector of the economy, as well as to determine the factors and determinants of active positive and negative impact on the formation of their quantitative and qualitative indicators.

The variables examined are intellectual property (in the amount of their income and payments), the number of registered patents, the level of urbanization, the share of the intellectual class, the gross domestic product and the global creativity index, which in turn includes investment in research and development, the number of researchers and patents per capita, the level and nature of education, Gallup polls on attitudes of people from different countries towards immigrants, racial and ethnic and sexual minorities.

To study the levels of economic development of the EU, a cluster analysis was performed using the k-means method (Figure 1). The following variables were taken as variables that determine economic development: X_1 – refugees abroad; X_2 – intellectual property, income; X_3 – patents, residents; X_4 – urbanization, %; X_5 – part of creative class, %; X_6 – access to sanitation services%; X_7 – mortality on the roads, per 100 thousand people; X_8 – population in the largest city, % of urban population; X_9 – intellectual property, payments; X_{10} – patents, non-residents; X_{11} – GDP per capita; X_{12} – GDP growth per year,%; X_{13} – exports, % of GDP; X_{14} – Global Creativity Index; X_{15} – subindex (conditional); X_{16} – subindex (real); X_{17} – Global Talent Competitiveness Index; X_{18} – Global Creativity Index; X_{19} – Global Innovation Index.

The first step in building the model was to find out the degree of correlation and interaction between the influencing factors themselves. In the figure we can see the correlation table between the variables.

In the second stage, the authors built two multiple regression models, where the dependent variables were GDP and the Global Creativity Index (GCI), and the factors were the indicators used to calculate the GCI. The regression models were built using RStudio, a free precursor to open-source software

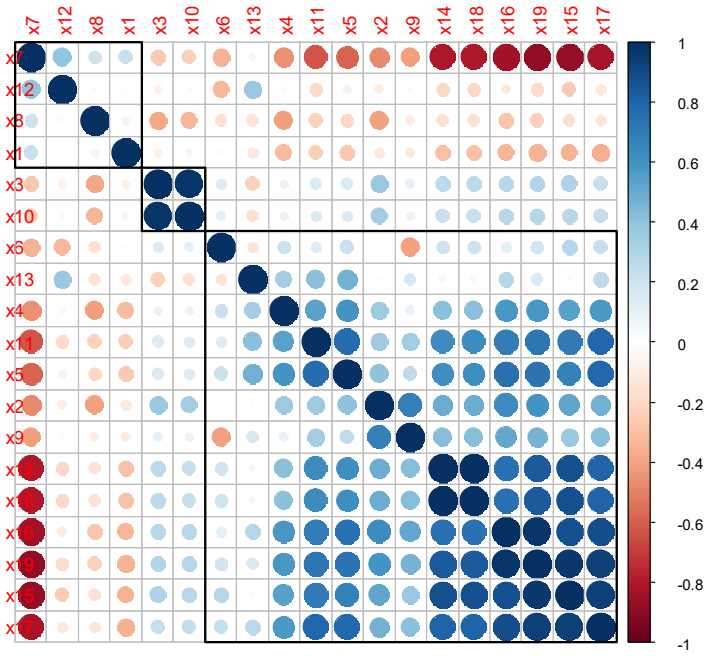

Figure 1. Correlation matrix of influencing factors

development for the R programming language, which is designed for statistical data processing and graphics.

The developed model has a geographical limitation – the object of modeling are the EU countries. In the constructed econometric model, according to the first scenario, GDP and GCI were chosen as dependent variables. Under the first scenario (1) (Y – GDP, X_1 – number of refugees, X_2 – intellectual property, X_3 – patents, X_4 – level of urbanization, X_5 – share of creative class) the following regression model was obtained:

$$Y = -55704,5 - 0,114 \cdot X_1 + 7,4 \cdot 10^{-5} \cdot X_2 + \\ + 0,05 \cdot X_3 + 174,1 \cdot X_4 + 2047,8 \cdot X_5 \quad (1)$$

According to the second scenario (2), the dependent variable Y is the Global Creativity Index (GCI) as a generalizing system indicator of the creative economy.

$$Y = 0,28 - 4,8 \cdot 10^{-6} \cdot X_1 + 5,5 \cdot 10^{-9} \cdot X_2 + \\ + 1,4 \cdot 10^{-6} \cdot X_3 - 9,0 \cdot 10^{-5} \cdot X_4 + 0,01 \cdot X_5 \quad (2)$$

The global creativity index, assuming that almost all coefficients are close to 0, depends solely on the share of the creative class. This result is logical, since it is human resources and creativity as their key characteristic that create the main product in the creative economy.

The result of the first model shows a significant dependence of GDP also on the indicator of the creative class. This indicates the growth of not only the share of the creative economy in GDP as one of the innovative industries, but also the growth of the intellectual component as a quality factor of creative human resources as the main in the process of value creation. This fact must be understood and taken into account in the process of developing a sustainable development strategy and implementing certain targeted programs to support it. Of course, it should be taken into account that the object of analysis at the regional level was the European Union – an association of industrialized countries, whose product structure is mainly focused on goods with high added value, high-tech, intellectual, creative goods and services.

Given the heterogeneity of the development and structure of the economies of individual countries in the West European region, as well as differences in the level of creativity of their economic systems, a significant addition to this study is a cluster analysis. Based on the analysis of key indicators and factors that characterize the current state of socio-economic

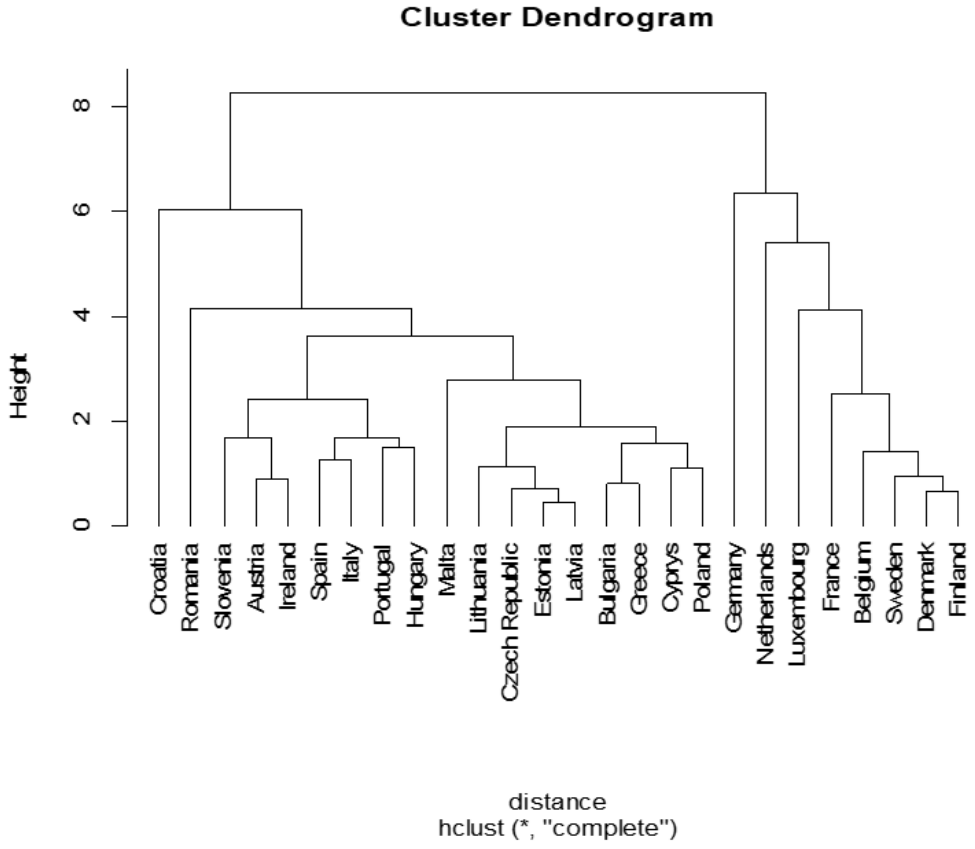

Figure 2. Cluster dendrogram of EU countries (according to general economic indicators and the level of development of the creative economy)

development of national economies according to their creativity and the use of economic-mathematical modeling, the main clusters that unite the national development systems of the EU were identified. On the basis of mathematical modeling a dendrogram was built (Figure 2). The EU countries were considered as a homogeneous group in terms of the nature of the relationship between general economic indicators and the level of development of the creative economy.

The analysis of dendrogram made it possible to identify the following clusters of countries:

1. France, Denmark, Sweden, Finland.
2. Germany, Netherlands, Luxembourg.
3. Bulgaria, Greece, Poland, Cyprus.
4. Malta.
5. Lithuania, Czech Republic, Estonia, Latvia.
6. Italy, Spain, Portugal, Hungary.
7. Slovenia, Romania, Croatia.
8. Austria, Ireland.

The countries, united into separate groups as a result of the cluster analysis, besides the commonalities in the set of studied indicators, have a number of common features, including directions and methods of general economic policy, peculiarities of national labor markets (taking into account special methods of management of creative human resources), forms and methods of development of separate sectors of creative economy and instruments of their complex integration into the general economic system of national economies.

Today, the EU takes a unidirectional approach to understanding the importance of the creative economy. This sector can directly or indirectly influence the economy by improving its performance and creating jobs, stimulating innovation, and contributing to social and sustainable development. In 2021, the major creative industries accounted for 558 billion euros in value-added GDP in the EU, about 4.4% of total European GDP. These industries provide about 8.3 million full-time equivalent jobs, or 3.8% of the total number of jobs in Europe. Statistics also show that most CCIs (cultural and creative industries) have a higher share of young workers than the rest of the economy, and this sector is resilient during economic and financial global and regional crises compared to others.

Despite growing recognition, the development of CCIs is slowing as they cover different areas of regulation, including culture, education, the economy, and urban/regional development. In recent years, the debate about the role of CCIs in the EU has focused on the following key issues:

– Inclusion of CCIs in the EU strategic program aimed at developing an integrated European ecosystem. CCI is still largely absent and is not covered by the EU 2025 strategy. At the highest level, some EU institutions recognize the role of culture in achieving the Sustainable Development Goals and are working to consider culture as a key driver for the implementation of the 2030 Agenda for Sustainable Development. The EU needs to take further steps to recognize and invest in TPPs and identify their potential to contribute to economic development and employment, the ability to catalyze innovation and become a key element of global competition and soft power. Innovation, entrepreneurship and CCIs have been formally identified as interrelated themes in the EU programs, such as Horizon 2020, Horizon 2030, COSME for small and medium-sized enterprises (including Erasmus for Young Entrepreneurs), Start-up Europe, Erasmus +, INTERREG – Territorial Cooperation and funds aimed at strengthening the EU's economic and social cohesion.

– Integrate the competitive advantages of CCIs with regional "smart specialization" strategies for regional and socio-economic development and innovation. CCIs can interact with other activities, often leading to agglomeration and clustering and contributing to a high share of local value added. Several EU regions direct their structural and aggregate funds to CCI for asset planning, resource mobilization, strategic partnerships and clusters, and infrastructure and service improvements.

– Recognizing the strategic importance of CCI for urban policy within the European Capitals of Culture initiative (ECC). Cities have always been places where artists and other creative people find themselves and succeed. New creative centers, platforms where professionals can create, meet, collaborate, and showcase their work, are catalysts for urban revitalization, giving new functions to abandoned industrial areas or unoccupied buildings and attracting related services and businesses to them. The ECC, a long-standing flagship initiative of the EU, has evolved from an international arts and culture program into a more structured initiative that encourages cities to include cultural development and CCI in their development strategies. The ECC brings together European cooperation and culture with stakeholders in the fields of innovation, tourism, and urban planning.

– Inclusion of CCI in innovation and research programs. The potential of CCI to promote innovation processes is not yet fully recognized and supported. The understanding that innovation is increasingly influenced by non-technological factors such as creativity, design, branding, and new organizational processes is rather declarative.

– Stimulating spillover effects and impacts on other sectors and society. CCIs are strategically positioned to have spillover effects on other sectors and industries related to both the arts and science and technology.

– Improving access to finance, through the new EU Guarantee Fund. Insufficient access to a variety of funding sources is the biggest obstacle for CCIs.

– Promoting international networks and alliances with creative centers and entrepreneurs – the European Network of Creative Centers and the Creative Tracks platform. The European Commission supports two pilot projects aimed at creating a European network of creative centers and an international platform for young creative entrepreneurs, Creative Tracks. These pilot projects create communities, peer-to-peer training programs, coordinating platforms and competitions, disseminate information and facilitate meetings, and offer a common platform for support structures around the world to share experiences and learn from each other.

Analyzing the approaches of various EU member states to strategic planning of creative industries, it is possible to divide them into four types of strategies:
– specialized strategies for foreign economic expansion of directly creative industries (for example, in the Netherlands – Policy Program for the Creative Industries, Creative Industries Internationalization Program; in Finland – Finnish Cultural Export Promotion Program);
– specialized strategies that promote the entire national culture at the international level (for example, in Sweden – Swedish Cultural Internationalization Strategies);
– general foreign economic strategies, which also affect the export-oriented development of the creative sector of the economy (for example in Denmark – the strategy Value, Growth and Knowledge for Denmark; in Austria – the Go-international program);
– the absence of a separate comprehensive foreign economic strategy for the creative industries, but the implementation of various programs and activities aimed at promoting exports of these industries as part of a national development strategy (for example, in Belgium – Flanders Image Flanders Audiovisual Fund; in Greece – Hellas Film Center Greek Film Center).

The European Commission is actively researching the creative economy industries, studying the forms of its impact and realization, and assessing its share in the overall economic development. Often the results of these studies are ambiguous, which once again emphasizes the diversity of the creative industry and the appropriateness of specific methods of its management development. Thus, according to the rating of European cities "Cultural and Creative Cities Monitor", based on the assessment of the cultural and creative potential of 168 cities in 30 European countries, not only megacities, but also small provincial cities received high scores. This reduces the importance of urbanization in the overall system of factors that activate the creative sector.

Trends of global urbanization and increased attention by governments around the world to the creative industries will continue over the next few decades. In many regions of the world, creative industries are systematically becoming the most important outline of social and economic change. Especially at the city or agglomeration level.

Summarizing the state of development of the creative economy in the EU, the following current trends and problems can be noted:
– what the future of the creative industries will be and how their activities are evaluated in terms of value and in terms of social significance;
– how to respect the rights and labor protection of artists;
– how to create innovations and conduct research activities in the future;
– what will be the digital environment and its impact on the economy;
– issues of intellectual property, especially copyright, the legal framework in the field of copyright protection; licensing, open access information sources, protection against information piracy;
– management in the field of intellectual property.

The creative and cultural industries determine the growth of a country's economy both in terms of traditional economic indicators and in terms of employment indicators. The world's creative industries account for about 3% of global GDP, drive the global economy, and employ 29.5 million people (1% of the world's active population). According to the International Confederation of Societies of Authors and Composers (CISAC) and UNESCO, income from the creative industries exceeds income from telecommunications services and creates more jobs than the automotive industry in Europe, Japan and the United States combined (29.5 million versus 25 million). Europe, along with the U.S., is a major innovation center from where the development and focus on creative business began.

3. Conclusions

Innovation and creativity of the economy at the present time is not only a characteristic feature of the leading economies of industrialized countries, but also a necessary condition for the formation of a modern advanced business environment, strengthening the competitive position of developing countries and a factor in achieving qualitative changes and specific quantitative indicators of sustainable development. EU countries consider the creative and cultural industries to be priority development areas with a high return on investment and a great impact on overall socio-economic development, including GDP growth, employment growth, SME development, improved investment climate, etc.

In general, the creative economy is associated with the ability to bring something new and original to different fields of practice, to find solutions to unusual problems and situations and, as a consequence, actively contributes to income generation, job creation

and export earnings, promoting social adaptation, cultural diversity and human development, including technological development and intellectual property issues. Quantitative measurements of the creative industry in its global relationship with socio-economic development are indicators of intellectual property (in the amount of its income and payments), the number of registered patents, the level of urbanization, the share of the intellectual class, gross domestic product and the global creativity index, investment in research and development, the number of researchers and patents per capita, the level and nature of education, etc.

Based on the cluster analysis the degree of correlation and interaction between the influencing factors themselves was determined. The main growth factors of the creative economy in question are: investments, innovations, human potential, external markets for creative goods, and the global intellectual property market. As a result of multiple regression modeling with geographical restriction within the European Union region it was found that both GDP and the Global Creativity Index are excessively dependent on the creative class indicator. This result indicates the growth of both the share of the creative economy in GDP and the intellectual component as the main value-added factor.

The commodity structure of EU production is already mainly focused on products with a high share of added value, high-tech, intellectual, creative goods and services. There is now a unidirectional approach to understanding the importance of cultural and creative industries in the overall socio-economic structure in the EU. CCIs have a significant impact on the economy, improving its performance and creating jobs, stimulating innovation, and contributing to social and sustainable development. As a result of mathematical modeling, the authors built a dendrogram that can be divided into eight clusters. This dendrogram shows the heterogeneity of the development and structure of the economies of Western European countries, as well as differences in the level of creativity of their economic systems.

Presumably, in many regions of the world, the creative industries are systematically becoming a critical factor in social and economic change. This obliges us to strengthen the emphasis in the list of priority sectors of the economy and investment areas, to develop updated strategies for regional and national sustainable development, taking into account the new situation and current trends in the structure of the global business environment. In addition to global transformations in the context of comprehensive globalization processes, changes are also needed in other areas – education (the formation of priority curricula), marketing and logistics (influenced by the culture of consumption), the formation of appropriate infrastructure, legislation, etc.

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