The Creative Economy in Romania, a Key Factor of Economic Integration in the European Union

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Abstract The past decades have witnessed the emergence and development of creative economies all over the world. As an impressive transformative force and one of the most rapidly growing economic sectors in today's globalized economy, the creative economy promotes human development, social inclusion, and cultural diversity, stimulates entrepreneurship, attracts a high-quality workforce, and constitutes a pathway to economic success in terms of income generation, job creation and export earnings. The aims of our chapter are to define the concept of creative economy and to analyse the evolution of the Romanian creative economy in the period 2001–2014. In this respect, the methodology is based on the use of the geographic information system software and of the grey level co-occurrence matrix and fractal analysis. The creative economies have proved to be a veritable development vector, showing superior capacity for adapting to structural crises, and contributed to the economic integration of Romania in the EU.

The key points of this chapter are the following ones:

1. to briefly present the emergence of creative economy from a theoretical point of view
2. to define the concepts of creative economy and creative industry
3. to identify the main components of the creative economy

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4. to analyse the evolution of creative economy in Romania in the period 2001–2014
5. to show the role played by the Romanian creative economy in the process of economic integration in the European Union.

1 Introduction

The past decades have witnessed the emergence and development of creative economies all over the world. Creativity lies at the heart of the creative economy and its rising importance is given by the expansion of a knowledge-based economy (Seltzer and Bentley 1999). As an impressive transformative force and one of the most rapidly growing economic sectors in today's globalized economy, the creative economy promotes human development, social inclusion and cohesion, and cultural diversity (UNCTAD 2008; Hajkowicz 2015), stimulates entrepreneurship (Henry 2007; Henry and de Bruin 2011), business and investment (UNESCO 2009), attracts a high-quality workforce (Bakhshi and Windsor 2015), and constitutes a pathway to economic success in terms of income generation, job creation and export earnings (EC 2010; UNDP 2013). Also, the creative economy has shown great resilience during the last economic and financial crisis (Ernst & Young 2014), contributes to overall prosperity and works in synergy with the knowledge-based economy (Veselá and Klimová 2014). Human creativity, skills and talent, and intellectual innovation have become both critical issues on the agenda on economic development and growth, and powerful engines driving the global economy (Araya and Peters 2010).

Therefore, the creative economy requires a proper and sound distribution of its activities within the boundaries of a city, county, region or country by considering various factors (e.g., the quality of the workforce, the characteristics of the territorial system). Also, there is a need to create, implement and develop reliable methodologies to classify, analyse and measure the creative economy (Hui et al. 2005; Higgs and Cunningham 2007; UNESCO 2009; DCMS 2016b).

The turn of the millennium proved to be a turn from hamburgers to software or from physical capital to ideas (Coy 2000). As a result, the 'Old' (Industrial) Economy is increasingly replaced by the 'New' (Creative) Economy, an economy highly dominated by the digital revolution in the use of information, creativity and knowledge. Thus, the creative economy has been the topic of numerous studies, debates and discussions at the global and European levels in the last period (Weckerle et al. 2016).

On the one hand, the features of the creative economy have become a major concern for policy-makers and governments (Kong and O'Connor 2009) as the development of the knowledge-based economy is strongly connected with the creative economy. Governments can play the role of an enabler by implementing coherent policies to provide the right conditions for the flourishment of creative economies within the national frontiers (WEF 2016). The creative economy contributes to the increase of territorial, regional, or national competitiveness and,

therefore, leads to economic growth and long-term development. In this respect, it is necessary to identify and analyse the creative elements of the economic system in correlation with other components of the territorial systems. After joining the European Union (EU) in 2007, Romania has decided to carry out fundamental transformations of its national economy through the implementation of deep structural changes in all fields of activity. One of them is related to the way Romania has succeeded in designing and developing a creative economy as a major factor of its economic integration in the EU considering the importance of creativity at the European level (EESC 2013).

On the other hand, the vast amount of literature dedicated to creative economy has demonstrated the ongoing relevance of this subject and, consequently, the increasing interest showed by researchers and organizations from various domains (De Voldere et al. 2006; UNCTAD 2008; Towse 2011; Flew 2012; Howkins 2013; Towse and Handke 2013; Florida 2014). In this regard, the creative and cultural industries obtained revenues of 535.9 billion euros and provided more than 7 million jobs in the European Union in 2012 (Ernst & Young 2014). One year later, the cultural and creative industries worldwide generated revenues of US$2250 billion (3% of world gross domestic product—GDP) and employed 29.5 million jobs from which Europe generated US$709 billion and employed 7.7 million jobs (Ernst & Young 2015). Therefore, there are studies that have highlighted the superior economic performance registered by the territorial or regional systems that encompass creative economies (Stoian et al. 2014; Pintilii et al. 2014). In spite of the fact that the share of the creative economy is not so high in GDP, it generates significant multiplication effects in other parts of the economic system (O'Connor 2000).

The aims of our chapter are to define the concept of creative economy and to analyse the evolution of the Romanian creative economy in the period 2001–2014. In this respect, the methodology is based on the use of the geographic information system (GIS) software and of the grey level co-occurrence matrix (GLCM) and fractal analysis. In the next section the paper briefly presents the emergence of the concept of creative economy and identifies its main components. The third section analyses the creative economy in Romania based on several indicators. Chapter ends with conclusions.

2 Theoretical Framework

Since its emergence, the concept of "creative economy" and its sibling, "creative industries", has generated an appreciable body of literature all over the world that includes various researches about definition and significance, purpose, history, measurement, or impact. Half a century ago, the framework of a new field of study called "cultural economics" was established with the interest shown in the economic analysis of museums and live performing arts (Towse 2011). As the importance of culture in economic development was reaffirmed in the 1960s, the cultural economics or the economics of the arts has become a relevant landmark in the history of creative economy (Towse and Handke 2013). Cultural economics has

a point of origin in the works of J. K. Galbraith (1960), W. J. Baumol and W. Bowen (1966) in the United States of America (USA), and L. Robbins (1963) in the United Kingdom (UK) (Throsby 1994). It deals with cultural goods and services that contain a creative or artistic element and express a symbolic meaning. Cultural goods are tangible elements (e.g., digital video disks) whereas cultural services are intangible elements (e.g., musical performances). Some of them are durable (e.g., pictures in museums), others exist for a relatively short period of time (e.g., performing arts). Also, some are final products and/or services (e.g., books) whereas others are intermediate goods and/or services (e.g., discs played on the radio for votaries of music).

The term "creative industries" came into use when the UK Department for Culture, Media and Sport (DCMS) launched its first *Creative Industries Mapping Document* in 1998. The document laid down the list of creative industries as follows: advertising, architecture, art and antiques markets, computer and video games, crafts, design, designer fashion, film and video, music, performing arts, publishing, software, and television and radio. According to DCMS, creative industries are "those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property" (DCMS 2001, p. 5). Thus, the creative industries, with their intense cultural focus, have become a subject of growing interest for policy-makers, governments and international organizations.

The beginning of the twenty-first century was marked by the publication of several mapping studies worldwide such as the UK *Creative Industries Mapping Document* (DCMS 2001), the *Creative Industries in New Zealand* (NZIER 2002), the *Australia Creative Industries Cluster Study* (NOIE 2002), the *Economic Contributions of Singapore's Creative Industries* (Heng et al. 2003) or the *Baseline Study of Hong Kong's Creative Industries* (CCPR 2003). Also, the concept of "creative economy" emerged based on the notions of creative cities, creative class and intellectual property. Published in the late 2000s, the *Creative Economy Report* defines creative industries as "the cycles of creation, production and distribution of goods and services that use creativity and intellectual capital as primary inputs" and creative economy as "a set of knowledge-based economic activities with a development dimension and cross-cutting linkages at macro and micro levels to the overall economy" with creative industries at its centre, embracing "economic, cultural and social aspects interacting with technology, intellectual property and tourism objectives" and fostering "income generation, job creation and export earnings while promoting social inclusion, cultural diversity and human development" (UNCTAD 2008, p. 4). In other words, the creative economy represents "a system for the production, exchange and use of creative products" (Howkins 2013, p. 6) that encompasses the following three main domains at its heart: the media and entertainment industries, the arts and cultural heritage, and the creative business-to-business services (Landry 2003). Later, the *America's Creative Economy Report* (Harris et al. 2013) considered the most common creative industries in the USA such as advertising, culture and heritage, design, television and radio, Internet broadcasting and publishing, or culture and heritage.

As urbanization stimulates innovation, creative economy flourishes in creative cities. Creative cities, such as London and New York, combine the cultural economy and the creative industries (Cooke and Lazzeretti 2008). They are the most suitable urban milieus for culture and creativity (Hessler and Zimmermann 2008) and home to highly educated and affluent residents (Jones et al. 2015). The increasing role played by creative cities in bringing together and augment human capital allow them to develop into places that mobilize and attract creative energies by mixing technology and talent with tolerance (Florida 2005). Creative people need creative cities as they interact in these creative milieus with a multitude of diverse individuals and organizations (e.g., universities). These cities possess the capacity to attract and retain the so-called "creative class" (Van Geenhuizen and Nijkamp 2012).

The continuous economic need for creativity has been expressed by the rise of a new social class, the creative class. The creative class becomes truly global and includes people in science and engineering, music, arts, architecture and design, education, law, business and finance, health care, and related fields. All of them share "a common ethos that values creativity, individuality, difference and merit" and are paid to primarily use their minds (Florida 2014, p. 9). In 2011, the global creative class map was dominated by the European countries such as the Netherlands (46.2% of the workforce), Switzerland (44.8%), Sweden (43.9%), Belgium (43.8%) and Denmark (43.7%) (Florida et al. 2011). In 2015, the European countries, such as Luxembourg (54% of the workforce), Switzerland (47%), Iceland (45%) and Sweden (45%), still dominated the global creative class map (Florida et al. 2015). At the EU level, the number of employees in the creative industries grew from 12,175,055 in 2011 to 14,166,879 in 2014 (Ketels and Protsiv 2014, 2016). In the UK, one of the European countries that contributed to this increase, the number of employees in the creative industries grew continuously from 2,081,000 in 2011 to 2,343,000 in 2013 and 2,900,000 in 2015 (Nathan et al. 2015; DCMS 2016a).

D. DeNatale and G. H. Wassall (2007) wrote a report for the New England Foundation for the Arts, *The New Creative Economy: A New Definition*. In their view, the creative economy includes "occupations and industries that focus on the production and distribution of cultural goods, services and intellectual property" (DeNatale and Wassall 2007, p. 10) and comprises three primary and interrelated components: the Creative Cluster, the Creative Workforce and the Creative Communities (Fig. 1).

The Creative Cluster (industry) deals with both commercial and non-profit organizations; the Creative Workforce (occupation) refers to people; and the Creative Communities (geography) relates to places. Other researchers consider that the creative economy represents the result of the interaction between "a "core" area, in which original creation occurs, and an "extended sphere," which consists of other creative and innovative actors and a multitude of other organizations in the "collocated sphere" (Weckerle et al. 2016, p. 73).

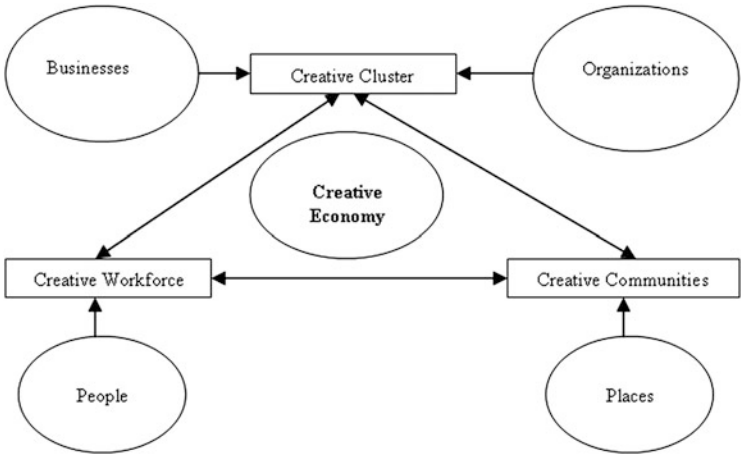

Fig. 1 The primary components of the creative economy. Source: Authors' contribution

As there is no single definition of creative economy several attempts have been made to clarify the concept, especially in the last decade. One of the main issues lies in the use of the word "creative" instead of "cultural". Most of the Commonwealth countries (e.g., Australia, New Zealand) adopt the concept of "creative industries" whereas other European and Asian countries (e.g., Finland, Japan) prefer the term "cultural industries" (Henry 2007). Consequently, the UK decided to take into consideration the following economic sectors: creative industries, cultural sector, digital sector, gambling, sport, telecoms, tourism (DCMS 2016b). The cultural sector encompasses all industries with a cultural object at their core such as manufacture of jewellery and related articles, manufacture of musical instruments, library and archive activities, or museum activities (DCMS 2016c).

Romania, as a member of the EU, categorizes the creative economic activities according to the Classification on National Economy Activities. Although there are some differences, the Romanian creative industries are similar to the British system (Table 1).

In the light of the above discussion some characteristics of the concept of "creative economy" should be emphasized. First, the creative economy is a relatively new development paradigm that puts creativity at its heart. Second, there are numerous and various definitions of the concept all over the world. Third, the creative economy represents a holistic concept dealing with a multitude of interactions between culture, economics, people, geography, creativity and technology in a world dominated by symbols. Fourth, the creative economy constitutes an evolving concept that is still being shaped. Fifth, the concept is a vast and heterogeneous domain being related with diverse activities such as music, televisions, and crafts.

Table 1 The creative ındustries in UK and Romania

Country	Creative industries
UK	Manufacture of jewellery and related articles; book publishing; publishing of directories and mailing lists; publishing of newspapers; publishing of journals and periodicals; other publishing activities; publishing of computer games; other software publishing; motion picture, video and television programme production activities; motion picture, video and television programme distribution activities; motion picture projection activities; sound recording and music publishing activities; radio broadcasting; television programming and broadcasting activities; computer programming activities; computer consultancy activities; public relations and communication activities; architectural activities; advertising agencies; media representation; specialised design activities; photographic activities; translation and interpretation activities; cultural education; performing arts; support activities to performing arts; artistic creation; operation of arts facilities; library and archive activities; museum activities (Nathan et al. 2015; DCMS 2016b)
Romania	Printing of newspapers; other printing activities; prepress services; binding and related services; book publishing activities; guidebooks, compendiums, mailing lists and similar activities; newspapers publishing activities; journals and periodicals publishing activities; other publishing activities; computer games publishing activities; other software publishing activities; motion pictures, video and television programme activities; post-production, motion picture, video and television programme activities; sound developing, recording and music publishing activities; radio broadcasting activities; television broadcasting activities; telecommunications activities through cable networks; telecommunications activities wireless network; satellite telecommunications activities; other telecommunications activities; custom software development activities (software-oriented client); information technology consultancy activities; management activities (management and operation) of computing; other information technology and computer service activities; data processing, hosting and related activities; web portals activities; news agency activities; other information service activities; architectural activities; engineering activities and related technical consultancy; technical testing and analysis activities; activities of advertising agencies; media representation; activities market research and public opinion polling; specialized design activities; photographic activities; activities of oral and written translation (interpreting); other professional, scientific and technical activities; artistic interpretation activities (performances); support activities for artistic interpretation; activities of artistic creation; libraries and archives activities; operation of sports; activities of sports clubs; activities of fitness centres; other sport activities (CAEN 2016; Pintilii et al. 2017)

3 New Methods Used in Analysing the Creative Economy: Romania, as a Case Study

3.1 Methodology

This study carries out a pertinent analysis of the creative economies in Romania for the period 2001–2014, by using two methods. The first method is based on the GIS software, which is necessary for spatial visualization and representation of four main economic indicators (number of companies, number of employees, profit and turnover) at the level of an administrative territorial unit (ATU). The second

method is based on the GLCM and fractal analysis, the latter being useful in the analysis of the spatial evolution of some economic indicators (e.g., the creative economies' average), highlighting the tendencies towards disorder, uniformity and homogeneity. Thus, valuable information can be obtained such as the spatial effects of an economic decision, a political decision, an economic crisis, or some economic indicators.

For a more detailed analysis on the global spatial evolution of the four economic indicators a series of methods have been used, which have not been applied until this study in the economics analysis: the GLCM analysis (Entropy, Energy and Homogeneity) and the fractal analysis (Pyramid Dimension). The inputs of GLCM and fractal analysis were the series of cartographic images with spatial representations of the distribution of the four above mentioned indicators at the level of ATU. The grey levels of these images represent the individual intensities of the four indicators.

The GLCM analyses were carried out in ImageJ 1.5.1h (Schneider et al. 2012), using the GLCM_TextureToo plugin (Haralick et al. 1973). ImageJ is a public domain Java-based image processing program designed for scientific multidimensional images, being developed at the National Institutes of Health from Bethesda, Maryland, USA. The grey-level co-occurrence matrix, also known as a spatial dependence matrix of grey-level, is a statistic method for examining the texture that takes into account the spatial relation of pixels. The GLCM functions characterize the texture of an image by calculating the density of the pixel pairs with specific values, in a specific spatial relations of an image, creating a GLCM, then extracting statistical dimensions from that matrix (offer information about the shape and the spatial relations of the pixels of an image) (Radović et al. 2013). The GLCM calculates how often a pixel with grey-level (grey scale intensity or Tone) value i occurs either horizontally, vertically, or diagonally to adjacent pixels with the value j. The computational complexity of GLCM method is highly sensitive to the number of grey levels (Clausi 2002).

In thermodynamics, the entropy measures a distribution of probabilities which reflects the microstates of a given system at a certain moment. Theoretically, the entropy increases with the tendency of homogenizing the probability distribution, or flattening that distribution. But, the traditional qualitative description of entropy, starting with Clausius, Boltzmann, Hermann von Helmholtz, is that entropy can be understood in terms of molecular "disorder" within a macroscopic system, measuring the disorder and order in atomic and molecular assemblies (Landsberg 1984; Anderson 2005). Likewise, the value of the entropy of a distribution of atoms and molecules in a thermodynamic system is a measure of the disorder in the arrangements of its particles (Greven et al. 2003). As in the traditional qualitative description, in GLCM analysis, **entropy** represents a statistical measure of randomness and measures the disorder or complexity in the sense of the degree of complication of textures of an image. The entropy is large when the image is not texturally uniform and many GLCM elements have very small values. Complex textures tend to have high entropy. Entropy is strongly, but inversely correlated to energy.

$$Entropy = -\sum_{i}\sum_{j} p(i,j)logp\ (i,j) \tag{1}$$

where i and j are the coordinates of the co-occurrence matrix.

Energy, also called Uniformity or Angular Second Moment, provides the sum of squared elements in the GLCM. The Energy measures the textural uniformity which represents the repetition of the pixel pairs, thus detecting the disorder in the texture. The maximum energy value is equal to one, and the minimum with zero. High energy values occur when gray-level distribution has a constant or sporadic shape. The GLCM of a less homogeneous image will have a large number of small low implicit inputs of Energy (Gadkari 2004).

$$Energy = \sum_{i}\sum_{j} \{p(i,j)\}^2 \tag{2}$$

where i and j are coordinates of the co-occurrence matrix.

A homogeneous image will contain only a few gray levels, giving a GLCM with only a few but relatively high values of *p(i,j)*. Thus, the sum of squares will be high.

Homogeneity, also called the Inverse Difference Moment, measures the proximity of the GLCM element distribution to the GLCM diagonal (measures the homogeneity of the image by assuming higher values for the smaller gray-level differences in the pair elements). Homogeneity is more sensitive to the presence of diagonal elements in GLCM. It has maximum value when all elements in the image are identical. GLCM contrast and homogeneity are strong but inversely correlated in terms of equivalent distribution in the pixel pair population. This means that homogeneity decreases if contrast increases, while energy is kept constant (Gadkari 2004).

$$Homogeneity = \sum_{i}\sum_{j} \frac{1}{1+(i,j)^2} p(i,j) \tag{3}$$

where i and j are coordinates of the co-occurrence matrix.

The fractal dimension indicates how much space is occupied by the object, representing the degree of complexity that the image has. The degree of irregularity derives from the properties of the fractal object, which is a fractured or broken geometric figure, which, if divided into parts, each side is approximately a smaller copy of the whole. In reality, these copies are not identical representations, but they are invariant on the scale (Jelinek et al. 2006; Andronache et al. 2016). As a fractal dimension method, **Pyramid Dimension** is an alternative to the Box-counting method and using image pyramids which are a sequence of identical images but at different sizes. The bottom of the pyramid represents the original image. The size of image is then reduced successively until it is one pixel, which represents the top of the pyramid. Pyramid dimension is defined according to:

$$D_p = \lim_{\varepsilon \to \infty} \left(\frac{\ln (N)}{ln\varepsilon} \right) \quad (4)$$

where D_P is Pyramid Dimension; ε is the scaling variable, and N(ε) is the total number of object pixels can be counted for each pyramidal image.

The Pyramid Dimension has been calculated by using IQM software (Kainz et al. 2015)—the PGM bilinear method according to Mayrhofer-Reinhartshuber and Ahammer 2016. IQM is image and signal analysis software fully written in Java, being developed by Helmut Ahammer from the Medical University of Graz, Austria.

3.2 Case Study: Romania

The spatial representations, visualized through the first method (Fig. 2), emphasize the fact that in 2001 a series of localities show an inhomogeneous distribution of the turnover. The large cities of Romania are clearly visible, like Bucharest or Timişoara, where the values are over 10%, or even 15%, but also other localities with a smaller number of inhabitants, where the average of creative activities is predominant, like the Nucşoara locality from the Argeş County. In Romania, the number of localities where the turnover of creative economies exceeds 5% of the economy's total value is 62, these being represented in Fig. 2 with five classifications and values between 5% and over 25%.

In 2007, during the economic crisis, the creative economy remarked itself through ascending tendencies, while other economic sectors presented a considerable fall. In the same year, the number of localities where the creative economy did not exist, decreased from 2597 to 1873, and those with positive values increased from 62 to 157. Therefore, in the first 8 years leading up to the economic crisis, localities around the polarisation centres of large cities, respectively Bucharest, Timişoara, Cluj-Napoca, and Iaşi, but also of some smaller cities, such as Sibiu or Oradea, began to agglomerate. Furthermore, there was an isolated county, which was affected by the economic crisis, namely the Nucşoara locality from the Argeş county. This locality maintained high values of over 25% (over 80%) during the period of 2001–2005, but values started to decrease in the year 2006 down to under 10% and fall to 0% between 2007 and 2008. After 2009, the values recovered to values of over 25%.

The post-crisis period until 2014 showed that 1636 new localities with creative economies emerged. These localities began to be more and more defined in the peri-urban areas of large cities and appeared more concentrated, for example, in the proximity of the Nucşoara commune or around the large cities where these already existed: Bucharest, Timişoara and Cluj-Napoca. A homogenization of values can be noticed in the West, North-West, Central Development Regions, Southern Muntenia and Bucharest-Ilfov.

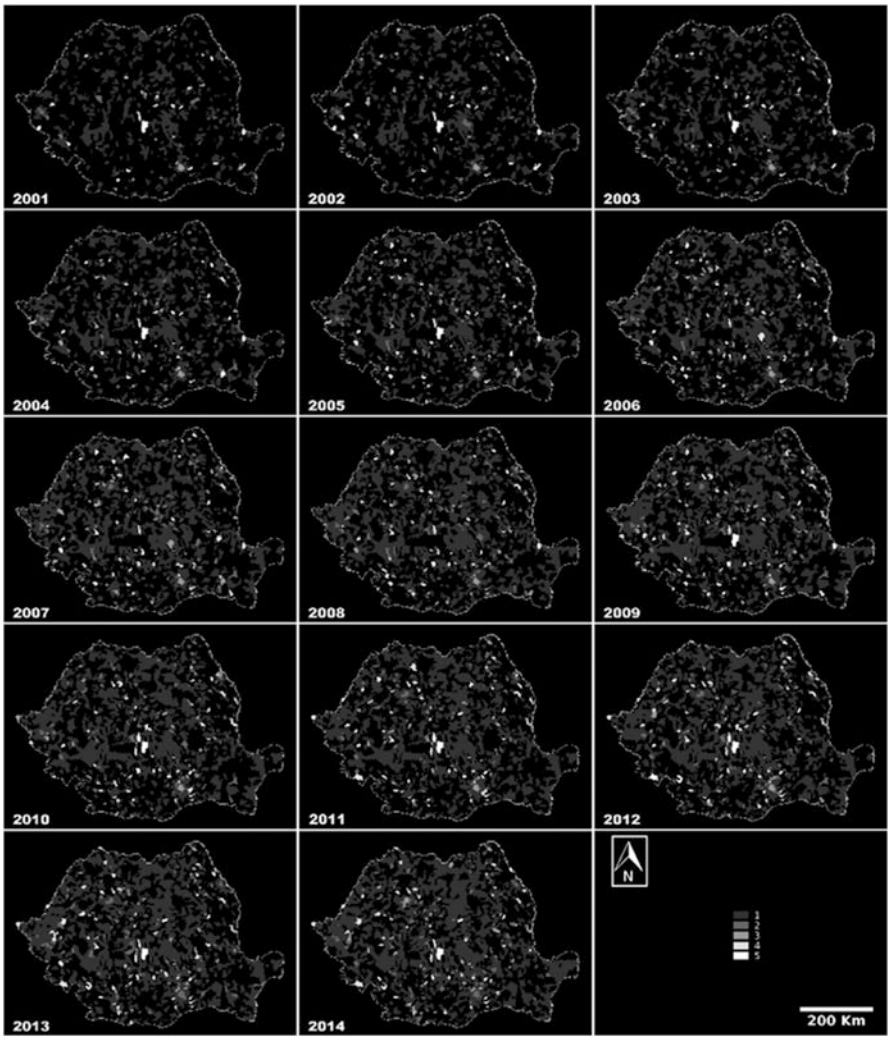

Fig. 2 Turnover in the Romanian creative economies in the period 2001–2014 (**1**: <5%, **2**: 5.01–10%, **3**: 10.01–15%, **4**: 15.01–20%, **5**: >20%). Source: Authors' contribution

Regarding the companies from the creative field (Fig. 3), the image of the year 2001 illustrates an insular spread of these, with a presence of only 2551, at national level. Therefore, these can only be identified in the peri-urban areas of the large cities: Bucharest, Timişoara, Braşov, Iaşi and Oradea. Additionally, there existed a reduced number of localities with percentage values that exceed the fifth threshold 25%. Again, it was the Nucşoara locality, situated in the centre of Romania, whose value was higher in the year 2001, particularly 66.67%. Two out of three companies situated in the Nucşoara locality performed activities in the creative economy.

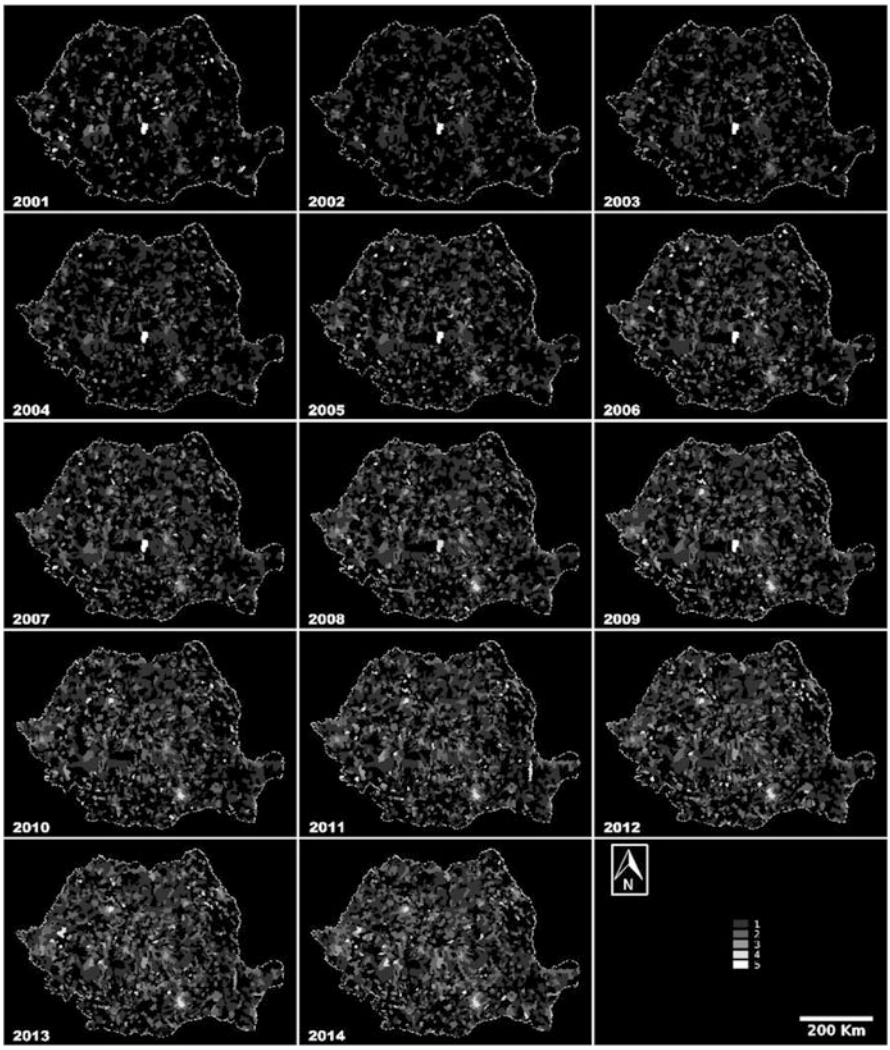

Fig. 3 Companies in the Romanian creative economies (2001–2014) (**1**: <5%, **2**: 5.01–10%, **3**: 10.01–15%, **4**: 15.01–20%, **5**: >20%). Source: Authors' contribution

A progressive ascending tendency of the companies from the creative economy can be observed before the big economic crisis, where the number of localities with companies in the creative domain increases from 630 to 1480 in 2009. This fact can occur by restricting the activity of the companies from other economic sectors, which have been more affected than those that lead their activity in the creative domain. Grouping or merging tendencies of some localities can be observed, under a cluster shape, especially around the large cities—Bucharest, Timișoara, Brașov and Cluj-Napoca.

After the economic crisis, the administrative territorial units which had companies in the creative economy homogenized because their number reached the value 1807 in 2014. In that year, even though a homogenization of the localities with companies in the creative economy was observed, the majority presented values of under 10%, only six of them were over the threshold of 25% (represented with white colour). Among these, the Gâdinți commune from the Neamț County can be emphasized. It is a locality with approximately 2000 inhabitants, but with the highest average of the creative economy, particularly 32% (eight companies activating in the creative economy).

In 2001, the predominant value of the employees (Fig. 4) was under 5%. A low representation can be observed at national level, hence, approximately 60% of Romania's localities have values equal to 0. At the beginning of the study period, however large cities like Bucharest, Timișoara, Brașov, Cluj-Napoca and the localities from their peri-urban areas can be observed. In the period leading up to the economic crisis, the number of localities with creative economies begins to increase, thus in 2001, there existed only 437 localities, and in the year 2008 their number increased to 1175 localities, most of these having values of under 5%.

The economic crisis of 2008 did not considerably affect the percentage value of the employees, which implied a decline in the economic sectors. Due to the crisis of 2008, in the following year an increase of values can be observed in cities like Oradea, Ploiești and Cluj-Napoca. Even though in the post-crisis period the number of localities with a significant average of employees in the creative industry ascended, in 2014 the number of localities with employees was 1338, of which 1032 counties had values under 5% and only 30 had values over 25%. The values began to be more homogenous in the West, North-West, Central Development Regions, Southern Muntenia and Bucharest-Ilfov.

Profit is the indicator that presents all the above values (Fig. 5) which were over 25% throughout the entire period of study. Thus, in 2001, 2712 out of the total of 3181 localities had a profit of 0%, 42 localities of over 25%, and the rest having values under this threshold. In that year three localities made themselves obvious because of the profit that came exclusively from the creative industries, these being the Coronini commune from the Caraș-Severin County, the Costești commune from the Iași County and the Nucșoara commune from the Argeș County.

In 2001, large cities (Bucharest and Timișoara) showed percentage values between 15 and 20, while lower values were observed in Cluj-Napoca, Brașov and Iași. Up to 2008 the number of localities where the profit of the creative economies is visible increased from 469 in 2001 to 1094, and the number of localities with values over 25% increased from 42 to 80, which suggests on the one side, the establishment of new companies, and on the other side, the fact that the profit increase represents the decline of other companies and from other economic sectors.

In the post-crisis period, a profit increase can be observed in large cities such as Cluj-Napoca, Iași and Ploiești. In 2014, the number of localities without a profit from the creative industries was reduced to 1823, and one locality with values of over 25% increased to 121. There had not been recorded any locality in the year

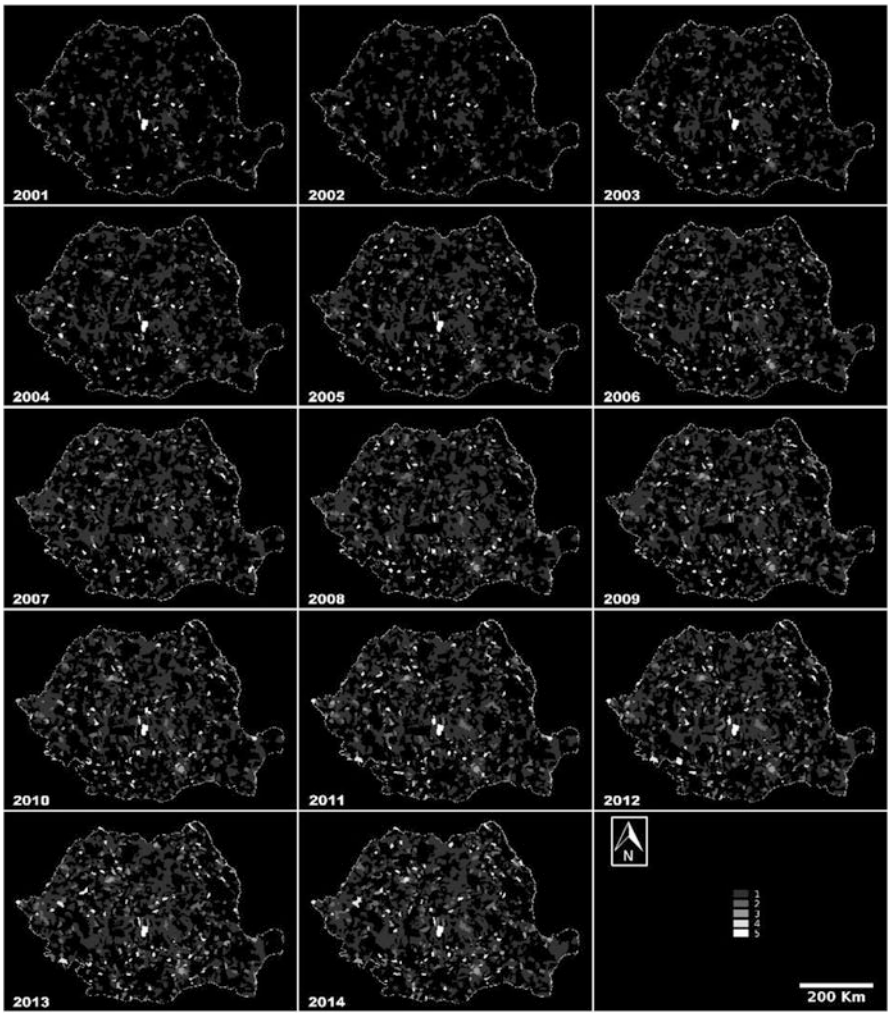

Fig. 4 Employees in the Romanian creative economies (2001–2014) (**1**: <5%, **2**: 5.01–10%, **3**: 10.01–15%, **4**: 15.01–20%, **5**: >20%). Source: Authors' contribution

2014 with a profit exclusively from the creative industries, the highest value being 98% in the Seaca de Pădure locality from the Dolj County.

The values for entropy (Fig. 6) indicate a general increase of the disorder degree of the distribution of the creative economies' average at the ATU level as an effect of the economic growth. The more creative economies extend at a spatial level and grow on average, the more they fragment the space occupied by the non-creative economies, thus generating an increase of entropy. The percentage values of the turnover significantly increase from 0.43 in 2001 to 0.79 in 2014. The emphasized

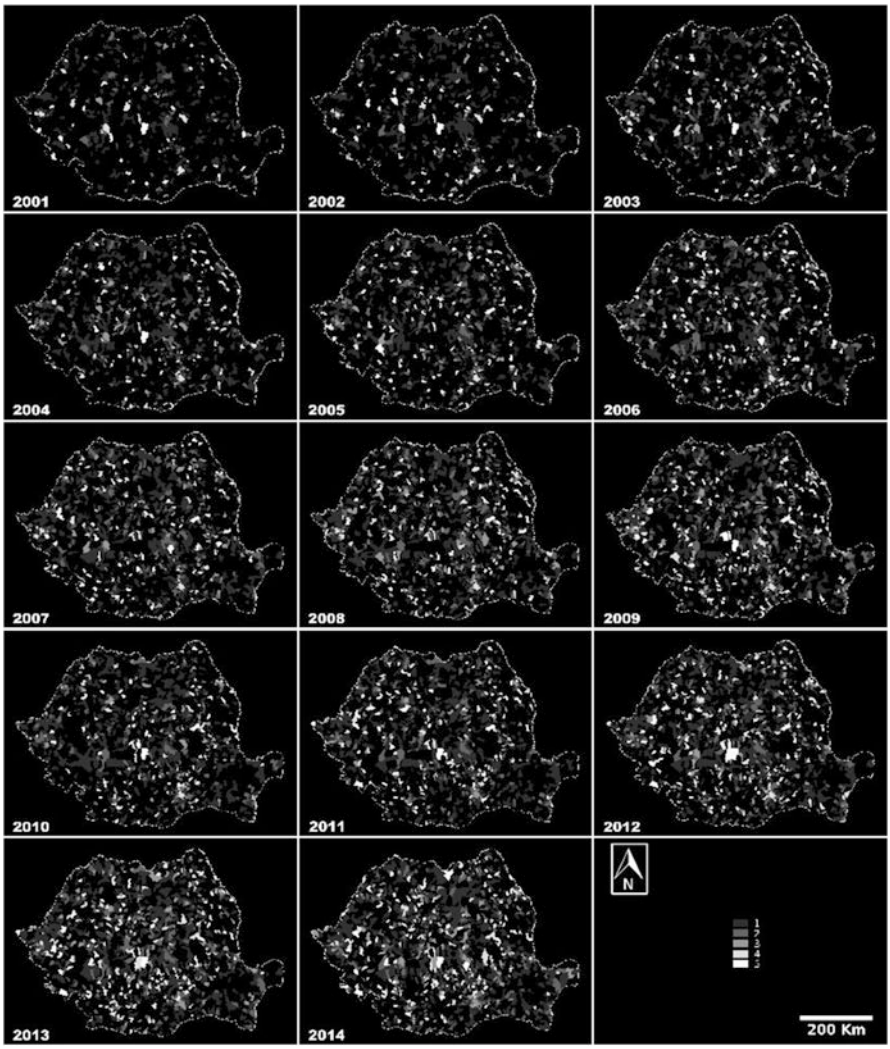

Fig. 5 Profit in the Romanian creative economies (2001–2014) (**1**: <5%, **2**: 5.01–10%, **3**: 10.01–15%, **4**: 15.01–20%, **5**: >20%). Source: Authors' contribution

increase of entropy is also specific to the number of companies (from 0.51 to 1.02), to the profit (from 0.41 to 0.93) and to the number of employees (from 0.36 to 0.8).

The economic crisis manifested itself through a slight decrease of the creative economies' average only in 2010 for the turnover and the number of employees, and in 2009–2010 for the profit (this has been the most affected indicator by the negative effects of the crisis). However, the crisis was not experienced for the company numbers, whose spatial disorder slightly grew.

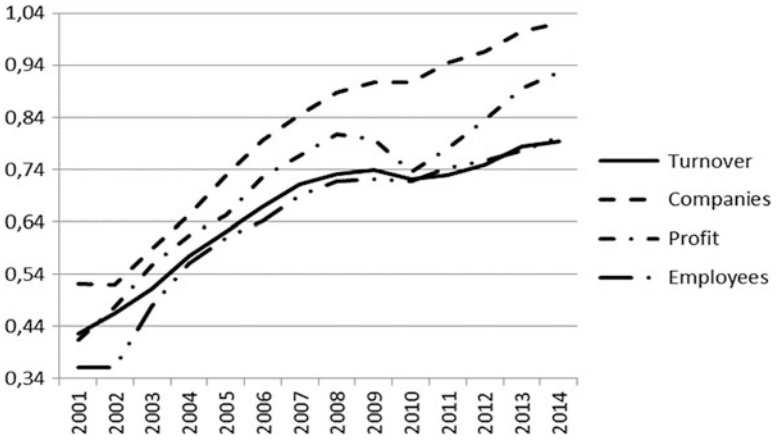

Fig. 6 The evolution of entropy of the spatial repartition of the Romanian creative economies' average (2001–2014). Source: CAIMT—Project UB/1365, 2016b

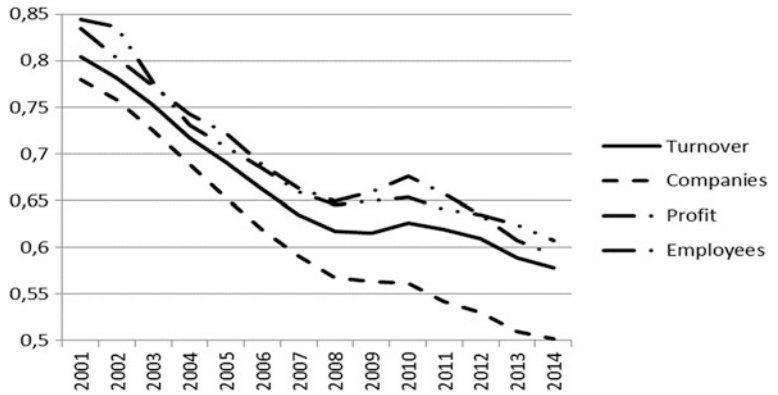

Fig. 7 The evolution of energy of the spatial repartition of the Romanian creative economies' average (2001–2014). Source: CAIMT—Project UB/1365, 2016b

The energy (Fig. 7) indicates a general tendency for the decrease of the textural uniformity of the creative economies' average repartition, as new begin to conduct new creative activities at Romania's level. Hence, energy decreased from 0.8 in 2001 to 0.58 in 2014 for the turnover; from 0.78 to 0.5 for the number of companies; from 0.83 to 0.59 for profit and from 0.84 to 0.61 for the number of employees. The economic crisis generated a slight decrease of textural uniformity in 2009–2010 for the profit and the number of employees and only in 2010 for the turnover. This time the crisis also was not felt and the company numbers continuously slightly decrease as the textural uniformity and their spatial repartition becoming more disordered.

The evolution of homogeneity (Fig. 8) confirms and is in accordance to the energy analysis, following its evolution. Hence, homogeneity slightly decreases

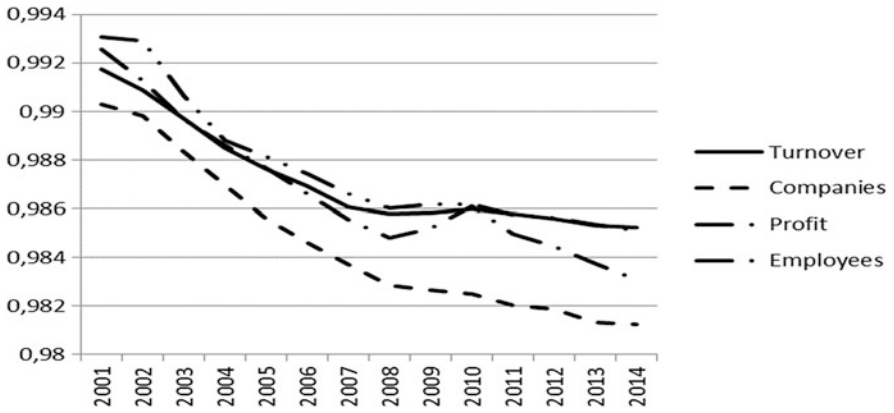

Fig. 8 The evolution of homogeneity of the spatial repartition of the Romanian creative economies' average (2001–2014). Source: CAIMT—Project UB/1365, 2016b

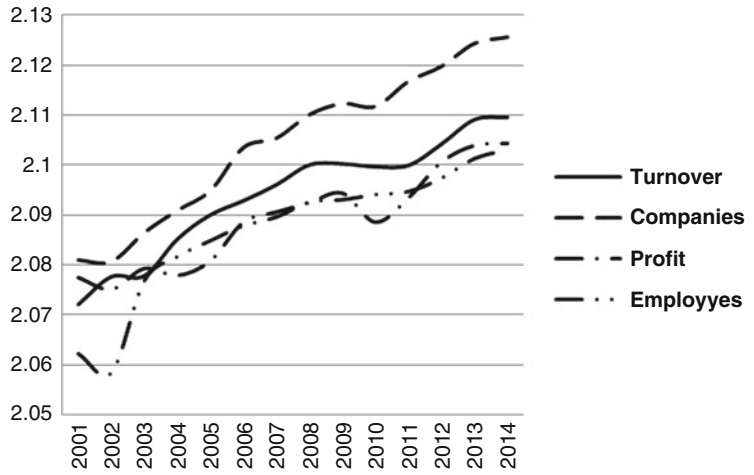

Fig. 9 The evolution of Pyramid Dimension of the spatial repartition of the Romanian creative economies' average (2001–2014). Source: CAIMT—Project UB/1365, 2016b

from 0.992 in 2001 to 0.985 in 2014 for the turnover; from 0.9903 to 0.981 for the number of companies; from 0.993 to 0.983 for the profit and from 0.993 to 0.985 for the number of employees.

The Pyramid Dimension (Fig. 9) confirms the growing tendency of the complexity of the spatial distribution of the creative economies' average on the background of economic growth. The average values of the turnover increased from 2.07 in 2001 to 2.11 in 2014. The Pyramid Dimension growth is also specific to the number of companies (from 2.08 to 2.13), profit (from 2.08 to 2.10) and to the number of employees (from 2.06 to 2.10).

The Pyramid Dimension represents the effects of the economic crisis on the spatial distribution of the creative economies' average, when in 2010 the degree of the fractal dimension decreases, both for the turnover, profit and number of companies. For the number of employees, the shock of the economic crisis was not emphasized by the Pyramid Dimension.

The above analysis shows that, despite its relatively small dimensions, the Romanian creative economy has played an important role in the process of economic integration in the EU. It registered total revenues of around 12.80 billion euro in 2013 and 13.16 billion euros in 2014 (CAIMT 2016a). In the same period, the Romanian gross domestic product (GDP) was 144 billion euros in 2013 and 150 billion euros in 2014 (Eurostat 2016). It means that the creative economy' share of GDP in Romania was 0.088 % in 2013 and 0.087% in 2014. However, it generated income, created jobs and proved to be resilient during the crisis.

4 Conclusions

The creative economy constitutes one of the most important resources for economic development and growth. It has increasingly become a topic of interest for researchers, organizations, and governments within the EU.

The analyses carried out on the Romanian creative economy show an increase of its importance within the national economy. These can contribute to the lasting growth of the local systems. The tendencies are underlined by the evolutions from the last period of the companies, employees, turnover, and as well as of the profit from the creative economies.

From the presented evolutions, it can be concluded that Bucharest clearly distinguishes itself from the other large cities of the country. In the last period, new tendencies of localisation (migration) of the creative economies towards their peripheries have been observed. These new spaces (urban peripheries) have demonstrated the capacity of ensuring optimal conditions (economic, demographic, social and of other types) for the development of activities in the creative domain.

The role of the creative economies in the local development of Romania is presented through the use of modern methods, such as the fractal analysis and GLCM, being a premiere in Romania for this type of studies. Thus, a new perspective is introduced, namely looking at the self-organisation of Romania's territorial systems. The creative economy has proved to be a veritable development vector, showing superior capacity for adapting to structural crises, and contributed to the economic integration of Romania in the EU.

This study traces new directions for analysing the creative economies, particularly applicable on Romania, and at the same time, represents an instrument generally useful for interested researchers and students.

Questions and Activities

1. Define the concept of creative industry.
2. Define the concept of creative economy.

3. Enumerate the primary components of the creative economy.
4. Has the Romanian creative economy contributed to the economic integration in the EU? How?
5. What does entropy measure? Analyse the case of the Romanian creative economy.
6. What does homogeneity measure? Analyse the case of the Romanian creative economy.
7. What does Pyramid Dimension mean? Analyse the case of the Romanian creative economy.
8. Enumerate three Romanian cities with significant creative economy activities.
9. Which are the main cities with the highest share of creative economy in Romania?
10. Is there any relationship between universities and the concentration of creative economies in Romania? Why?

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