

The role of the IT sector in the development of local economies in Romania

*Gruia Andreea Karina*¹, Faculty of Administration and Business, University of Bucharest, Romania,

karina.gruia@faa.unibuc.ro

*Dinescu Raluca*², Faculty of Administration and Business, University of Bucharest, Romania,

raluca.dinescu@unibuc.ro

*Constantin Ionuț*³, Faculty of Administration and Business, University of Bucharest, Romania,

ionut.constantin@faa.unibuc.ro

*Băloi Aurel-Mihail*⁴, Research Center for Integrated Analysis and Territorial Management, University of Bucharest,

Romania, aurel-mihail.baloi@unibuc.ro

*Mihăilă Viorel*⁵, Faculty of Administration and Business, University of Bucharest, Romania,

viorel.mihaila@faa.unibuc.ro

Abstract

Creative economies are recognized worldwide as an important pathway for economic development and growth. The growth of creative economies is driven by their role as a driver of local economic development and innovation. Innovation, digital transformation and information technology are important factors in creating value in the competitiveness and performance of countries. The role of the creative economy in the territorial economy has increased and can make it the heart of local economic development models, even in disadvantaged territories. The obtained results are an answer to the question: What are the geographical areas where the IT sector has a major role in the sustainable development of local economies? The main purpose of this paper is to analyze the distribution and dynamics of the IT sector within the national creative economies and its influence on their development. The analyses were carried out based on an economic database, at the level of the territorial administrative unit, comprising 4 economic indicators: number of companies, turnover, number of employees and profit. The analyzes were carried out at the level of the Classification of Activities in the National Economy (NACE), at the level of 4-digit code, for the period between 2000-2021. The database was created on the basis of Government Decision no. 859 of 2014, which indicates, for this economic sector, a number of 66 codes which were grouped into 7 main classes. For the relevant indicators, a series of maps and graphs showing the share of the IT sector in the total creative economies at the national and regional level have been made. The results show spatial patterns for the distribution of the IT sector from creative

¹ Assistant professor, Department of Public Administration, Faculty of Administration and Business, University of Bucharest, Bucharest, Romania. E-mail: karina.gruia@faa.unibuc.ro

² Lecturer, Department of Public Administration, Faculty of Administration and Business, University of Bucharest, Bucharest, Romania. E-mail: raluca.dinescu@unibuc.ro

³ Lecturer, Department of Public Administration, Faculty of Administration and Business, University of Bucharest, Bucharest, Romania. E-mail: ionut.constantin@faa.unibuc.ro

⁴ PhD student, Faculty of Geography, Research Center for Integrated Analysis and Territorial Management, University of Bucharest, Bucharest, Romania. E-mail: aurel-mihail.baloi@unibuc.ro

⁵ Associate professor, Department of Public Administration, Faculty of Administration and Business, University of Bucharest, Bucharest, Romania. E-mail: viorel.mihaila@faa.unibuc.ro

economies and suggest that at the national level, policies should be implemented targeting the development of creative economies, especially in the IT sector, which was rapidly developing in recent years.

Keywords: creative economies, economic growth, information technology, innovation

1. INTRODUCTION

The term “creative economy” is used in this article since it is now an internationally acknowledged concept, as highlighted in two groundbreaking UNCTAD papers of the same name (*UNCTAD, 2008, 2010*). Critically, this concept is broader than the concept of creative industries, which has traditionally been limited to commercial enterprises involved in intellectual property generation. The creative industries have grown rapidly in the last 20 years, thanks to digitalization and policy backing.

Howkins (*2001*) invented the term “creative economy”, which has garnered international attention. The creative economy is a policy that tries to generate new growth through economic operations that foster creativity, knowledge convergence, and sophisticated scientific technology based on coordinated learning, resulting in the creation of a new market and new jobs. This may be interpreted as a new paradigm in economic development that has emerged from the chase-and-imitate economic model that has been adopted by the majority of developing countries until now (*National Information Society Agency, 2013*). Advertising, architecture, art, crafts, design, fashion, film, music, performing arts, publishing, R&D, software, toys and games, TV and radio, and video games are all part of the creative economy, according to Howkins (*2001*).

With unique dynamics and a substantial structural impact on the other elements of the economic system, creative economic activities have experienced the most spectacular rise among economic sectors in recent decades, both in the European Union and in other major economic systems throughout the world. Long-term patterns of these tendencies have produced a highly individualistic economic sector, which is now significantly more interdependent with other economic sectors and having a greater impact on society.

The creative economy refers to development paths that have existed at the regional level for most of history (Scott, 2008), and are based on long traditions of collaboration, trust, and reciprocal specialization (*Becattini, 1990; Storper and Salais, 1997*). A distinguishing feature of the creative economy is its urban bias, with the European region demonstrating a distinct urban focus (*Power and Nielsen, 2010*); this link between creativity and the urban urban area is also reinforced by the global development of urban creative industry clusters.

In the face of strong global competition, the creative economy is becoming a driving force for the growth and maintenance of a national economy, particularly in developing nations (*Evans, 2009*). In terms of money generation and job creation, it is one of the fastest expanding sectors (*United Nations, 2013*).

Recent studies consider the creative economy as a strategy for sustainable development and fostering regional development (*Deheinzelin, 2011*), as well as the fact that it can be used to develop public policies aimed at preserving the quality of the city, increasing community prosperity, and preserving its historical development (*Abankina, 2013; Shuaib and Enoch, 2012*).

Recent studies have examined economic growth approaches focused on the promotion of cities' creativity (Peck, 2005; Zimmerman, 2008; Murphy and Redmond, 2009; Ponzini and Rossi, 2010). This interest coincides with the shift to a new economy (Scott, 2006) based on creativity, which incorporates culture, creativity and the culture sector, the creative class, and the urban environment as important conditions (Lawton et al., 2010).

Today, these characteristics are part of the programs that support urban planning and are commonly connected with urban entrepreneurship (Hall and Hubbard, 1996). Creativity is what drives urban economic growth, competitiveness, and vibrancy (Kipfer and Keil, 2002). In this environment, there is a significant dynamic of regional and local policies fostering creativity and city culture, with benefits for the urban economy in order to accomplish urban center rejuvenation. However, different axes, such as culture, art, industry, and urban design, should be included in these policies in order to create a comfortable city/urban environment that fosters creativity (Nohara et al., 2016).

An investigation of perceptible variations in the application of information technology in the creative industries promises to be fruitful, as the results could help to better understand the nature and characteristics of the creative economy (Sung, 2015).

Information technology (IT) is a vital component of today's company. It supports corporate strategy and consumes a substantial proportion of a company's resources. Worldwide IT spending hit \$3.7 trillion in 2011, up nearly 8% from the previous year, and is expected to rise further (Pearson and Saunders, 2013). However, in today's economic world, IT is a big investment for any corporation, and the outcomes can be disastrous if the IT investment does not assist the organization strategically beat its competitors. IT has inherent characteristics that can be utilised in a variety of situations (Sung, 2015).

2. RESEARCH METHODOLOGY

The purpose of this research is to conduct spatial analysis and dynamics of the IT sector within national creative economies, as well as its impact on their development. Data were obtained from 1,225 places that contain the IT industry, which is part of the creative economy, as one of the economic activities prevalent in the area.

2.1. Study area

The study area is represented by Romania (Figure 1) with the 8 Development regions (1. North-East Development Region, 2. South-East Development Region, 3. South-Muntenia Development Region and 4. South-West Oltenia Development Region, 5. West Development Region, 6. North-West Development Region, 7. Center Development Region and 8. Bucharest-Ilfov Development Region) and with 42 counties (Bacău, Botoșani, Iași, Neamț, Suceava and Vaslui part of 1. North-East Development Region; Brăila, Buzău, Constanța, Galați, Vrancea and Tulcea part of 2. South-East Development Region; Argeș, Călărași, Dâmbovița, Giurgiu, Ialomița, Prahova and Teleorman part of South-Muntenia Development Region; Dolj, Gorj, Mehedinți, Olt and Valcea part of 4. South-West Oltenia Development Region; Arad, Caraș-Severin, Hunedoara and Timiș part of 5. West Development Region; Bihor, Bistrița-Nasăud, Cluj, Sălaj, Satu Mare and Maramureș part of 6. North-West Development Region; Alba, Brașov, Covasna, Harghita, Mureș and Sibiu part of 7. Center Development Region and Municipality of Bucharest and Ilfov

part of 8. Bucharest-Ilfov Development Region). The spatial analyses have been made for the 1,225 localities that have as one of the economic activities found in the area, the IT sector belonging to the creative economy.



Figure 1. Study area location - Romania

2.2. Spatial analysis

A classic geographic analysis of the data spread across 1,225 locales was carried out. For the period 2000-2021, a database was constructed with the number of enterprises, turnover, number of employees, and profit at the Classification of Activities in the National Economy (NACE) 4-digit code level. The database was built on the basis of Government Decision No. 859 of 2014, which specifies a total of 66 codes for this economic sector, which were divided into seven main classes after, for an analysis of the IT sector (Table 1).

Table 1. NACE codes and activities covered by the IT sector

CLASS	NACE CODES	CREATIVE ACTIVITIES
IT	6202	Computer consultancy activities
	6203	Computer facilities management activities
	6209	Other information technology and computer service activities
	6311	Data processing, hosting and related activities
	6312	Web portals
	6399	Other information service activities n.e.c.

The spatial analysis was carried out as follows: unique intervals for each studied type (number of companies, turnover, number of employees, and profit) were generated, and a set of 22 specific maps were created for each type of data. The color of the map is given by the number of classes resulting. QGIS (spatial analysis) and Inkscape (vectorial graphics) were utilized as software (Figure 2).

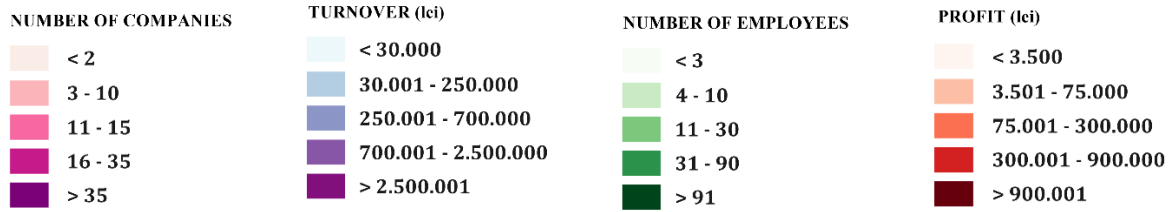


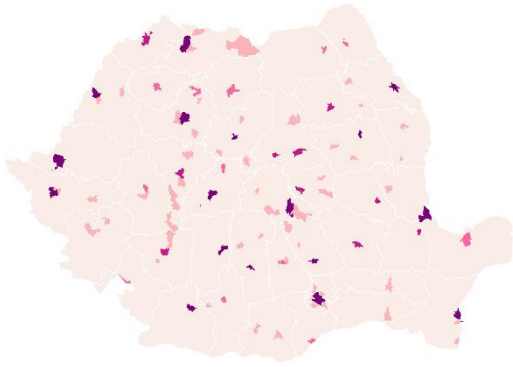
Figure 2. Legend of maps

3. RESULTS

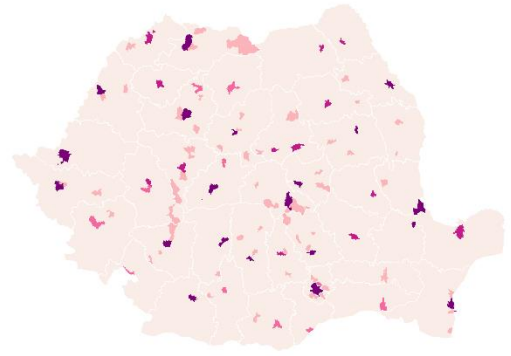
3.1. Dynamics of the number of companies

The analysis of the spatial distribution of the total number of IT companies in the creative sector at the national level (Figure 3) reveals an evolution for the time studied and highlights the fact that activities are concentrated in and around large cities.

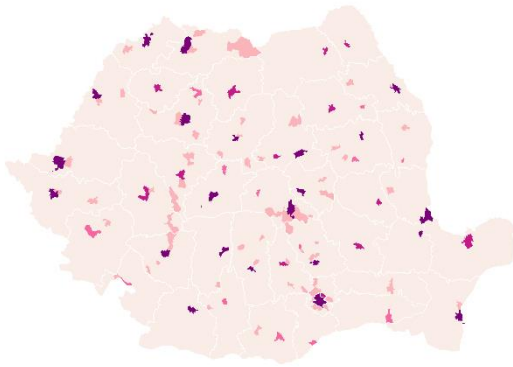




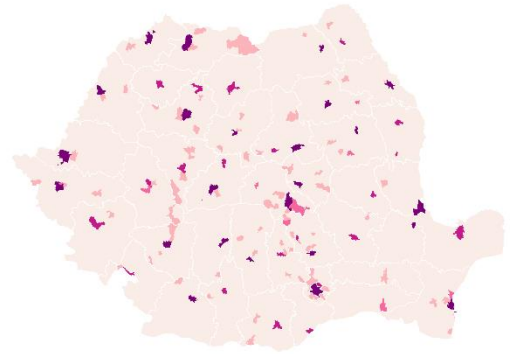
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2005



2006



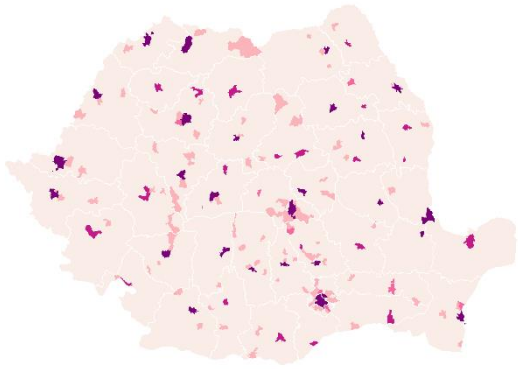
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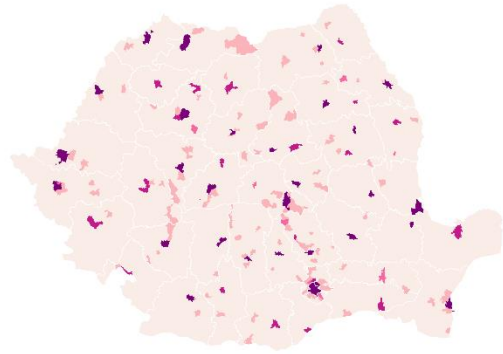
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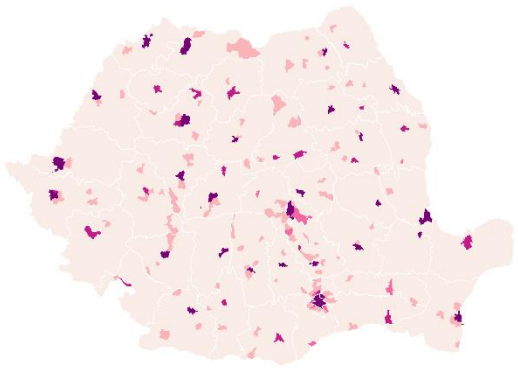
2009



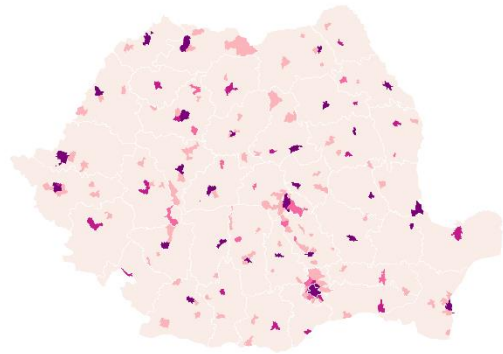
2010



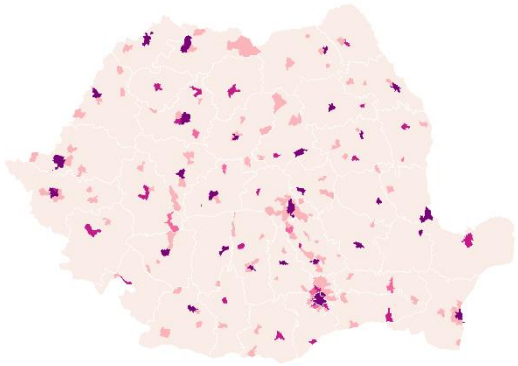
2011



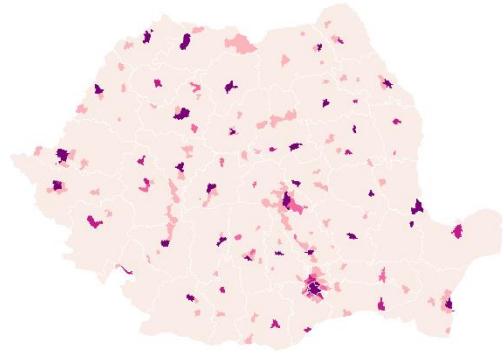
2012



2013



2014



2015

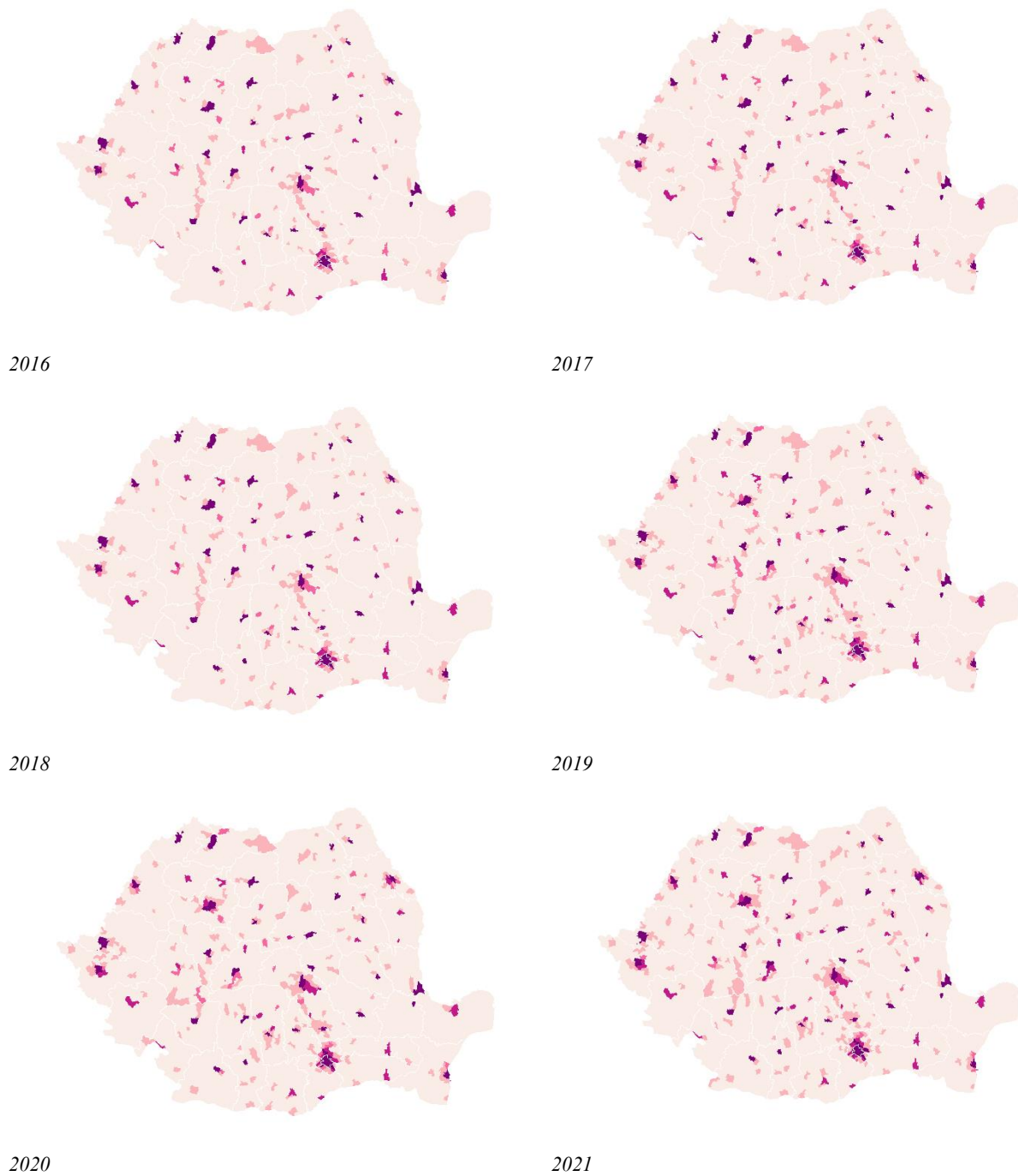


Figure 3. Spatial distribution of number of companies in the IT sector at national level for the period 2000-2021

The activities of the NACE codes in the IT class for the number of companies show an upward trend (Figure 3), the most important being in code 6202 - Computer consultancy activities, followed by code 6311 - Data processing, hosting and related activities, cod 6209 - Other information technology and computer service activities, code 6312 - Web portals, code 6203 - Computer facilities management activities and code 6399 - Other information service activities n.e.c. .

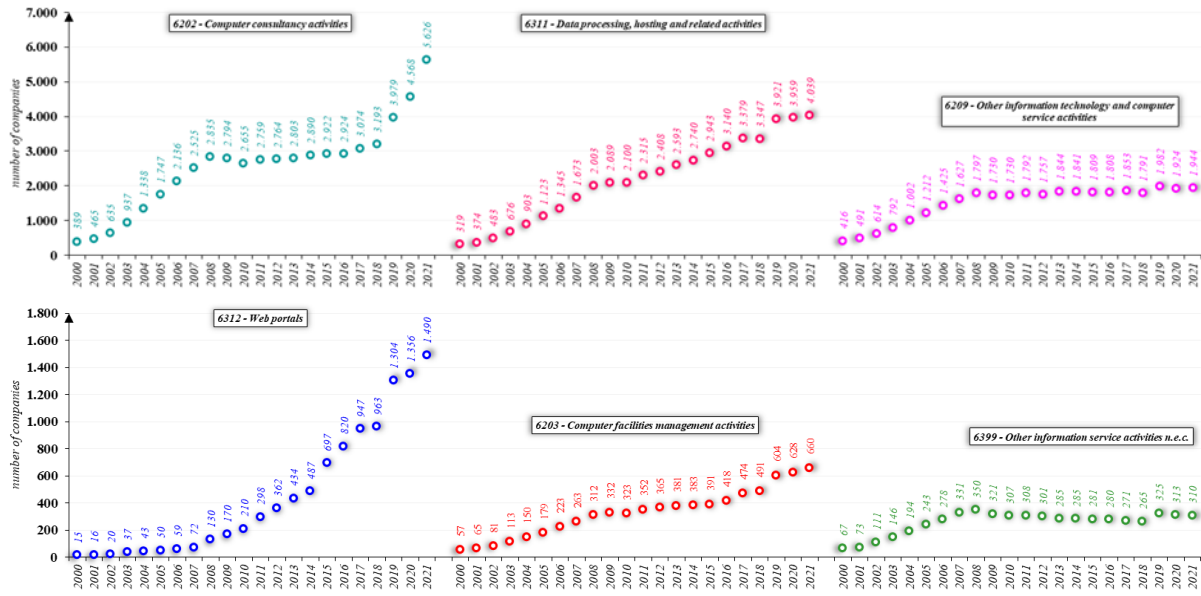


Figure 4. Evolution of the number of companies in the IT sector at national level for the period 2000-2021

Comparing the years 2000 and 2021 in terms of the analysis of the number of companies (Figure 5), a positive development can be observed with a number of 389 companies (in 2000) for 6202 - Computer consultancy activities and in 2021 a number of 5.626 companies, for 6311 - Data processing, hosting and related activities, a number of 319 companies in 2000, and 4.039 companies in 2021, for 6209 - Other information technology and computer service activities a number of 416 in 2000, and 1.944 in 2021, for 6312 - Web portals a number of 15 companies in 2000, and 1.490 companies in 2021, for 6203 - Computer facilities management activities a number of 57 companies in 2000, and 660 companies in 2021, and for 6399 – Other information service activities n.e.c. a number of 67 companies in 2000, and 310 companies in 2021.

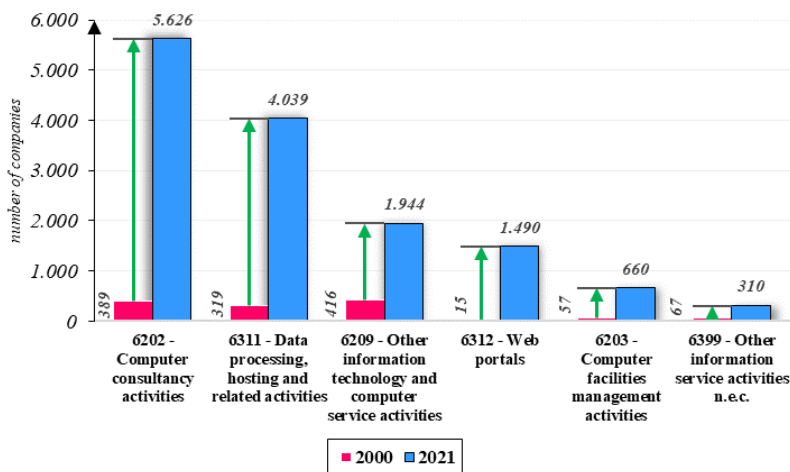
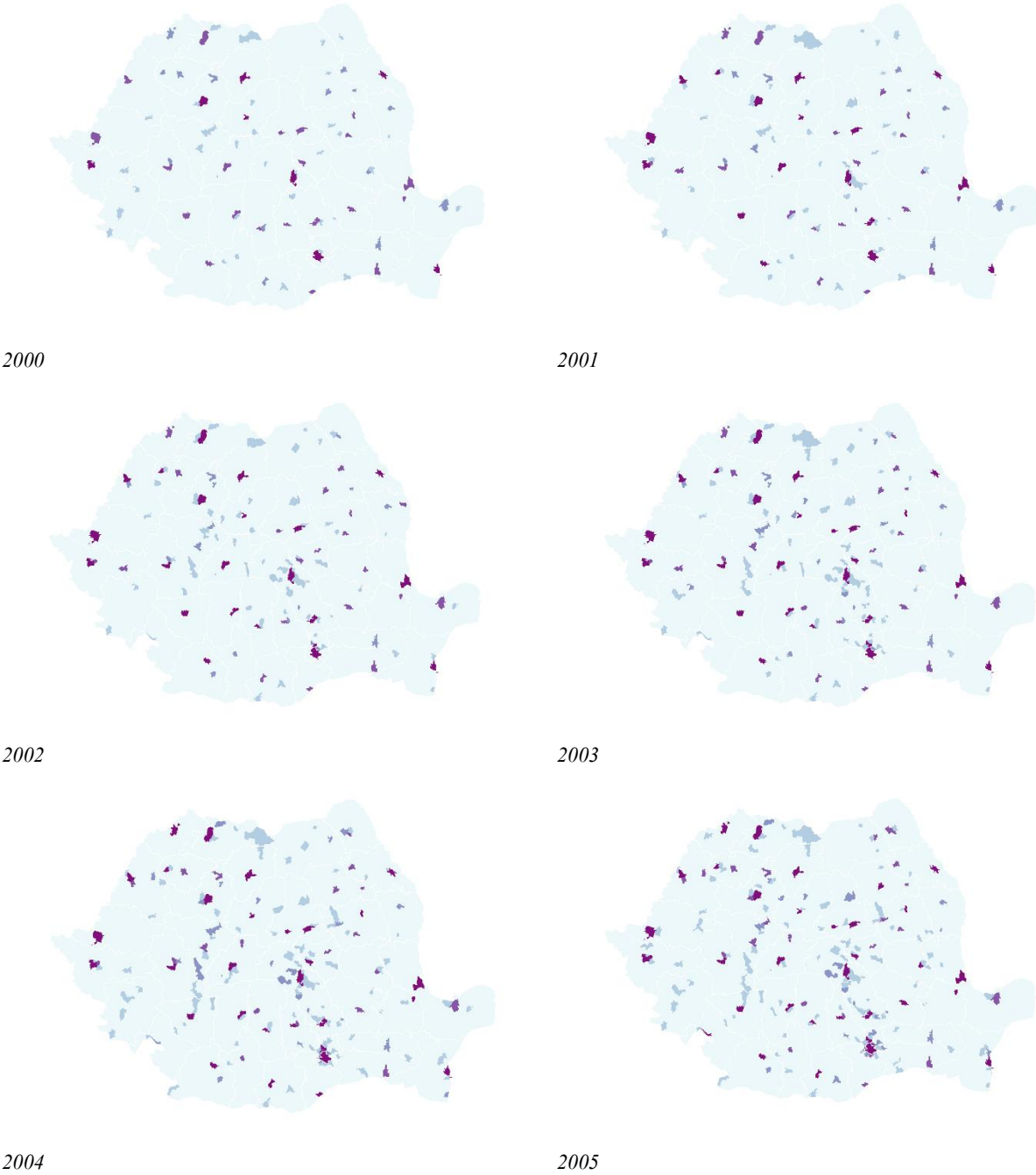


Figure 5. Evolution of the number of companies in the IT sector for years 2000 and 2021

3.2. Dynamics of turnover

Analyzing the spatial distribution of total turnover in the creative sector (Figure 6) reveals that the creative economy has developed mostly around large cities, with an increase in turnover values over the period studied.

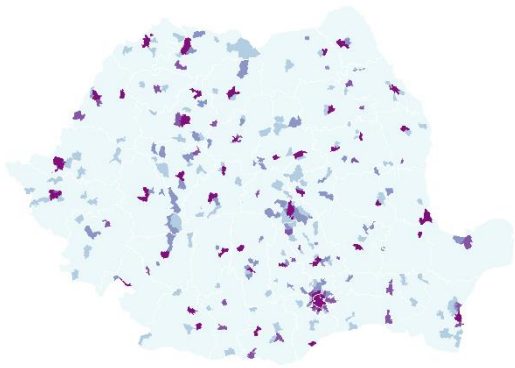




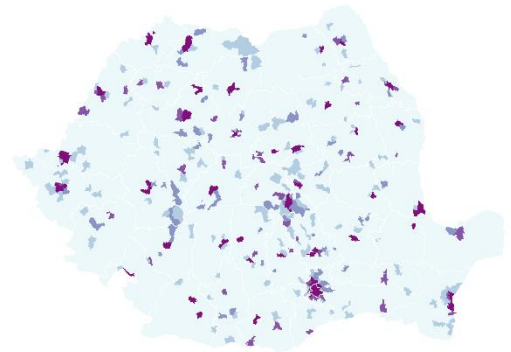
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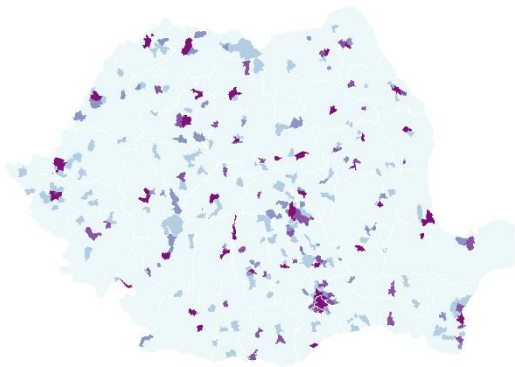
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2008



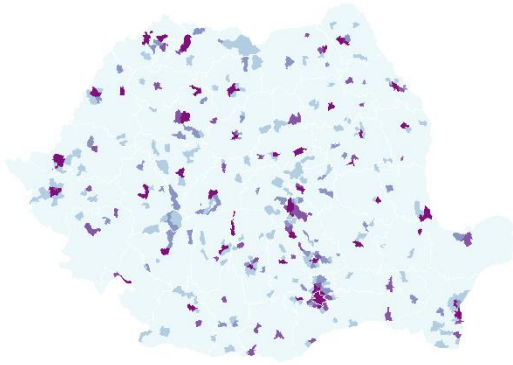
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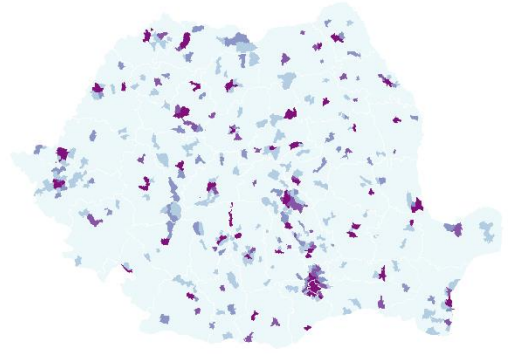
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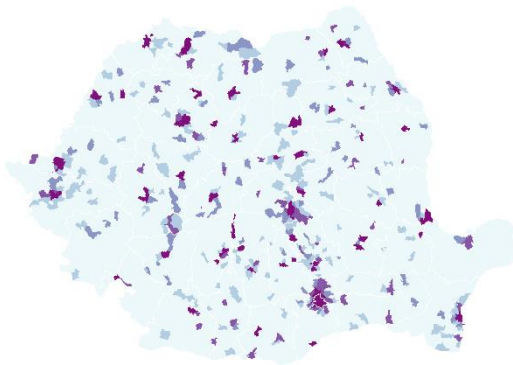
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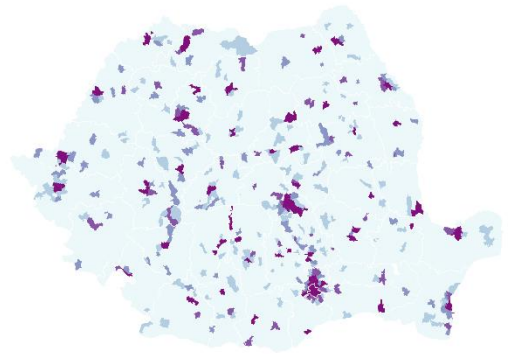
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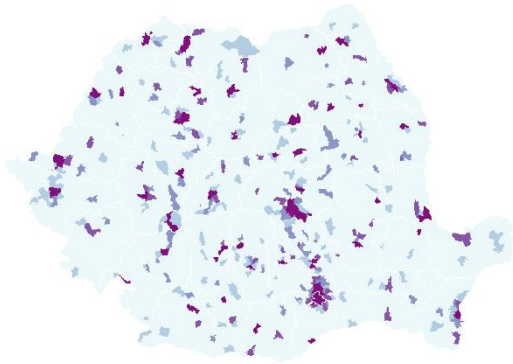
2013



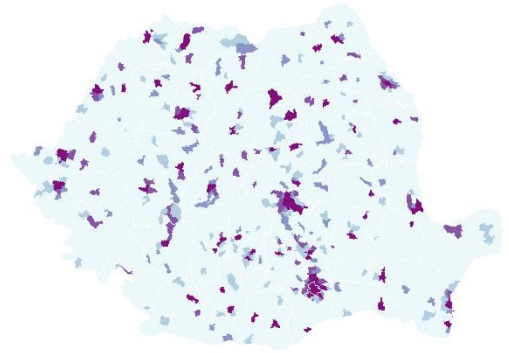
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2016

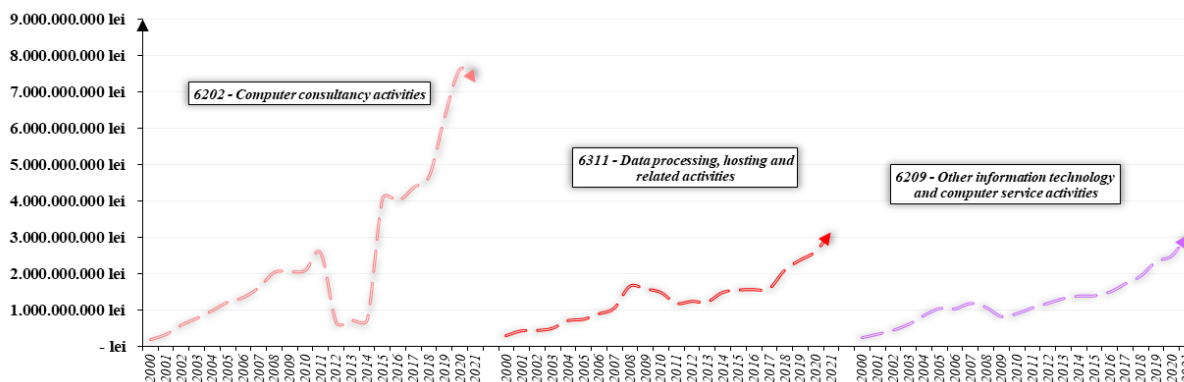


2017



Figure 6. Spatial distribution of turnover in the IT sector at national level for the period 2000-2021

The turnover of the NACE codes in the IT class shows an upward trend (Figure 7), with code 6202 - Computer consultancy activities being the most important, followed by code 6311 - Data processing, hosting, and related activities, code 6209 - Other information technology and computer service activities, code 6312 - Web portals, code 6203 - Computer facilities management activities, and code 6399 - Other information service activities n.e.c.



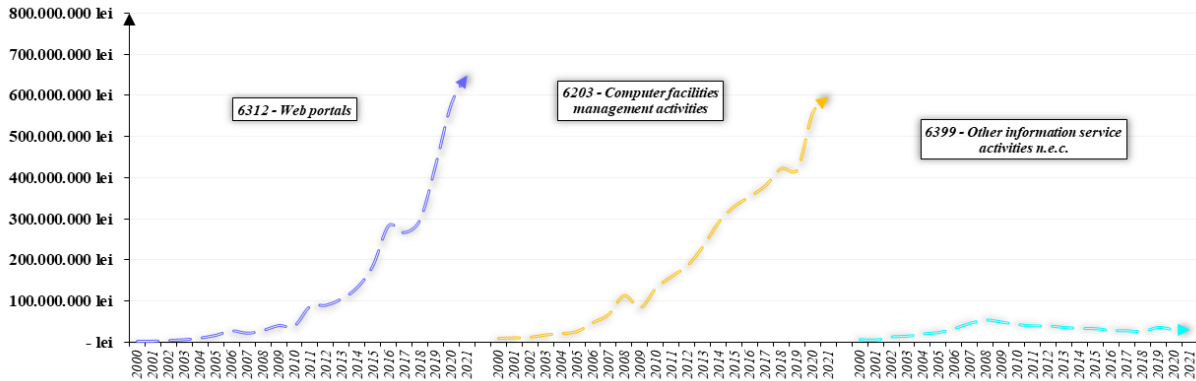


Figure 7. Evolution of turnover in the IT sector at national level for the period 2000-2021

When comparing the years 2000 and 2021 in terms of the evolution of the turnover (Figure 8), a positive development can be observed with a value of 172.854.418 lei (in 2000) for 6202 - Computer consultancy activities and in 2021 with 7.246.826.826 lei, for 6311 - Data processing, hosting and related activities, a value of 8.689.639 lei in 2000, and 595.278.948 lei in 2021, for 6209 - Other information technology and computer service activities a value of 297.246.957 lei in 2000, and 3.133.295.348 lei in 2021, for 6312 - Web portals a value of 243.717.525 lei in 2000, and 3.044.943.031 lei in 2021, for 6203 - Computer facilities management activities a value of 2.663.960 lei in 2000, and 649.290.466 lei in 2021, and for 6399 – Other information service activities n.e.c. a value of 6.708.566 lei in 2000, and 30.360.938 lei in 2021.

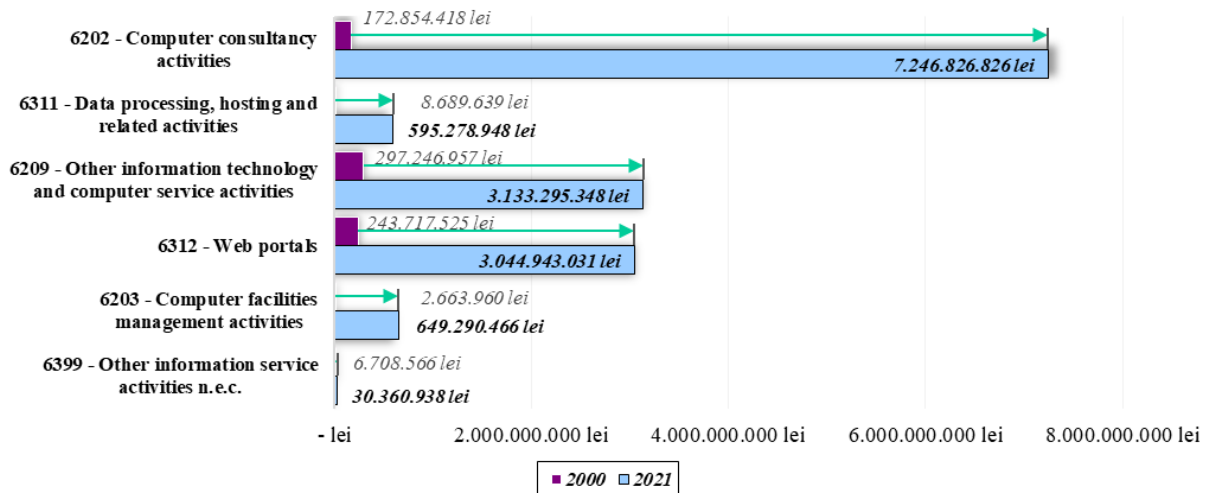
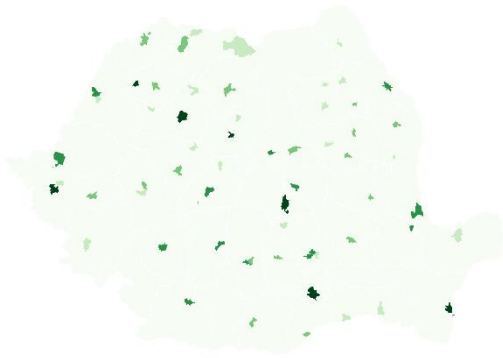


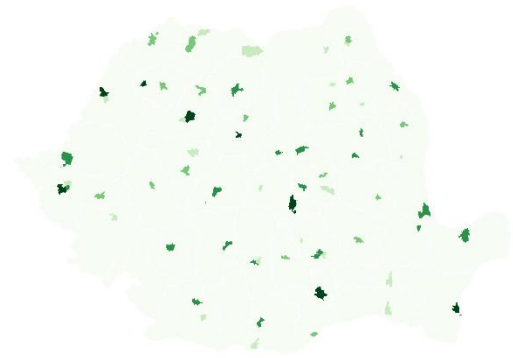
Figure 8. Evolution of turnover in the IT sector for years 2000 and 2021

3.3. Dynamics of the number of employees

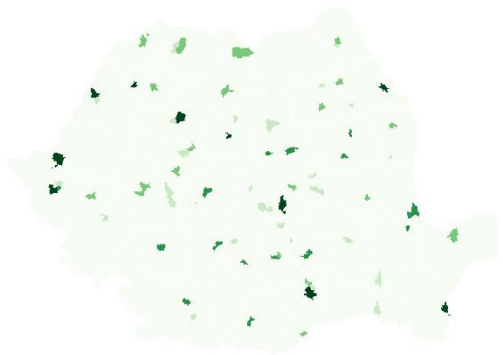
The spatial distribution of total creative employees from 2000 to 2021 (Figure 9) indicates a continuous expansion, with minor changes throughout the economic and pandemic crises (2008-2010 / 2019-2020).



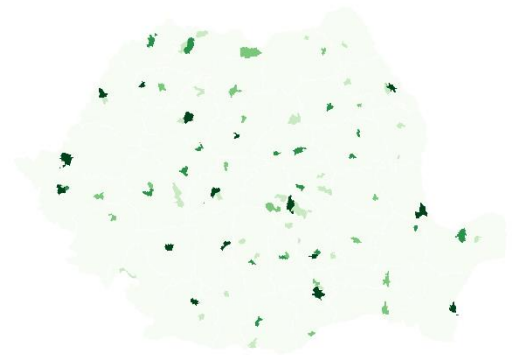
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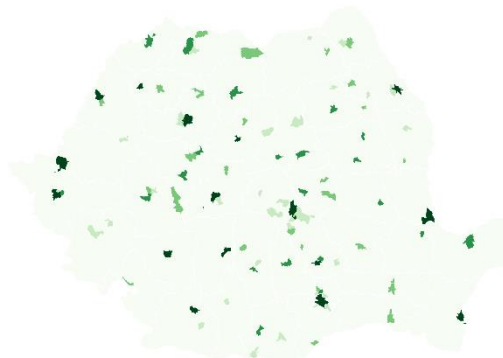
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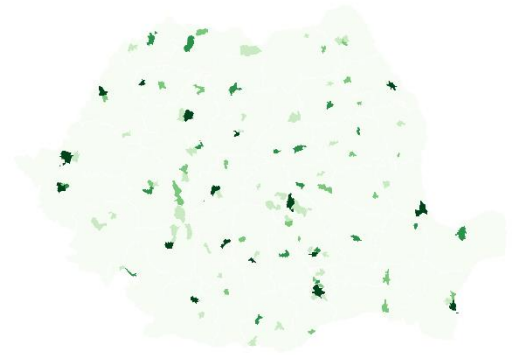
2002



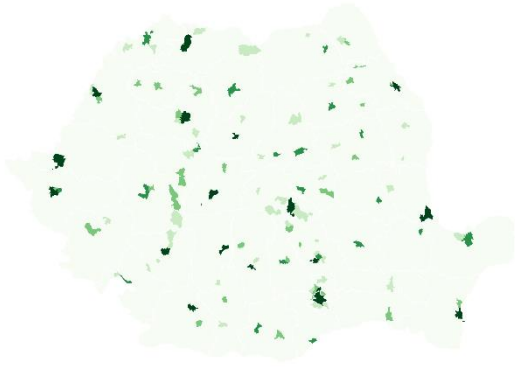
2003



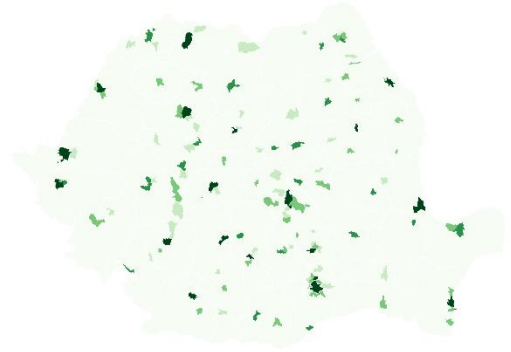
2004



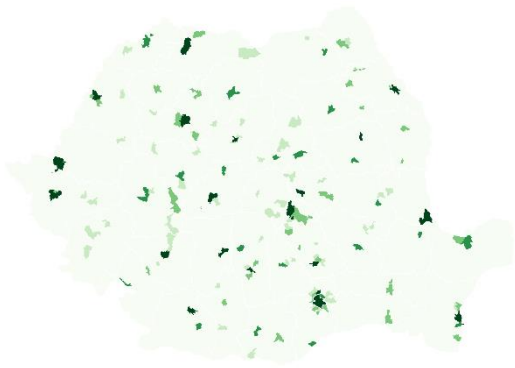
2005



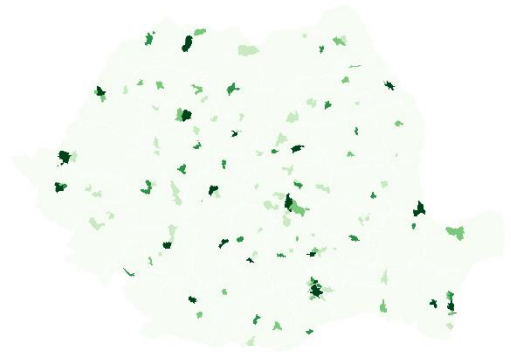
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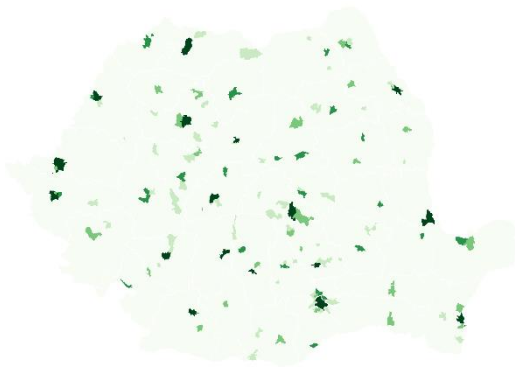
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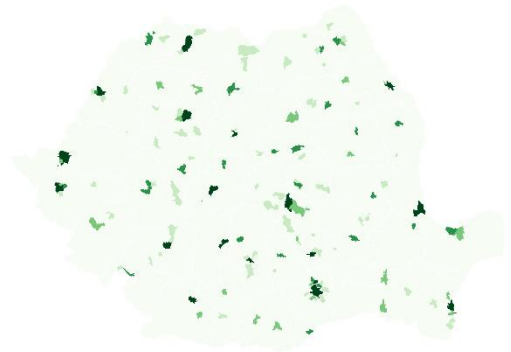
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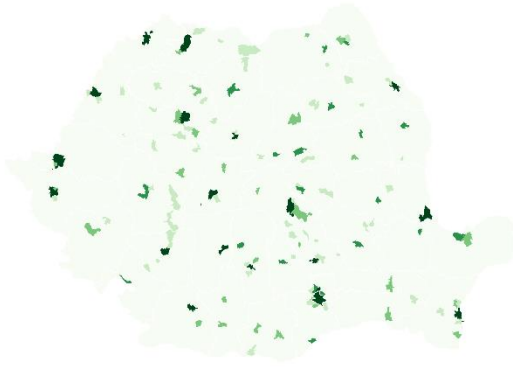
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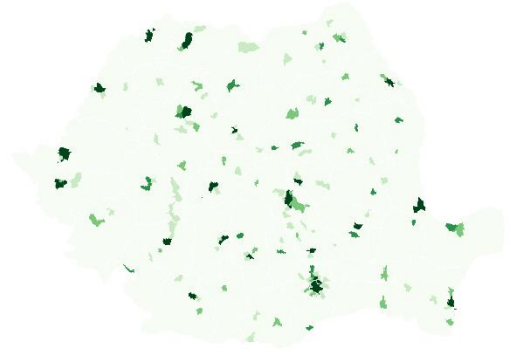
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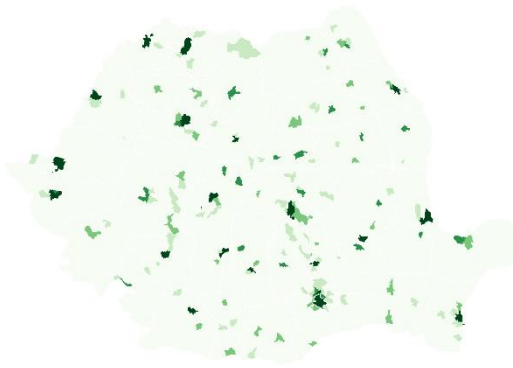
2011



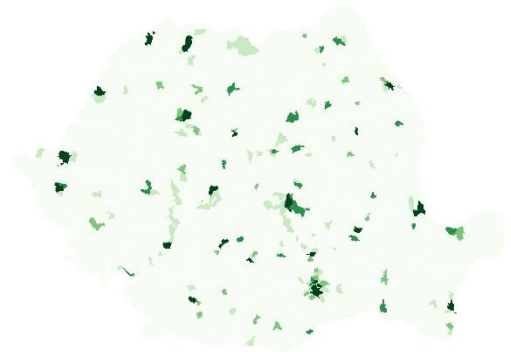
2012



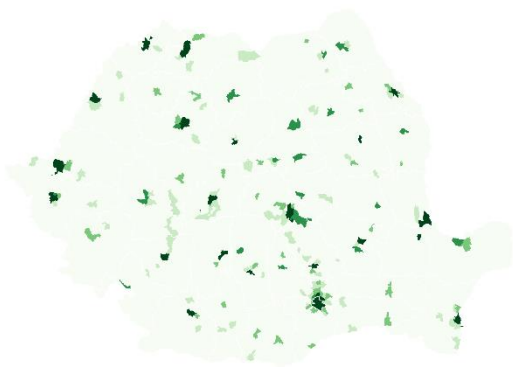
2013



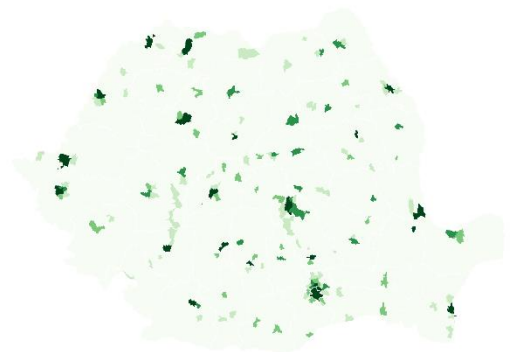
2014



2015



2016

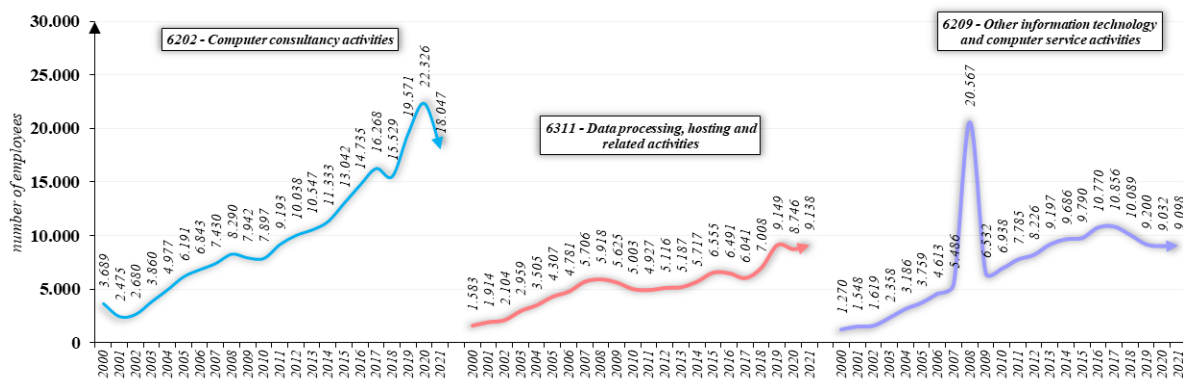


2017



Figure 9. Spatial distribution of the number of employees in the IT sector at national level for the period 2000-2021

The number of employees in the IT class is increasing (Figure 10), with code 6202 - Computer consultancy activities being the most important, followed by code 6311 - Data processing, hosting, and related activities, code 6209 - Other information technology and computer service activities, code 6312 - Web portals, code 6203 - Computer facilities management activities, and code 6399 - Other information service activities n.e.c.



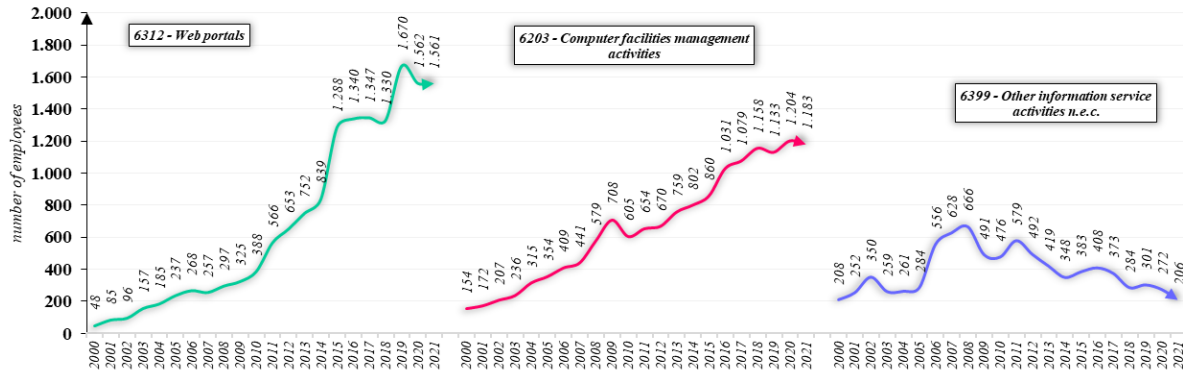


Figure 10. Evolution of the number of employees in the IT sector at national level for the period 2000-2021

When comparing the years 2000 and 2021 in terms of employee numbers (Figure 11), a good trend can be seen, with 3.689 employees (in 2000) for 6202 - Computer consultancy activities and 18.047 employees in 2021, for 6311 - Data processing, hosting and related activities, a number of 154 employees in 2000, and 1.183 employees in 2021, for 6209 - Other information technology and computer service activities a number of 1.583 employees in 2000, and 9.138 employees in 2021, for 6312 - Web portals a number of 1.270 employees in 2000, and 9.098 employees in 2021, for 6203 - Computer facilities management activities a number of 48 employees in 2000, and 1.561 employees in 2021, and for 6399 – Other information service activities n.e.c. a number of 208 employees in 2000, and 206 employees in 2021.

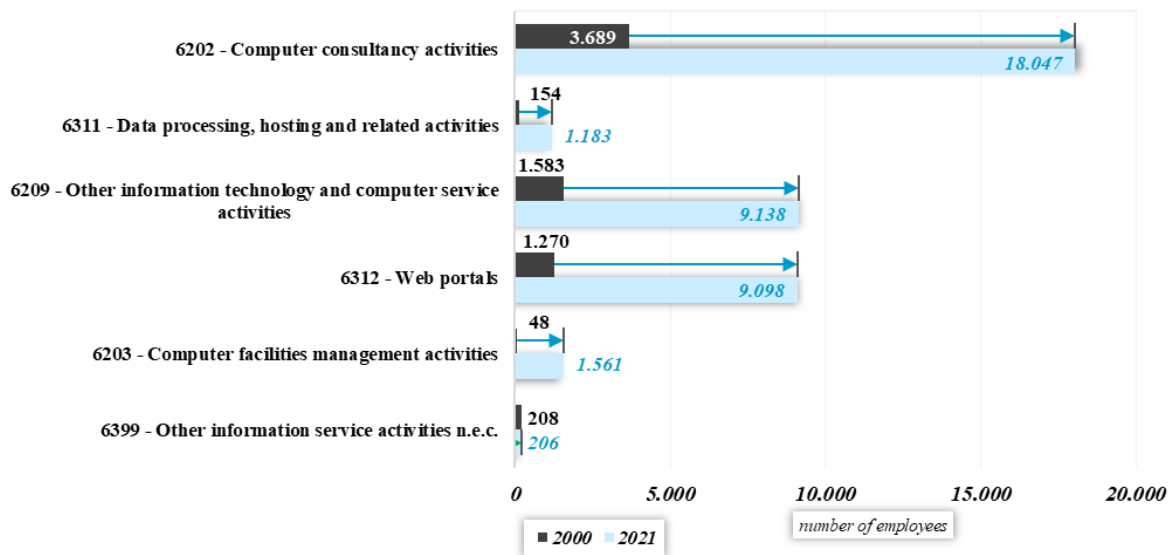


Figure 11. Evolution of number of employees in the IT sector for years 2000 and 2021

3.4. Dynamics of the profit

The spatial distribution of total profit in the creative industry at the national level from 2000 to 2018 (Figure 12) demonstrates a positive evolution throughout the period studied, with minor dips from 2008 to 2010 and modest gains thereafter. The highest concentrations are observed in Bucharest.



2000



2001



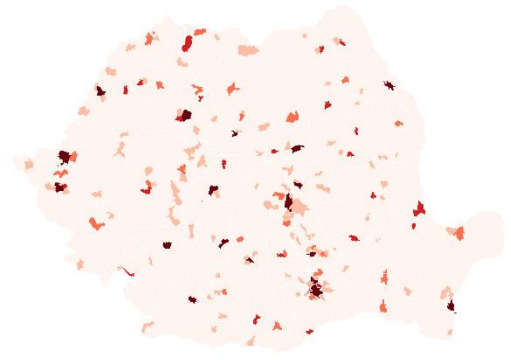
2002



2003



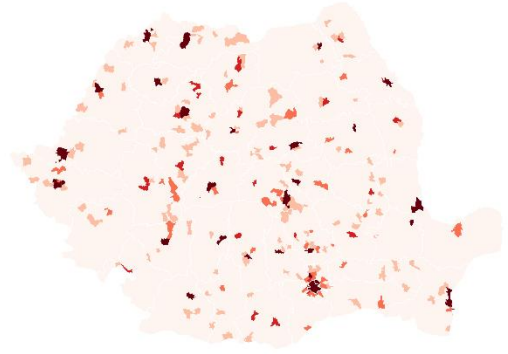
2004



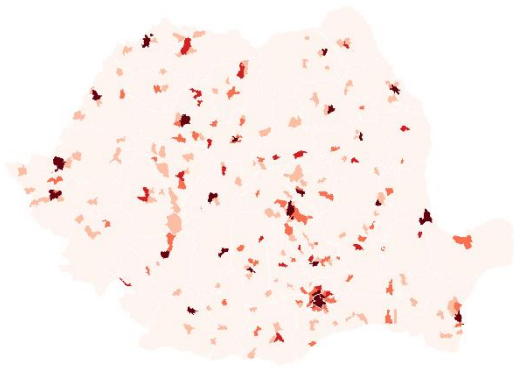
2005



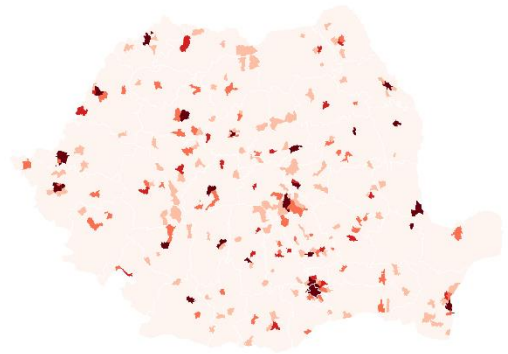
2006



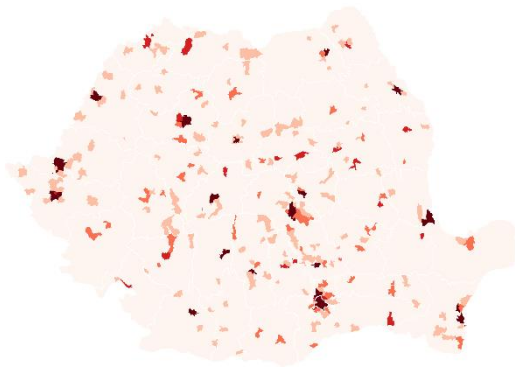
2007



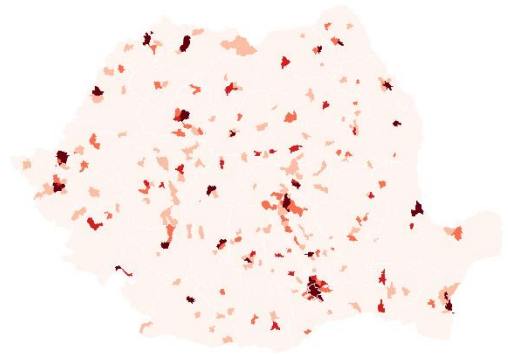
2008



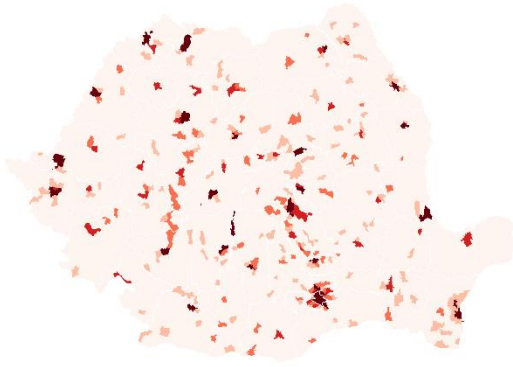
2009



2010



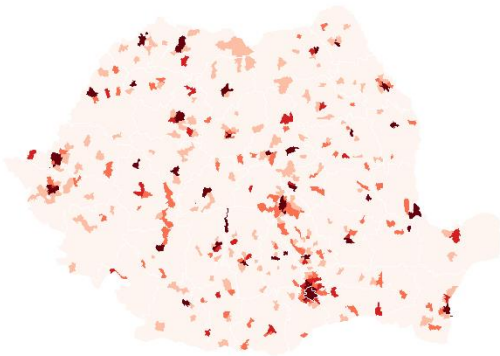
2011



2012



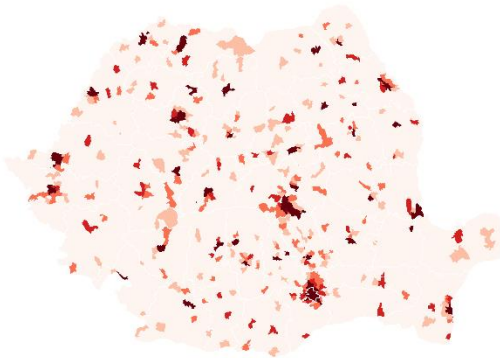
2013



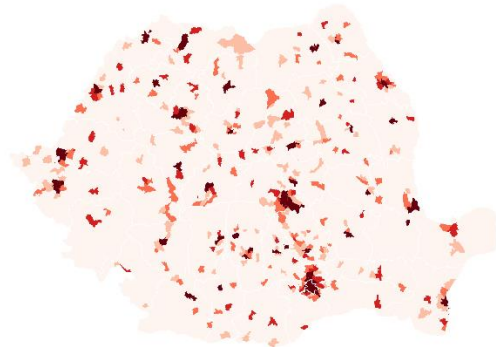
2014



2015



2016



2017

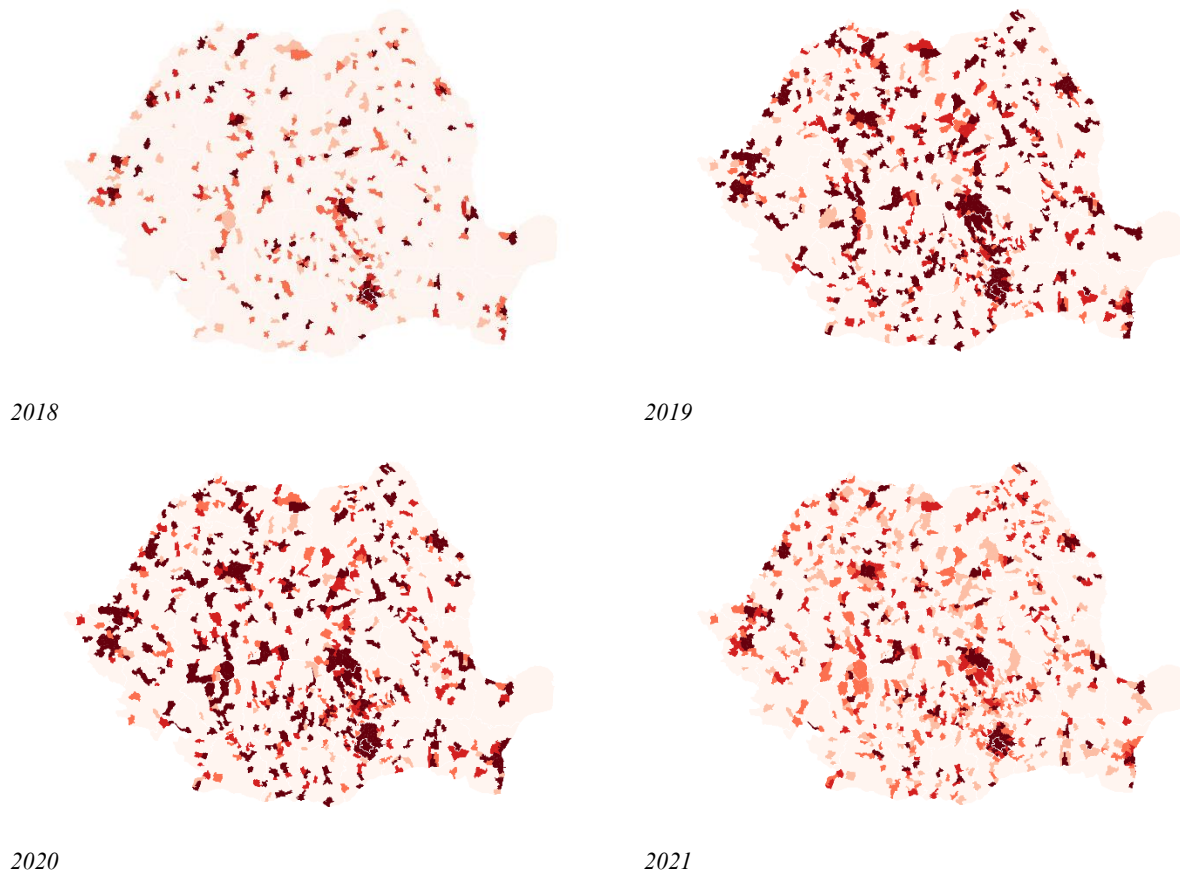


Figure 12. Spatial distribution of profit in the IT sector at national level for the period 2000-2021

The NACE code activities in the IT class for profit evolution show a declining trend after 2020 (Figure 13), the most important being in code 6202 - Computer consultancy activities, followed by code 6311 - Data processing, hosting and related activities, cod 6209 - Other information technology and computer service activities, code 6312 - Web portals, code 6203 - Computer facilities management activities and code 6399 - Other information service activities n.e.c. .

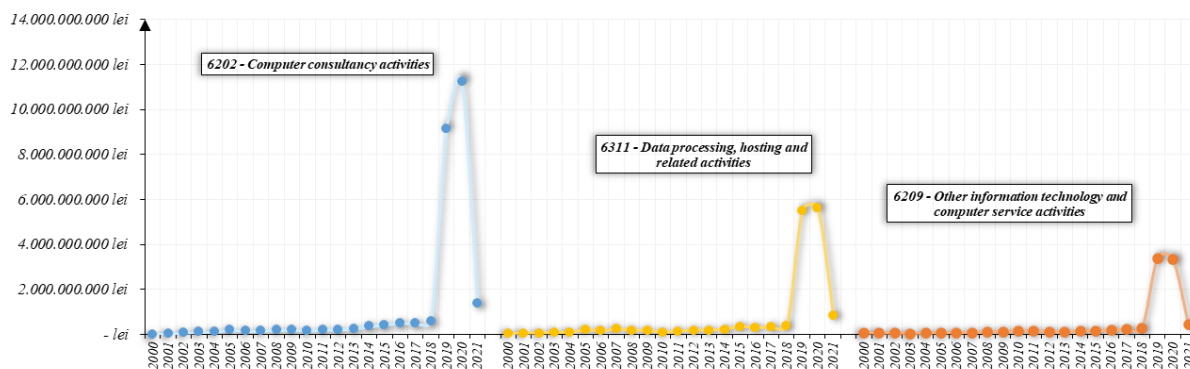




Figure 13. Evolution of profit in the IT sector at national level for the period 2000-2021

A favorable development may be seen when comparing the years 2000 and 2021 in terms of profit values (Figure 14) with a value of 12.573.880 lei (in 2000) for 6202 - Computer consultancy activities and in 2021 with 1.365.749.036 lei, for 6311 - Data processing, hosting and related activities, a value of 295.710 lei in 2000, and 324.233.683 lei in 2021, for 6209 - Other information technology and computer service activities a value of 46.274.186 lei in 2000, and 431.466.995 lei in 2021, for 6312 - Web portals a value of 23.116.810 lei in 2000, and 839.737.080 lei in 2021, for 6203 - Computer facilities management activities a value of 103.422 lei in 2000, and 208.681.819 lei in 2021, and for 6399 – Other information service activities n.e.c. a value of 475.059 lei in 2000, and 6.900.360 lei in 2021.

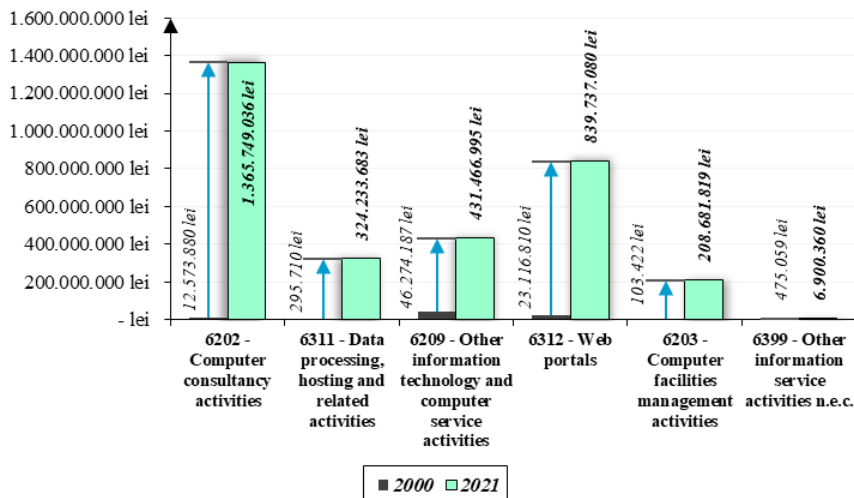


Figure 14. Evolution of profit in the IT sector for years 2000 and 2021

4. CONCLUSION

Despite worries that too much emphasis has been placed on the ability of this sector to solve an increasing number of “issues”, particularly those of the current economic crisis, creative industries development remains a cornerstone of UE strategy (*Banks and O'Connor, 2009; Pratt, 2009, Bell and Jayne, 2010*).

Policy for the creative industries has been established and implemented during the last decade, primarily through public sector players such as local governments and regional development organizations.

Urban-based creative industries policy has emerged as a critical strategy for tackling the economic (and, more recently, social) malaises plaguing cities and city spaces, with emphasis on attracting, cultivating, and maintaining creative practitioners in cities. Some regions have successfully employed creative economy policies to transform their economies and change their image.

While the creative industries are widely recognized as essential urban resources and critical to reinventing urban economic and cultural life, there is still much work to be done to better understand the creative environment's promise and limitations. To ensure the success of the “creative space” agenda, policymakers must begin to engage more rigorously and nuancedly with the complexity and diversity of the creative economy.

In recent years, the creative industries have seen substantial modifications, with aspects such as flexibility, user interaction, technological innovation, open platforms and digitization, and project-based short life cycles being noticed (*Liu, 2021*). These transformations have occurred most notably in the IT sector, which has grown in size. Digital platforms can combine online media and games, tablets and mobile phones, and user experiences, reforming the sector in terms of technology and business model innovation. While organizations have typically emphasized closed innovation and intellectual property protection, open innovation focuses on information exchange between internal and external sources. Knowledge spillover, product expansions, and user contributions are further creative industries innovation consequences.

As a result, the creative sector is expected to be better prepared than others to respond to structural crises (the 2008-2009 global financial crisis and the 2020 pandemic crisis). The creative economy, which is linked to the information economy, is frequently defined as “innovative”, “entrepreneurial”, and “problem-solving” (*Berwick and Wright 2009; Kirkpatrick, 2009; Felton et al., 2010*).

The creative economy can also be characterized as solid, sustainable, value-added, and flexible, and it is precisely these characteristics that have the potential to buttress many areas of the sector against the ravages of the global economic downturn (*Kirkpatrick 2009; Priestman 2009*). It is resilient because of its resilience. The creative economy, in particular, as a sector whose core assets include intellectual property and people who make something out of nothing, tends to rely on a lighter infrastructure and is thus more responsive to market conditions than many other industries, whose need for a larger infrastructure makes them difficult and slow to change (*Kirkpatrick 2009, Felton et al., 2010*).

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