

An Analysis of Business Performance In Romania's IT Sector

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Abstract

Competitiveness, financial performance and operational performance are determinant factors of business performance. This study focuses on the comparative analysis of the evolution of these indicators in the Romanian IT sector in the 2019-2021 period. The results presented visually in this paper support the idea of a divergence between physical productivity and revenue productivity, by analyzing their possible development in the context of the numerical analysis of the businesses existing on the market. The results of the present study contain interesting conclusions and converge towards the awareness of the need for further research into the factors which influence business interest, its performance or efficiency.

Key words: business performance, IT sector, net profit, labor productivity

J.E.L. classification: M15, M20, M21

1. Introduction

The increasing use of information and communications technology over the last three decades in more and more sectors of activity is a dominant characteristic of today's economies (Castellacci and Tveito, 2018, pp. 308-325). In order to create competitive economies, governments' objectives have focused on maximizing the effects and benefits of digitization and the whole ITC industry on the one hand, and on the other hand on minimizing the risks arising during the digital transformation.

According to a study published by the International Trade Administration of the United States (ITA, 2022), Romania ranks first in Europe and sixth in the world in terms of the number of certified IT specialists in relation to the total population, surpassing even the United States and Russia. At the moment, in our country there are about 179 thousand people employed in the IT and Telecommunications sector, i.e., about 2.7% of the total number of employees. According to the information provided by the Employers' Association of the Software and Services Industry (ANIS, 2021, p. 67), of the total number of employees in this sector, the largest share, of about 67%, belongs to the software and IT services industry, which in 2019 employed around 120 thousand people and in 2020 more than 130 thousand. One coordinate which indicates the importance of the ITC sector at European level is the vote to establish the EU Cybersecurity Competence Centre in Bucharest in December 2020.

The National Institute of Statistics of Romania published on 7 December 2022 the report presenting the Gross Domestic Product for the third quarter of 2022, which recorded an increase of 4% by gross series and 4.7% by seasonally adjusted series compared to the same quarter of the year 2021. A significant contribution to this growth was made by the *Information and Communications* sector, with a +6.9% share in GDP formation.

It is estimated that in the coming years the share of the IT&C sector in the formation of the Gross Domestic Product could reach 10%, as both private companies in different industries and state institutions continue to invest in digital transformation (ANIS, 2021, p.8).

The IT sector is among the most dynamic in the Romanian economy in terms of the number of new companies, and compared to other European countries, the growth in the number of companies in the IT sector places Romania at the top of the ranking. The key element of the Romanian industry, which helps us to position ourselves favorably compared to most Central and Eastern European countries, is the access to human capital: we have many IT specialists at a relatively low cost, a reality which reinforces the IMF's observation that a country's human resources are a strategic component for economic growth and development (IMF, 2018, p.64).

Our paper starts by reviewing the research on the importance, the development potential of the IT sector and the growth impulse it gives to the economy in general (Rus, M. -I., 2013, p. 942; Rus, M. -I., 2016, p. 187). It then explores the dynamics of the main financial indicators of Romanian businesses operating in the IT sector. Considering the significant contribution of the *Information and Communications* sector branch to the formation of the GDP, the evolution of the financial indicators of profitability is analyzed in close correlation with the indicators of labor productivity of the employees working in Romania. The results of the analysis complete the direction of the research aimed at exploring the differences between income, financial performance and operational performance.

2. Literature review

Taking into consideration the fact that the ITC sector is directly linked to automation and digital transformation, increasing the efficiency of this sector can provide a considerable boost to the economy (Mckinsey Report, 2017, p.1). Although the process of digital transformation differs from country to country, from company to company, most studies have shown that digital transformation uses technology as a means to accelerate economic development and raise living standards, not as an end in itself (Kwon and Park, 2017, p. 12586-12587).

According to the approach presented by Rübmann M. in the report *Industry 4.0: The future of productivity and Growth in Manufacturing Industries*, Industry 4.0 includes research and innovation, reference architecture, standardization and system security as fundamental elements. According to this report, the transformation of the economy into Industry 4.0 can be made possible by providing the right substructures, supported by sensors, machines, jobs and information technology (Rübmann et al, 2015, p. 12).

Specialized literature recognizes that the IT and telecommunications industries have great potential in terms of increasing productivity and income (Aivaz, 2021a, p. 8), this only being possible if companies are efficient. At the same time, there is growing concern that successive waves of investment in digital technologies will contribute to job losses, wage stagnation and rising wage inequality (OECD, 2017, p. 8). From a historical perspective, it is certain that major technological innovations have always been accompanied by extensive labor market transformations (OECD, 2017, p.7-8), with mobility and flexibility changing the labor experience (Tofan and Aivaz, 2022, p. 418). More recently, *cloud computing* has changed the relationship between employees and employers. In a world based on cloud-based data storage, employees can share resources and collaborate more efficiently, while accessing information from wherever they are. This helps the company greatly as it can easily find cheap and skilled workers. Jääskeläinen (2015, p. 67) pointed out that cloud technology supports employees; they can work when it is convenient for them, with flexible working hours improving employee satisfaction and business efficiency. This transformation is often supported by online platforms which facilitate interaction and intermediary transactions, partly or entirely online, with the comparison of supply and demand for goods (eCommerce), of services and information often taking place in real time (Folea, 2019, p.1-2).

Economic efficiency, on the one hand, means achieving maximum economic effects with a given consumption of resources, and on the other hand, the minimum consumption of resources means achieving the best results. Based on this double expressing manner, Buder and Felden (2012, p.4340) distinguish between quality (effectiveness) and needed effort (efficiency). Often, in the economic literature, the efficiency of firms is placed under the same umbrella as the term's competitiveness and productivity.

Iordache et al (2017, pp.1-2) argued that operational and technical process skills are seen as fundamental aspects of the 21st century economy, learned through schooling and industrial or organizational training in the workplace. These skills are particularly held by technology and IT experts, who add value to the companies.

Information and communications and the role they play in the productivity of the companies and in their development has been researched in many studies for two decades ago. (Colecchia & Schreyer, 2002; Oliner & Sichel, 2000, p.13; Kretschmer, 2012). The potential of ICT is based on the fact that they are general-purpose technologies (Bresnahan & Trajtenberg, 1995) which lead to technological improvement, and their diffusion throughout the economy plays a role in facilitating innovation. The ICT sector enables closer relationships between firms, their customers, suppliers and collaborators. Another key element brought by IT companies is the reduction of geographical barriers. In addition to this, they facilitate the creation of new knowledge and its faster dissemination through more efficient information transmission processes, both within and between the companies and sectors (Kretschmer, 2012).

A series of empirical studies (Stiroch, 2001; Pilat *et al.*, 2002; Belorgey *et al.*, 2006; Sobhani, 2008; Shapiro and Mathur, 2011; Chen *et al.*, 2006; Savulescu, 2015, pp. 1-2; Hofman *et al.*, 2016, etc.) have shown that the impact of ICT on productivity and economic growth varies across countries. Different results of past studies might be due to differences in productivity levels across countries, but also to gaps over time, especially when ICT spending or ICT investment is used for development.

Hodrob and Awad (2016, p. 1-2), analyzing the impact of ICT on the economy, point out that the role of technology and information on people, governments, and organizational change, by transforming information into knowledge and innovation, acts as a key driver of productivity growth and economic growth.

At the national level, the Employers' Association of the Software and Services Industry (ANIS) conducted an extensive study in 2021 on the software and IT services industry and its impact on our economy. According to this study, Romania's competitive advantages in this sector are the existence of a large base of specialists and relatively low labor costs. In light of this, the national software and IT services industry has favorable conditions for further accelerated development that could lead the software and IT services industry to reach a total contribution (through direct, indirect and induced effect) of 10% to GDP in 2025, of which approx. 6.5% exclusively through direct contribution (from around 4% in 2020). In terms of the number of employees, the software and IT services industry has become an important part of the Romanian labor market, with the highest growth rate in the last 5 years. However, the industry is facing a shortage of specialists, which is an impediment to further accelerated growth. In addition to these characteristics, Romania faces a considerable innovation gap, with the lowest performance in Europe, especially in terms of the share of R&D expenditure in GDP. Therefore, the development strategy of the software and IT industry requires dedicated public measures in order to start the transition towards an innovation-based economic model, major investments in education and research and in supporting companies in the ICT sector.

3. Research methodology

The performance of the managerial activity of Romanian IT companies can be revealed by the structure and evolution of the level of some result indicators which highlight the overall effectiveness of the managerial act, as well as by a series of overall or partial efficiency indicators calculated on the basis of data from the accounting balance sheets of the companies using the ratio method. As other specialized studies have also shown, extending the analysis of the dynamics of financial indicators by economic activity branches allows the creation of valuable reference bases for the development of comparisons between territorial areas (Munteanu, 2021, p. 61) or business categories. At the same time, such an analysis can provide important clues on the future evolution of the sectoral economy (Munteanu and Aivaz, 2017, p. 436), the potential for financial development or the impact on employment. Our study contributes to the sphere of quantitative data research by presenting a series of chromatic maps which allow structuring the study results and complementing them with visual representations.

To this end, in a first phase it was necessary to build a database by selecting a set of economic and financial indicators from the balance sheets of the Ministry of Public Finance: net turnover, net profit, number of employees. Given the emergence of the global pandemic crisis and the reconfiguration of the entire world economy, the analysis of this sector focused on the 2019-2021 period.

According to Romanian legislation, the development of statistical studies at the economic level by categories of activities is possible due to the classification of each activity carried out by companies, since their legal establishment, according to a system implemented at the national level. The Classification of Activities in the National Economy (CAEN) is a nationally established statistical structuring of activities in Romania. The classification is established on several levels. The general classification is identified by alphabetical codes, groups of related activities being identified by a 2-digit numerical code, and each division of sub-activities receives a 4-digit numerical code. As a general rule, each company is obliged to declare only one main activity (to which a 4-digit CAEN code is assigned) at the time of its establishment and, optionally, it may declare several 1 secondary activities.

Our study focuses on the analysis of financial indicators reported through the annual financial statements of companies operating in the IT sector in Romania, classified according to the main activity declared by each entity at its establishment.

For the analysis of the managerial efficiency of the IT sector in Romania, more specifically, of the companies included according to the CAEN classification in Division **62 Information technology service activities**, the companies that declared one of the categories shown in Table 1 as their main object of activity were taken into account.

Table no. 1 The division of CAEN classification 62 Information technology service activities

CAEN Code	Name of CAEN class
6201	Custom software development activities (client-oriented software)
6202	Information technology consultancy activities
6203	Management activities (management and operation) of the means of calculation
6209	Other information technology service activities

Source: ONRC/National Trade Register Office

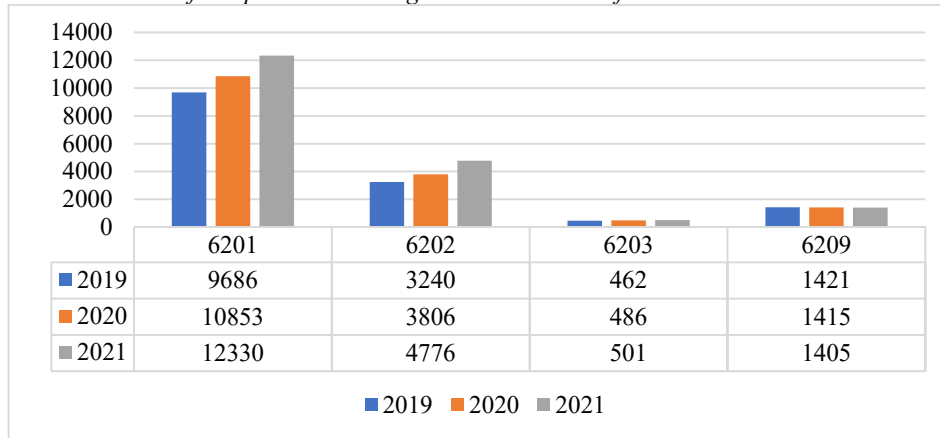
The construction of a unified database involved selecting from the balance sheets of IT companies, for the analyzed years, the indicators reported in all balance sheet forms: net turnover, net profit and average number of employees. Data processing was carried out using the SPSS software.

4. Findings

The number of companies in CAEN Division 62 *Information technology service activities*, by the 4 classes, is represented in Figure 1. It can be seen that most companies are registered in Division 6201 *Custom software development activities (client-oriented software)*, with the number of companies in this division increasing in 2021 compared to 2019 by 2644.

The fewest firms are found in CAEN 6203 *Management activities (management and operation) of the means of calculation*, with only 462 companies registered in 2019 and an increase of only 39 companies in 2021. On the other hand, the graphical presentation of the number of companies in Figure no. 1 shows an increasing interest in business development in the IT sector, with the number of companies established in the four sub-branches of CAEN activities increasing throughout the analyzed period.

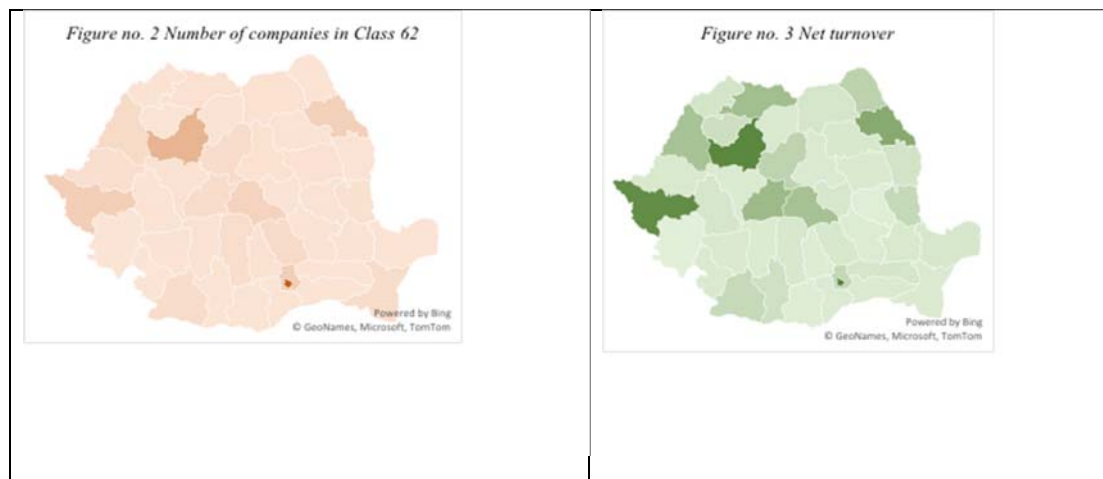
Figure no.1 Number of companies according to the NACE classification



Source: authors' own processing

The next stage of our analysis was to create color maps that allow us to identify the geographical areas where most IT businesses are concentrated. Subsequently, the numerical concentration of businesses was analyzed against the evolution of financial indicators, i.e., the geographical areas where IT activity generates the most revenue, profit, number of jobs or shows the best job predictability.

Figure 2 shows the total number of firms in Romania in category 62 *Information technology consultancy activities*, grouped by county. Most firms are registered in Bucharest, with 6,176 registered in 2021. The counties with most companies in the same CAEN category are Cluj, with 2,360 registered firms, Ilfov with 1,070 registered firms, Timis, with 1,026 firms, followed by Iasi County, with 953 firms.



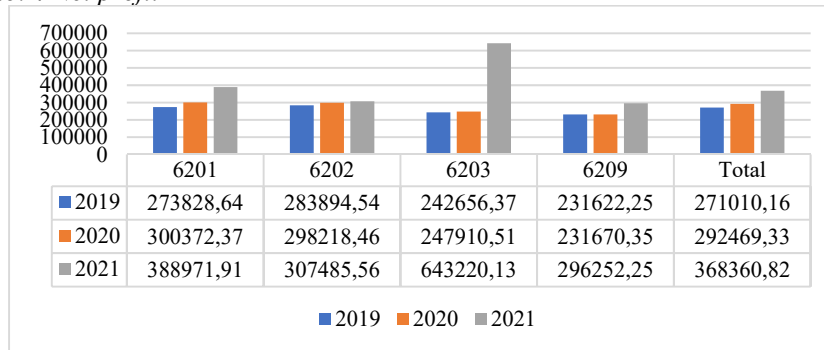
Source: authors' own processing

Figure no. 3 shows the distribution and territorial concentration of income generated from IT activities in Romania. The analysis intended to show the information in the clearest way, the chromatic maps being chosen in order to identify the geographical areas where the highest IT turnover was recorded and the corresponding allocation of the most pronounced chromatic shades. The areas with less pronounced shades show areas where although the number of companies may be significant, the turnover generated is not as high. From the perspective of the evolution of turnover in the 2019-2021 period, the analysis showed that the peak period of the pandemic, felt in Romania in 2020, has meant a slight decrease in the global turnover achieved compared to the year 2019. The decrease in turnover in 2020 was recovered in 2021, with global turnover reported by businesses developed in the IT sector increasing compared to 2019.

Net turnover is the total amount obtained from the sales of the products and services provided over a given period of time. In other words, turnover is the total income earned by a company from its activities.

The companies in Bucharest County are leaders in terms of net turnover, recording a level of 3383859 lei in 2021, followed by businesses in Cluj and Timis.

Figure no. 4 Net profit

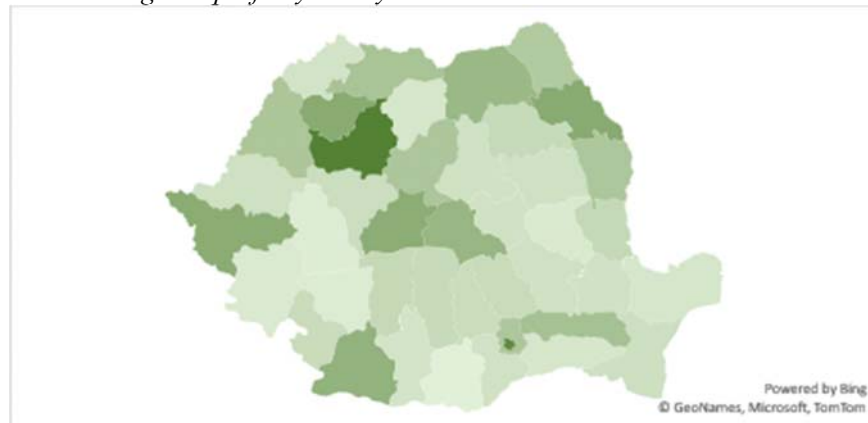


Source: developed by this paper's authors based on ANAF data

Net profit is the result of a company's business activity, measured in the difference between revenues/income and expenses, i.e., the profit remaining after all expenses, including taxes, have been deducted; basically, this indicator is a reflection of the company's performance. The evolution of the indicator is shown in Figure no. 4.

The highest net profit was recorded in 2021 by companies in the CAEN 6203 division, and the lowest was in the year 2019 in the CAEN 6209 division - representing 36% of the highest value recorded.

Figure no. 5 Average net profit by county

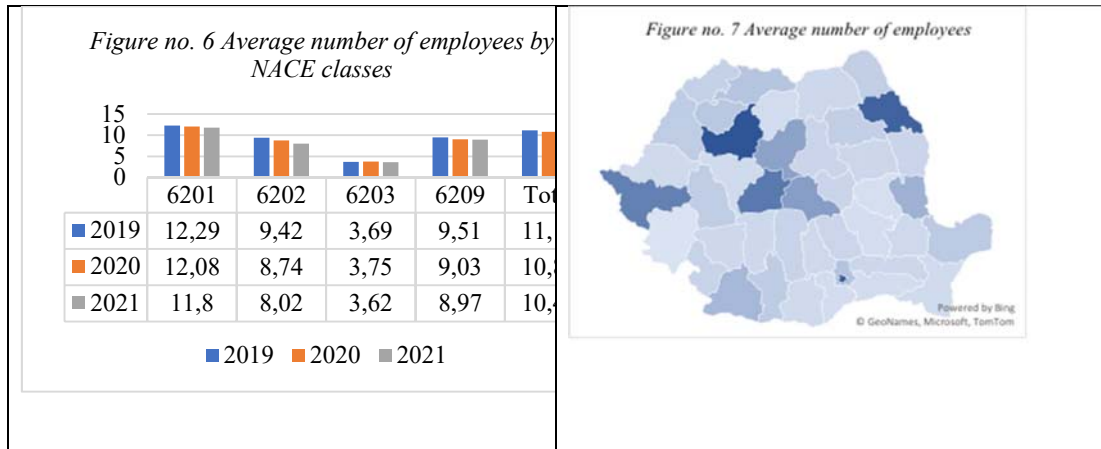


Source: developed by this paper's authors based on data publicly provided by ANAF

The average net profit recorded by the companies in Romanian counties is graphically represented in Figure no. 5, the 1st place being occupied by Bucharest in the year 2021, with a value of 473657,40 lei, and the lowest value was recorded in Gorj in 2019, with 79472,06 lei. Figure 5 shows that Bucharest and Cluj are the areas with the highest levels of profitability in IT compared to the rest of the geographic areas in Romania.

The average number of employees by CAEN class is shown in Figure 6, with the highest number in 2019 in CAEN class 6201 - Custom software development activities (client-oriented software). The pandemic period has set a slightly downward trend in the average number of employees in IT in all the sub-branches analysed. Even though the pandemic period led to a pronounced expansion of

home-based work, the impact of this period also seems to have led to a decrease of around 7% in the average number of IT employees in 2021 compared to 2019.

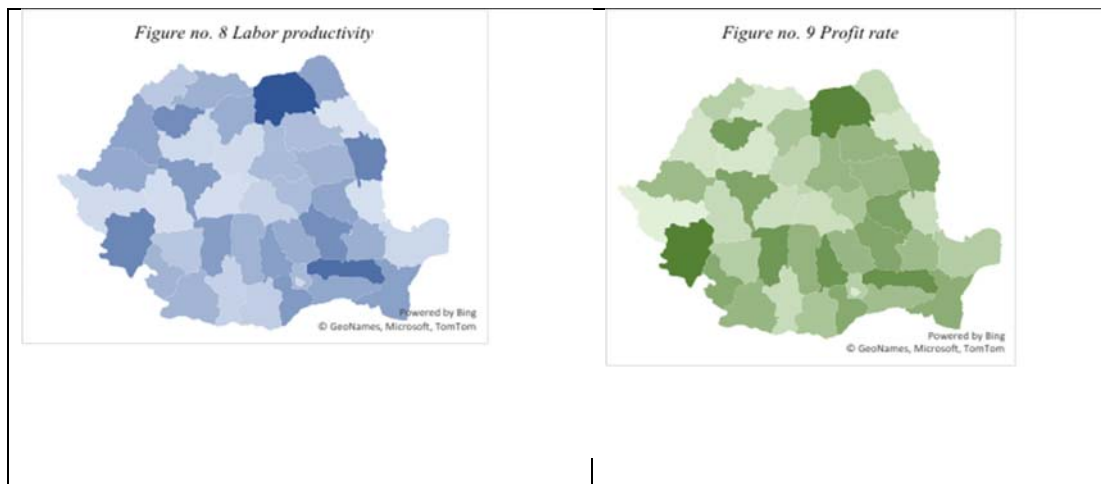


Source: developed by this paper’s authors based on ANAF data

The average number of employees, organized by counties of the country is represented in Figure no. 7, where we can see how the first place was held by Cluj County, followed by Bucharest and Iasi.

Labour productivity is a concept used to measure worker efficiency and is calculated as the value of output produced by a worker per unit of time, such as one hour. By comparing individual productivity with the average productivity, it is possible to identify whether a particular worker is underperforming or not. The extent to which labour productivity or managerial performance impacts the financial performance of businesses (Barrero, 2022, pp. 640) has prompted research from various perspectives.

At the level of the CAEN codes in class 62 *Service activities in information technology*, the highest value of labour productivity in 2021 was obtained by code 6203 *Management activities (management and operation) of the means of calculation*.



Source: developed by this paper’s authors based on data publicly provided by ANAF

Labour productivity within the companies registered under CAEN code 62 in Romanian counties is illustrated in Figure no. 8. The analysis of centralized ANAF data shows interesting results. Although the observation of chromatic concentrations carried out in the previous steps does not show notable results, the labour productivity calculated in Suceava county is the highest. Moreover, the results suggest that although turnover and profitability are highest in Bucharest, Cluj and Timis, the productivity of workers in these areas is low compared to other counties. The results confirm research

showing that increased labour productivity is not a determining factor in achieving the best financial performance results (Foster *et al.*, 2008, p. 394).

Profit rate is an indicator which measures the relative size of profit. It is calculated by relating the profit margin to a reference variable, such as total cost or turnover. The following formula can be used to calculate the profit rate in relation to turnover:

$$R_{Pr/CA} = \frac{Pr}{CA} * 100$$

R Pr/CA – Profit rate in relation to turnover;

Pr – profit;

CA – turnover.

The highest Rate of profit was in 2021 under CAEN code 6203, double than that of 2019 under the same CAEN code and more than triple compared to the lowest value recorded in 2019 by CAEN code 6201.

The distribution of the profit rate by geographical area is presented in Figure 9. It is interesting to note that Suceava and Caraş Severin were the counties with the highest profit rate, whereas Bucharest, Cluj and Timiş did not have high results of this indicator compared to the rest of the counties.

5. Conclusions

The results of our research show interesting evolutions of the financial indicators obtained in the IT sector in Romania, in the period close to the beginning and the aftermath of the pandemic. The IT sector stands out for its dynamism, rapid technical evolution, and flexibility to macroeconomic challenges. The results presented visually in this paper are in line with research results showing the divergence between physical productivity and income productivity developed by Foster *et al.* and considered as inspirational for multiple research directions. As previous studies have shown, the evolution of profitability indicators, price-fixing so as to achieve a predicted level of turnover, compared to labor productivity, employment rate or numerical concentration of businesses, show peculiarities and distinct concentrations in different territorial areas (Aivaz, 2021b, p. 17; Mirea et Aivaz, 2016, p. 201).

Existing specialized literature often suggests that price-fixing is strongly influenced by the entry of new competitors on the market. The relationship between the evolution of turnover figures and the increase in the number of competitors on the market suggests that their impact resonates differently in the sphere of profitability compared to labor productivity. As we have shown, the results of this study are interesting both in terms of their territorial perception and in terms of understanding competitiveness in the context of the dynamics of economic performance.

Competition as an evolution engine is a generally accepted assumption in economics. The numerical development of businesses in certain geographic areas raises curiosity about increasing IT efficiency and performance in those areas. The dynamics of profitability, price levels, work performance show peculiarities and distinct determinant factors. The conclusions of the present research point to the need for further research into the factors which influence business interest, its performance and efficiency.

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