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Taxing the digital economy – rethinking Romania's prospects

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Abstract. *The digital revolution is fundamentally changing business strategies, structures and evolution, consumer behaviour and regulatory approaches. More than ever, the current pandemic has intensified the role of the ICT sector for economic and social survival and resilience and profiled it as a "winner" when compared to other sectors and industries. The paper addresses how the digital economy can contribute more in Romania from taxation, building on arguments in the literature in favour of considering the tax system composition as important as the absolute level of taxation. We discuss how the European Commission's proposal of a digital services tax could be applied to Romania and what the impact would be on the ICT sector, which already benefited from certain tax advantages in the last 10 years. Within an exploratory and descriptive case study, we show the very good performance of the Romanian ICT sector relative to the overall economy in the last decade, in terms of turnover evolution and profitability, although its share in GDP remains relatively low. Still, average salaries in the industry are double than those of the overall economy, which may be an indication that its value added is higher. We conclude that it is unlikely for the Romanian ICT sector to be able to bear in full the EU proposed digital services tax, but a more bearable scenario is one with a 0.5% tax or 1% tax. Nevertheless, such a proposal should be accompanied by a comprehensive ICT strategy aimed at addressing the labour force competition and investing on the digitalization of the overall economy.*

Keywords: digital economy, taxation, Romania, case study.

Introduction

One hundred years ago, Karel Čapek coined the word "robot" in his play "R.U.R." ("Rossum's Universal Robots") that premiered in Prague on January 25, 1921. Forty years later, in 1961, General Motors installed Unimate, the first industrial robot, hoping that it could be used for "repetitive, arduous and hazardous tasks" (Mims, 2021). Nowadays, technology is a ubiquitous presence in our daily lives, which the current pandemic has transformed into a vital tool for working, schooling, traveling, and living. The digital or Internet or Web economy (Tapscott, 1995; Kogut, 2003; Vafopoulos, 2012), defined as an economy in which economic activities use digital computing technologies, is identified by Mesenbourg (2001) around three characteristics: e-business, e-business infrastructure, and e-commerce. These three attributes revolve throughout the "digital sector" or the IT/ICT sector that produces the initial digital goods and services (Bukht & Heeks, 2017) and is complemented by emerging digital and platform services. Bukht and Heeks (2017) offer a broader understanding of the digital economy due to ICTs use across all

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economic sectors, i.e., the "digitalized economy". Certainly, the digital economy is intertwined with the traditional economy, but the digital revolution is fundamentally changing business strategies, structures and evolution, consumer behaviour and regulatory approaches.

The ICT sector is defined by Eurostat based on the OECD official definition as "the production (goods and services) that fulfils or enables the function of information processing and communication by electronic means, including transmission and display" (OECD, 2011). Eurostat divides the activities included in the ICT sector in ICT Manufacturing – which includes 5 industry codes (3-digits NACE Rev.2): Manufacture of electronic components and boards (26.1), Manufacture of computers and peripheral equipment (26.2), Manufacture of communication equipment (26.3), Manufacture of consumer electronics (26.4), and Manufacture of magnetic and optical media (26.8); and ICT Services – which includes 6 industry codes (2 or 3-digits NACE Rev.2): Wholesale of information and communication equipment (46.5), Software publishing (58.2), Telecommunications (61), Computer programming, consultancy and related activities (62), Data processing, hosting and related activities; web portals (63.1), and Repair of computers and communication equipment (95.1).

At the end of 2018, the share of the ICT sector in European Union's GDP was 4.54% (the average share in GDP for EU's member countries, excluding Ireland, Cyprus, Luxembourg, and Netherlands due to lack of data availability), although differences from one country to another are present (see Figure 1). Thus, Malta had the highest share in GDP (8.04%), but Bulgaria, Estonia, Hungary, Sweden, and United Kingdom also had shares above 5%. Romania's share in 2018, was only 3.74%, the second smallest in the CEE region, after Poland (3.59% share). At the same time, the ICT sector share in GDP in all CEE countries, including Romania, was higher compared to Italy, Greece, Spain, or Austria's. In this respect, a 2018 report by McKinsey considered CEE countries as "digital challengers" in the European Union and forecasted a 200 million euro by 2025 in GDP rise due to strong digital economy growth potential (Novak et al, 2018). More recently, a another McKinsey report estimated the CEE's digital economy growth at around 14% in the first five months of 2020, which represented 78% of the increase in all twelve months of 2019 (Izkowska et al., 2020).

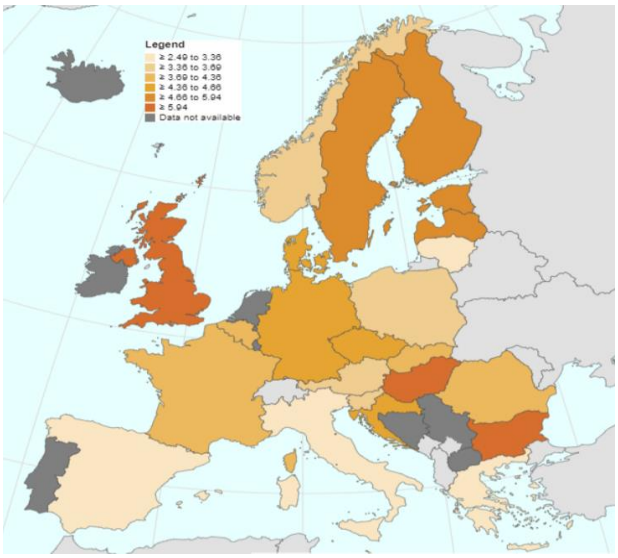


Figure 1. ICT sector share in GDP (%), 2018

Source: Eurostat.

Romania's ICT sector share in GDP was on a rise between 2009 and 2018, from 3.12 to 3.74%, but the ICT services sector's share was growing from 2.87 to 3.5%, while the share of ICT manufacturing sector was slightly declining from 0.25 to 0.24% during the same time frame. It is worth noting, though, that the share of the ICT sector in total employment was smaller than the corresponding share in GDP: in 2018, the ICT sector contributed by 2.52% to total employment, and this share has grown by 68% between 2009 and 2018. McKinsey estimated a 16.6 billion euro size of the digital economy in Romania in 2019, fuelled by 3.4 million new users of online services, which represents approximately 30% of the new digital users in all CEE countries (Izkowska et al., 2020).

The current health crisis and pandemic have heightened the role of the ICT sector for economic and social survival and resilience and profiled it as a "winner" when compared to other sectors and industries, such as manufacturing, HoReCa, transportation, and so on. The physical distancing imposed by governments in their efforts to fight the spread of the new coronavirus has provided citizens and businesses around the world the opportunity to use the Internet and associated technologies to connect, in an "exercise" that has not been seen in modern times. In this framework, we address the issue of digital economy taxation, given its increased importance in GDP, with a focus on Romania, where the sector still benefits from fiscal facilities, thus using resources from the public budget. Since the post-pandemic recovery effort will require significant resources, one key source may be represented by those sectors and industries with increased historical performance and robust during the coronavirus pandemic, as is the ICT sector.

Our research aims at providing an answer to the question of whether the ICT sector in Romania is able to face a different tax system than the existing one, building on the three main attributes of a good taxation system of the digital economy, i.e., (i) efficiency in the tax collection process; (ii) proportionality compared to other industries; and (iii) selective exemptions to facilitate investment in infrastructure and promotion of adoption by end-users. We use a case-study methodology to gain contextual and in-depth knowledge of the Romanian ICT sector's evolution before and during the pandemic, and its prospects for future advancement, that will further incorporate our considerations for changes in the tax system applied to the sector. To our knowledge, this is one of the pioneering papers on the needed overhauling of digital economy taxation in Romania.

The remaining of the paper is structured as follows: the next section outlines the main research directions on the digital economy contribution to development, particularly in CEE countries, and on ideas for changes in taxation in the extant literature; the Methodology section explains the data and information sources and the approach we have taken towards the research objective; the Results and discussion section presents the most important findings and our main arguments in favour of a different tax system applied to the ICT sector in Romania; the last section concludes and offers directions for future research.

Literature review

Our paper's research objective stands at the crossroad between three topics, i.e., digital economy's role in economic advancement, the impact of taxation on economic growth and development, and the specific taxation of the digital economy.

The largest part of the existing literature on the digital economy, ICT sector and economic development identified links between them, with a general support in favour of a positive impact of the ICT sector growth on economies (Venturini, 2015; Jorgenson and Vu, 2016; Albiman & Sulong, 2017). The main drivers of economic growth linked to the emergence and consolidation

of the digital economy are increases in productivity, externalities associated to knowledge and innovation diffusion, cheaper services to consumers, and higher economic competitiveness (Domazet et al, 2020). Maybe one of the best evidences in favour of the positive impact of the digital economy on economic growth is the emergence of the Fourth Industrial Revolution (or Industry 4.0) concept, which refers to cyber-physical systems being used in production and business connectivity (Schwab, 2017; Schwab & Davis, 2018). Moreover, governments from all continents have already included this concept in their strategic development programs (Neamțu et al, 2019), recognizing the ability of (sometimes) disrupting technology to be a source of competitiveness for some industries, as well as a necessity for survival in the case of others (Ogrean and Herciu, 2020).

At the same time, there is literature that questions this positive relationship between ICT development and economic growth, either by reporting no significant link between the two (Haller and Lyons, 2015), or by showing a negative relationship (Mayer et al, 2020). One of the arguments that supports these results is the difference in economic level among countries, i.e., GDP or GDP per capita, which is correlated to a rather heterogeneous impact of ICT on economic growth. Thus, a recent study by Fernández-Portillo et al. (2020), shows that ICT sector development was a significant economic growth driver for developed EU economies, but the significance was lower for less developed EU member countries. Therefore, the authors maintain that the study of the ICT sector contribution to economic growth needs to be performed individually, on a country-by-country basis, in order to accommodate the results to countries' particular level of development. A more balanced assessment of the ICT sector potential for economic growth was suggested by Mazurencu et al. (2006), which includes the risks of this sector but also the need of public policies to acknowledge the capabilities of each country and its region for development.

One of the mediating factors for the link between ICT sector development and economic growth is the taxation system, including the general level of taxes and the specific taxation for ICT industries and services. Engen and Skinner (1996) have strongly argued in favour of a significant impact of tax policies on economic growth and living standards but have also considered the tax system composition as important as the absolute level of taxation. The same opinion is supported by Myles (2000), which proposes the use of demand inelasticity versus tax effect on growth rates trade-off as optimal taxes design driver, i.e., higher taxation on commodities with inelastic demand and insignificant effects on the economic growth rate. In a more recent paper that addresses the impact of taxation on economic growth in a panel of OECD countries, Macek (2014) indicates that taxation policy should be directed towards lowering corporate and personal income taxes but increasing indirect taxes as a compensation for the former.

With these in mind, one question which arises is how taxation should evolve, given the digitalisation of the economy. In 2018, the European Commission issued a proposal, which is the result of many years of work, laying down principles for aligning the taxation with the value creation, as well as the background for a new type of tax, the digital services tax, i.e., a tax on the turnover realised by market players from digital services. This approach is supported by many studies, like Olbert andSpengel (2017), Nellen (2016) and Ting and Gray (2019). We explore in this paper how this could be applied to Romania and what the impact would be to the market, in an industry which already benefited from certain tax advantages in the last 10 years.

Methodology

We propose an exploratory and descriptive case study (Gerring, 2006; Yin, 2017) to build the argument for a change in the taxation of the ICT sector in Romania. The main themes and questions we address, as well as information and data sources, are presented in Table 1. Data was collected for the period 2009-2019 (except where otherwise stated), from official and proprietary sources.

Table 1. Case study themes, questions, and information sources

Theme	Questions	Information and data sources
ICT sector importance in the Romanian economy in the pre-pandemic period	- What is the importance of the ICT sector and its divisions (manufacturing and services) in the economy in terms of share in GDP and employment, turnover and value added? - Which is the ICT sector contribution to the economy in Romania when compared to other Eastern European countries? - What is the performance of the ICT industries in terms of labour productivity and profitability? - Where does the ICT sector stand when compared to other industries in Romania? -What is the structure of the sector in terms of size of players, namely is there a dominance of large players or rather by smaller ones?	- Eurostat – Structural business statistics - National Institute of Statistics (INSSE) - Digital Economy and Society Index (DESI)
ICT sector – a winner of the pandemic and prospects for Romania	- How well has the ICT sector performed during the current pandemic? - Which are the estimated developments in the ICT sector in the foreseeable future? - How is the ICT sector forecast to contribute to Romania's economic development?	- McKinsey Global Institute - Employers' Association of Software and Services Industry (AsociatiaPatronala a Industriei de Software siServicii) – ANIS
Which is the current taxation system used in the Romanian ICT sector and is it adapted to the sector's importance in the economy?	- What is the nominal tax rate which applies to ICT sector? - What are the incentives the industry benefitted from and what is the average value of the fiscal incentives? - Are the incentives positively correlated with the evolution of ICT sector as a percentage of GDP?	- Local tax laws & regulations - Employers' Association of Software and Services Industry (AsociatiaPatronala a Industriei de Software siServicii) – ANIS - National Institute of Statistics (INSSE) - TP Catalyst database, January 2021 version
Can the Romanian ICT sector face a change in taxation?	- What would be the state budget contribution of a 3% digital service tax? - How would such a tax influence the profitability of the companies in ICT sector? - Are there any other "side effects" that should be considered?	- Authors' estimations

Source: Authors' own research.

Results and discussions

Since 2014, the European Commission has been observing digital economy and society's progress through the Digital Economy and Society Index (DESI), which considers five dimensions of digitalization, as follows: connectivity, human capital, use of Internet, integration of digital technology and digital public services (DESI, 2020). The importance of digitalization has become apparent during the current pandemic, as individuals, businesses and authorities were

forced to use Internet networks, platforms, and data to maintain afloat the economy. Figure 2 shows the latest values of DESI (for 2020) and its components for the 28 EU member states, with Romania ranking 26th (out of 28 countries) and far from the EU average. More important than the ranking, though, is the country's lack of progress compared to the pre-pandemic years in four out of four dimensions; the exception is connectivity, due to the ultrafast broadband and the high urban availability of fixed networks. However, Romania has the worst performance in EU in digital public services and use of Internet services. Various factors may explain this reality, such as political instability or the lack of commitment towards implementing the National Strategy on the Digital Agenda for Romania for 2020 (DESI, 2020).

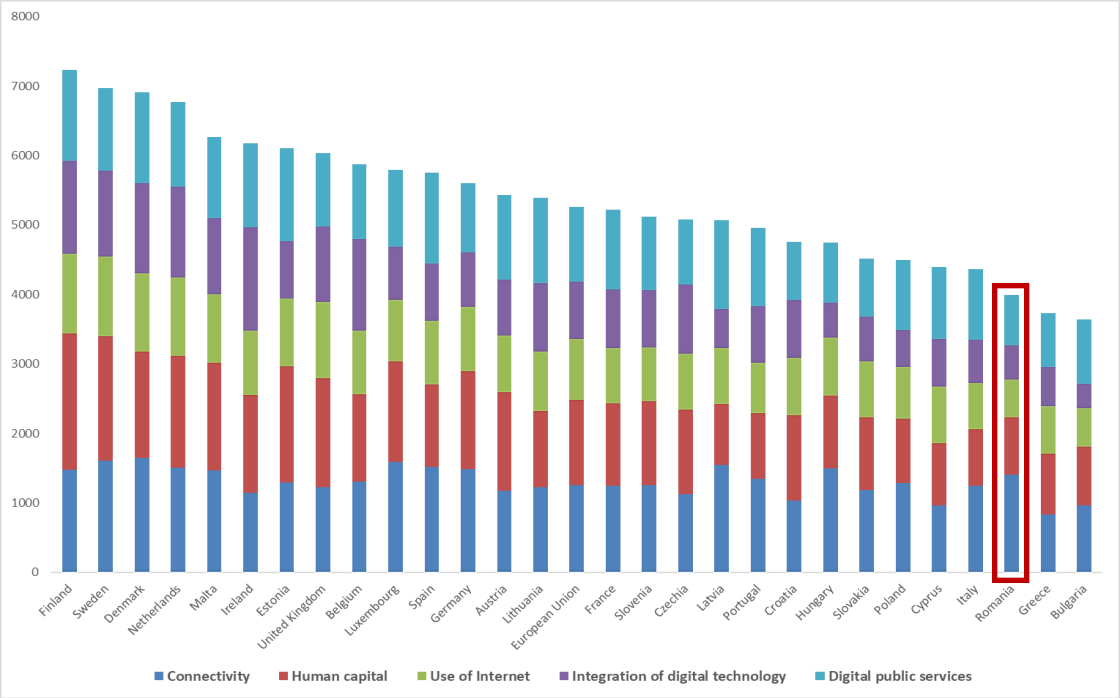


Figure 2. Digital Economy and Society Index, 2020

Source: European Commission.

We have taken a closer look at one of DESI's components – Integration of digital technologies by businesses – and of its constituents between 2015 and 2020 for Romania, a panel of similar countries from CEE, and the EU average (see Figure 3). An important observation is that both scores were rather similar over the years, but, unfortunately, Romania has seen only little progress for both constituents – Business digitization and E-commerce – between 2015 and 2019. Moreover, Romania's performance was lagging the one of Hungary, Czechia, and Croatia, as well as below the EU average. The lack of significant progress is even more accentuated when we contrast Romania to Czechia, Poland, and the EU average, although it needs to be said that Romania performed slightly better than Bulgaria or Hungary.

Considering this general framework of the Romanian digital economy and society, we further explore the characteristics of the ICT sector, its importance in GDP, employment, and we contrast the performance of enterprises in this sector with the non-financial economy between 2009 and 2018.

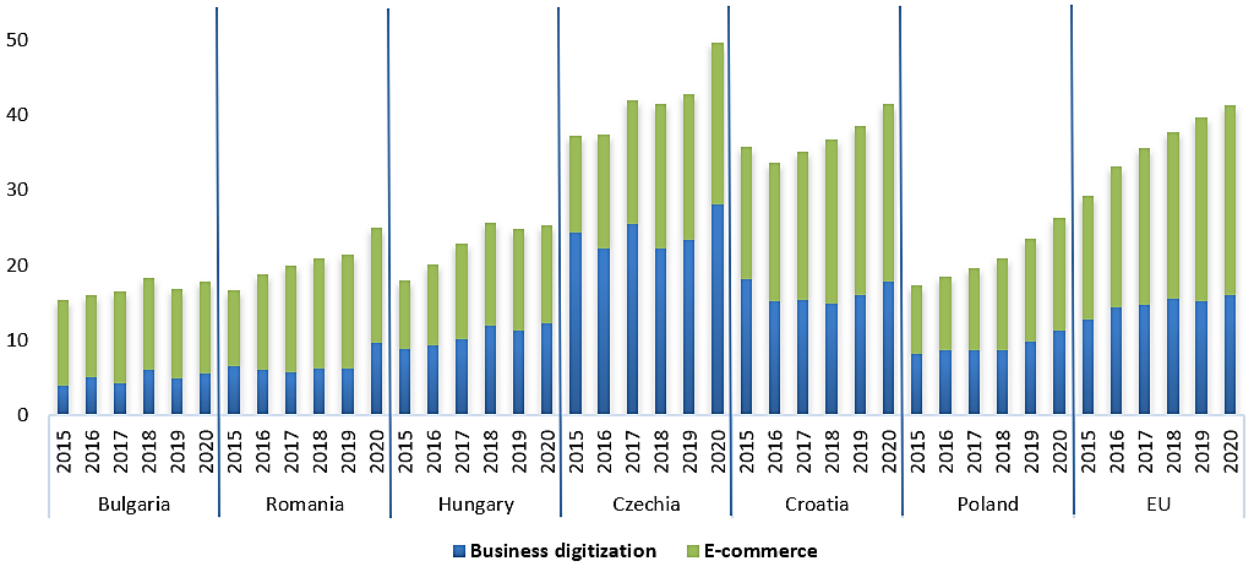


Figure 3. Integration of Digital Technology by businesses – DESI, 2015-2020

Source: European Commission and authors' work.

The core of the digital economy is the ICT sector. In Eastern European countries, the sector held shares in GDP between 3 and 6% between 2009 and 2018, and in employment between 1.5 and almost 4% - see Figure 4. Romania is one of the laggards in the region, with a share in GDP of only 3.74% in 2018 and in employment of 2.52% in employment. However, the dynamic of these shares was one of the highest in the region: Romania increased its ICT sector share in GDP by 19.9% between 2009 and 2018 (second place after Bulgaria, with a growth in GDP share of 25%) and in employment by 68% (ahead of Bulgaria, with a growth of only 66.6%).



Figure 4. Shares of ICT sector in GDP and employment, 2009-2018

Source: European Commission and authors' work.

Further on, we analysed the Romanian market using the Eurostat definition of ICT sector presented in Introduction and its manufacturing and services divisions. Figure 5 shows that, in 2018, ICT services had a consistently higher share in both GDP an employment compared to ICT manufacturing in Romania, in a similar manner to the other similar CEE countries. On the other hand, both ICT manufacturing and services held higher shares in GDP than in employment, in all

countries in this sample. This points towards a sector that generates steady value added with the available labour resources.

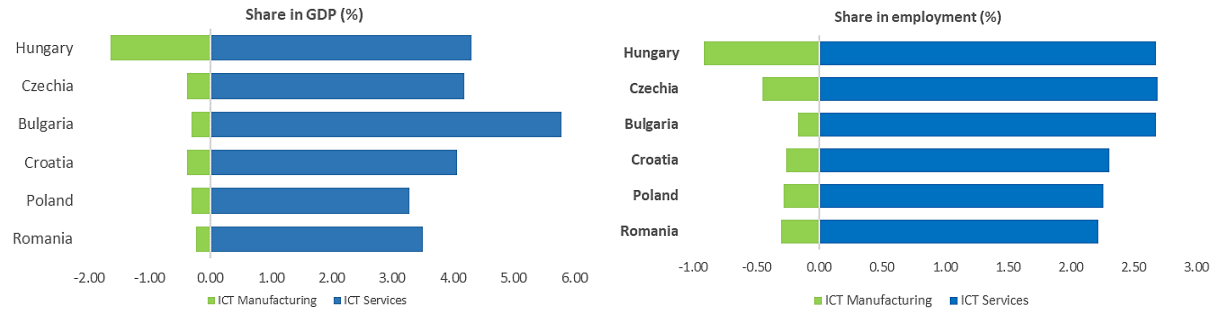


Figure 5. ICT sector share in GDP and employment, 2018 (%)

Source: Eurostat and authors' work.

When contrasting the Romanian ICT sector and its divisions to the non-financial economy – see Tables 2 and 3, interesting features are evidenced. First, when contrasting the ICT sector with the non-financial economy, we observe lower shares in enterprises, turnover or persons employed (around 5% for each) compared to gross operating surplus (almost 8%), value added (around 9%) and even 10.74% for wages and salaries. Second, the ICT services businesses dominated largely the manufacturing ones, particularly in terms of number of enterprises, gross operating surplus and value added.

Table 2. Romanian ICT sector main characteristics against the non-financial economy, 2018

	Enterprises (number)	Turnover (million euro)	Value added (million euro)	Gross operating surplus (million euro)	Wages and salaries (million euro)	Persons employed
Total non-financial economy	501,974	313,932.90	74,679.10	34,777.70	38,575.20	4,061,210
ICT – Total	24,883	17,386.50	6,941.30	2,685.40	4,142.90	217,333
ICT share in non-financial economy	4.96%	5.54%	9.29%	7.72%	10.74%	5.35%
ICT Manufacturing	512	1,879.60	448.20	132.40	306.10	25,888
ICT Services	24,371	15,506.90	6,493.10	2,553.00	3,836.80	191,445
ICT Services against ICT Manufacturing	47.60	8.25	14.49	19.28	12.53	7.40

Source: Eurostat and authors' own research.

When the relative performance of the ICT sector against the non-financial economy is analysed, we note significant differences in favour of the ICT sector. Thus, as an average, although businesses in the ICT sector were only slightly larger than in the non-financial economy in 2018, employing 8.7 persons compared to 8.1 in the non-financial economy – with the striking difference between ICT Manufacturing, with 50.6 persons employed per enterprise against only 7.9 in ICT services – they generated an almost two times higher turnover per enterprise (1.93) and gross value added per employee (1.76), but also paid two times higher personnel costs compared to the non-financial economy. In the same vein, the gross operating rate (a profitability measure) in the ICT sector was 15.4% - almost 1.5 times higher than in the non-financial economy, and the apparent labour productivity was 1.73 times higher. On the other hand, the

wage-adjusted labour productivity was lower in the ICT sector, due to higher personnel costs compared to the non-financial economy.

Table 3. Romanian ICT sector relative performance against the non-financial economy, 2018

	Turnover per person employed (thousand euro)	Persons employed per enterprise	Gross value added per employee (thousand euro)	Personnel costs per employee (thousand euro)	Value added at factor cost in production value (%)	Gross operating rate (%)	Apparent labour productivity (thousand euro)	Wage-adjusted labour productivity (%)
Total non-financial economy	77.3	8.1	18.9	10.1	33.4	11.1	18.4	181.8
ICT - Total	149.1	8.7	33.2	20.3	48.6	15.4	31.9	156.9
ICT - Total against non-financial economy	1.93	1.07	1.76	2.01	1.46	1.39	1.73	0.86
ICT Manufacturing	72.6	50.6	17.4	12.3	24.2	7	17.3	141.3
ICT Services	81	7.9	35.4	21.5	52.3	16.5	33.9	157.8
ICT services against ICT manufacturing	1.12	0.16	2.03	1.75	2.16	2.36	1.96	1.12

Source: Eurostat and authors' own research.

Figure 6shows comparatively the growth rate of the indicators presented in the Tables 2 and 3 between 2009 and 2018 for the ICT sector and its divisions, and the non-financial economy. By far, the highest growth for all categories was recorded for wages and salaries, but they went up by 278.8% in the ICT sector compared to "only" 125.6% in the non-financial economy. An immediate consequence of this impressive growth in wages and salaries was the drop in profitability, as indicated by GOR: the gross operating rate dropped by almost 25% in the ICT sector between 2009 and 2018, compared to, again, "only" 1.77% in the non-financial economy. Moreover, the wage-adjusted labour productivity (WALP) also plunged by 36.4% in the ICT sector (more in ICT Manufacturing), while the decline in WALP was only 8.08%. Other significant differences in indicators' evolution between 2009 and 2018 were the highest increase in turnover, value added, and persons employed, but also the lowest growth in gross operating surplus, gross value added per employee and apparent labour productivity in the ICT sector against the non-financial economy.

Eurostat offers only aggregate data for ICT sector, which makes it difficult to observe the evolution of the sector depending on its structure, particularly when considering business size. To gain insight into the sector from this perspective also, we investigated the medium and large sized companies included in the Orbis – TP Catalyst database. This resulted in a sample of approximately 2,000 companies. The median turnover of the sample is around 1.7 million euro, which shows that the ICT sector is dominated by large and very large players. Figure 7 shows the turnover and operating profit of the 2,000 players in the ICT sector between 2011 and 2019. The analysis indicates that, while the total turnover almost doubled in the last 9 years, profitability stayed the same in absolute terms, which means that operating costs' growth matched turnover growth.

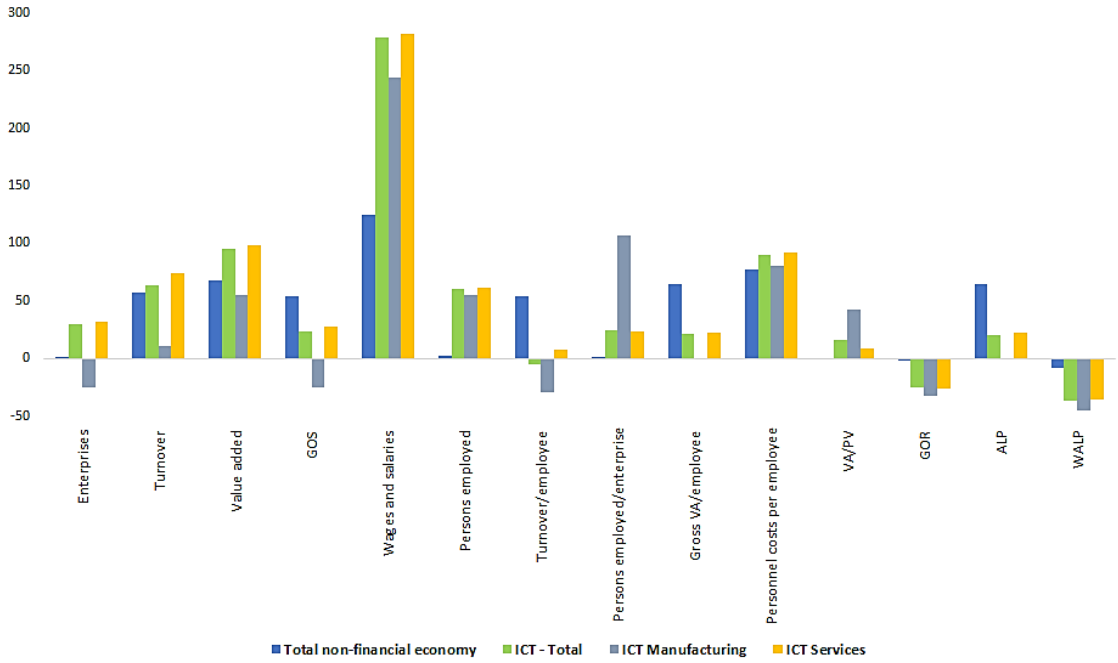


Figure 6. Performance indicators growth rates for ICT sector and non-financial economy, 2009-2018

Source: Eurostat and authors' own research.

Delving deeper into the number of employees and their respective costs in the ICT sector, for the 2,000 players. Figure 8 shows the sizeable growth in number of employees between 2011 and 2019 (mentioned above) and the corresponding growth in employee costs over the same time interval. Based on the analysed sample, while the number of employees doubled, the costs increased 3.5 times.

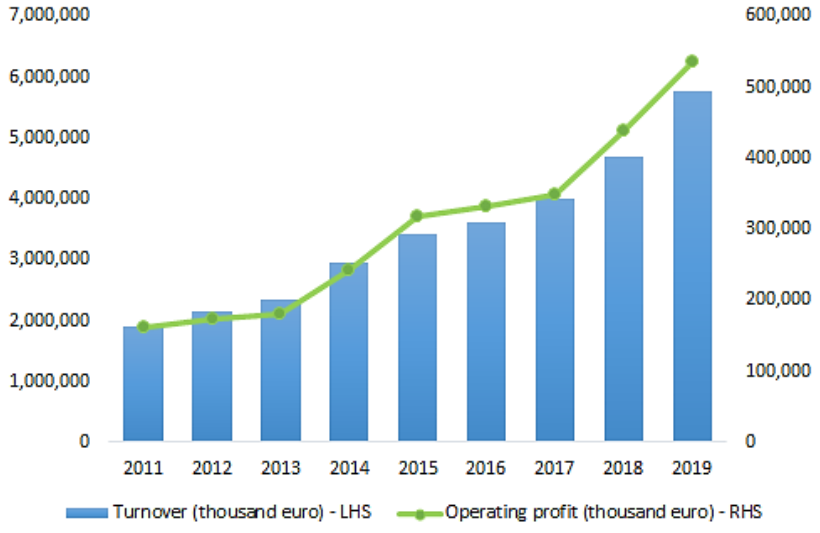


Figure 7. Key financial indicators of Romanian ICT companies 2011-2019

Source: TP Catalyst and authors' work.

The ICT sector has been one of the pandemic "winners", as the health crisis has transformed digitalization from objectives, goals, and options into requirements for economic and societal survival and, certainly, future development. At the same time, the technological progress has been tremendous and for many areas it was a true "leapfrog"; for example, a report by McKinsey in May 2020 estimated that the adoption of digital technologies by consumers and businesses has vaulted five years forward in around eight weeks (Baig et al, 2020) and forecasted a continuation of the process into the post-Covid recovery. Although data at business level is not yet available to portray the ICT sector in 2020, the plans seem to be ready. In Romania, such plans have been announced by ANIS in a report at the end of last year; of them, the strategic ones are a 10% share of the ICT sector in GDP by 2025, based on integrated and sustained policies, and transforming Romania into the most powerful IT business hub in Central and Eastern Europe (ANIS, 2020). As supporting measures for these plans, ANIS proposed the development of a fiscal framework that would include already existing measures and new measures, such as reduced profit taxation for own patents selling, and direct deductions from taxes on profits of various expenses.

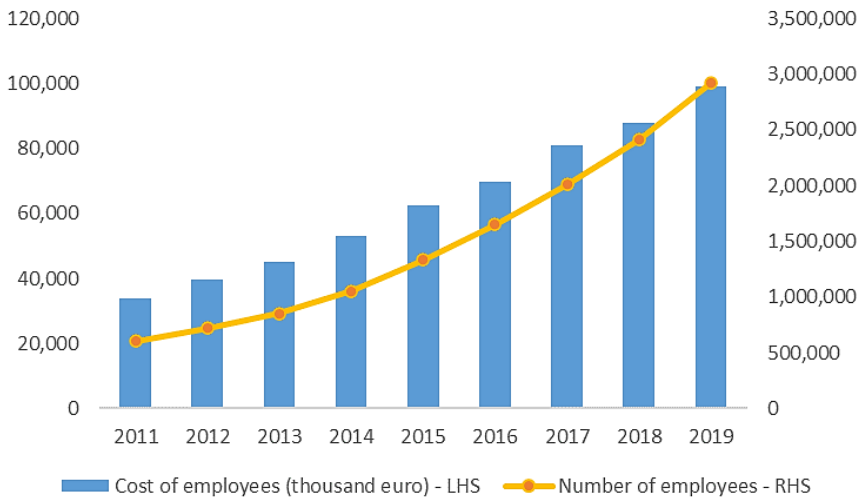


Figure 8. Evolution of number of employees and employee costs for Romanian ICT companies, 2011-2019

Source: TP Catalyst and authors' work.

From taxation point of view, part of the Romanian ICT industry (almost 25%, by average number of employees) benefitted of a specific exemption from salary tax (for the entire period 2011-2019) and social security contributions (as per Law no. 571/2003, Law 227/2015, as subsequently amended). In 2019, the average gross salary in the ICT industry was EUR 2,400, compared to EUR 1,200 for the average economy (source: Author's estimations from the selected sample, information regarding national average gross salary from INSSE). On average, the total salary tax cost for the ICT industry is 35%, while for the rest of the economy is around 42%.

The social security exemption was removed in 2017, while the profitability of the industry has not dropped, on the contrary. Companies which still apply the income tax exemption have higher profit margins (9% on average) than the average industry margin (7%).

As per the European Commission's proposal, a digital service tax may be introduced to tax turnover of companies in the ICT sector, above a certain size. If we apply this tax to the sample, two scenarios arise:

1. The digital services tax applies only to companies which currently apply the income tax exemption, thus to take away the effect of the incentive. In this scenario, the state budget could "recover" more than half of the opportunity cost (175 million euro digital services tax, as compared to 320 million euro, the value of the income tax incentive – data for 2019, authors' estimation based on selected sample and data from TP Catalyst).
2. The digital services tax applies to all companies with the relevant NACE code. In this scenario, the state budget could earn up to 1 billion euro in tax (using total turnover of the ICT industry for 2019). However, we consider this to be an extreme scenario, taking away 60% of the profits of the industry, and thus would not be sustainable. A more reasonable approach looking at the industry as a whole would be a digital services tax of 0.5% or 1%. This translates into revenues to the state budget of 175 to 350 million euro per year, while taking away not more than 10-20% of the industry's profitability.

One question which arises is what the potential side effects of such a tax policy could be. The tax could be borne by the companies (through reduced profitability), by the market (through higher prices), or by both. Looking at data from the last 9 years, we anticipate the latter, since (i) the profitability of the sector increased at the same time the salary cost increased, (ii) post-pandemic trends are likely to positively influence the demand for ICT manufacturing and services and (iii) there is a similar trend in many European countries, which diminishes incentives to move operations in other countries to benefit from lower costs.

Conclusions

While the Romanian ICT industry performed very well relative to the overall economy in the last decade, in terms of turnover evolution and profitability, its share in GDP remains relatively low, lagging behind other European states. On the other hand, average salaries in the industry are double than those of the overall economy, which may be an indication that its value added is higher. The wages may also be a consequence of tax incentives which provided for an impressive exemption from wage taxation, mostly for ICT services. Nowadays, the incentive is reduced; still, the cost of employment significantly increased in the last nine years, which could be a result of internal competition for qualified labour force. This competition is likely to continue, as the ICT sector is expected to grow more accelerated in a post-pandemic and extremely digitalized world.

We explored whether the ICT sector could support higher taxation than the rest of the economy, as per the European's Commission proposal of a 3% turnover tax. We modelled the results and concluded that it is unlikely for the Romanian ICT sector to be able to bear such a tax, especially since its contribution in the overall GDP should grow to reach European averages. A more bearable scenario is one with a 0.5% tax or 1% tax; alternatively, the tax could be focused to the ICT services sector, which benefitted of the said incentives, and which could theoretically afford to compensate that incentive with a 3% turnover tax. Still, such a proposal should be doubled with a comprehensive ICT strategy aimed at addressing the labour force competition and the money to be spent on the digitalization of the overall economy.

References

Albiman, M. M., & Sulong, Z. (2017). The linear and non-linear impacts of ICT on economic growth, of disaggregate income groups within SSA region. *Telecommunications Policy*, 41(7-8), 555-572.

ANIS (2020). *Viziunea ANIS: Romania digitala 2025*. Retrieved from https://anis.ro/wp-content/uploads/Viziunea-ANIS_Romania-Digitala-2025.pdf.

Baig, A., Hall, B., Jenkins, P., Lamarre, E., & McCarthy, B. (2020). The COVID-19 recovery will be digital: A plan for the first 90 days. *McKinsey Digital*.Retrieved fromhttps://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/the-covid-19-recovery-will-be-digital-a-plan-for-the-first-90-days.

Bukht, R., Heeks, R. (2017). *Defining, conceptualising and measuring the digital economy*. Development Informatics working paper, (68), Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3431732.

Domazet, I., Zubović, J., & Lazić, M. (2018). Driving factors of Serbian competitiveness: Digital economy and ICT. *Strategic management*, 23(1), 20-28.

Engen, E. M., & Skinner, J. (1996). *Taxation and economic growth* (No. w5826). National Bureau of Economic Research.

European Commission (2020). *Digital Economy and Society Index2020*. Retrieved from https://ec.europa.eu/digital-single-market/en/digital-economy-and-society-index-desi.

Fernández-Portillo, A., Almodóvar-González, M., & Hernández-Mogollón, R. (2020). Impact of ICT development on economic growth. A study of OECD European Union countries. *Technology in Society*, 63, 101420.

Gerring, J. (2006). *Case study research: Principles and practices*. Cambridge: Cambridge University Press.

Haller, S. A., & Lyons, S. (2015). Broadband adoption and firm productivity: Evidence from Irish manufacturing firms. *Telecommunications Policy*, 39(1), 1-13.

Izkowska, J., Kawecka, K., Malinowska, M, Marciniak, T., Młodziejewska, M., Novak, J., Pastusiak, B., &Valachovicova, I.(2020). Digital Challengers in the next normal in Central and Eastern Europe. *Digital McKinsey. Retrieved from*https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-challengers-in-the-next-normal-in-central-and-eastern-europe.

Jorgenson, D. W., & Vu, K. M. (2016). The ICT revolution, world economic growth, and policy issues. *Telecommunications Policy*, 40(5), 383-397.

Kogut, B. M. (Ed.). (2003). *The global internet economy*. Cambridge: MIT Press.

Macek, R. (2015). The impact of taxation on economic growth: Case study of OECD countries. *Review of Economic Perspectives*, 14(4), 309-328.

Mayer, W., Madden, G., & Wu, C. (2020). Broadband and economic growth: a reassessment. *Information Technology for Development*, 26(1), 128-145.

Mazurencu, M. M., Niculescu-Aron, G. I., & Mihaescu, C. (2006). An overview of the Romanian ICT sector in the context of European emerging markets. *Economy Informatics*, 1-4, 111-114.

Mesenbourg, T. L. (2001). *Measuring the digital economy*. US Bureau of the Census, (1).

Mims, C. (2021). On the 100th Anniversary of 'Robot,' They're Finally Taking Over, *Wall Street Journal*, January 23.

Myles, G. D. (2000). Taxation and economic growth. *Fiscal studies*, 21(1), 141-168.

Neamţu, D. M., Hapenciuc, C. V., & Bejinaru, R. (2019, May). The impact of digitalization on business sector development in the knowledge economy. In Proceedings of the International Conference on Business Excellence, 13(1), 479-491, Sciendo.

Nellen A., (2016). Taxation and Today's Digital Economy, *Journal of Tax Practice & Procedure*, April-May, 17.

Novak, J., Purta, M., Marciniak, T., Ignatowicz, K., Rozenbaum, K., & Yearwood, K. (2018). The rise of digital challengers how digitization can become the next growth engine for central and Eastern Europe. *Digital McKinsey*, Retrieved from https://digitalchallengers.mckinsey.com/files/McKinsey%20CEE%20report_The%20Rise%20of%20Digital%20Challengers.pdf.

Olbert, M., & Spengel, C. (2017). International taxation in the digital economy: challenge accepted. *World Tax Journal*, 9(1), 3-46.

Ogrean C., & Herciu, M. (2020). Digital Transformation of Centru Region – Romania. Needs Assessment. *Studies in Business and Economics*, 15(2), 270-281.

Organisation for Economic Co-operation and Development. (2011). OECD guide to measuring the information society. Retrieved from https://www.oecd.org/sti/ieconomy/oecdguidetomeasuringtheinformationsociety2011.htm.

Schwab, K. (2017). *The fourth industrial revolution*. New York, Crown Business.

Schwab, K., & Davis, N. (2018). *Shaping the future of the fourth industrial revolution*. New York: Currency.

Tapscott, D. (1997). *The digital economy: promise and peril in the age of networked intelligence*. New York: McGraw-Hill.

Vafopoulos, M. N. (2012). *The Web Economy: Goods, Users, Models, and Policies*, Foundations and Trends® in Web Science, 3(1-2), 1-136.

Venturini, F. (2015). The modern drivers of productivity. *Research Policy*, 44(2), 357-369.

Vu, K., Hanafizadeh, P., & Bohlin, E. (2020). ICT as a driver of economic growth: A survey of the literature and directions for future research. *Telecommunications Policy*, 44(2), 101922.

Yin, R.K. (2017). *Case study research and applications: Design and methods*. Sage publications.