MASTER THESIS

2023

Soproni Egyetem
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DIGITAL TRANSFORMATION AND DIGITAL DIVIDE IN TIMES OF COVID-19: REGIONAL PATTERNS OF CHANGE IN EUROPEAN TRANSITION ECONOMIES

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Sopron

2023

Határozat

Nemény Dorka Virág International Economy and Business mesterszakos hallgató a 2022. november 30-án rendezett Kari Tudományos Diákköri Konferencia Fenntarthatóság – világgazdaságtan – regionalitás szekciójában „Digital transformation and digital divide in times of COVID-19: Regional patterns of change in European transition economies" c. dolgozatával 1. helyezést ért el.

A Szekció zsűrije a Kar Oktatásszervezési Szabályzatának 20. § (7) pontja alapján dolgozatát **változtatás nélküli diplomadolgozat** elfogadásra javasolta.

A Kari TDK Tanács az Oktatásszervezési Szabályzat 20. § (7) pontja alapján megvizsgálta a diplomadolgozatként történő beszámítás lehetőségét, és egyöntetűen támogatta azt.

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DORKA VIRÁG NEMÉNY
2023
International Business and Economy MSc

University of Sopron
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DIGITAL TRANSFORMATION AND DIGITAL DIVIDE IN TIMES OF COVID-19: REGIONAL PATTERNS OF CHANGE IN EUROPEAN TRANSITION ECONOMIES

Digitális átalakulás és digitális szakadék COVID-19 idején: a változás regionális mintázatai az európai átmeneti gazdaságokban

Digital transformation and the improvement of Information and Communication Technologies have crucial impact on economic growth, competitiveness and sustainable development. Digitalisation provides opportunities but also poses risks as digital divide may deepen in economic, demographic, social and territorial divisions. Accordingly, supporting digital transformation has been of high priority in the European Union.

The main purpose of my study is to explore the patterns of digital transformation and digital divide among the NUTS-2 regions of the 11 Central and South-East European transition economies (CSE-11) over the period 2016–2021 with special regard to the consequences of the COVID-19 crisis.

After presenting the concept of digital divide, its terminological background, previous research on the subject and methods to capture digitalisation, I provide an overview on the key areas and fields of action made by the EU, including strategic documents and the Digital Economy and Society Index, the relation of digital development and the Multiannual Financial Frameworks, and key findings of existing analyses at the European level.

A database of 7 ICT-related indicators from Eurostat for 49 regions of CSE-11 is employed. Univariate analyses enable to examine the extreme (top and bottom) positions in the relative growth of regions, explore the convergence vs. divergence patterns in EU-27 and CSE-11 comparison, and analyse the patterns of balance vs. imbalance regarding growth dynamics. Multivariate analysis of multidimensional scaling derives two dimensions from the original indicators and allows to explain similarities and distances between regions. Using scatter plots and mapping differences provide a better insight in the features of digital divide.

The overall conclusion is that there has been convergence in all ICT-related indicators within several regions of the European transition economies, but a sharp divide is still visible among regions. Also, regions belonging to the same country are more similar than different, and regions of relatively low capacities in digitalisation tend to be the same ones with respect to all indicators. I believe that my findings have the potential to contribute to the discussion and research on digital transformation and digital divide at the European level.

NEMÉNY DORKA VIRÁG
2023
Nemzetközi gazdaság és gazdálkodás mesterszak

Soproni Egyetem
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DIGITÁLIS ÁTALAKULÁS ÉS DIGITÁLIS SZAKADÉK COVID-19 IDEJÉN: A VÁLTOZÁS REGIONÁLIS MINTÁZATAI AZ EURÓPAI ÁTMENETI GAZDASÁGOKBAN

Digital transformation and digital divide in times of COVID-19: regional patterns of change in European transition economies

A digitális átalakulás, illetve az információs és kommunikációs technológiák (IKT) fejlődése erőteljes hatással bír a gazdasági növekedésre, a versenyképességre és a fenntartható fejlődésre. A digitalizáció lehetőségeket kínál, ám kockázatokat is rejt magában, mivel a digitális szakadék elmélyülhet a gazdasági, a demográfiai, a társadalmi és akár a területi megosztottságban. Ennél fogva a digitális átalakulás támogatása az Európai Unió egyik kiemelt prioritásává vált.

Tanulmányom fő célja a digitális átalakulás és a digitális szakadék mintázatainak feltárása 11 közép- és délkelet-európai átmeneti gazdaság (CSE-11) NUTS-2 régiói között, a 2016–2021 közötti időszakban, különös tekintettel a COVID-19 válság következményeire.

A digitális szakadék koncepciójának bemutatása után, érintve a fogalmi hátteret, a témával kapcsolatos korábbi kutatásokat és a digitalizáció megragadására szolgáló módszereket, áttekintem az EU kulcsfontosságú témáit és akcióterületeit, ide értve a stratégiai dokumentumokat, a Digitális Gazdasági és Társadalmi Indexet, a digitális fejlődés és a többéves pénzügyi keretek kapcsolatát, valamint az európai léptékben publikált elemzések fő megállapításait.

Az Eurostatból leggyűjtött, 7 IKT-val kapcsolatos mutató alapján adatbázist hozok létre a 49 CSE-11 régióra. Az egyváltozós elemzések lehetővé teszik a kiugrások (felső és alsó) vizsgálatát a régiók relatív növekedésében, a konvergencia és a divergencia mintázatainak feltárását EU-27 és CSE-11 összehasonlításban, valamint az egyensúly és az egyensúlytalanság mintázatainak elemzését a növekedési dinamika tekintetében. A többdimenziós skálázás, mint többváltozós elemzési eszköz két dimenzióra redukálja az eredeti mutatókat, és lehetővé teszi a regionális hasonlóságok és különbségek magyarázatát. A különbségek térképeken és pontdiagrammokon való ábrázolása jó betekintést ad a digitális szakadék jellemzőibe.

A legfőbb következtetés az, hogy az európai átmeneti gazdaságok számos régiójában konvergencia mutatkozik az IKT-val kapcsolatos mutatók terén, bár továbbra is éles szakadék húzódik a régiók között. Emellett az egyazon országhoz tartozó régiók inkább hasonlítanak, mint különböznek, és a digitalizáció terén viszonylag alacsonyabb kapacitással rendelkező régiók minden mutató tekintetében többnyire ugyanazok. Úgy vélem, hogy eredményeim hozzájárulhatnak a digitális átalakulással és a digitális szakadékkal kapcsolatos európai szintű diskurzushoz és kutatásokhoz.

CONTENTS

1. INTRODUCTION

1.1. MOTIVATIONS BEHIND THE CHOICE OF TOPIC

There is no doubt that digitalisation and Information and Communication Technologies (hereinafter ICT) have become crucial in driving economic growth (Vu et al. 2020), improving the competitiveness of the economy (Boikova et al. 2021) and creating sustainable development (Mondejar et al. 2021) for the last couple of decades. Humanity has been moved into an emerging 'virtual world' of socio-economic development in which online infrastructure, virtual trade and online markets grow in importance (Øverby–Audestad 2021). On the one hand, digitalisation is an opportunity to reduce costs, provide new services, establish new business models and technologies, break out poverty, and so on. On the other hand, the access, use and benefit of ICT are disproportionate (Nevado-Peña et al. 2019), and many are benefiting much less and fall behind; thus, it is no surprise that there is also a sorting out in every society.

The adoption of telecommunication and use of ICT open broad avenues also for regional development by giving local production system greater competitiveness and efficiency (Capello–Nijkamp 1996, Yilmaz–Dinc 2002, Capello 2016). However, new threats arise as technologies advance; for instance, digitalisation raises the question of *digital divide* in every society, whereby some people and some places – especially geographical space without technology – are being 'left out' of the new information economy, resulting in increasing development gaps between regions (Stimson et al. 2006). Besides, a quick spread of the COVID-19 crisis and its consequences accelerated *digital transformation* (Agostino et al. 2021); this has become especially important when the governments of countries have implemented extraordinary measures, like the lockdown or social distancing, which has increased the application of technology (Ha, 2022).

Geographic digital divide situations are occurring in many parts of the world, so also in the European Union (hereinafter EU) (Várallyai et al. 2015, Boikova et al. 2021). Avoiding the deepening of the digital divide and facilitating digital transformation have been and are still of high priority in the European common market. In the EU, the aspect of digitalisation – as a process of applying digital technologies and infrastructures in diverse dimensions of business, households and individuals – has come into focus for the last two decades. Both the European Council and the European Commission consider that ICT are critical to improving the competitiveness of the European industry and meeting the demands of its

society and economy. Accordingly, the European Commission set out priority areas in strategic agendas (cf. Lisbon Strategy, Europe 2020 Strategy, A new strategic agenda for the EU 2019–2024[1]) as well as political guidelines (cf. Commission priorities for 2019–2024[2]) to shift to a knowledge-based society through the use of the key elements of modern economies (e.g. Internet, e-business, e-commerce, research and development, telecommunication, e-inclusion etc.).

My personal motivation in choosing this topic comes from many reasons. As a student of the International Economy and Business MA programme, I find it important to better understand digital transformation and digital divide across European countries and regions, especially in times we live in now.

The COVID-19 pandemic has had a tremendous impact on the world and life; it caused an enormous shift in the economic life, and I have eagerly followed everything that was happening. The virus originated in 2019 from China, and by the end of January 2020 it reached Europe. Not even a month later, the virus infected people in all European countries. Apart from complete lockdowns, countries opted for less severe measures such as school closures and social distancing measures. Nonetheless, all restrictions had an enormous impact on the European economy, such as job losses, decrease in production and productivity, trade limitations, as well as complete shutdown of certain industries.

The COVID-19 pandemic has had a significant influence on computer and social networks. Thus, I would like to know more about how the pandemic affected and changed households' and individuals' attitude towards ICT usage. I believe that an in-depth investigation on the smallest unit of society (level of households and individuals) is crucial for getting a better insight into the current state of the digital transformation. I believe that digitalisation will affect social inclusion and integration of the most vulnerable groups of societies in the following years and decades. I am very sensitive to this topic, and I have thoughts about it.

Furthermore, I am interested in getting an insight in the current state (level) of digital transformation and characteristics of digital divide in the EU Member States and regions, with special focus on some of the countries that joined the EU after the millennium. This

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[1] Priority 2 (Developing a strong and vibrant economic base) aims to build a resilient economy by embracing digital transformation. Available at https://european-union.europa.eu/priorities-and-actions/eu-priorities_en
[2] Commission political priorities include *A Europe fit for the digital age* priority that focuses on embracing digital transformation by investing in businesses, research and innovation, reforming data protection, empowering people with the skills necessary for a new generation of technologies and designing rules to match. Available at https://european-union.europa.eu/priorities-and-actions/eu-priorities_en

group of European countries are often termed as '*transition economies*' as they discovered the power of market economy in the late 1980s and early 1990s after the collapse of command economies and centrally planned (bureaucratically controlled) systems.

1.2. RESEARCH AIMS, METHODS AND STRUCTURE

The main purpose of this work is *to empirically examine the level of digital development, the status of digital transformation and spatial characteristics of digital divide on regional (NUTS-2[3]) level in European transition economies through measuring the recent changes (2016–2021) in the ICT usage in households and by individuals*. The specific research questions of the study are as follows:

- What is 'digital divide' and what factors influence digital divide? How can it be assessed and measured?
- Does 'digital divide' exist in the EU, as well as in its Member States and regions? How can European transition economies and regions of these countries be characterised by the level of digitalisation?
- What is the role of the EU in promoting digital development and digital transformation? What are the related objectives and fields of action? How does the EU financially support digitalisation?
- How can the usage of ICT be captured and measured on the level of regions?
- How large are the differences within the regions of European transition economies? In which way and to what extent do these countries differ from the European average?
- Does the COVID-19 outbreak have any short-term influence and impact on digital transformation in this group of regions?

In this work, the term 'transition economies' covers 11 Central and South-East European countries (hereinafter CSE-11), which joined the EU in the 2000s. In other words, CSE-11 includes countries that are Member States of the EU either since 2004, 2007 or 2013: Bulgaria (BG), Croatia (HR), Czechia (formerly Czech Republic) (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO), Slovakia (SK) and Slovenia (SI).[4]

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[3] NUTS is Nomenclature of territorial units for statistics. It is a geocode standard for referencing the subdivisions of countries for statistical purposes.

[4] International Monetary Fund (2000) and World Bank (2002) classify several other countries as "transition economies", such as countries in the former Soviet Union (Commonwealth of Independent States), in Asia

On the one hand, research methods are literature review on the terminological background and dimensions of digital divide and measurement of digital competence, as well as textual analysis for investigating the content of existing policy documents, actions and initiatives, assessment methods, key achievements and financial background in shaping the EU's digital future.

On the other hand, quantitative analysis techniques are called into service to measure ICT usage in households and by individuals empirically on NUTS-2 regional level in CSE-11 countries. The dataset considers the following three years: 2016 (baseline year), 2019 (last year of economic boom before the COVID-19 outbreak) and 2021 (data available for the last year). The empirical analysis is based on secondary data collection from Eurostat database. Regional breakdowns are available for a selection of indicators disseminated in the regional tables (*Regional statistics by NUTS classification / Regional digital economy and society (reg_isoc)*). In this study, 7 indicators from regional ICT statistics are selected to capture the status (level) of digitalisation and indicate digital divide.

Both univariate and multivariate statistical analyses are developed to get an insight into the regional patterns of change, regional diversity, issue of balances versus imbalances, and issue of regional convergence versus divergence. For multivariate analysis, multidimensional scaling (MDS) is used as explanatory tool and assessment technique.

The remainder of my work is organised as follows. Chapter 2 and 3 review related works. Chapter 4 introduces the data and applied methods. Empirical results are provided in Chapter 5. Key findings derived from univariate and multivariate statistical analyses are presented separately: in subchapters 5.1. to 5.3., as well as in subchapter 5.4. Results are demonstrated visually on maps and scatter plots throughout this part of my study. Chapter 6 concludes the work, summarizes the limitations, and highlights future research agenda. In the Annexes 1 to 9, further information on data and calculations, as well as supporting visual material corresponding to univariate statistical procedures are provided.

(e.g. Cambodia, Vietnam), as well as non-EU countries in Europe (e.g. Albania, Bosnia and Herzegovina, Northern Macedonia); however, in this work, these countries are not considered.

2. CONCEPTUALIZING AND MEASURING DIGITAL DIVIDE

2.1. DIGITAL DIVIDE: TERMINOLOGICAL BACKGROUND

According to the standard definition proposed by the OECD (2001), digital divide refers to the gap between individuals, households, businesses, as well as geographic areas at different socio-economic levels with regard both to their opportunities to access ICT and use of the Internet for a wide variety of activities. Accordingly, digital divide emerges both between and within countries, and the differences between opportunities for connectedness and availability of ICT for people derive from several diverse sources and reasons.

A very simple explanation by Norris (2001) is as follows: digital divide is any and every disparity within the online community. As research on the subject evolved, as well as new aspects of digitalisation emerged, interpretations were revised. For instance, Fuchs and Horak (2007, 15–16) give a complex explanation of digital divide: it refers to "unequal patterns of material access, usage capabilities, benefits, and participation concerning ICT" that are "due to the asymmetric distribution of economic (money, property), political (power, social relationships), and cultural capital (skills)".

As Bruno et al. (2011) point out, the debate on the definition of digital divide among practitioners and scholars from different academic circles is constant as the concept of digital divide is dynamic and evolving, shifting from focusing solely on access to technological resources to a multidimensional understanding of inequality and includes a complex set of divides caused by a variety of factors.

2.2. DIMENSIONS OF DIGITAL DIVIDE

Widespread research in academic circles and policy discussion occur about the growing importance of digital divide. Of the firsts, Riggins and Dewan (2005) systematise the different approaches towards digital divide and conclude that research topic is of high importance.

Norris (2001) underlines the multidimensionality of digital divide and distinguishes three dimensions of digital divide (Table 1.):

1. *Global divide among countries* emerges due to disparities between industrialized and developing countries. Compared to advanced economies, developing countries entered the digital world decades later and fail to catch up eventually. This group of countries still lack the necessary skills, resources and infrastructure to better invest in the information society.

2. The *social stratification within countries* is a challenge emerged within the national borders mainly due to the uneven distribution of technological resources. Significant differences can be detected in Internet penetration according to income and educational levels, between racial and ethnic groups, old and young generations, single and dual-parent families, as well as people with and without disabilities. Accordingly, certain groups are steadily excluded, such as poorer neighbourhoods, working-class households and peripheral rural communities.

3. Furthermore, within the online community, *democratic divide* is an emerging problem between those who use and do not use Internet to engage and participate in public life.

Table 1.: Dimensions of digital divide

Dimensions	Interpretation
Global divide among countries	Dichotomy of integration into the digital world between developed and developing countries.
Social stratification within countries	Differences between technological resource availability of certain social groups within a country.
Democratic divide	Difference between people who use and do not use digital networks for civic and public engagement.

Source: Own elaboration based on Norris (2001) pp. 3–14.

Wei et al. (2011) also reveal the levels of digital divide; according to their classification, digital divide can be captured on three levels:

1. *Individual level:* the gap is originally between individuals. Certain people and group of people are technologically, sociologically or economically disadvantaged; therefore, they lack access to ICT;

2. *Organisational level:* on the one hand, some organisations can utilise ICT for gaining advantage against rivals or changing the circumstances within their industry; on the other hand, there are several other organisations that lag behind from the technological point of view and are in strategically disadvantageous position;

3. *Global level:* there are significant differences between countries. Some countries have already initiated actions successfully to promote digital development and competence, while other countries still struggle with providing areas – mainly rural areas – with Internet broadband access. This phenomenon can be observed not only on country level, but also on regional level.

According to Lucendo-Monedero et al. (2019), the initial understanding of the digital divide was solely restricted to the *conditions* available in a certain territory, namely the ability to access information (known as *first-level digital divide*, also referred to as *access divide* or *narrow sense of digital divide*). According to Scheerder et al. (2017), the common practice is to capture the availability or unavailability of ICT as the basis of measuring digital divide. The authors emphasise that in several countries of advanced economy, the first level of digital divide has lost its fundamental role in creating inequalities as broadband access and the availability of digital devices has become prevalent.

The next step in understanding digital divide is to consider the different motives in ICT usage. This level is frequently referred to as *second-level digital divide* or *capability divide*. Moreover, the accumulation of digital competencies can be termed as 'digital capital' (Ragnedda 2018). These competencies consist of information, communication, safety, content creation, problem-solving and the usage of digital technology. From this viewpoint, digital competencies refer to a set of internalized ability and aptitude.[5]

As research on the subject evolved, another crucial factor emerged to describe the differences between individuals and households in connection with ICT usage, namely the *benefits* from ICT usage. For example, van Deursen et al. (2014) examine the importance of certain sets of skills (communication, operational, formal, information and strategic) that influence the individual benefits of Internet use. This stage of digital divide can be referred to as *third level of digital divide* or *outcome divide*.

Table 2. summarises the main features of the three-level digital divide framework.

Table 2.: The Three-Level Digital Divide Framework

Level	Kinds of digital divide				
Individual level	First-level digital divide: digital access	⇒	Second-level digital divide: digital capability	⇒	Third-level digital divide: digital outcome (benefits)
Organizational level					
Global level					

Source: Own elaboration based on Wei et al. (2011), Scheerder et al. (2017) and Lucendo-Monedero et al. (2019).

As Vicente and López (2011) notice, previous research on the subject focused on two relevant issues: on the one hand, the measurement of digital divide regarding its extent,

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[5] The possession of digital capital affects both the second and the third level of digital divide. Besides, higher level of Internet use proficiency enables to convert digital capital to other forms of capital (e.g. economic, social, relational capital) (Ragnedda 2018). Furthermore, according to Park (2017), digital capital can be understood as an integral digital ecosystem that is formed based on human interaction during which digital technologies are used as platform.

evolution and pace, on the other, the explanation of digital divide through the assessment of its drivers. The authors reveal that ICT adoption is determined by the following factors:

– differences in the wealth of territories as well as individuals;
– income that affects the infrastructure and diffusion of ICT technologies;
– level of education of a territory;
– socio-demographic factors and population size, level of urbanization, population density, age of the population, racial construction;
– proportion of younger generations within the society;
– network effects (spillover) as the extent of ICT diffusion of the surrounding environment influences the likelihood of a household to acquire such technologies;
– institutional and governmental factors, commercial openness, and cultural elements.

Capello (2016) stresses that the effects of ICT on regional disparities is still dubious. In the past 15–20 years two currents of thought have interpreted the impact of ICT on regional disparities:

1. The first viewpoint maintains that new ICT are able to resolve the problem of peripherality. The greater access to information, knowledge and specific services to production reduce the disadvantages of a peripheral location;
2. The second opinion argues that stronger areas of great potential demand and of more knowledge have the ability to better exploit technologies, so the gap widens between the core and the periphery.

The explanation of digital divide on regional basis have recently been put in the spotlight as fresh articles in the field show.

For instance, Nevado-Peña et al. (2019) suggest that the relationship between the quality of life of citizens and the technological characteristic of areas is clearly detectable as the most technologically developed societies are happier in general. However, the elimination of the gap between regions is a challenging task and can only be successful when paired with the promotion of research and development (R&D) and investment in the training of people.

According to Mondejar et al. (2021), advanced digital technologies – such as Internet of things (IoT), big data management and artificial intelligence (AI) – are perfect means to

enhance sustainable development. The contribution of these technologies to the development of agriculture, smart cities, water accessibility, energy efficiency, green manufacturing, healthcare, as well as to fight against climate change is undeniable; however, without ensuring equal access to data, the process of digitalisation can lead to the further increase of digital divide instead of closing the gap.

Furthermore, Øverby and Audestad (2021) notice that although there has been an increase in the access to Internet worldwide over the last decade, the key issue to tackle is to provide the developing areas with access to the Internet as there are still significant differences – an existing digital divide – within and between countries.

Bannykh and Kostina (2022) point out that modern researchers claim that there are already four levels of the digital divide due to the ongoing digital changes: geographic, technological, cultural and spiritual. The authors underline the increased vulnerability of certain social groups, such as elderly people and residents of small settlements in peripheral areas.

In addition, alongside the digital shift in technology, there has been a change in narrative with user-experience, engagement and co-creation taking place in service design and technology as COVID-19 has affected all areas of public service delivery, with public authorities having to move their operations wholly or in partly online. Both governments and organisations had to act and react over a short period (Agostino et al. 2021). Without doubt, the COVID-19-induced digital acceleration is an opportunity to follow how digital gaps changed in the last couple of years.

2.3. MEASURING THE LEVEL OF DIGITALISATION: AN OVERVIEW OF INDEXES

Scholars use various measures to quantify the level of digitalisation. There are several indicators that capture the state of digital competence of the resident population, such as the number of people using the Internet, the number of people having access to the Internet from home, and the number of people selling or ordering services online, and so on.

According to Bannykh and Kostina (2022), digitalisation can be measured on two different levels: on micro and macro level. The first comprises indicators related to digital literacy of individuals, while the second includes the availability and quality of digital infrastructure, the level of digital society and digital economy. In addition, a grouping of indicators with respect to the tangible (hard) and intangible (soft) infrastructure can be created. The first reflects the available devices, while the second refers to the usage and knowledge of such devices.

To get a deeper understanding in the level of digitalisation of households and by individuals, certain composite indices have been created by different institutions as follows:

1. *Digital Skills Indicator*[6]*:* It covers four competence domains: information, communication, content creation and problem solving. Directorate-General for Communications Network, Content and Technology (DG CONNECT) and the Eurostat Information Society Working Group agreed to create and publish this indicator. Data is collected through the ICT survey on ICT usage by households and individuals.

2. *Digital Competence Framework*[7]*:* It was created within the framework of the DigComp 2.1 proposal defined by European Digital Competence Framework for Citizens; however, recently the complete DigComp 2.2 framework has become available. The DigComp framework identifies the key components of digital competence in 5 areas:

    1) information and data literacy;
    2) communication and collaboration;
    3) digital content creation;
    4) security;
    5) problem solving.

Figure 1. summarises the DigComp conceptual reference model with 21 competencies.

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[6] Digital Skills Indicator. Available at https://digital-strategy.ec.europa.eu/en/library/new-comprehensive-digital-skills-indicator

[7] DigComp Framework. Available at https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en
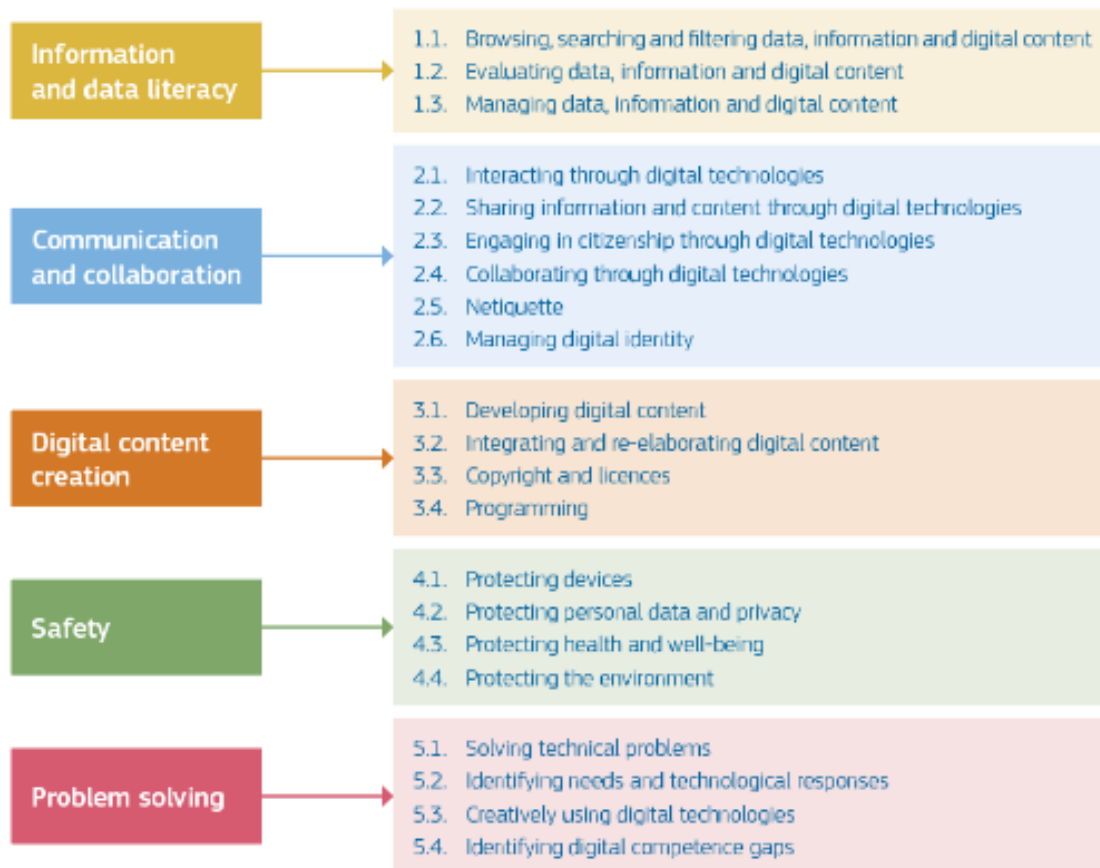
Figure 1.: DigComp 2.2 conceptual reference model

Source: https://joint-research-centre.ec.europa.eu/digcomp/digcomp-framework_en

3. *ICT Development Index (IDI)*[8]*:* This is a composite index proposed by International Telecommunication Union (ITU) that was published from 2009 to 2017. IDI combined 11 indicators into a composite score. It was used for monitoring and comparing developments in ICT between countries and over time. Figure 2. presents the indicators, reference values and weights of IDI.

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[8] The ICT Development Index. Available at https://www.itu.int/en/ITU-D/Statistics/Pages/IDI/default.aspx

ICT access	Reference value	(%)
1. Fixed-telephone subscriptions per 100 inhabitants	60	20
2. Mobile-cellular telephone subscriptions per 100 inhabitants	120	20
3. International Internet bandwith (bit/s) per internet user	2'158'212*	20
4. Percentage of households with a computer	100	20
5. Percentage of households with Internet access	100	20

ICT use	Reference value	(%)
6. Percentage of individuals using the Internet	100	33
7. Fixed-broadband subscriptions per 100 inhabitants	60	33
8. Active mobile-broadband subscriptions per 100 inhabitants	100	33

ICT skills	Reference value	(%)
9. Mean years of schooling	15	33
10. Secondary gross enrolment ratio	100	33
11. Tertiary gross enrolment ratio	100	33

ICT access: 40
ICT use: 40
ICT skills: 20

ICT Development Index

Figure 2.: IDI Development Index

Source: https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2017/methodol-

ogy.aspx

4. *Global Cybersecurity Index (GCI)*[9]*:* This is a trusted reference provided by ITU
Global Cybersecurity Agenda that measures the commitment of 194 countries to
cybersecurity. It is used to raise awareness of the importance and different dimen-
sions of the issue. As cybersecurity has a broad field of application, cutting across
many industries and various sectors, each country's level of development or engage-
ment is assessed along five pillars:

1) legal measures;

2) technical measures;

3) organizational measures;

4) capacity development;

5) cooperation.

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[9] Global Cybersecurity Index. Available at https://www.itu.int/en/ITU-D/Cybersecurity/Pages/global-cyber-
security-index.aspx

3.   ACTIONS OF THE EU IN THE FIELD OF DIGITAL DEVELOPMENT

3.1.   POLICIES AND ACTIONS IN SUPPORT OF DIGITAL DEVELOPMENT IN THE EU

The institutions of the EU consider that ICT are critical for improving the competitiveness of European industry in meeting the demands of its society and economy. The contribution of ICT to the European economy has been fundamental for the development of knowledge-intensive products and services since the last couple of decades. There has been an important need to address ICT-related skills (e-skills) issues to ensure that every citizen is digital literate in a lifelong learning context (e-inclusion). Moreover, key enabling technologies have been considered to be essential in a shift to a low carbon economy.

To efficiently promote digital transformation and counteract against existing digital divide, which can be observed in the EU according to recent studies (e.g. Várallyai et al. 2015, Boikova et al. 2021), it is crucial to identify the manner in which the EU influences digitalisation. One of the first initiatives, *i2010* used to be a EU policy framework for the information society and media. It promoted the positive contribution that ICT can make to the economy, society and personal quality of life (CEC 2005). Further policy actions in the field have been taken over the 2010s and at the beginning of the 2020s.

3.1.1.   A Digital Agenda for Europe

The Digital Agenda for Europe (hereinafter Agenda, EC 2010a) was launched by the European Commission as a flagship initiative of the Europe 2020 Strategy (EC 2010b). The Agenda was created to identify the key enabling role of ICT that are crucial for reaching the priorities of the Europe 2020 Strategy.

The Agenda was based on the important issue of developing the EU in the field of digitalisation. Accordingly, seven action areas were set out and elaborated in detail for boosting the EU's social and economic performance with the help of digitalisation. Continuous engagement and commitment were required on the following levels: EU, Member States and regions. As transformations are inevitable to increase the digital economy and society, the Agenda aimed at creating the adequate circumstances and preparing the common market to the challenges of the following decades. One of the most important aspects of digitalisation was outlined as follows: the EU should use of the Internet more efficiently as it became an essential medium of economic and societal activity.

The expected results of the Agenda include spurring innovation, economic growth and improvements in the daily lives of citizens and businesses. Going further, reaching the goals of the Agenda can contribute to several fields of life of Europeans, such as better healthcare,

safer and more efficient transport solutions, cleaner environment, new media opportunities and easier access to public services and cultural content.

On the one hand, it was highlighted that the ICT sector contributes to the European GDP with a remarkable share (5%), as well as plays an enabling role as it affects how other sectors operate. On the other hand, the social impact of the sector cannot be underestimated, which can be confirmed by the increasing number of daily Internet users and percentage of Europeans owning mobile phones. The importance of digital devices and the online world is expected to increase even further; accordingly, the Agenda compares the revolutionary impact of high-speed networks at present to the development of electricity and transportation networks previously.

The Agenda proposes a virtuous cycle of the digital economy that includes the main components of the process towards an increasingly digital economy and society. The three pillars within the cycle are as follows:

1. *Creation of Content and Borderless Services:* attractive content and services are to be made available in an online environment that is interoperable and borderless;

2. *Increase of service demand:* this emerges as the consequence of the first pillar; the demand for higher speed and capacity is formed on the basis of consuming online content and using services via Internet;

3. *Roll-out of networks:* while the second pillar captures the demand, and the third one matches the supply with it, as it opens the way for exploiting higher speeds via innovative services.

According to the Agenda, there are still serious challenges for the EU as the single market, which was established before the appearance of the Internet, lacks completeness to the online world. It is a great concern that Europe is not adequately equipped in the ICT sector to participate in the global competition for investments, jobs and economic influence. Approximately 30% of Europeans have not used the Internet yet, and there is only 1% penetration of high-speed network (compared to Japan: 12%, South Korea: 15%). Besides, the ICT research and development budget of the EU only counts for 40% of the US level.

While finding the causes of this lagging position, through consultation with stakeholders and using the insights of previous documents (e.g. Granada Declaration, the European Parliament Resolution), seven obstacles were identified that negatively impact the possibilities of the EU to exploit the chances in ICT.

These barriers are as follows:

1. *Fragmented digital markets:*
   – Europe is a patchwork of national online markets;
   – The elimination of regulatory barriers is needed to reach the flow of commercial and cultural content across borders;

2. *Lack of interoperability:*
   – There are weaknesses in standard setting, public procurement and in the coordination between public authorities;

3. *Rising cybercrime and risk of low trust network:*
   – Engagement of people in online activities is held back by their fear of unreliable networks;
   – Europe needs to address new forms of cybercrime and develop responsive mechanisms;
   – IT systems and networks are to be made resilient and secure to prevent all sorts of threats;

4. *Lack of investment in networks:*
   – The roll-out and take-up of broadband at increasing speeds using fixed and wireless solutions is needed;
   – Investment into the new very fast open and competitive Internet networks is crucial for the economy of the future;
   – Incentives to promote private investments along with carefully targeted public investment are to be made;

5. *Insufficient research and innovation efforts:*
   – The problems are underinvestment, fragmented efforts, lack of creativity of the SME sector, and the failure to convert research into market-based innovations;
   – There is a need to build an innovation ecosystem where European companies can develop high quality products, and by that, demand is also to be increased;

6. *Lack of digital literacy and skills:*
   – The threat of a growing shortage in ICT skills along with the digital literacy deficit is faced by Europe;

- These are obstacles for productivity growth, as the multiplier effect of ICT take-up is locked by the exclusion of EU citizens from the digital society and economy;

7. *Missed opportunities in addressing societal challenges:*
   - The efficient exploitation of ICT could lead the EU towards the solution to problems such as climate change and environmental degradation, ageing population and its pressure on the healthcare system, inefficient public services and the social exclusion of people with disabilities.

Key actions are the most important tasks on certain action areas defined by the EC. The ones that are of high relevance in light of the current topic are as follows:

- *Key Action 8 (KA8):* Adopt a Broadband Communication in 2010 that lays out a common framework for actions at EU and Member State to meet the Europe 2020 broadband targets. For the EC, this includes work on the funding of high-speed broadband through EU instruments, attraction of capital through credit enhancement, proposing a European Spectrum Policy Programme, encouraging investment in Next Generation Access (NGA) networks. Member States should develop national broadband plans to meet the Europe 2020 targets, facilitate broadband investment on national levels, utilise the Structural and Rural Development Funds, implement the European Spectrum Policy Programme and the NGA Recommendation;
- *Key Action 10 (KA10):* Propose digital literacy and competences as a priority for the European Social Fund regulation (2014–2020);
- *Key Action 13 (KA13):* Undertake pilot actions to equip Europeans with secure online access to their medical health data by 2015 and to achieve widespread deployment of telemedicine services by 2020;
- *Key Action 14 (KA14):* Propose a Recommendation defining a minimum common set of patient data for interoperability of patient records to be accessed or exchanged electronically across Member States by 2012;
- *Key Action 16 (KA16):* Propose by 2012 a Council and Parliament Decision to ensure mutual recognition of e-identification and e-authentication across the EU based on online 'authentication services' to be offered in all Member States (which may use the most appropriate official citizen documents).

Table 3. presents the structure of the Agenda with the action areas, sub-areas and the required key actions (KA).

Table 3.: The structure of the Digital Agenda for Europe

Action area	Sub-areas	Key actions
1. A vibrant digital single market	1.1 opening up access to content	KA1
	1.2 making online and cross border transactions straightforward	KA2; KA3
	1.3 building digital confidence	KA4
	1.4 reinforcing the single market for telecommunication service	
2. Interoperability and standards	2.1 Improving ICT standard-setting	
	2.2 Promoting better use of standards	
	2.3 Enhancing interoperability through coordination	KA5
3. Trust and security		KA6; KA7
4. Fast and ultra-fast Internet access	4.1 Guarantee universal broadband coverage with increasing speeds	
	4.2 Foster the deployment of NGA networks	
	4.3 Open and neutral Internet	KA8
5. Research and innovation	5.1 Step up efforts and efficiency	
	5.2 Driving ICT innovation by exploiting the single market	
	5.3 Industry-led initiatives for open innovation	KA9
6. Enhancing digital literacy, skills and inclusion	6.1 Digital literacy and skills	
	6.2 Inclusive digital services	KA10; KA11
7. ICT-enabled benefits for EU society	7.1 ICT for environment	KA12
	7.2 Sustainable healthcare and ICT-based support for dignified and independent living	KA13; KA14
	7.3 Promoting cultural diversity and creative content	KA15
	7.4 eGovernment	KA16
	7.5 Intelligent Transport Systems for efficient transport and better mobility	

Source: Own elaboration based on EC (2010a).

3.1.2. A Europe fit for the digital age and the 2030 Digital Compass

In 2019, the EC set four priority areas that shape the political and policy agenda until 2024[10]. Priority 2 (*Developing a strong and vibrant economic base*) aims to build a resilient economy by embracing digital transformation. Besides, the *von der Leyen* European Commission determined six political priorities derived from the European Council's strategic agenda and discussions with the political groups of the European Parliament. Priority 2 (*A Europe fit for the digital age*) aims to embrace digital transformation by investing in businesses, research and innovation, reforming data protection, empowering people with the skills necessary for a new generation of technologies and designing rules to match.

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[10] European Union priorities 2019–2024. Available at https://european-union.europa.eu/priorities-and-actions/eu-priorities_en

The EU's digital strategy was formed with the purpose of facilitating the digital transformation of people and businesses, while supporting the climate neutral Europe by 2050. In addition, Europe aims to strengthen its digital sovereignty and set the standards instead of accepting them. The most relevant issues in light of this topic are as follows:

- *Digital skills and jobs:* The EC set the goals to tackle the digital skills gap and contribute to the improvement of digital skill levels in Europe by promoting projects and strategies;
- *Connectivity:* By 2030 the EU committed to Europe being the most connected continent. The main goal is for every household to have access to high-speed Internet coverage by 2025 and gigabit connectivity by 2030;
- *Digital Identity for all Europeans:* Creating a European Digital Identity that is available to every citizen, resident or business, widely usable as a way of identification, or as a proof of eligibility of access to services, giving full control to citizens in choosing which personal data and certificates are their willing to share.

The EC formulated its vision for shaping Europe's digital future (EC 2020a)[11]. With this document the EC set out three key objectives that can lead Europe through the digital transformation while benefiting people and respecting values and helping the EU become a trendsetter. The important objectives are as follows:

1. *Technology that works for people:* Introduction of technology that people benefit from in their daily lives, an economy that masters and shapes technology in line with the European values;
2. *A fair and competitive economy:* A single market that supports companies in developing, marketing and using digital technologies, products and services, respecting consumer rights;
3. *An open, democratic and sustainable society:* Creating an environment that enhances democratic values and respects the fundamental rights, contribute to sustainable, climate-neutral and resource efficient economy.

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[11] Available at https://ec.europa.eu/info/sites/default/files/communication-shaping-europes-digital-future-feb2020_en_4.pdf

In March 2021, the *2030 Digital Compass* (EC 2021) was released to lead Europe through the digital transformation. Table 4. presents the structure of the Compass. The Compass revolves around four cardinal points:

1. A digitally skilled population and highly skilled digital professionals;
2. Secure and performant sustainable digital infrastructure;
3. Digital transformation of businesses;
4. Digitalisation of public services.

Table 4.: The structure of the 2030 Digital Compass

Cardinal Point	Dimensions	2030 EU Target
1) SKILLS	ICT specialists	- 20 million+ ICT specialists - Gender convergence - 80% of population having basic digital skills
2) INFRASTRUCTURE	Connectivity	- Gigabit for everyone, 5G everywhere
	Semiconductors	- Double EU share in global production to 20%
	Data – Edge / Cloud	- 10,000 climate-neutral highly secure edge nodes
	Quantum computing	- First computer with quantum acceleration
3) BUSINESS	Tech up-take	- 75% of enterprises using Cloud/AI/Big Data
	Late adopters	- 90%+ SMEs reach at least basic level of digital intensity
	Innovators	- Grow scale-ups and finance to double EU Unicorns
4) GOVERNMENT	Government as a platform	- 100% of key public services online - 100% of citizens having access to medical records - 80% of citizens using digital ID

Source: Own elaboration based on EC (2021).

3.2. THE DIGITAL ECONOMY AND SOCIETY INDEX (DESI)

DESI[12] assessment system was created with the aim to monitor the digital progress of EU Member States. The yearly DESI reports have been released since 2014 with country profiles and thematic chapters of overall European analysis according to the components of DESI. The index is used for researching the digital transformation of Member States, industrial sectors, and socio-economic dimensions of the EU that are important for the transparent execution of the improvement of competitiveness. The key areas of DESI are as follows (Table 5.):

1. *Human capital:* Internet user skills along with advanced skills and development are monitored across the EU;

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[12] The Digital Economy and Society Index (DESI). Available at https://digital-strategy.ec.europa.eu/en/policies/desi

2. *Connectivity:* it is monitored by measuring the supply and demand of fix and mobile broadband;
3. *Integration of digital technology:* the integration of new technologies into businesses and e-commerce are assessed;
4. *Digital public services:* the goal is the use of digital public services.

Table 5.: Dimensions of the DESI

Human Capital	Internet use, basic and advanced digital skills
Connectivity	Fixed broadband, mobile broadband, and prices
Integration of Digital Technology	Business digitalisation and e-commerce
Digital Public Services	eGovernment and eHealth

Source: Digital Economy and Society Index, Eurostat[13]

According to Bánhidi et al. (2020), the advantage of DESI is its methodology, since it is general and applicable, allowing researchers to make comparisons between years or between the Member States. Although DESI is widely used among practitioners and policy makers, too, the index has certain limitations. Despite being the most suitable robust approach for analysing the EU's progress in the field of digitalisation, the index does not include information that is detailed enough to create an adequate deep analysis or to explain certain phenomena related to digitalisation. In addition, the composition of dimensions changes yearly, and there are differences between the approaches used by statistical offices.

The Digital Economy and Society Index 2022 shows that Member States have made progress in general, and – as it was found in comparison with the 2020 DESI results – the COVID-19 pandemic has left its mark on digital development, mainly by enhancing the process of digital transformation. However, the implementation of key digital technologies for businesses has remained at a low level. Thus, further efforts are needed for the full deployment of ubiquitous connectivity infrastructure and the advancement of insufficient digital skills as these phenomena can deepen the digital divide (EC 2022).

The relative progress of Member States over the period 2017–2022 is presented on Figure 3. On Figure 4. the overall 2022 DESI results are shown according to dimensions and countries.

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[13] Data Visualization Tool – Data & Indicators. Available at https://digital-agenda-data.eu
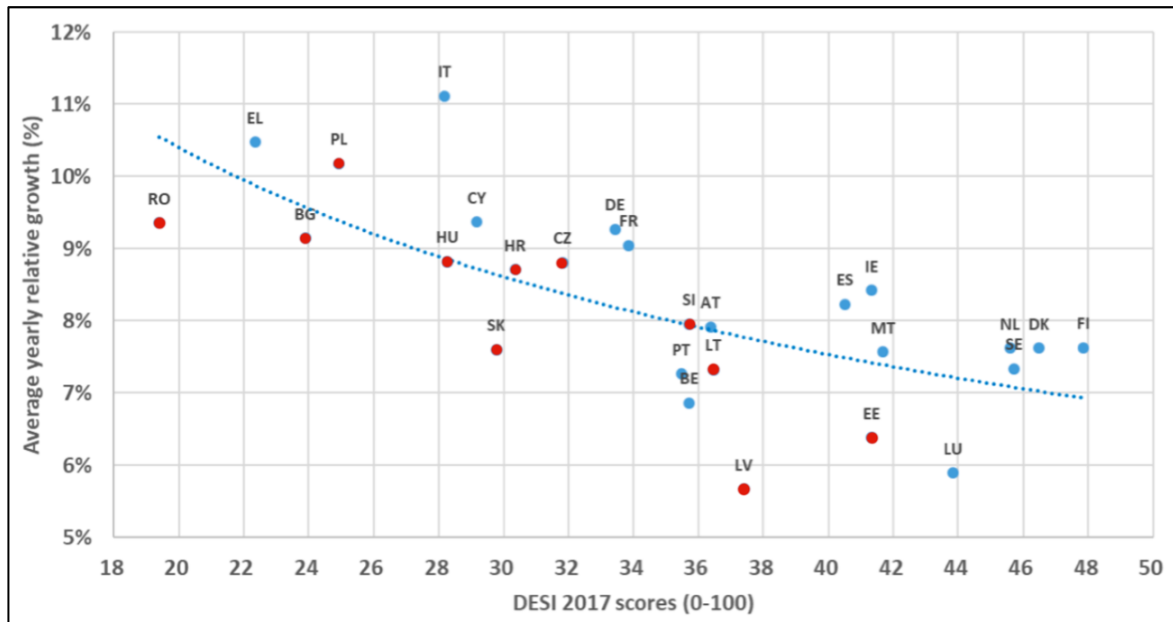
Figure 3.: DESI scores: average yearly relative growth, 2017–2022 (%)
Source: EC (2022) p. 17.

One can detect that with respect to the transition economies the initial scores were relatively higher in the Baltic states (Estonia, Latvia and Lithuania) as the results of these countries are much closer to the frontrunner North-Western European Member States. In addition, there is a clear divide between two groups of countries: the greater part of the CSE-11 countries belongs to the group with relatively low results at the baseline year, although higher annual growth rates can be detected in these countries. Poland, Czechia, Croatia and Slovenia are to be found above the blue line, which means that these countries managed to grow more than it was expected.
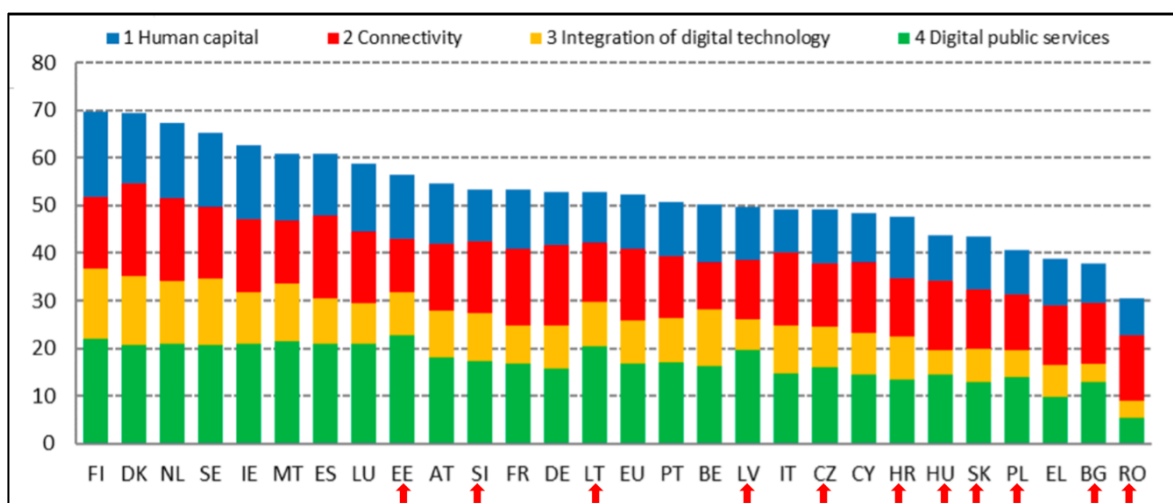
Figure 4.: Digital Economy and Society Index, 2022 (score)
Source: EC (2022) p. 19.

According to the ranking, the situation in the CSE-11 countries is unsatisfactory; however, Estonia, Slovenia and Latvia can be found above the EU average. Other CSE-11 countries are in lagging positions, and four out of the five worst performers belong to this group of countries, namely Romania, Bulgaria, Poland and Slovakia (plus Greece).

3.3. MULTIANNUAL FINANCIAL FRAMEWORKS AND EUROPEAN DIGITAL DEVELOPMENT

1. The 2014–2020 Multiannual Financial Framework (MFF)

As digital transformation became a field of key importance for the EU with the release of the Digital Agenda for Europe, substantial financial contribution from the EU was allocated for the execution of digital transformation within the MFFs. The 2014–2020 MFF contained the following six Headings:

- Heading 1: Smart and inclusive growth
    - Heading 1a: Economic, social and territorial cohesion
    - Heading 1b: Competitiveness for growth and jobs
- Heading 2: Sustainable growth: natural resources
- Heading 3: Security and citizenship
- Heading 4: Global Europe
- Heading 5: Administration
- Heading 6: Compensations

Heading 1a covered an amount of € 371.4 billion that is 34% of the overall MFF. The initiation called *Connecting Europe Facility* accounts for 12% of Heading 1a, and by that, it was the third largest share in this heading.

2. The 2021–2027 Multiannual Financial Framework (MFF)

The focus of this MFF has shifted in the sense that digitalisation and digital development became areas that have been considered crucially important for the future of the EU. The headings of this MFF were formed as follows (EC 2020b[14]):

- Heading 1: Single Market, Innovation and Digital
- Heading 2: Cohesion, Resilience and Values
- Heading 3: Natural Resources and Environment

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[14] Available at https://ec.europa.eu/info/sites/deault/files/about_the_european_commission/eu_budget/mff_factsheet_agreement_en_web_20.11.pdf

- Heading 4: Migration and Border Management
- Heading 5: Security and Defence
- Heading 6: Neighbourhood and the World
- Heading 7: European Public Administration

As one can detect solely by reading the names of the headings, digital development explicitly appears and among the most supported headings. Heading 1 received altogether € 143.4 billion of total allocation from MFF and Next Generation EU (NGU). In addition, in the period of 2021–2027 MFF, aspects related to climate change and digitalisation are handled as high priorities in each program; besides, 20% of funds from the Recovery and Resilience Facility (RRF) must be allocated for these purposes.

3.4. Overview of level of digitalisation in the EU based on Eurostat and DESI

Internet access and broadband Internet connection are to be considered as the basis of knowledge-based informed society; accordingly, it is essential to analyse the change of the percentage of households having access to the Internet and broadband connection.

Data and trend related to Internet access and broadband Internet connections of households are shown during a ten-year period (2011 to 2021) on Figure 5. Based on the trendline, one may conclude that there has been an increase in the level the EU countries regarding both Internet access and broadband connections. As Eurostat reported, more than 50% of the EU citizens have had access to the Internet since 2007, and the ratio has been increasing ever since. In 2012, the proportion of households accessing the Internet was around 75%, then continued to increase and reached 80% in 2014. In overall, within the last ten years an increase of 20% can be observed. By taking a closer look at the trendline concerning broadband access, one can conclude that the proportion of households having this type of access has been growing at a faster pace; the increase was 25% from 2011 to 2021 with a proportion of 90% in 2021.
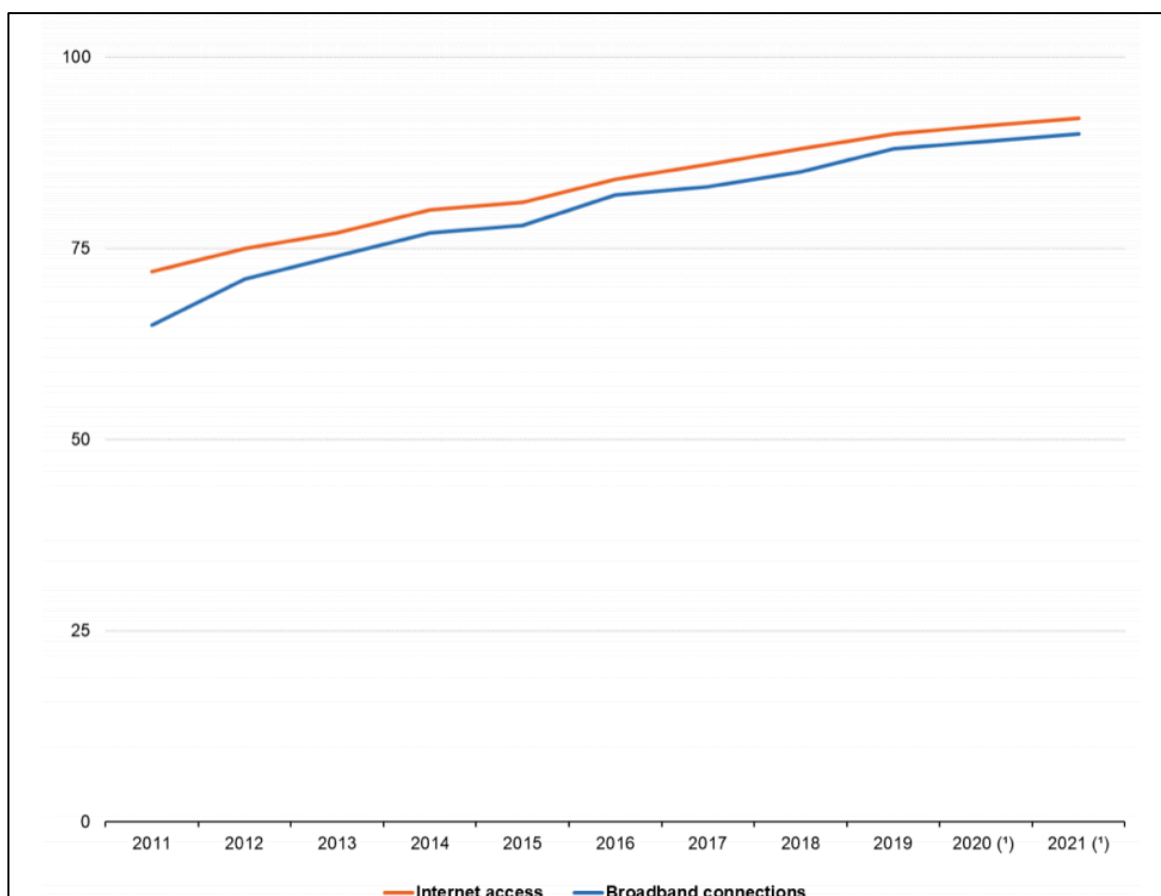
Note: (¹) Estimation.

Figure 5.: Internet access and broadband Internet connections of households in the EU, 2011–2021 (% of households)

Source: Eurostat – Digital economy and society statistics[15]

As Figure 6. presents, Internet access of households increased from 2016 to 2021 in European countries. Regarding the performance of Member States in the CSE-11 group, one can conclude that these countries were not among the highest performers in 2016; however, the results from 2021 show quite positive outcomes as households had Internet access at above 84% in these countries. The highest increase was performed by Bulgaria, where the results from 2021 is more than 20% higher than the result from 2016. In 2021, three countries (Slovenia, Estonia and Poland) are above the EU average, or at least, at the same level (92%).

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[15] Eurostat – Digital economy and society statistics. Available at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Digital_economy_and_society_statistics_-_households_and_individuals#Internet_access
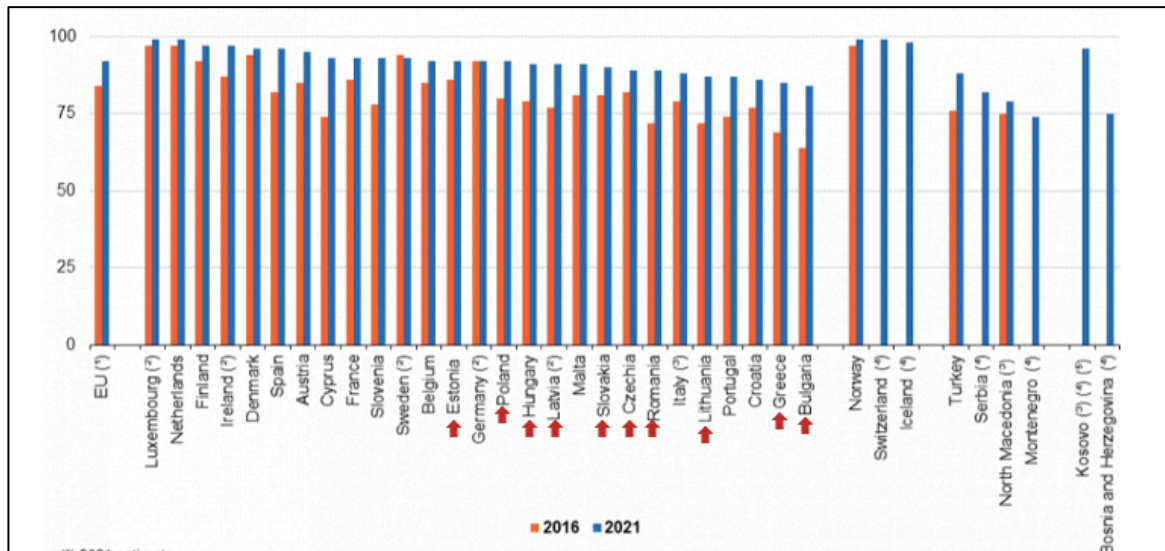
Figure 6.: Internet access of households, 2016 and 2021 (% of all households)
Source: Eurostat – Digital economy and society statistics

As this research puts the regional perspectives in the focus, it is important to understand the differences within the countries from an urbanisation point of view. On Figure 7. the existing urban-rural divide is presented regarding the access to Internet. With data from 2021, one can get insight into the current state of the divide. The figure shows that households in cities, towns and suburbs can be associated with high rates of Internet access (around 80–90%). In contrast, rural areas have relatively lower access rates than the previous types. In some CSE-11 countries, the dichotomy between the urban and rural areas is quite sharp. These are Bulgaria, Croatia and Romania; in these countries, the overall Internet access rate does not reach the EU average. Some exceptions from the standard divide are Estonia and Poland, where instead of rural areas having the lowest ratio of Internet use, it can be associated with towns and suburbs.

Note: ranked on overall internet access. ✕ Cities ◇ Towns and suburbs ○ Rural areas
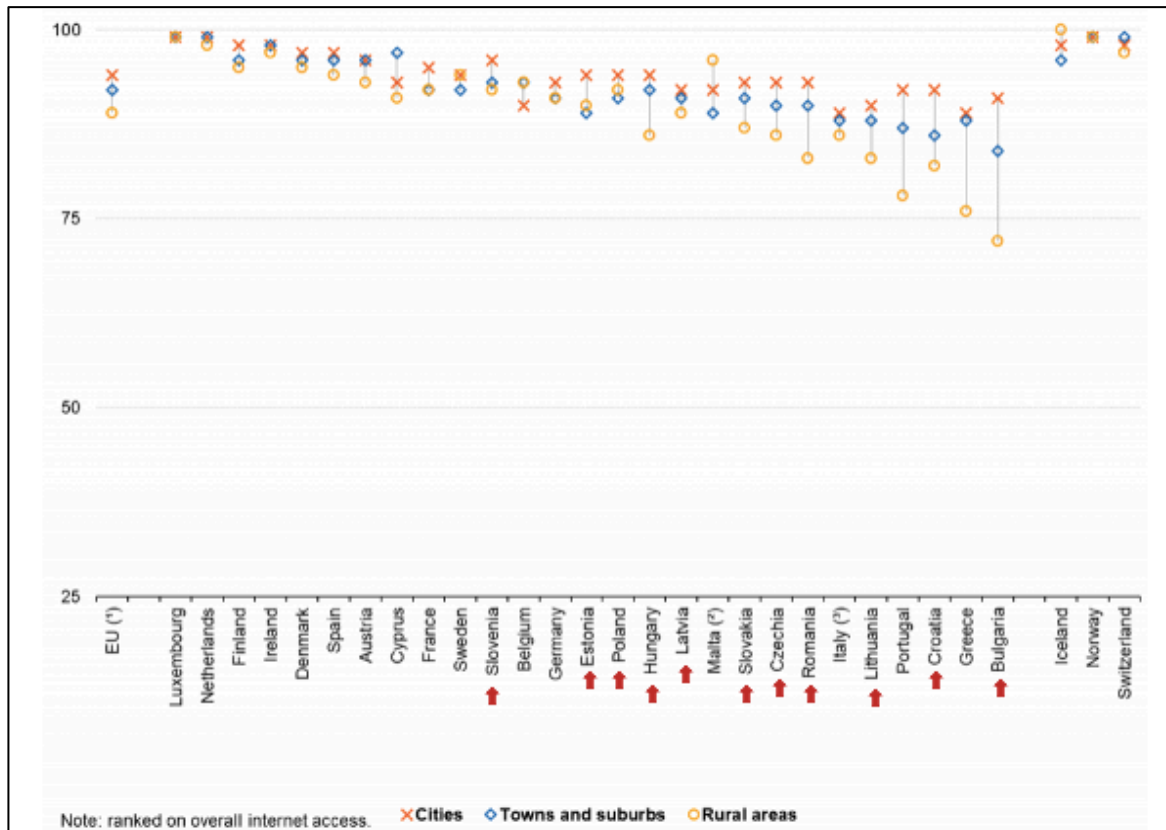
Notes: ranked on overall Internet access, (¹) Estimation; (²) Rural areas: low reliability; (³) 2020 instead of 2021.

Figure 7.: Internet access in households by degree of urbanisation, 2021 (% of all households)

Source: Eurostat – Digital economy and society statistics

As Internet access is the first step of connectedness and the base of digitalisation, the second aspect to cover for understanding the digital maturity of a society is the frequency of Internet use among the citizens. As shown on Figure 8., the EU in overall averaged 89% of citizens aged 16 to 74 years that used the Internet at least once within the three months prior to the survey. Higher shares of Internet users are typical in Northern and Western European countries with Denmark, Ireland and Luxemburg (owing the top three positions of Internet users). By examining the situation of CSE-11 countries, one can note that this group of countries are not among the best performing Member States. The ratio was the lowest in Bulgaria and Poland, while Romania and Croatia were below the EU average, as well. On the other hand, some exceed the overall EU level (e.g. Estonia, Latvia) or reported promising ratios.

Another important measure is the change of the ratio that expresses how many EU citizens have never used the Internet. This proportion decreased to 8% by 2021. The same ratio was 26% in 2011, which means the amount of people that have never used the Internet

decreased to around one third of its level. 80% of EU citizens used the Internet daily in 2021, which shows how important it is for the citizens to be connected to the digital world on daily basis. One can be considered a regular user of the Internet if he uses it at least once a week; the proportion of such users was 87%. Another interesting aspect is the ratio of daily Internet users within all Internet users who used the Internet at least once in the three months prior to the survey. The average of this ratio was 90% in overall. The country with the lowest ratio was Romania (82%), and among the CSE-11 countries Poland has a considerably low percentage, too.
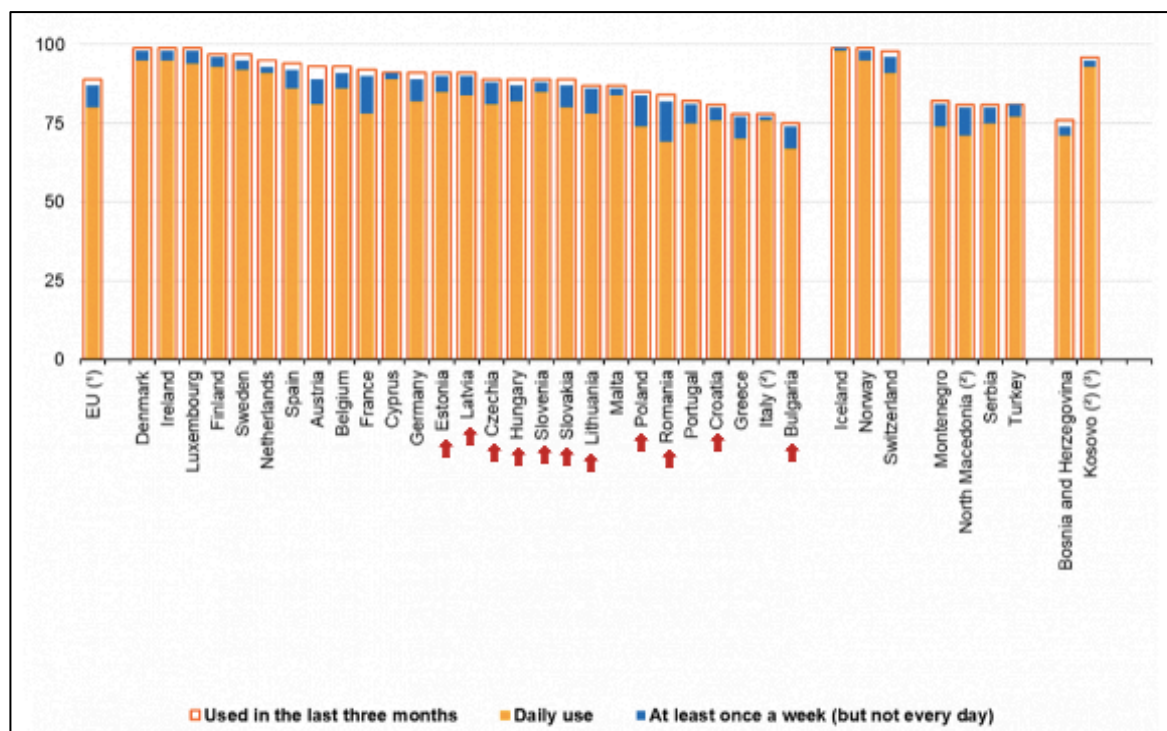
Notes: (¹) Estimation; (²) 2020 instead of 2021; (³) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.

Figure 8.: Frequency of Internet use, 2021 (% of individuals aged 16 to 74)
Source: Digital economy and society statistics – households and individuals, Eurostat

The next important field within digital involvement of people is understanding the motives of accessing the Internet, or in other words, what are EU citizens using the Internet for? One of the main online activities is participating in social networks nowadays, which was the most common activity in the EU in 2021.

On Figure 9., the ratio of people that engaged in activities connected to social networks are shown. In overall, among the individuals aged 16 to 74, more than half of EU citizens (57%) participated in social networking. From this aspect, the highest ratio was reported from Denmark, while countries with the least amount of people engaging in social

networking was France, Germany and Italy. As the EU average is around 50%, all CSE-11 countries provided ratios that exceed, or at least reach that. The third highest percentage can be associated with Hungary, which is the best performance within the CSE-11 group.
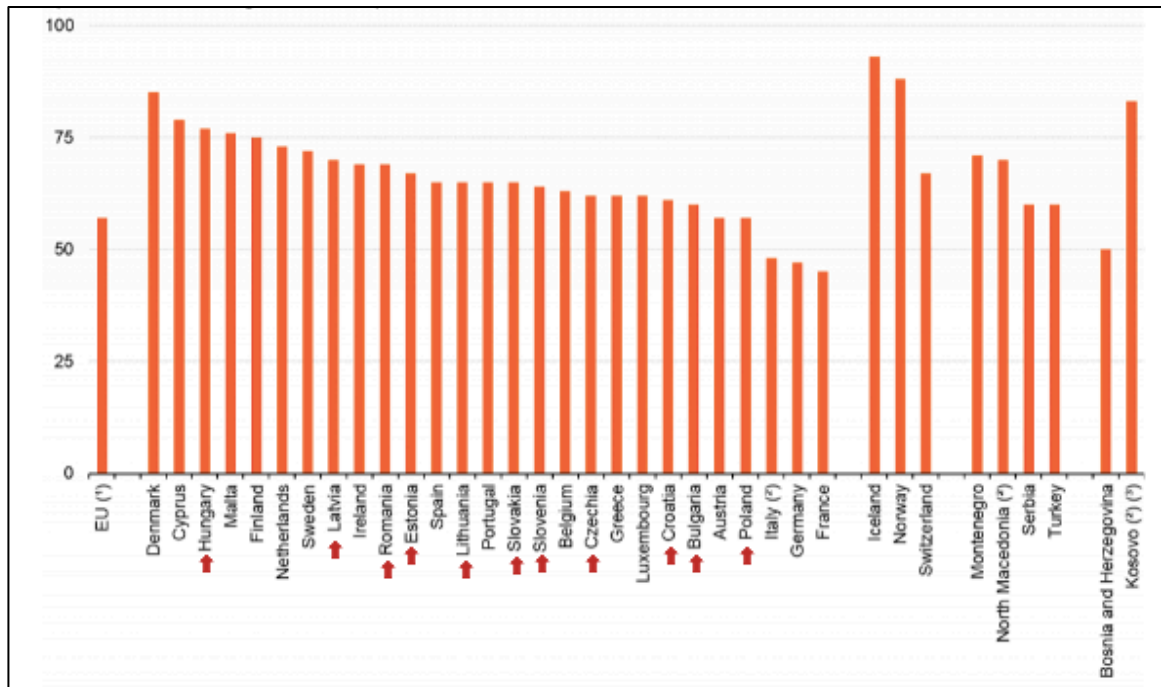
Notes: (¹) Estimation. (²) 2020 instead of 2021; (³) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.

Figure 9.: Individuals who used the Internet for participation in social networking, 2021 (% of individuals aged 16 to 74)
Source: Eurostat – Digital economy and society statistics

Among the functions of the Internet, purchasing and ordering via online platforms are worth mentioning. By examining Figure 10., one can note that on the overall EU level, there has been an increase of 15% within the period of 2016–2021. The highest ratios belong to Denmark, the Netherlands, Ireland and Sweden (all above 85%), while the lowest ones can be associated with Romania and Bulgaria; none of these provided satisfactory levels of ratio. In 17 Member States there was an increase of at least 15% between 2016 and 2021. Most of the CSE-11 countries, with the exception of Slovakia and Estonia, were below the average in 2016; however, the highest increase can be observed within these countries: Slovenia – 32%, Czechia – 28%, Hungary and Lithuania – both 27%. In 2021, four CSE-11 countries exceeded the EU average, namely Czechia, Slovakia, Slovenia and Estonia.
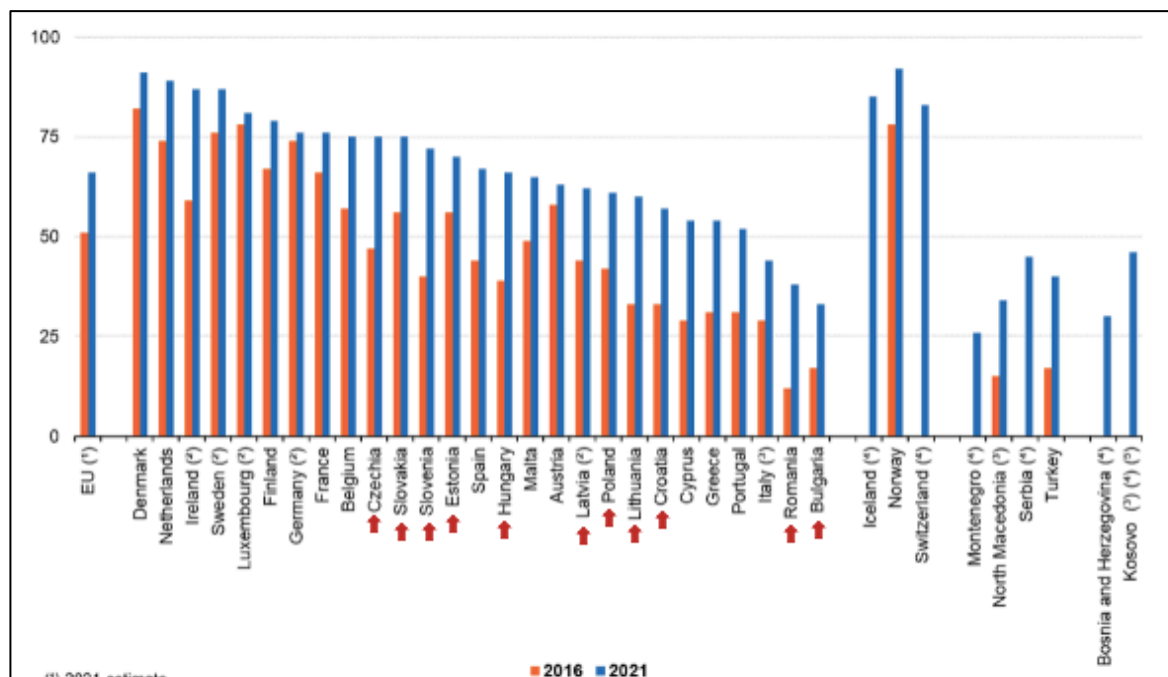
Notes: (¹) 2021 estimation; (²) Break in the time series; (³) 2020 instead of 2021; (⁴) 2016: not available; (⁵) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.

Figure 10.: Individuals who ordered goods or services over the Internet for private use in the 12 months prior to the survey, 2016–2021 (% of individuals aged 16 to 74)
Source: Eurostat – Digital economy and society statistics

Within the field of human capital, one that is within the current priorities of the EU regarding digital development, a key objective is increasing digital skills. Figure 11. presents the 2021 state of Member States in the field of having at least basic digital skills. The overall European target is to have at least 80% of the population that possess basic digital skills by 2030. One can conclude that even the forerunners lag behind the target for now; however, there is still plenty of time to reach it. In general, 54% of Europeans were provided with at least basic digital skills. The countries analysed in this research are primarily to be found in lagging positions, except Estonia and Slovakia. The worst results are provided by Bulgaria and Romania, where the level of basic digital skills among individuals is less than half of the desired target.
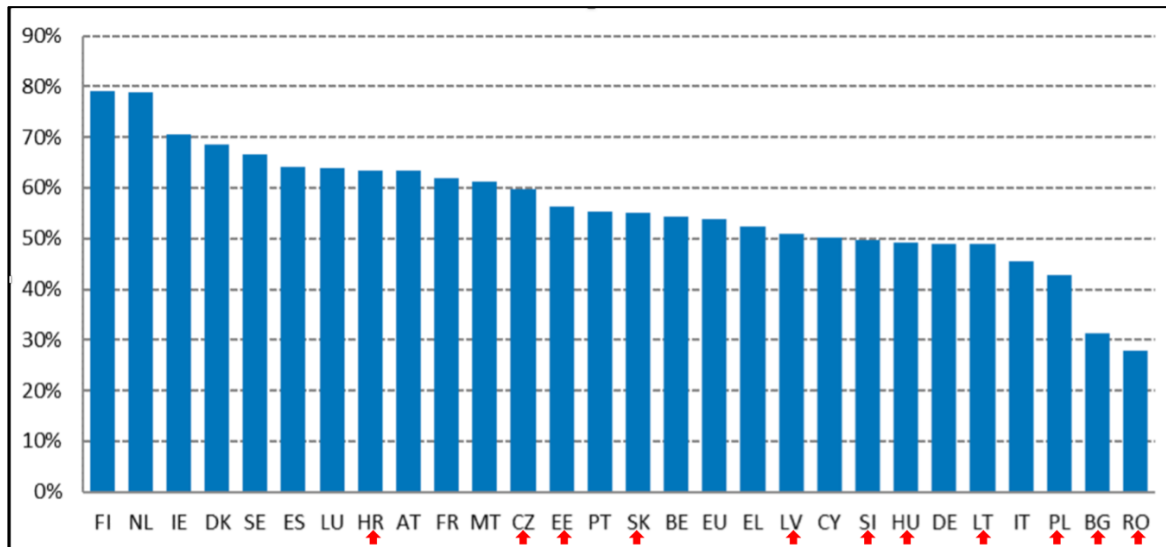
Figure 11.: At least basic digital skills, 2021 (% of individuals)

Source: EC (2022) p. 14. based on European Union survey on the use of ICT in house-
holds and by individuals provided by Eurostat.

4. MATERIALS AND METHODS

4.1. THE DATASET AND THE RELATION OF INDICATORS WITH THE LEVELS OF DIGITAL DIVIDE

Based on Eurostat's *Regional digital economy and society* database, a dataset of 7 ICT-related indicators is employed in the current study.[16] My dataset considers the period 2016–2021; accordingly, it partially covers the years of COVID-19 crisis. The geographical unit of the analysis is represented by the NUTS-2 regions, according to NUTS version 2016. In this analysis, 49 regions from 11 Central and South-East European countries are involved. All countries are Member States of the European Union and known as transition economies. Due to the lack of data, NUTS-2 level data are substituted with data on corresponding NUTS-1 levels in the case of Poland. In the case of Hungary and Lithuania there has been minor change of in the NUTS classification, so NUTS-2 level data are replaced with country level data for 2016 and 2017 in the following regions: Pest (HU), Budapest (HU), Sostines regionas (LT) and Vidurio ir vakaru Lietuvos regionas (LT).

The 7 selected indicators are presented in Table 6. The first two indicators (1. House-holds with broadband access, 2. Frequency of Internet access: daily) reflect access to and use of ICT by individuals and in households (*first level of digital divide*). Four indicators (3. Internet use: participating in social networks; 4. Internet use: interaction with public authorities; 5. Internet use: Internet banking; 6. Online purchases: from sellers from other EU countries) are more concerned with ICT competence and skills (*second level of digital divide*). These indicators reflect the skills in using of the Internet and social networks for different purposes (e-commerce, exchange information and services with governments and public administrations, e-government). Finally, 'Internet use: selling goods or services' (indicator no. 7) serve as a good measure of the *third level of the digital divide* as it captures a key action to realise economic benefit through online commerce. The abbreviations shown in the fourth column of Table 6. are used consequently in my study from this point.

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[16] The EU survey on the use of ICT in households and by individuals is an annual survey conducted since 2002 aiming at collecting and disseminating harmonised and comparable information on the use of ICT in households and by individuals. Data presented in this domain are collected by the National Statistical Institutes and are based on Eurostat's annual model questionnaire. This questionnaire is updated each year to reflect the evolving situation of ICT. Indicators from this survey are used for benchmarking purposes and in particular, this survey supports measuring the implementation of priorities for the period 2019–2024 of the *von der Leyen* European Commission (ICT usage in households and by individuals. Available at https://ec.europa.eu/eurostat/cache/metadata/en/isoc_i_esms.htm).

Table 6.: Set of indicators

Nr.	Name of indicator	Definition of indicator	Abbreviation	Measurement unit
Indicators related to first level digital divide (digital access)				
1.	Households with broadband access	The indicator measures the share of private households with broadband access (density of broadband Internet services).	BBACC	% of households
2.	Frequency of Internet access: daily	The indicator measures the percentage of individuals who regularly use the Internet.	DUINT	% of individuals
Indicators related to second level digital divide (digital competence)				
3.	Internet use: participating in social networks	The indicator measures the use of Internet for the following purposes: creating user profile, posting messages or other contributions to Facebook, Twitter, etc.	SOCMED	% of individuals
4.	Internet use: interaction with public authorities	The indicator measures the percentage of individuals who used the Internet to exchange information and services with governments and public administrations in the last 12 months.	PUBAU	% of individuals
5.	Internet use: Internet banking	The indicator measures the percentage of individuals who used online banking services.	ONBANK	% of individuals
6.	Online purchases: from sellers from other EU countries	The indicator measures the percentage of individuals who ordered goods and services online from other EU Member States.	ORDER	% of individuals
Indicator related to third level digital divide (digital outcome)				
7.	Internet use: selling goods or services	The indicator measures the percentage of individuals who sold goods and services online.	ONSELL	% of individuals

Source: Own elaboration.

4.2. APPLIED METHODS

4.2.1. Univariate analysis

For detecting the highest (top five) and lowest (bottom five) performing regions, the absolute and percentage changes from 2016 to 2021 and from 2019 to 2021 are calculated for each region with respect to all indicators. The results of the percentage changes are used for detecting the highest and lowest changes. To capture the patterns in the development of each NUTS-2 region and make comparisons with respect to the EU-27 and CSE-11 average, I label regions using the convergence or divergence patterns borrowed from the classification of the Eurofound (2018). The classification system, with relabelled arrows – Region/Member State instead of Member State, and EU-27/CSE-11 instead of EU – is available in Annex 1. The classification system is shown on Figure 12. Datasheets including calculations can be found from Annex 2 to 8.
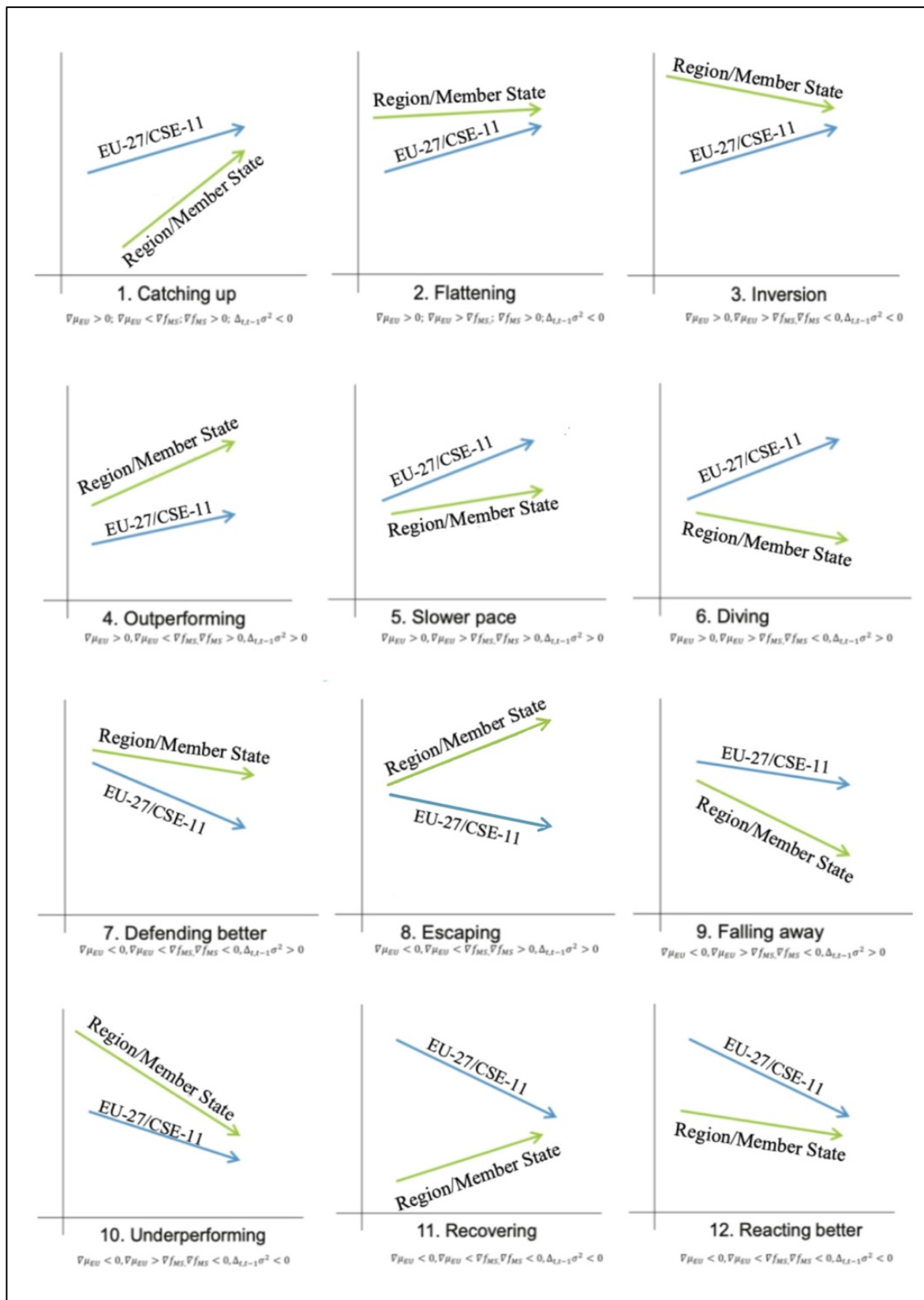
Figure 12.: The classification of convergence and divergence patterns
Source: Own elaboration based on Eurofound (2018), pp. 25–26.

Figure 12. presents twelve different possible convergence and divergence patterns that can be used for further regional and country comparison. According to Eurofound (2018), upward convergence is reached through the maximisation of the indicator in the case when the direction is positive, or through the minimisation of the indicator when the direction is negative. According to the classification system, upward convergence is reached by the maximisation of indicators. Within the *Upward convergence* category, one can detect three patterns as described below:

1. *Catching up:* When the performance of a region / Member State (hereinafter MS) is lower than the EU-27 / CSE-11 average at the beginning, but it grows quicker and reduces the gap;

2. *Flattening:* Occurs when the region / MS has a higher initial performance than the EU-27 / CSE-11 average, but it grows slower, and the gap is reduced;

3. *Inversion:* In this case the starting performance of the region / MS is higher than the EU-27 / CSE-11 average, but its performance declines, and the distance narrows, as the EU-27 / CSE-11 average is simultaneously increasing.

The second category is called *Upward divergence*, and includes three patterns:

4. *Outperforming:* The performance of the region / MS is higher at the starting point, and it grows faster than the EU-27 / CSE-11 average. This leads to the gap widening further;

5. *Slower pace:* The initial performance of the region / MS is lower than the EU-27 / CSE-11 average and grows at a slower rate. The gap increases over time;

6. *Diving:* The performance of the region / MS is worse initially, and it declines further, while the EU-27 / CSE-11 average increases, and results in the further expansion of the gap.

The third category represents *Downward divergence* with three patterns:

7. *Defending better:* The performance of the region / MS is higher at the beginning, then both decline, but the EU-27 / CSE-11 average falls at a faster rate. The gap increases;

8. *Escaping:* The starting performance of the region / MS is higher, and as it grows, the EU-27 / CSE-11 average declines; consequently, the gap widens;

9. *Falling away:* At the beginning the performance of the region / MS is lower, then both decline. The EU-27 / CSE-11 average falls at a slower rate, leaving the gap to expand.

The fourth category includes three pattern and can be labelled as *Downward convergence*:

10. *Underperforming:* The initial performance of the region / MS is higher, then both fall. There is convergence, as the EU-27 / CSE-11 average declines at a slower pace;

11. *Recovering:* At the beginning the performance of the region / MS is lower, but it grows, while the EU-27 / CSE-11 average declines, and the gap between them narrows;

12. *Reacting better:* The performance of the region / MS is lower initially, then both decline, but the EU-27 / CSE-11 average falls at a slower pace, so the gap shrinks.

While labelling the regions based on the above mentioned twelve basic categories, two additional pattern types emerged as follows:

13. *At the same pace:* Occurs when then the magnitude of the change performed by the region / MS is the same as the one performed by the EU-27 / CSE-11 average (the slope of the two trendlines are equal);

14. *Intersecting:* When the path of the region / MS and the path of the EU-27 / CSE-11 average cross with each other at some point, so there are two observable patterns between the two examined years. In these cases, both patterns are indicated next to each other.

For a better understanding of the balance vs. imbalance patterns, as well as gaining an insight into the regional development dynamics, I calculate the mean, the standard deviation, and based on these, the coefficient of variation for each indicator based on data from 2016 to 2021. Coefficient of variation (CV) is the ratio of the standard deviation to the mean and shows the extent of variability in relation to the mean of the population. The higher the CV, the greater the dispersion. Regional CV is calculated as follows:

$$CV_{[2016;2021]}^{REG} = \frac{Std.deviation_{[2016;\,2021]}^{REG}}{Mean_{[2016;\,2021]}^{REG}} \quad (1)$$

To make my result more visible, I create scatterplots for each indicator that contain the values from the 49 regions under observation, as well as EU-27 and CSE-11 averages. Scatterplots represent the mean on the horizontal (x-) axis and coefficient of variation on the vertical (y-) axis. Scatterplots serve as a good tool as they enable the comparisons of regions with each other and the EU-27 and CSE-11 averages.

4.2.2. Multivariate analysis

The application of Multidimensional Scaling (hereinafter referred as MDS) is based on data of 'distance' or 'similarity' nature, or data that can be transformed into such. MDS refers to a set of statistical techniques that are used to reduce the complexity of a data set, permitting visual appreciation of the underlying relational structures contained therein. With this method one can systematically create geometric representations for given objects (e.g. regions), which reflect the relationship of these objects (e.g. regions) in a geometric space with the appropriate number of dimensions with the smallest possible distortion. Although not in great number, the application of the method has already been demonstrated in space-specific research carried out by Hungarian authors (e.g. Lengyel 1999, Lukovics–Lóránd 2010, Dusek 2012).

To show the similarities and distances, namely to capture the sense of 'distance' and 'similarity' among the NUTS-2 regions regarding their performance in the 7 ICT-related indicators, I reduce the original 7 dimensions (indicators) to the two-dimensional space by performing MDS. I use the IBM SPSS (Statistical Package for Social Sciences, 25th version) for conducting the analysis. The approach and mathematical foundations of MDS for SPSS are already available in Hungarian language in different handbooks (Székely–Barna 2008, Ketskeméty et al. 2011) and journal articles (Mérő 1986, Takács 2013, Bánhidi et al. 2020).

Out of the two common techniques of performing this analysis, Alscal routine and Proxscal routine, the latter is chosen. MDS Proxscal routine can be reached under the following command line: *Analyze/Scale/Multidimensional Scaling (PROXSCAL).* In the Data Format dialog box, create proximities from data is selected as proximities among the regions are generated. Values are standardized, so none unequally high weights can be assigned to any indicator that would influence the results.

Concerning the test statistics, the co-called S-stress formula is widely used to express the goodness of fit of the MDS model. It is calculated as follows:

$$S - stress = \sqrt{\frac{\sum_{i=1}^{n} \sum_{j=1}^{n} (d_{ij} - d_{ij}^*)^2}{\sum_{i=1}^{n} \sum_{j=1}^{n} (d_{ij})^2}} \quad (2)$$

where (d_{ij}) is the (initial) distance matrix consisting of symmetric, non-negative elements, as well as (d_{ij}–d_{ij}^*) the distance matrix that measures the difference in numerical terms. If there is a perfect correspondence between the originally detected and the depicted differences (d_{ij}–d_{ij}^*), then the error is zero, and so is the value of the S-stress. In other words, SPSS examines and selects the configuration for which the value of S-stress is minimal. Therefore, the smallest possible value of S-stress is desirable, because it corresponds to the smallest distortion (Table 7).

Table 7.: The value and quality of the S-stress (rule-of-thumb)

S-stress value	The quality of the reconstruction
0.00 – 0.05	*Excellent*, probably contains all relevant information.
0.05 – 0.10	*Good*, appropriate, the results can be interpreted.
0.10 – 0.20	*Acceptable*, worth dealing with it, the result is still interpretable.
above 0.20	*Poor*, the dimension number can only be interpreted with a large loss of information, it is worth trying a larger dimension number.

Source: Ketskeméty et al. (2011), Takács (2013).

I test five different distance methods (also known as Minkowsky p-values). The goodness of fit for all the possible intervals is tested to decide which distance method is the most adequate for the dataset. In the case of the Euclidean distance ($p=2^1=2$) for all examined years, and in the case of the Minkowsky distance ($p=3$) regarding the years 2019 and 2021, the S-Stress values seem to be 'excellent' (S-Stress values are between 0.025 and 0.049). However, out of the possible options, the best fit measures can be associated with the Manhattan distance ($p=2^0=1$) as the S-Stress values fall in the 'near perfect fit' category as they are between 0.000 and 0.024. Accordingly, this distance method is used for further analysis on the subject. MDS test statistics are shown in Table 8.

Table 8.: MDS test statistics: goodness of fit – stress and fit measures

Distance (interval)	Manhattan Distance (Minkowsky p=1)	Euclidean Distance (Minkowsky p=2)	Squared Euclidean Distance	Minkowsky Distance (p=3)	Chebychev Distance (Minkowsky p ⇒ ∞)
2016					
Normalized Raw Stress	0.0206	0.0287	0.0451	0.0342	0.0411
Stress – I.	0.1434	0.1695	0.2124	0.1849	0.2026
Stress – II.	0.2905	0.3604	0.3830	0.4066	0.4652
S-Stress	0.0221	0.0420	0.1034	0.0602	0.1011
Dispersion Accounted For (D.A.F.)	0.9794	0.9714	0.9549	0.9658	0.9590
Tucker's Co-efficient of Convergence	0.9897	0.9855	0.9772	0.9828	0.9793
2019					
Normalized Raw Stress	0.0191	0.0206	0.0486	0.0206	0.0381
Stress – I.	0.1380	0.1436	0.2205	0.1433	0.1951
Stress – II.	0.2792	0.3065	0.4001	0.3164	0.4511
S-Stress	0.0259	0.0262	0.1000	0.0310	0.0850
Dispersion Accounted For (D.A.F.)	0.9810	0.9794	0.9514	0.9795	0.9620
Tucker's Co-efficient of Convergence	0.9904	0.9896	0.9754	0.9897	0.9808
2021					
Normalized Raw Stress	0.0155	0.0207	0.0405	0.0262	0.0442
Stress – I.	0.1247	0.1440	0.2013	0.1618	0.2103
Stress – II.	0.2581	0.3103	0.3623	0.3559	0.4727
S-Stress	0.0217	0.0330	0.1003	0.0466	0.0973
Dispersion Accounted For (D.A.F.)	0.9845	0.9793	0.9595	0.9738	0.9558
Tucker's Co-efficient of Convergence	0.9922	0.9896	0.9795	0.9868	0.9776

Source: Own elaboration based on SPSS output table.

As mentioned before, scatterplots are created to make results more apparent. Each region is marked with dot on the figures and labelled with geocode in the next chapter. Furthermore, along the Dimension 1, which compresses most indicators (6 out of the 7 indicators), regions are split up into three categories: '*Laggards*', '*Average*' and '*Leaders*'; while the first category consists of regions that show relatively low performance, the third group includes regions with relatively high levels in ICT infrastructure and usage. For 2016, 2019 and 2021, maps demonstrate the classification of regions according to the three categories which also enables to detect the changes in times of the COVID-19 outbreak.

5. PRIMARY RESULTS

5.1. TOP AND BOTTOM POSITIONS OF ICT-RELATED INDICATORS ON REGIONAL LEVEL

1. Household with broadband access – BBACC

Regarding this indicator, the overall European development is around 13%, while the CSE-11 countries average shows almost 18% increase from 2016 to 2021. The regions with the lowest levels of development within this period are two regions from Czechia, Estonia, the Romanian capital region and a Slovakian region. The top performers include two Romanian regions and three regions in Bulgaria.

During the period 2019–2021, the average increase for the EU-27 is slightly below 5%, while within the CSE-11 group it is a litter higher, almost 7%. There are two Czech regions where the number of houses having broadband access did not increase, but stagnated or slightly decreased. Other low results are associated with two Czech regions that are among the laggers within the other time period, as well Estonia. Regions with the most remarkable increase are three Bulgarian regions, and two regions from Slovakia.

2. Frequency of Internet access: daily – DUINT

Examining individuals who use the Internet daily one can see that the EU-27 average is around 20%, while in the CSE-11 countries an average increase of more than 25% can be presented. During the period 2016–2021 there is one region from each of these countries among the lowest performers: Estonia, Croatia, Hungary, Poland and Slovakia. All the highest performing regions are associated with Romania, all having increases above 50%.

For the period 2019–2021, the EU-27 average is slightly above 7%, and the CSE-11 average is almost 10%. There is a decrease in the case of two Czech regions, and stagnation in one Hungarian and one Slovakian region. The top performers are again Romanian regions along with some Bulgarian ones.

3. Internet use: participating in social networks – SOCMED

The EU-27 average is a bit above 20%, and it was somewhat higher, almost reaching 30%, in the CSE-11 countries. The lowest performances appear in Czechia, Croatia, Hungary and Slovakia, while the biggest change during the period is associated with Romania, Slovenia and Bulgaria.

The period from 2019 to 2021 brings changes between 8–10% in the EU-27 and the CSE-11 averages. Decrease is also detectable in three Czech and one Slovakian regions, and

one in region from Bulgaria there is stagnation. The highest increases are to be found in two Bulgarian, one Slovenian and two Slovakian regions.

4. Internet use: interaction with public authorities – PUBAU

Between 2016 and 2021 the EU-27 average increase is slightly below, and the CSE-11 average slightly above 30%. The lowest performances were provided in Estonia, Latvia and Slovakia. The highest performances are associated with two Romanian and three Czech regions, in all of which an increase above 110% is performed.

For the period between 2019 and 2021 both the EU-27 and the CSE-11 averages are between 16–17%. In several cases a decrease can be detected, with the most unsatisfactory cases being in two Bulgarian and three Slovenian regions. The highest increases, on the other hand, are to be found in two Bulgarian, two Hungarian and one Romanian regions.

5. Internet use: Internet banking – ONBANK

The average increase for the EU-27 is 32%, while in the CSE-11 countries it is somewhat higher, reaching 37% for the period 2016–2021. Regions with relatively low level performances are to be found in Poland, Slovakia and Estonia. The highest performances are detected in Bulgaria and Romania, where in some regions the number of individuals using Internet banking has grown four–five times higher compared to the initial level.

For the period between 2019–2021 the average increase for the EU-27 and the CSE-11 is both around 13%. In one Bulgarian region, a decline can be detected. Other low performances are associated with Estonia, Hungary, Poland and Slovakia. The most promising results are provided by two Bulgarian and four Romanian regions, in all of which the initial level was at least doubled.

6. Online purchases: from sellers from other EU countries – ORDER

During the period 2016–2021 there is an increase of around 8% in the number of individuals who ordered goods online from other Member States in case of the EU-27, while in the CSE-11 countries the average has grown by almost 30%. On the regional level the least sufficient results, that are all declines, reaching even -50% in some cases, are to be found in Bulgaria, Poland and Romania. The highest-level performances can be detected in Czechia and Romania, where some regions have grown to more times the initial level.

During the years between 2019 and 2021 there is a decline in both the EU-27 (-8%) and CSE-11 (-4%) averages. The lowest performers show declines of around -50% and can

be detected in regions of Bulgaria, Hungary and Romania. Despite of the overall lower-level performance of regions within this indicator, there are some positive examples, too. In some regions in Czechia and Romania an increase of 45–100% can be detected.

7. Internet use: selling goods or services – ONSELL

Both the EU-27 and the CSE-11 average increases are around 36% for the period 2016–2021. The most unsatisfactory results are provided by regions in Bulgaria, Czechia and Poland, all have undergone a decline of at least 40%. The high performing regions include one Lithuanian, three Hungarian and one Romanian regions. In these the initial level has been doubled at least.

Between the year 2019 and 2021 the EU-27 and the CSE-11 averages has increased by around 24%. In case of some regions in Bulgaria, Czechia and Poland, decline of 40-60% is detectable. The highest performances, on the other hand, means at least doubling the initial levels for certain regions in Lithuania, Hungary and Romania.

5.2. CONVERGENCE VS. DIVERGENCE PATTERNS OF CSE-11 COUNTRIES AND NUTS-2 REGIONS[17]

The first six indicators (BBACC, DUINT, SOCMED, PUBAU, ONBANK, ONSELL) show remarkably similar pictures within the distribution of patters between the CSE-11 regions. In these indicators the patterns appearing were exclusively within the upward convergence (catching up, flattening, inversion) and upward divergence (outperforming, slower pace, diving) types. In BBACC and DUINT patterns of upward convergence dominate, while in the others upward divergence is more extensive.

In addition, for these six indicators the number of cases where regions are associated with downward trends are minimal. However, there are some exceptions: in SOCMED for the period 2019–2021 in three Czech regions there was a downward trend, in PUBAU for the period 2019–2021 almost all regions of Slovakia and Bulgaria are categorized by a downward trend, and most outstandingly, in ONSELL a downward trend is presented in almost all of Poland as well as in some Czech, Slovakian, Bulgarian, Croatian and Slovenian regions.

The last indicator, ORDER, deviates from the others as all possible categories appear. The most interesting ones are the patterns appearing within the period 2019–2021, as these are ones of downward divergence (defending better, escaping, falling away) and downward

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[17] The detailed overview of results related to this analysis is presented through maps available in Annex 9.

convergence (underperforming, recovering, reacting better). Most regions are assigned to downward convergence, but a decent number of regions are associated with downward divergence, as well in both cases. In these two cases regions presenting a downward trend outnumber the ones with an upward trend. Results for the period 2016–2021 show similar tendencies to the first six indicators, as these include upward convergence and upward divergence patterns. There are some exceptions in Bulgaria, Poland, Romania and Slovakia, but in overall, upward tendencies are more common in these two cases.

5.3. BALANCE VS. IMBALANCE PATTERNS OF CSE-11 COUNTRIES AND NUTS-2 REGIONS

5.3.1. Households with broadband access – BBACC

The results of the analysis on the balance vs. imbalance of regions regarding the indicator concerning with the number of households having broadband connection at home is shown on Figure 13. By examining the figure one can see that all the regions had average performances above 65%, and that within this indicator the results are relatively high in overall. This might be related to the fact that the BBACC indicator is special, as it is the basis of the other indicators, since an individual has to have access to the Internet in order to participate in any kinds of activates online. In this case the difference between the EU-27 and the CSE-11 is relatively less significant.

The lowest average performances were provided within Bulgarian and Romanian regions, however, in the capital region of Romania (RO32) one of the highest average values were reached. Despite the Bucharest region, the most favourable average values, that exceed even the EU-27 average, are to be found in regions of Czechia, Hungary, Slovenia, Poland, and Slovakia. When the growth rates are under focus, it is important to mention that the scale of the growth rates (y-axis) is the shortest in this case among the seven indicators, which again can be related to the high initial performances: there was not much space left for growth. The highest pace of growth is to be associated with the regions of Romania and Bulgaria in which the average values are not so satisfactory. Apart from the ones mentioned as extremities, most of the regions are grouped around the two averages, which can mean that in overall, the performances provided by the CSE-11 regions do not show extreme differences.
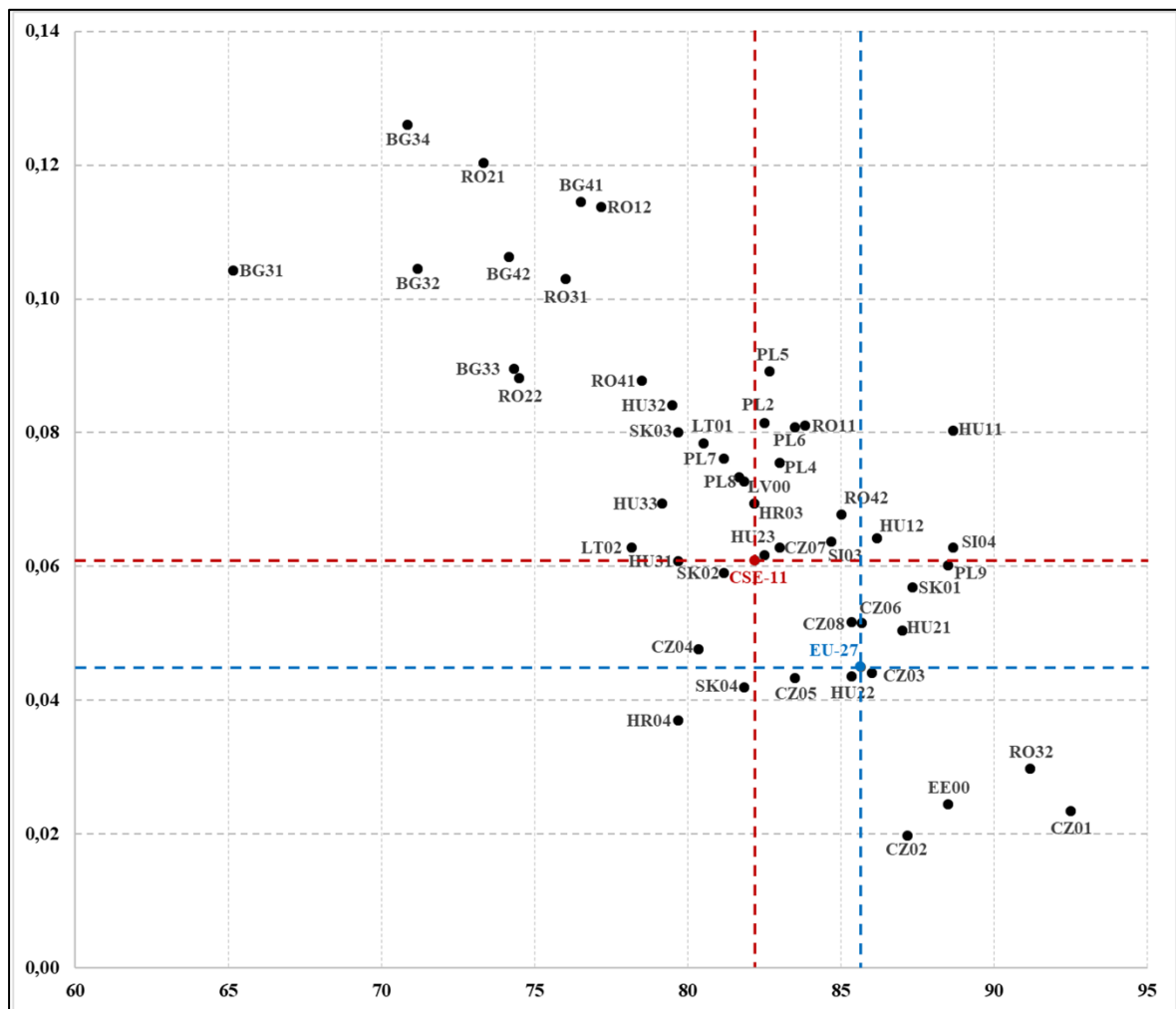
Figure 13.: Households with broadband access: mean (x-axis) and coefficient of variation (y-axis) across the CSE-11 regions, 2016–2021
Source: Own elaboration.

5.3.2. Frequency of Internet access: daily – DUINT

On Figure 14. the dynamics of regions within the number of individuals who use the Internet daily is shown. Examining the two axes one can find that while the maximal value of the x-axis is lower than in the case of BBACC, the scale is wider for the y-axis, meaning that the average results of regions were lower while the growth of regions was more remarkable.

The relationship between the two means shows that the average value for the CSE-11 countries was significantly, more than 10%, lower than the EU-27 average. The difference between the average growths is substantial in comparison with the other indicators. One can see that once again, the lowest average results belong to Romanian and Bulgarian regions. These, apart from the capital regions, all fall below the CSE-11 average on the x-axis. All other regions, except for PL8 (Makroregion Wschodni), have higher average mean than the

regional average. Most CSE-11 regions fall between the EU-27 average and the CSE-11 average, the x value is higher than the EU-27 in only five of them.

Regarding the y-axis, the highest coefficient of variation is associated with some Romanian and Bulgarian regions, the ones which were associated with the lowest mean values according to the x-axis. Most CSE-11 regions performed above the CSE-11 average in terms of their growth pace. The lowest y values are detected in Estonia, and in one Hungarian, one Czech, one Polish and one Slovakian regions.

Figure 14.: Frequency of Internet access: daily: mean (x-axis) and coefficient of variation (y-axis) across the CSE-11 regions, 2016–2021
Source: Own elaboration.

5.3.3. Internet use: participating in social networks – SOCMED

The next indicator under observation is the one concerning with the intensity of social media use among the individuals within a region, the result of which is presented on Figure 15. One can see that while the scale of the y-axis remained the same, the x-axis shrunk further compared to previous indicators, as here there are no values above 90%.

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Concerning the relationship between the two averages, the difference between them – regarding the mean value – is almost minimal. There are numerous regions below the CSE-11 average from Bulgaria, Poland, Czechia, Romania and Croatia. On the other hand, in several regions from Hungary, Estonia, Slovakia, Latvia, Lithuania and Romania performance was above the EU-27 average, which is quite unique among the seven indicators.

Regarding the mean values, the country with outstandingly high performance in terms of the x-axis is Hungary, with all of its regions well-above the EU-27 average. Among the lowest values there are Bulgarian and Polish regions, however the usually underperforming Romanian ones are placed among the moderately performing regions. Czech regions are to be found in less satisfactory positions within this indicator.

For the values distributed on the y-axis one can note that the highest growth is associated with the two Slovenian regions, followed by three Romanian and one Czech regions. The lowest level of growth is detected in two Slovakian regions, while in the other two performance above the CSE-11 average is detected. Other lower growth pace can be found in Estonia and one Hungarian region.
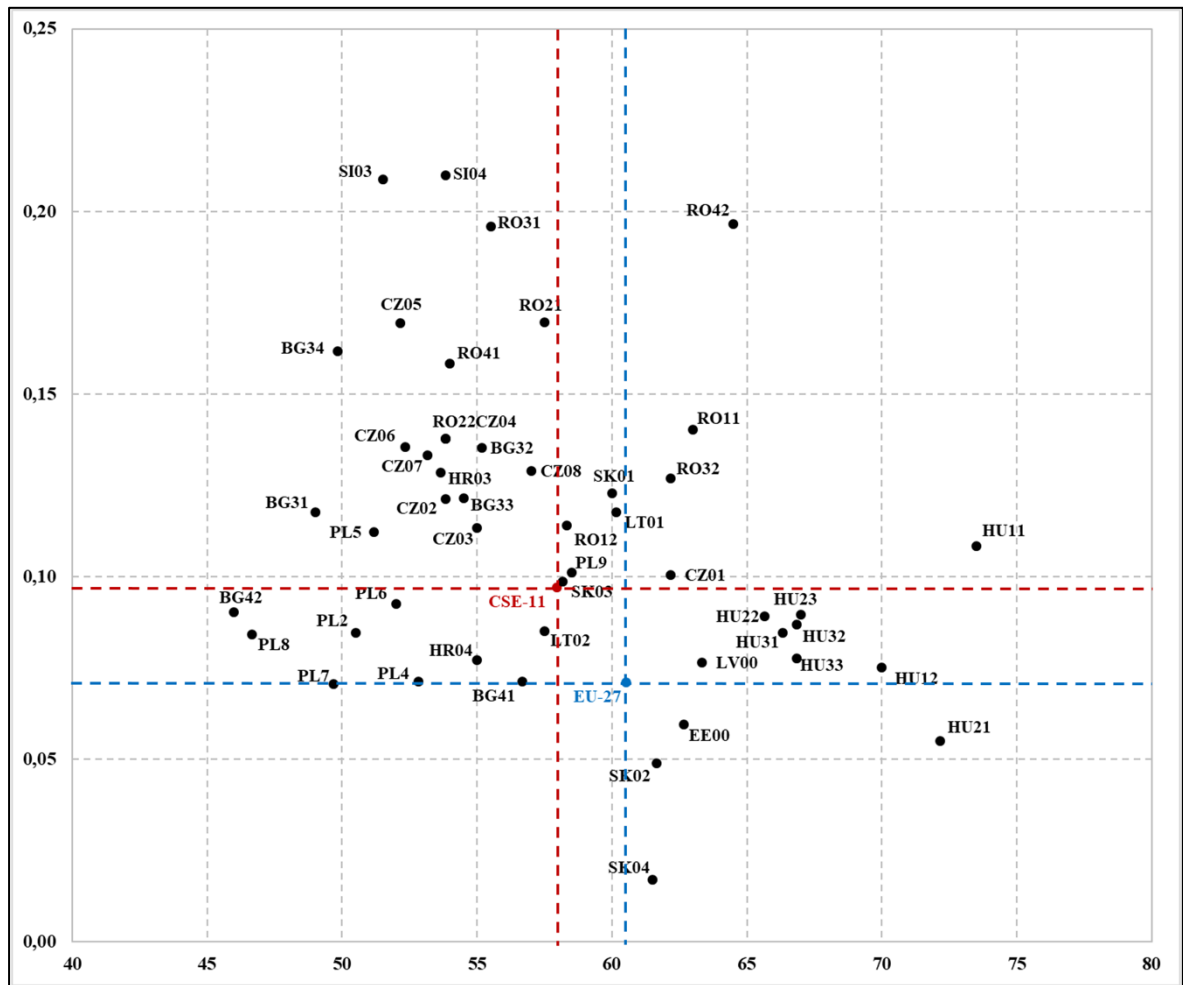
Figure 15.: Internet use: participating in social networks: mean (x-axis) and coefficient of variation (y-axis) across the CSE-11 regions, 2016–2021
Source: Own elaboration.

5.3.4. Internet use: interaction with public authorities – PUBAU

For understanding the balance vs imbalance within the indicator that assesses the number of individuals interacting with public authorities online, the regional results are shown on Figure 16. The scale of the y-axis is considerably higher than in the case of Figure 15, while the x-axis has a shorter scale, meaning that the mean values are lower (there are no values above 75%) and that there are graver differences between the coefficient of variation of the regions.

One can see that the difference between the EU-27 and the CSE-11 averages has not changed significantly, however, it is remarkable regarding the x-axis, where it is around 10%. There are several regions below the CSE-11 average on the x-axis (mostly Romanian, Bulgarian, Croatian and Polish ones). Between the two averages there are Czech, Hungar-

ian, Slovakian, Slovenian and Lithuanian regions. In Estonia, and in some regions of Hungary, Czechia, and one-one Slovenian, Slovakian Romanian regions the EU-27 average was overperformed.

The dispersion of results in terms of the y-axis shows that there is one region (RO22 – Sud-Est) that stands out by far as the highest result. Other top performers include Romanian, Czech and Bulgarian regions. The lowest value for coefficient of variation is detected in Estonia, in which almost no growth happened. Latvia, Slovakia, Lithuania and Hungary also had regions among the lowest values of the y-axis.

Regarding the x-axis, the lowest results are associated with Romania, some of which do not reach 10%. The highest value was provided by Estonia, which had a mean of almost 80%.
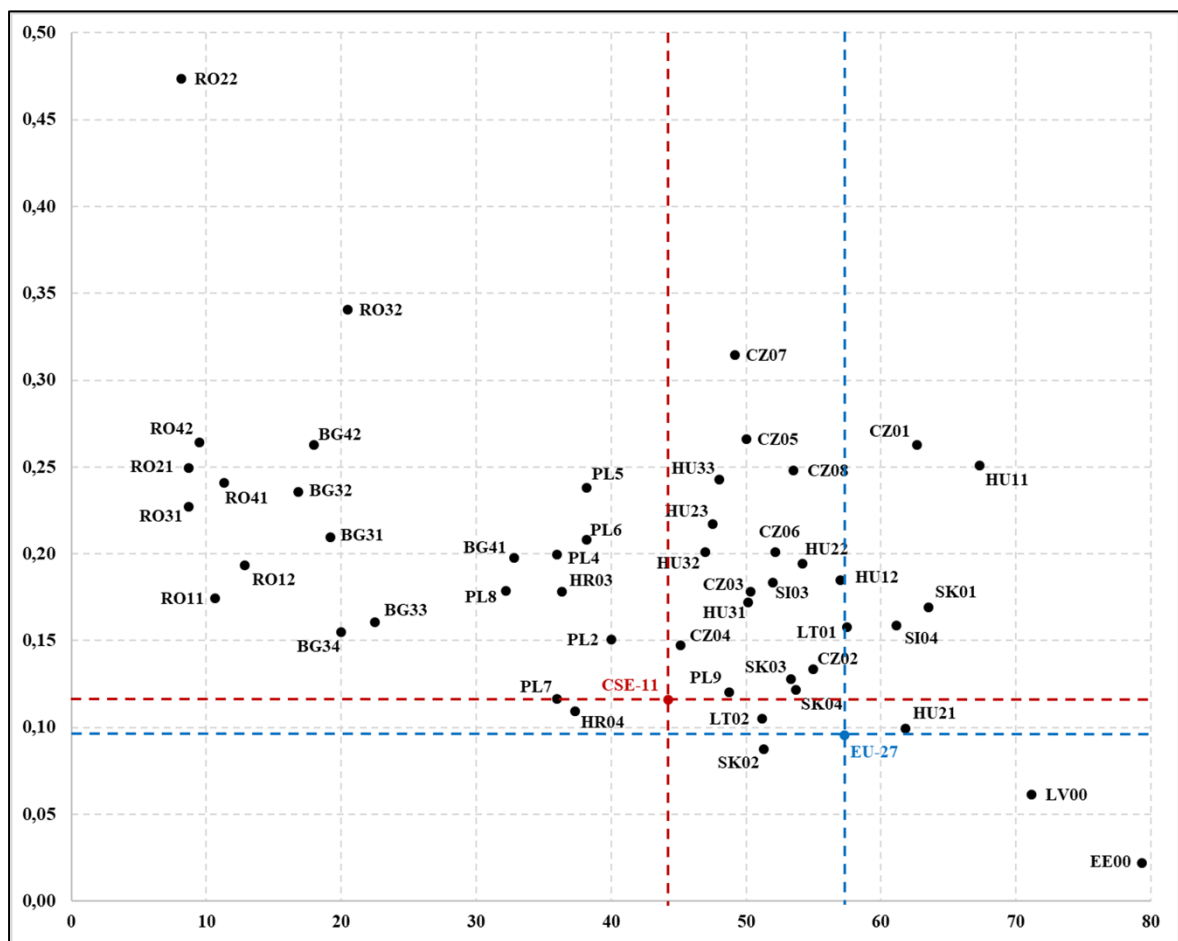
Figure 16.: Internet use: interaction with public authorities: mean (x-axis) and coefficient of variation (y-axis) across the CSE-11 regions, 2016–2021
Source: Own elaboration.

5.3.5. Internet use: Internet banking – ONBANK

The result of the analysis based on the indicator concerning with the number of individuals using online banking are presented on Figure 17. In this case the scale of the y-axis widened further compared to the one of the previous indicators, meaning that the differences between the growth dynamics of regions increased. On the x-axis one can note that the scale widened, as there is a region in which a mean value above 80% was provided.

Regarding the two averages, the difference between them based on the x-axis is again, around 10%, while on the y-axis the two values representing the EU-27 and the CSE-11 remain close, as well. Most regions are located around the two averages, however, the two typically lagging countries are further away from the CSE-11 average, with only the Romanian capital region converging towards the other regions.

Observing the dispersion of values on the y-axis, one can see that there is a break between two groups of regions. The first one consists of Romania and Bulgaria, and is characterized by high values, meaning that regions within these countries have higher growth rates than other regions. Within the second group highest y values are provided by mostly Hungarian regions, as well as the Romanian capital region. Estonia is an out stander, as its result is considerably lower than any other regions.

Dispersion on the x-axis shows almost the same pattern. Romanian and Bulgarian regions, here with the Romanian capital included, all performed under 20%, and are far from the results in other regions. The second group performed between around 35-70% with mostly Hungary and Croatia at the bottom of the group, Polish and Slovakian regions in the middle, and Czech and Lithuanian regions at the top. Estonia stands out from this aspect, as well, as it has the absolute best mean result, remarkably higher than any other regions.
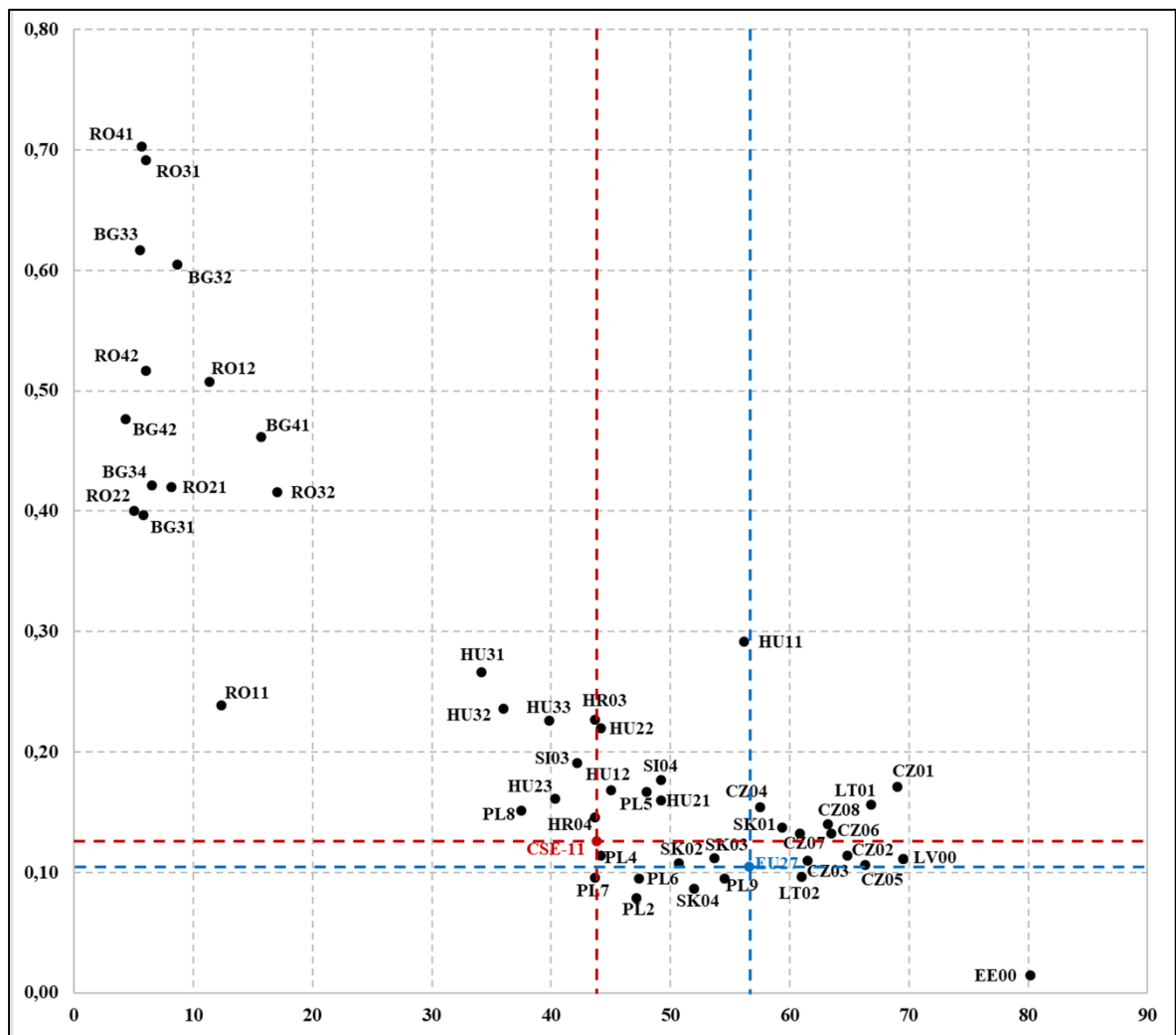
Figure 17.: Internet use: Internet banking: mean (x-axis) and coefficient of variation (y-axis) across the CSE-11 regions, 2016–2021
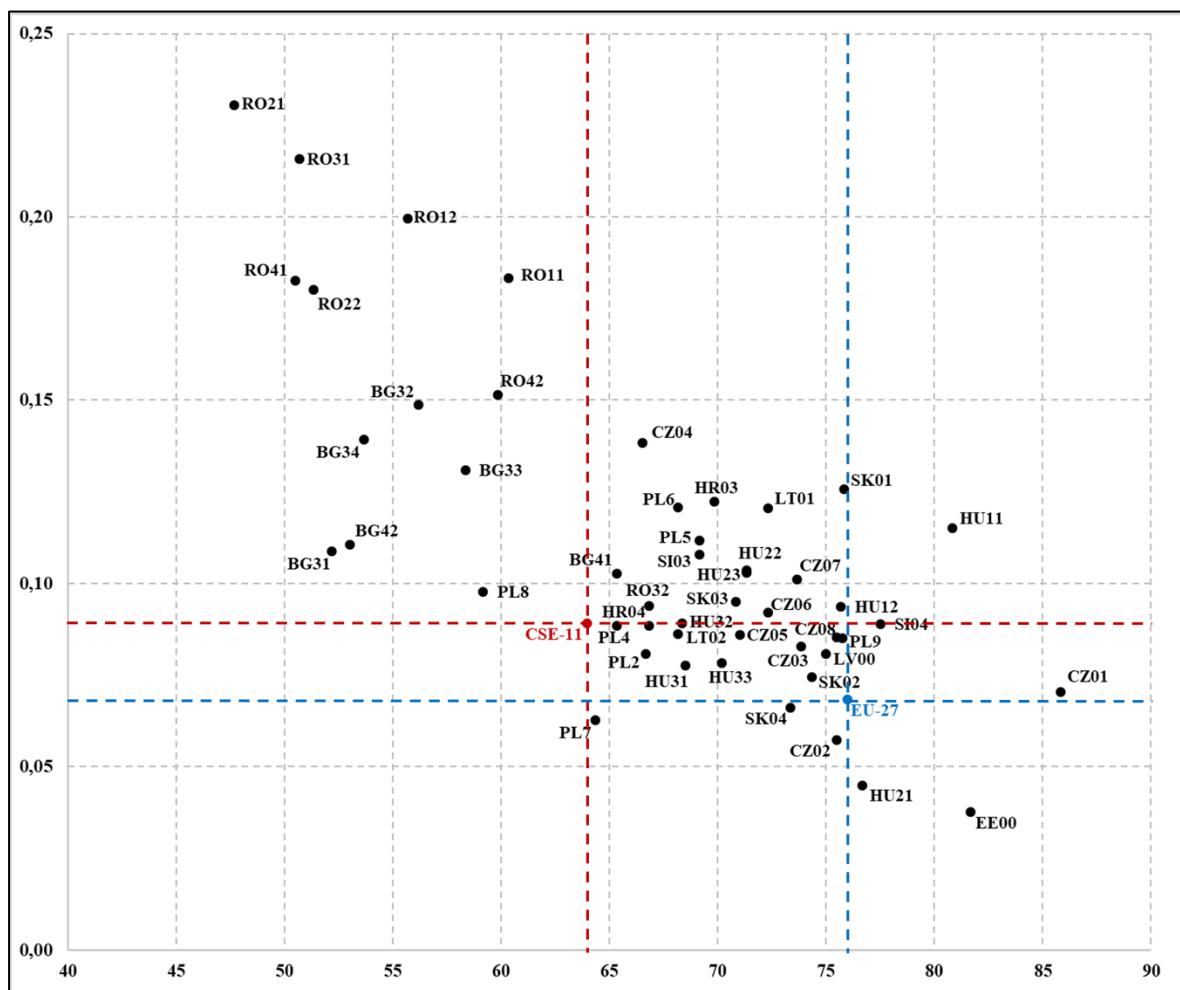Source: Own elaboration.

5.3.6. Online purchases: from sellers from other EU countries – ORDER

The last indicator under observation measures the number of individuals that conducted online purchases from seller from other EU countries. The results are presented on Figure 18.

Observing the relationship between the two averages, one can conclude that the distance between them on the x-axis rose to 10%, which can be considered high, relatively to the scale of the axis. The difference between them is somewhat higher regarding the y-axis.

Examining the x-axis, one can see that the regions are dispersed relatively evenly on the scale. The worst results are connected to Romanian regions, then comes Bulgaria and Poland. Some Czech and Hungarian regions are below the CSE-11 average. There were only three regions where the EU-27 average was overperformed: one Slovenian, one Slovakian and Estonia.

Regarding the values on the y-axis, it is noticeable that most of the regions are distributed evenly, apart from the two Romanian regions in which the highest results were performed. The vast majority is located within the middle part of the scale, including regions from Romania, Czechia, Bulgaria, Hungary, Lithuania, Slovenia and Estonia. The lowest values are associated with three Slovakian, one Polish, one Croatian regions, as well as Latvia.
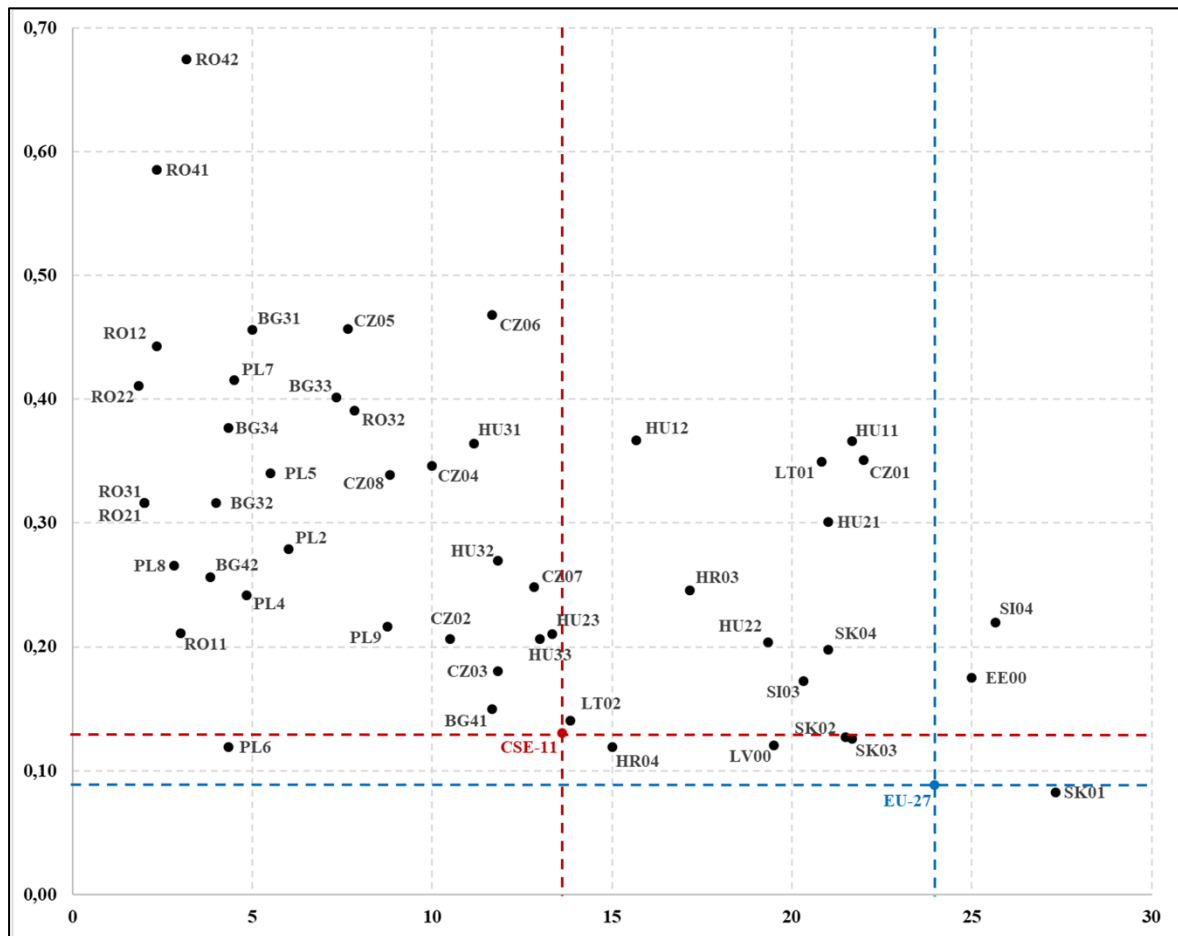
Figure 18.: Online purchases: from sellers from other EU countries: mean (x-axis) and coefficient of variation (y-axis) across the CSE-11 regions, 2016–2021
Source: Own elaboration.

### 5.3.7. Internet use: selling goods or services – ONSELL

The next indicator under observation is the one concerning with the number of individuals who sold goods or services online, the result of which is shown on Figure 19. One can see that the scale of the x-axis is the shortest among the indicators (together with the previous one on Figure 18.), meaning that relatively to the other indicators, the regions in this case are closer to each other. On the other hand, the scale of the y-axis is the widest here, as the

highest coefficient of variation, detected in RO41 (Sud-Vest Oltenia), belongs to this indicator.

Examining the differences between the CSE-11 and the EU-27 averages one can see that regarding the mean values, the difference is only around 5%, which is relatively low in comparison with the other indicators. On the y-axis the difference is again, minimal, so the two average values are certainly close to each other.

Values on the x-axis are dispersed relatively evenly, there are no clear outlier regions. The lowest results, once again, belong to Romania, then Bulgaria, with all Romanian regions being under 5%. The highest value is connected to one of the Croatian regions, however, this one is still under 30%. Other well-performing regions are located in Slovakia, Croatia and Estonia.

Examination of the y-axis reveals that the highest value was provided in a Romanian region, that is by far above the following ones. Other higher coefficients of variation are to be found in Hungary and Romania. Below that, regions are located more densely. The lowest performances, that are positioned below the EU-27 average, are associated with Poland, Bulgaria, Croatia and Czechia. It is interesting to mention that Romanian regions are widely dispersed on the y-axis that leads to the conclusion that there are grave differences within the country.
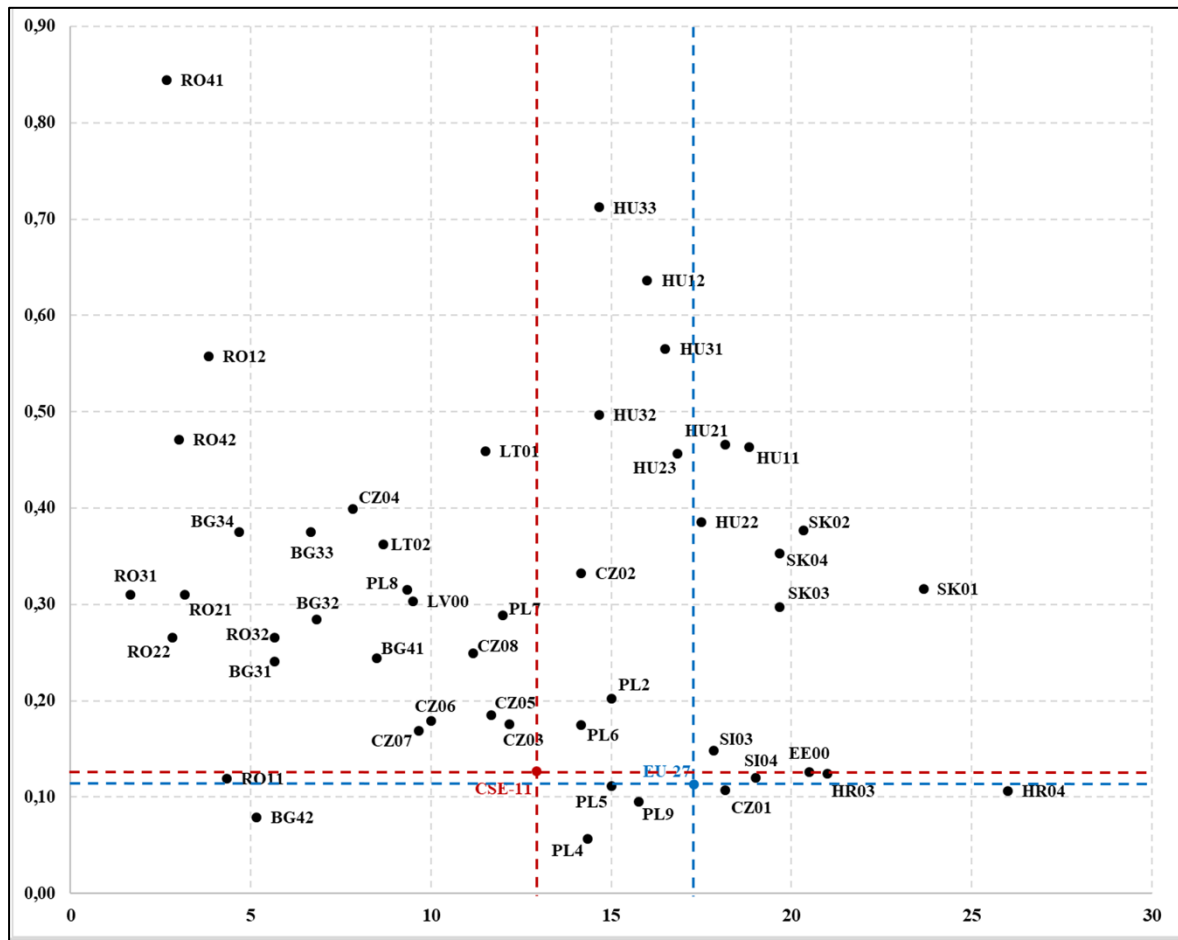
Figure 19.: Internet use: selling goods or services: mean (x-axis) and coefficient of variation (y-axis) across the CSE-11 regions, 2016–2021
Source: Own elaboration.

5.4. RESULTS OF THE MULTIDIMENSIONAL SCALING (MDS)

5.4.1. The 2016 MDS results

The results of MDS for 2016 are presented on Figure 20 and 21. The two dimensions are indicated as the two axes of the diagram. Most of the indicators appear in Dimension 1, where the order of these based on the extent of their influence on the dimension is as follows: DUINT, PUBAU, ONBANK, ORDER, BBACC, ONSELL, and the directions of the included indicators are the same with no exceptions. The only indicator influencing Dimension 2 is SOCMED. The constellation of indicators in the dimensions does not change significantly through the three years, consequently the three results are comparable with each other.

Based on the two dimensions, the most favourable positions are in the upper right corner of the diagram, while the lowest-level performances are associated with the bottom left corner. Regarding Dimension 1, the weakest results can be witnessed in the Romanian

and Bulgarian regions, with the exclusion of the capital regions of both countries, as these fall into the 'Average' category. The highest values within Dimension 1 were given to Estonia and Latvia, as well as, all regions of Slovakia, three Hungarian, two Czech and one Slovenian regions. Within Dimension 2, the performance of Estonia was the weakest, and the highest result is associated with a Croatian region, which stands out especially compared to the other Croatian region (HR03 – Jadranska Hrvatska).

The NUTS-2 regions of the CSE-11 countries tend to group together in several cases. For example, Romanian and Bulgarian regions are close to each other, apart from the capital regions of both countries (RO32 – Bucuresti-Ilfov; BG41 – Yugozapaden). Hungarian regions are located near each other, as well, where regional performances brought results slightly higher than average in Dimension 1, completed with high intensity of social media use that is descriptive of the country. In the middle part of the diagram, within the 'Average' category, there are mostly Polish, Czech and Lithuanian regions.

By comparing the results of the MDS analyses of 2019 and 2021, one can conclude that the NUTS-2 regions were almost divided into three parts, with some exceptions in the year 2016. The laggards – mostly Bulgaria and Romania; the above-average – consisting of Hungarian and Slovakian regions; and the middle part – Czech, Polish, Lithuanian regions; and some outliers.

Examining the visualization of the categories based on Dimension 1, one can see that the 'Laggards' category consists of regions of two Member States: Bulgaria and Romania. The 'Average' regions are located in Croatia, Poland, Lithuania, the Eastern half of Slovenia, the Southern and Eastern part of Hungary, the peripheral regions of Czechia, and the capital regions of Bulgaria and Romania. The category consisting of the 'Leader' regions include Slovakia, Estonia and Latvia, the Western part of Slovenia and Hungary, the central regions of Czechia.
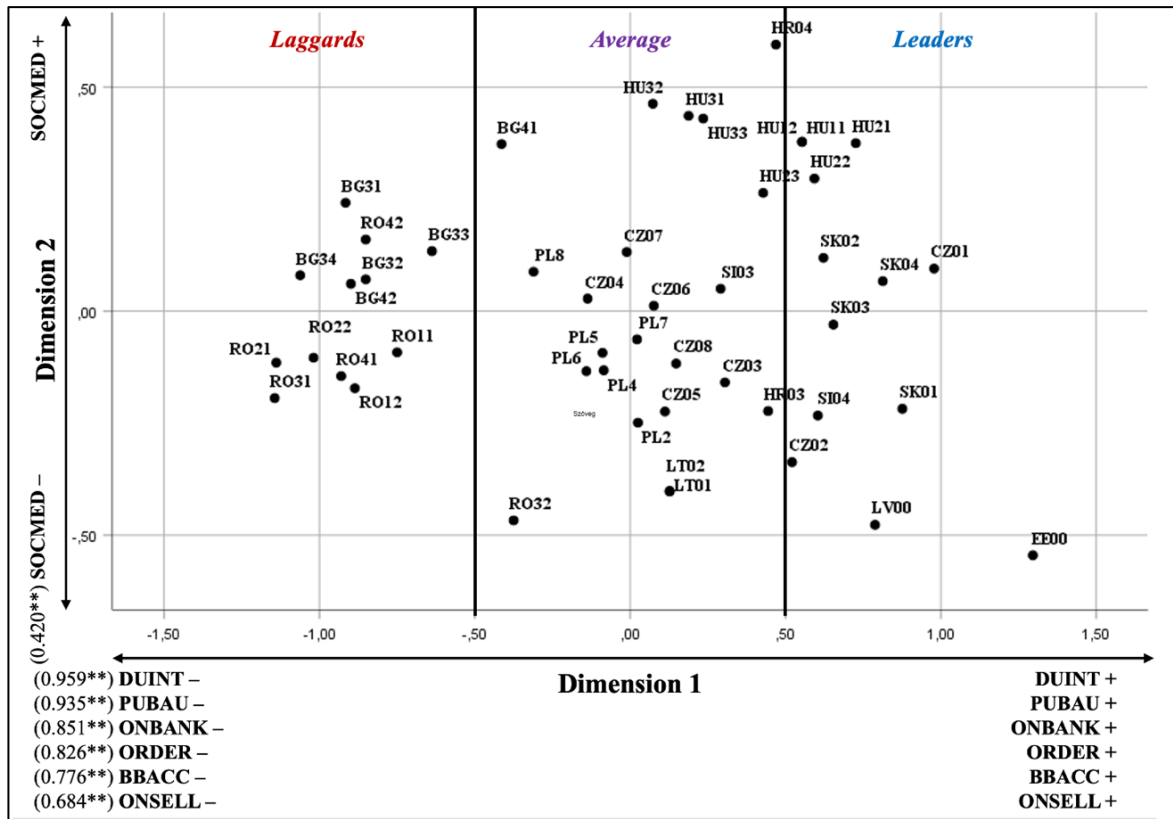
Note: ** At 95% confidence (p<0.050).

Figure 20.: MDS results in CSE-11 NUTS-2 regions, 2016
Source: Own elaboration.
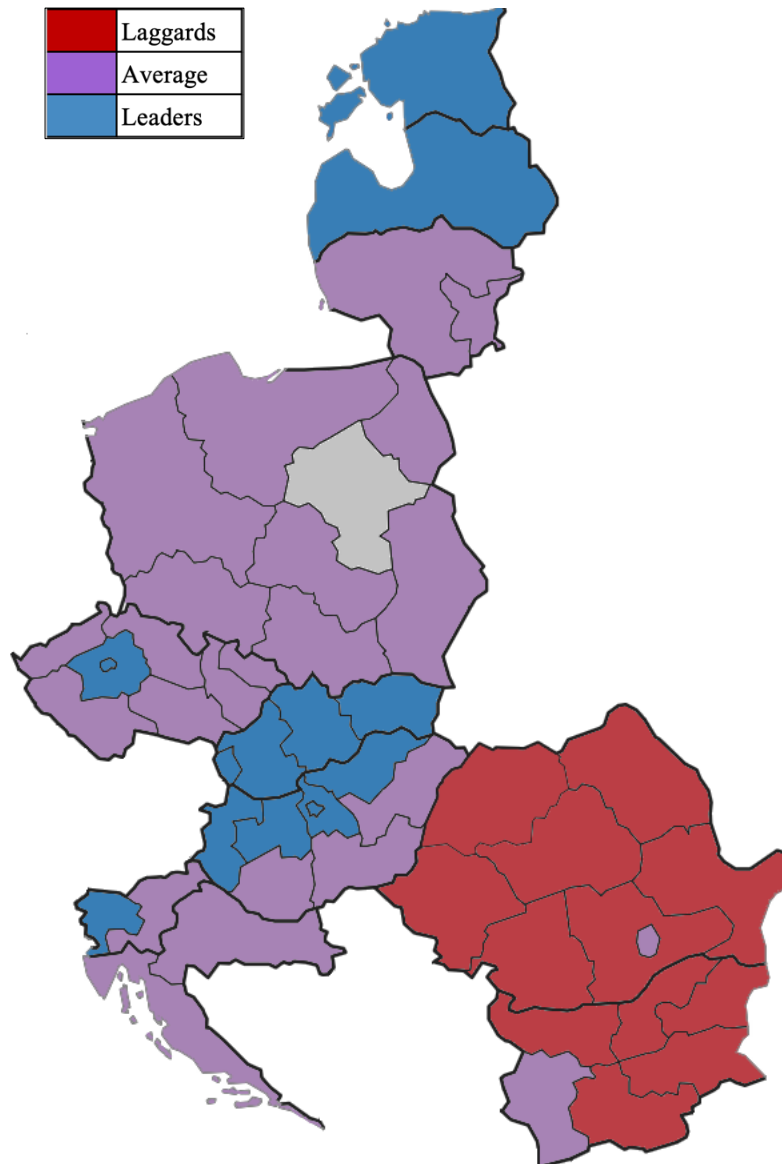
Figure 21.: Classification of CSE-11 NUTS-2 regions based on Dimension 1, 2016
Source: Own elaboration (design and cartography by the author).

5.4.2. The 2019 MDS results

On Figure 22. and 23. the results of MDS for 2019 are presented. Within the set of indicators influencing the dimensions the only difference from the year 2016 is change between the ONSELL and the BBACC regarding their level of influence.

According to Dimension 1, the lowest performances once again are detected in Bulgarian and Romanian regions, however, their position in terms of social media use changed: in 2016 Bulgarian regions were better according to Dimension 2, while in 2019 Romanian regions have better positions, except for the capital region. The best performances based on Dimension 1 are in Estonia, the Czech capital region and two central regions of Hungary. From the point of view of Dimension 2, Estonia, Latvia and Lithuania are no longer in the

lowest positions, and HR04 (Kontinentalna Hrvatska) is still on the top followed by some, mostly Slovakian and Hungarian, regions.

Romania and Bulgaria are a bit further from each other, and regions within these countries are more scattered, as well. Hungarian regions are divided into two parts, and while the two Croatian regions are closer, the two Lithuanian and Slovenian regions are further from each other. Czechia and Poland are also more separable from the other.

Further observations can be made by looking at Figure 21. The 'Laggards' category has not gone through significant changes, only the situation of the Romanian capital region deteriorated. In case of the 'Average' regions one can note that there are more regions falling into this category then in 2016. The additional elements came from the 'Leaders' category, meaning that the number of regions belonging here declined. It can be concluded that this category was deprived of one Hungarian, one Slovakian and one Czech regions, while only the Western Lithuanian region was added to it.
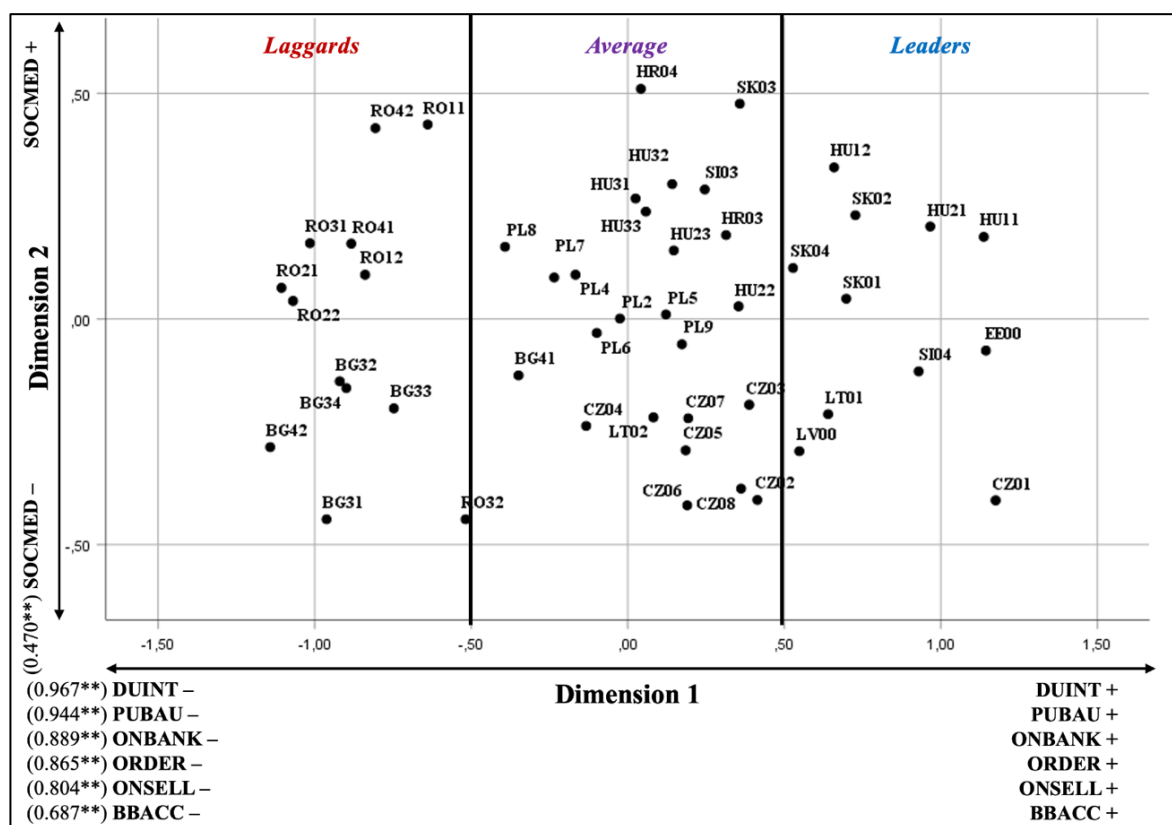
Note: ** At 95% confidence (p<0.050).

Figure 22.: MDS results of CSE-11 NUTS-2 regions, 2019
Source: Own elaboration.
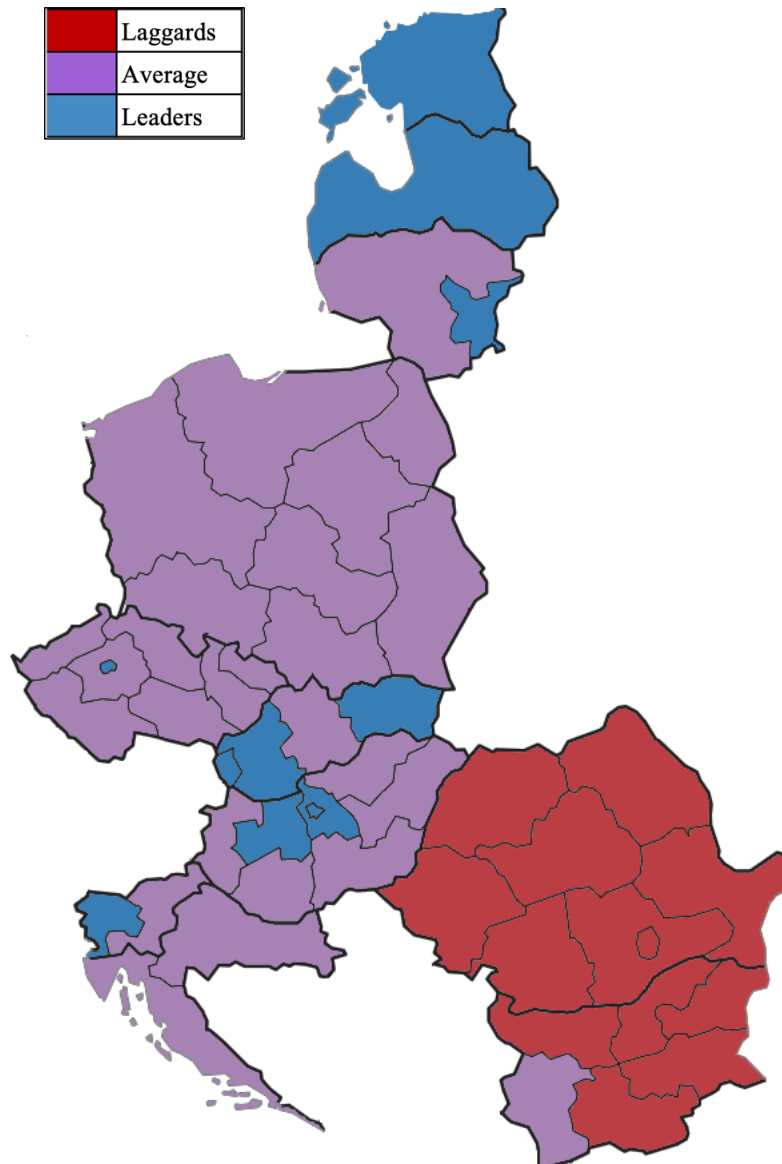
Figure 23.: Classification of CSE-11 NUTS-2 regions based on Dimension 1, 2019
Source: Own elaboration (design and cartography by the author).

5.4.3. The 2021 MDS results

On Figure 24. and 25. the result of MDS for 2021 is shown. Regarding the set of indicators represented by the two dimensions, change can be observed in two cases: in Dimension 1 ONBANK and ORDER were switched, and in Dimension 2 ONSELL also appear together with SOCMED.

The best results within Dimension 1 are associated with one-one regions from Hungary, Slovakia, Slovenia and Estonia. The worst performances were once again provided by Bulgarian and Romanian regions. Regarding Dimension 2, highest values are connected to Hungary completed with one Croatian and one Bulgarian regions. The lowest results were provided mostly by Polish and Czech regions.

Bulgarian regions are divided into two parts influenced by their results in Dimension 2, and the country's regions are again well-distinguishable from the Romanian regions. Hungarian regions rearranged and are closer to one another. Slovenian regions converged closer to each other. Czech and Polish regions switched positions regarding Dimension 2, with Polish regions being the bottom, performers in this year.

Figure 25. shows differences from the previous years within the dispersion of regions into the three categories. To the 'Laggards' category one Polish and one Bulgarian region were added, while the Romanian capital no longer belongs here. Two Slovakian regions descended to the 'Average' category, and the region of Bucharest is also included here. Two Hungarian regions were attached to the 'Leaders' category, making the whole Western part of the country included among the high performers. The middle part of Slovakia also ascended to this category. Slovenia was consistent with its two regions belonging to different categories through the three years, and Croatian regions did not transfer either.
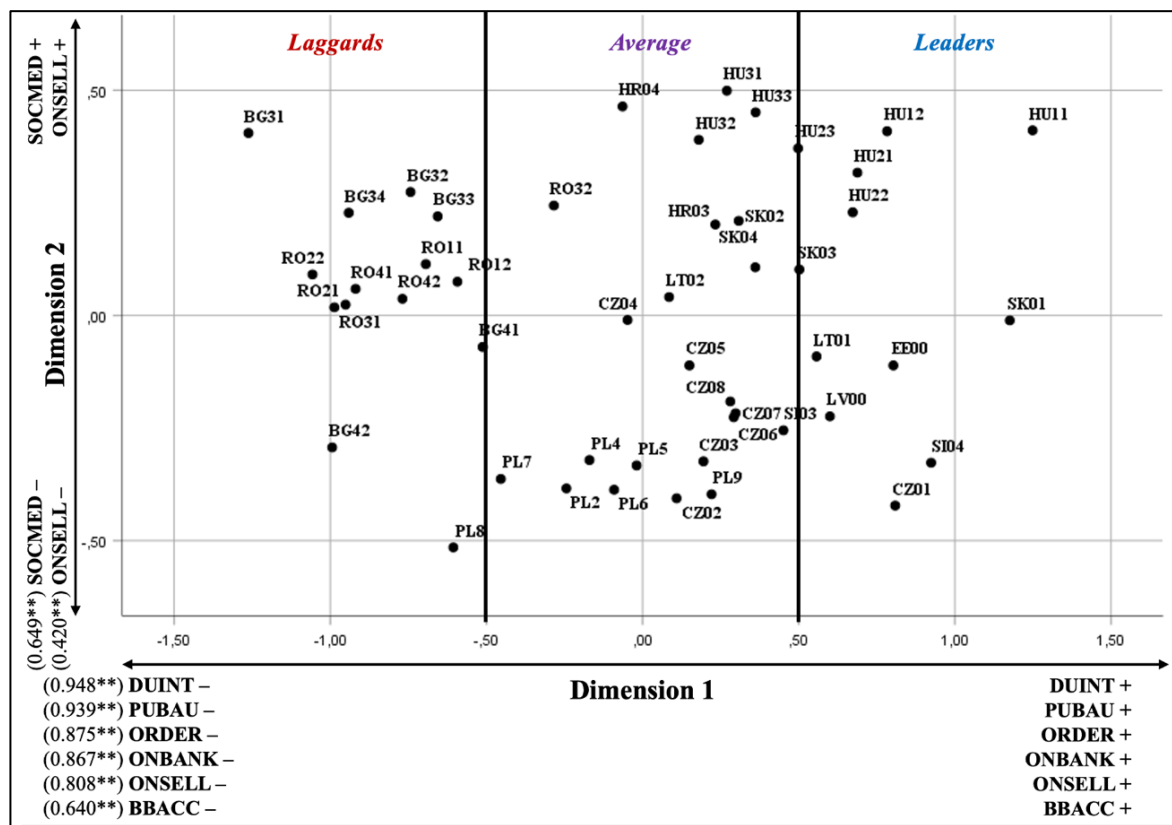
Note: ** At 95% confidence (p<0.050).

Figure 24.: MDS results of CSE-11 NUTS-2 regions, 2021
Source: Own elaboration.
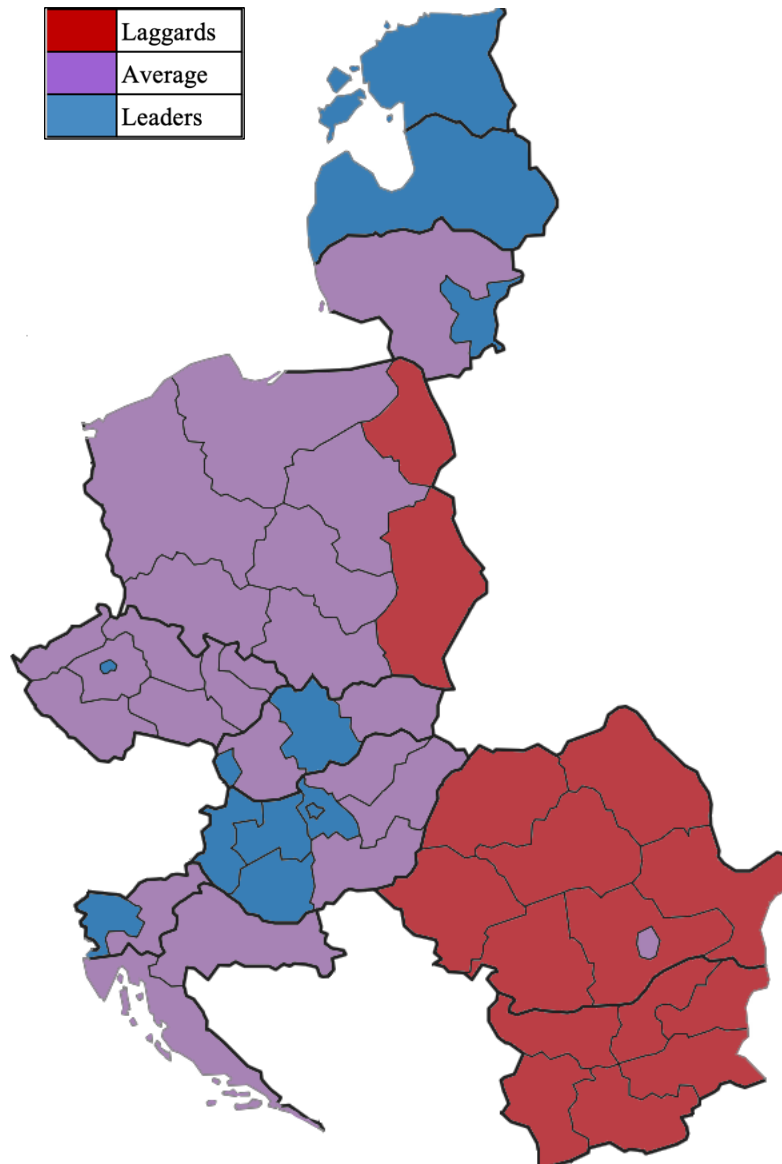
Figure 25.: Classification of CSE-11 NUTS-2 regions based on Dimension 1, 2021
Source: Own elaboration (design and cartography by the author).

5.5. EVALUATION OF RESULTS IN LIGHT OF THE COVID-19 OUTBREAK

There is no doubt that COVID-19 has had an enormous impact on several fields of the everyday life of individuals and households. One of the gravest concerns the world faced owing to the pandemic was to find digital solutions in working, education and even in social life, as well as to introduce safety measures, like social (physical) distancing. By looking at the results of the primary results, it is possible to gain information about the short-term effects of the pandemic on digitalisation. Based on the detected patterns of change, especially for the 2019–2021 period, it is possible to draw up conclusions about the direction and the extent of the short-term effects of the pandemic on the digitalisation.

As for the convergence and divergence patterns, there are no sharp changes in the case of the first level of digital divide (BBACC, DUINT) in the period of 2019–2021 as all regions are either in the upward convergence or upward divergence category (regions show downward trends only in very few cases). Concerning the second level of digital divide, one can observe a more diverse picture. In the case of indicator related to online banking (ONBANK), the features are very similar to the indicators of first level of digital divide. In addition, upward trends are more common for indicators related to social media participation (SOCMED) and interaction with public authorities (PUBAU); however, there are also several regions that can be characterised with a decreasing share engaging in such activities during the period of the pandemic. The results in case of ordering goods and services from other EU Member States (ORDER) are not comparable to other indicators as here exclusively downward patterns (downward convergence and downward divergence) can be detected for the 2019–2021 period. It is also clear that the number of regions in which online ordering decreased is almost equal to the number of regions in which it increased. Finally, the third level of digital divide (ONSELL) shows upward patterns on both regional and EU level. In this case it can be also observed that the increase in the number of regions in which the number of people who have economic benefit from selling on Internet is similar to the number of regions in which it decreased.

Regarding two indicators, BBACC and DUINT, regions show minor differences with respect to the growth intensity; however, it is important to note that during the COVID-19 years the average increase within the CSE-11 region was higher than within the EU-27. These indicators show relatively lower, but stable growth with no extreme or outstanding regions. The widest range of regional performances can be associated with ONSELL. The only case in which the average change both at the regional and EU level were negative is ORDER. The highest average increase can be associated with ONSELL.

In summary, I can conclude that regional tendencies have probably been influenced by the COVID-19 as there are significant changes in the period of the pandemic. One can find examples of rapid growth in some areas of ICT usage (e.g. BG32 (Severen tsentralen), BG42 (Yuzhen tsentralen), RO12 (Centru), RO32 (Bucuresti – Ilfov), RO42 (Vest)).

6. CONCLUSIONS AND OUTLOOK

6.1. KEY FINDINGS

In keeping with the key research aim presented in the introduction, *this study empirically examined and evaluated the level of digital development, the status of digital transformation and spatial characteristics of digital divide on regional (NUTS-2) level among 49 regions of the 11 Central and South-East European transition countries through measuring the recent changes (2016–2021) in the ICT usage in households and by individuals through 7 ICT-related indicators with special regard to the consequences of the COVID-19 pandemic.*

To reach this aim and find answers to the research questions of the study, I provided a thorough literature review on digital divide, and pointed out its three levels and influencing factors, as well as presented existing indices that have been designed to measure digitalisation (Chapter 2). Besides, I summarised the EU's strategic actions, initiatives and financial framework related to digital transformation. I presented the DESI and provided an overview on the current state of the digital development in the EU based on factual evidence produced by Eurostat (Chapter 3). Furthermore, I classified the regions of transition countries through their progress with special regard to the convergence or divergence patterns they show with respect to two time periods (2016–2021, 2019–2021) in EU-27 and CSE-11 comparison. Moreover, I analysed the balance and imbalance patterns within the development dynamics of regions based on the mean value and the coefficient of variation (CV) with respect to all indicators. Finally, I conducted multidimensional scaling (MDS) to get an insight into the regional similarities and differences in the case study area (Chapter 5).

The most important conclusions and findings of the research can be summed up as follows.

First, I can conclude that the digital divide is a relatively recent, but urgent matter that emerged in an era when the infrastructure and usage of ICT enhanced, and the access to the 'virtual world' became crucial in everyday life. As presented, digital divide has three levels, reflecting the digital access (first level), digital capability (second level) and digital outcome (third level) one can gain from the process of digitalisation.

Besides, I can conclude that the EU's actions in the field as well as policy objectives towards building a digital Europe have been of high priorities for the last couple of decades. The institutions of the EU have already recognised the promotion of digital transformation, and policy making in the EU shifted in the focus from providing only access to the Internet for the population to the provision of high-speed Internet and connectivity throughout the

EU, together with the promotion of digital literacy and e-inclusion in order to narrow the digital gap between Member States and regions. The financial support frameworks (2014–2020 MFF, 2021–2027 MFF) also reflect the importance of digital development as great amounts of funds from the EU budget have been allocated for digitalisation purposes. I also pointed out that the DESI index is a key and common measure to capture the different aspects of digitalisation and enables the comparison of countries.

In addition, based on the results of the primary research, I managed to identify regions with relatively low and high progress in the observed periods. Regarding the 2016–2021 period, one can find regions of Romania among the top performers, followed by Bulgarian and Czech regions. Regarding regions of relatively low-level progress in the observed period, the most underperforming regions can be reported from Slovakia, Poland, as well as Estonia and Czechia. In the 2019–2021 period, the highest number of top performers can be associated with Romania; however, there are several cases with high performances in Bulgaria, too. The highest number regarding low-level performance can be found in Czechia.

Furthermore, based on the analysis of patterns of balance and imbalance regarding the growth dynamics of regions, I can conclude that CSE-11 regions have a lower mean value than EU-27 regions together; however, the coefficient of variation seems to be constantly higher for this group than for the whole common market. Moreover, the regions belonging to the same country tend to group together. Bulgarian and Romanian regions almost exclusively form a separate group with relatively low mean values and high coefficients of variation.

MDS revealed that there is a relationship between the 7 ICT-related indicators, and the dimension reduction resulted in solutions that do not differ significantly for the three years (2016, 2019, 2021). Dimension 1. embraces six indicators out of the original seven indictors, while Dimension 2 consists of the SOCMED in 2016 and 2019, as well as SOC-MED–ONSELL relation in 2021. I can conclude that mostly Bulgarian and Romanian regions can be assigned to the 'Laggards' category along Dimension 1. Estonia and Latvia can be defined as 'Leaders'. Regions of Poland, Czechia, Lithuania and Croatia can be mostly associated with the 'Average' category, but partly with the 'Leaders' category, too. In the case of Hungary, Slovakia and Slovenia, there is a remarkable number of regions belonging to the 'Leaders'. One can also notice that there is a clear dichotomy between the capital regions and the countryside, as capital regions tend to overperform the rest of the countries in general. This phenomenon can be witnessed in, for example, Bulgaria, Romania, Hungary and Czechia.

An important conclusion is that there has been convergence in all ICT-related indicators within several regions of the European transition economies, but a sharp divide is still visible among regions. Also, regions belonging to the same country are more similar than different, and regions of relatively low capacities in digitalisation tend to be the same ones with respect to all indicators. Finally, I can conclude that regional tendencies have probably been influenced by the COVID-19 as there has been rapid growth in the period of the pandemic.

6.2. MAIN LIMITATIONS

During the assessment process I came across some shortcomings that deserve mention and further analysis. First, there are some other ICT-related indicators provided by Eurostat that could have been involved in this study; however, I had to exclude them from this research as data were not available for some years (e.g. individuals who have never used a computer). Second, my original intention was to create an analysis focusing on every region in the EU-27 context; however, data service delays in some Western and Southern European countries. Accordingly, I had to narrow down the case study area. Besides, ICT indicators are not available at NUTS-2 (regional) level in some cases; in the case of Poland data on NUTS-1 level were available. In addition, indicators available in Eurostat are not perfect for monitoring and evaluating digitalisation-related objectives as they are not in line with the priorities of the EU with respect to digital transformation. Therefore, the impacts of the actions of EU level are harder to be detected. Accordingly, the entire measurement system can be amended and improved. Greater efforts in terms of data collection should be made to test other elements and features of digitalisation in the future.

6.3. FUTURE RESEARCH AGENDA AND POLICY IMPLICATIONS

I have found several possible further directions for a more detailed elaboration of the subject.

First, ICT-related indicators can be correlated with other indicators or indexes that capture economic prosperity, competitiveness, social exclusion and sustainable development. Out of these, analysing linkages between social exclusion, social aspects and digitalisation should be particularly crucial areas of study as digital transformations always have, mainly negative, side effects on society.

Another possible extension of the current research could be carrying out empirical investigations at lower territorial units. For instance, cities or functional urban areas may serve as good case study fields for further primary research. Further investigations at LAU1

or LAU2 levels would reflect the existing dichotomies more precisely, and results derived from such investigations can be applied to practice and help policy makers design a creditable and sustainable ICT policy to empower the countryside as well as rural and peripheral areas, including sub-regions and settlements.

Furthermore, a possible direction for future research is in creating an empirical analysis with respect to every region of the European Union. In this study, the EU-27 average emerged as a reference point. However, examining digital divide and digital transformation throughout the 27 Member States along with their regions would be crucial.

The findings of the study are of strong political relevance as they have important implications for European sectoral and spatial development policies and policy areas. The results obtained might provide a reference for assessment and analysis of situation for European Union's sectoral and territorial policies and agendas (e.g. cohesion policy, digital economy, digital society, digital finance, e-commerce, e-government, e-inclusion, lifelong learning), especially to take advantage of ICT infrastructure (access) and usage (competence). Adequate knowledge about the state of digital divide helps policy makers identify further actions for improvement. I believe that my findings have the potential to contribute significantly to the ongoing discussion and evolving research on the subject.

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ANNEXES

LIST OF ANNEXES

ANNEX 1.: THEORETICAL PATTERNS OF UPWARD CONVERGENCE, UPWARD DIVERGENCE, DOWNWARD CONVERGENCE AND DOWNWARD DIVERGENCE

1. Catching up
$\nabla \mu_{EU} > 0; \nabla \mu_{EU} < \nabla f_{MS}; \nabla f_{MS} > 0; \Delta_{t,t-1}\sigma^2 < 0$

2. Flattening
$\nabla \mu_{EU} > 0; \nabla \mu_{EU} > \nabla f_{MS}; \nabla f_{MS} > 0; \Delta_{t,t-1}\sigma^2 < 0$

3. Inversion
$\nabla \mu_{EU} > 0, \nabla \mu_{EU} > \nabla f_{MS}, \nabla f_{MS} < 0, \Delta_{t,t-1}\sigma^2 < 0$

4. Outperforming
$\nabla \mu_{EU} > 0, \nabla \mu_{EU} < \nabla f_{MS}, \nabla f_{MS} > 0, \Delta_{t,t-1}\sigma^2 > 0$

5. Slower pace
$\nabla \mu_{EU} > 0, \nabla \mu_{EU} > \nabla f_{MS}, \nabla f_{MS} > 0, \Delta_{t,t-1}\sigma^2 > 0$

6. Diving
$\nabla \mu_{EU} > 0, \nabla \mu_{EU} > \nabla f_{MS}, \nabla f_{MS} < 0, \Delta_{t,t-1}\sigma^2 > 0$

7. Defending better
$\nabla \mu_{EU} < 0, \nabla \mu_{EU} < \nabla f_{MS}, \nabla f_{MS} < 0, \Delta_{t,t-1}\sigma^2 > 0$

8. Escaping
$\nabla \mu_{EU} < 0, \nabla \mu_{EU} < \nabla f_{MS}, \nabla f_{MS} > 0, \Delta_{t,t-1}\sigma^2 > 0$

9. Falling away
$\nabla \mu_{EU} < 0, \nabla \mu_{EU} > \nabla f_{MS}, \nabla f_{MS} < 0, \Delta_{t,t-1}\sigma^2 > 0$

10. Underperforming
$\nabla \mu_{EU} < 0, \nabla \mu_{EU} > \nabla f_{MS}, \nabla f_{MS} < 0, \Delta_{t,t-1}\sigma^2 < 0$

11. Recovering
$\nabla \mu_{EU} < 0, \nabla \mu_{EU} < \nabla f_{MS}, \nabla f_{MS} < 0, \Delta_{t,t-1}\sigma^2 < 0$

12. Reacting better
$\nabla \mu_{EU} < 0, \nabla \mu_{EU} < \nabla f_{MS}, \nabla f_{MS} < 0, \Delta_{t,t-1}\sigma^2 < 0$
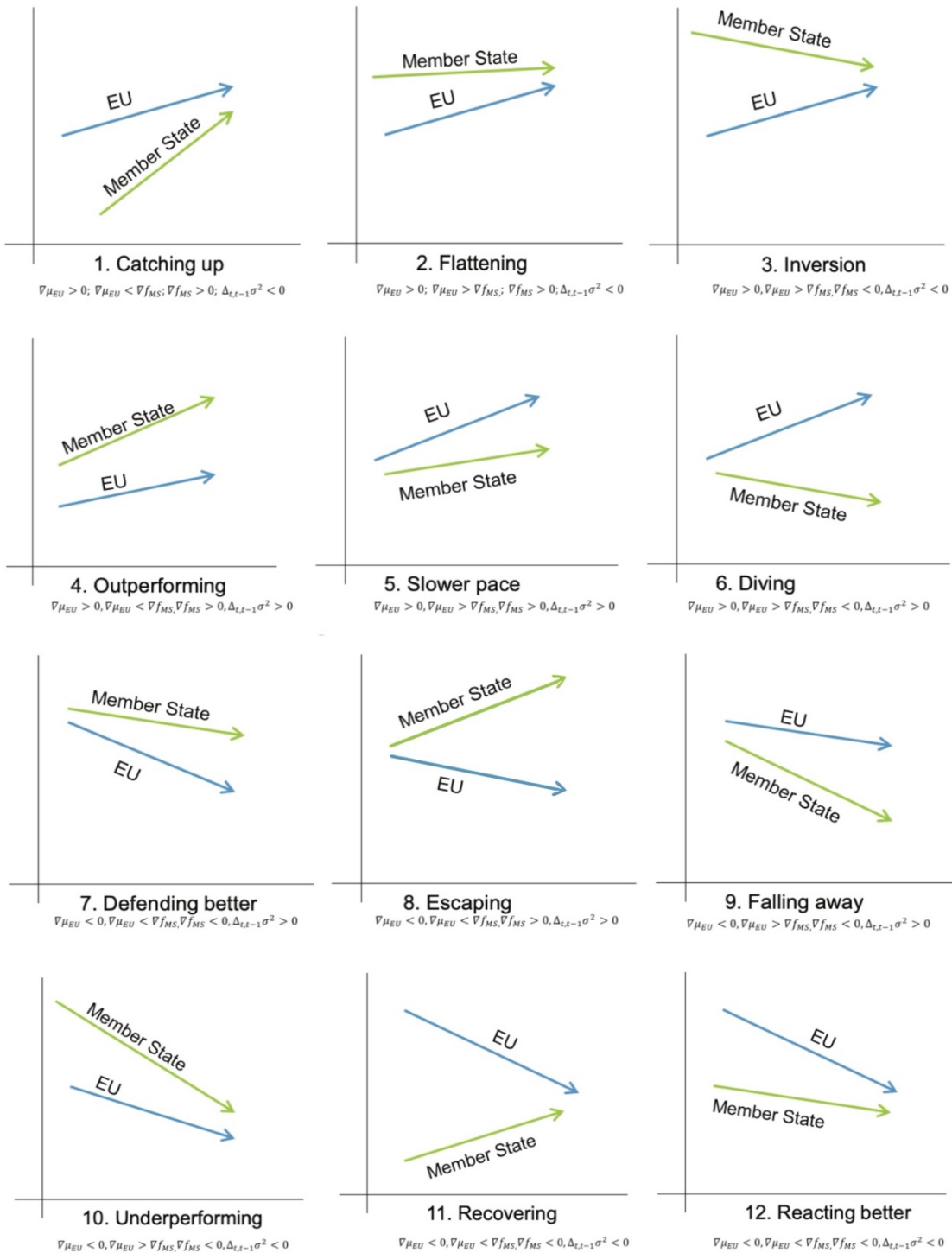
Source: Own elaboration based on Eurofound (2018), pp. 25–26.

ANNEX 2.: HOUSEHOLDS WITH BROADBAND ACCESS (BBACC) – DATA & CALCULATIONS

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	Abs. 2016–2021	Abs. 2019–2021	% 2016–2021	% 2019–2021	EU-27 avg 2016–2021		CSE-11 avg 2016–2021		EU-27 avg 2019–2021		CSE-11 avg 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
EU-27	European Union	80	83	84	87	89	91	10	4	12,93%	4,73%	n.r.	n.r.	-4,88%		n.r.	n.r.	-2,03%		85,6377	3,8551	0,0450
CSE-11	Central & South-East Europe	76	78	81	83	86	89	13	6	17,81%	6,76%	4,88%		n.r.	n.r.	2,03%		n.r.	n.r.	82,1818	5,0068	0,0609
BG	Bulgaria	63	67	71	75	79	84	21	9	33,33%	12,00%	20,40%	catching up	15,52%	catching up	7,27%	catching up	5,24%	catching up	73,1667	7,7567	0,1060
BG31	Severozapaden	58	57	65	71	66	74	16	3	27,59%	4,23%	14,65%	catching up	9,78%	catching up	-0,51%	slower pace	-2,54%	slower pace	65,1667	6,7946	0,1043
BG32	Severen tsentralen	62	67	67	73	75	83	21	10	33,87%	13,70%	20,94%	catching up	16,06%	catching up	8,97%	catching up	6,94%	catching up	71,1667	7,4409	0,1046
BG33	Severoiztochen	67	68	74	74	78	85	18	11	26,87%	14,86%	13,93%	catching up	9,06%	catching up	10,13%	catching up	8,10%	catching up	74,3333	6,6533	0,0895
BG34	Yugoiztochen	59	62	70	75	77	82	23	7	38,98%	9,33%	26,05%	catching up	21,17%	catching up	4,60%	catching up	2,57%	catching up	70,8333	8,9312	0,1261
BG41	Yugozapaden	64	70	75	78	86	86	22	8	34,38%	10,26%	21,44%	catching up	16,57%	catching up	5,52%	catching up	3,50%	catching up	76,5000	8,7579	0,1145
BG42	Yuzhen tsentralen	63	70	72	75	79	86	23	11	36,51%	14,67%	23,57%	catching up	18,70%	catching up	9,93%	catching up	7,91%	catching up	74,1667	7,8846	0,1063
CZ	Czechia	80	83	86	87	88	89	9	2	11,25%	2,30%	-1,68%	slower pace	-6,56%	flattening	-2,43%	slower pace	-4,46%	flattening	85,5000	3,3912	0,0397
CZ01	Praha	91	89	93	93	95	94	3	1	3,30%	1,08%	-9,64%	flattening	-14,51%	flattening	-3,66%	flattening	-5,69%	flattening	92,5000	2,1679	0,0234
CZ02	Střední Čechy	84	87	87	88	88	89	5	1	5,95%	1,14%	-6,98%	flattening, then slower pace	-11,86%	flattening	-3,60%	flattening, then slower pace	-5,62%	flattening	87,1667	1,7224	0,0198
CZ03	Jihozápad	82	82	86	86	88	92	10	6	12,20%	6,98%	-0,74%	flattening	-5,61%	flattening	2,24%	catching up, then outperforming	0,22%	at the same pace	86,0000	3,7947	0,0441
CZ04	Severozápad	75	78	82	79	82	86	11	7	14,67%	8,86%	1,73%	at the same pace	-3,14%	slower pace	4,13%	catching up	2,10%	catching up	80,3333	3,8297	0,0477
CZ05	Severovýchod	79	80	82	86	87	87	8	1	10,13%	1,16%	-2,81%	slower pace	-7,68%	flattening, then slower pace	-3,57%	slower pace	-5,60%	flattening, then slower pace	83,5000	3,6194	0,0433
CZ06	Jihovýchod	78	83	87	88	90	88	10	0	12,82%	0,00%	-0,11%	slower pace	-4,99%	flattening, then slower pace	-4,73%	flattening, then slower pace	-6,76%	flattening, then slower pace	85,6667	4,4121	0,0515
CZ07	Střední Morava	74	81	83	84	88	88	14	4	18,92%	4,76%	5,98%	catching up	1,11%	at the same pace	0,03%	at the same pace	-2,00%	flattening, then slower pace	83,0000	5,2154	0,0628
CZ08	Moravskoslezsko	79	81	87	90	86	89	10	-1	12,66%	-1,11%	-0,28%	slower pace	-5,15%	flattening	-5,84%	inversion/diving	-7,87%	inversion	85,3333	4,4121	0,0517
EE	Estonia	85	87	89	90	89	91	6	1	7,06%	1,11%	-5,88%	flattening	-10,75%	flattening	-3,62%	flattening	-5,65%	flattening	88,5000	2,1679	0,0245
EE00	Eesti	85	87	89	90	89	91	6	1	7,06%	1,11%	-5,88%	flattening	-10,75%	flattening	-3,62%	flattening	-5,65%	flattening	88,5000	2,1679	0,0245
HR	Croatia	77	76	81	81	85	86	9	5	11,69%	6,17%	-1,25%	slower pace	-6,12%	flattening, then slower pace	1,44%	catching up	-0,59%	slower pace	81,0000	4,0497	0,0500
HR03	Jadranska Hrvatska	78	73	83	84	88	87	9	3	11,54%	3,57%	-1,40%	slower pace	-6,27%	flattening, then slower pace	-1,16%	slower pace	-3,19%	flattening, then slower pace	82,1667	5,7067	0,0695
HR04	Kontinentalna Hrvatska	76	77	80	79	83	83	7	4	9,21%	5,06%	-3,72%	slower pace	-8,60%	flattening, then slower pace	0,33%	at the same pace	-1,70%	slower pace	79,6667	2,9439	0,0370
LV	Latvia	75	76	79	83	88	89	14	6	18,67%	7,23%	5,73%	catching up	0,86%	catching up	2,50%	catching up	0,47%	at the same pace	81,6667	5,9889	0,0733
LV00	Latvija	75	76	79	83	88	89	14	6	18,67%	7,23%	5,73%	catching up	0,86%	cathing up	2,50%	catching up	0,47%	at the same pace	81,6667	5,9889	0,0733
LT	Lithuania	71	75	78	81	82	86	15	5	21,13%	6,17%	8,19%	catching up	3,32%	catching up	1,44%	catching up	-0,59%	slower pace	78,8333	5,3448	0,0678
LT01	Sostines regionas	71	75	81	83	86	87	16	4	22,54%	4,82%	9,60%	catching up	4,73%	catching up	0,09%	at the same pace	-1,94%	slower pace	80,5000	6,3166	0,0785
LT02	Vidurio ir vakaru Lietuvos regionas	71	75	77	81	80	85	14	4	19,72%	4,94%	6,78%	catching up	1,91%	catching up	0,20%	at the same pace	-1,82%	slower pace	78,1667	4,9160	0,0629

II

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	Abs. 2016–2021	Abs. 2019–2021	% 2016–2021	% 2019–2021	EU-27 avg 2016–2021		CSE-11 avg 2016–2021		EU-27 avg 2019–2021		CSE-11 avg 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
HU	*Hungary*	*78*	*82*	*83*	*86*	*87*	*91*	*13*	*5*	*16,67%*	*5,81%*	*3,73%*	*catching up*	*-1,14%*	*at the same pace*	*1,08%*	*catching up*	*-0,95%*	*flattening*	*84,5000*	*4,5056*	*0,0533*
HU11	Budapest	78	82	90	92	94	96	18	4	23,08%	4,35%	10,14%	catching up, then outperforming	5,27%	outperforming	-0,39%	at the same pace	-2,41%	flattening	88,6667	7,1181	0,0803
HU12	Pest	78	82	88	88	87	94	16	6	20,51%	6,82%	7,58%	catching up, then outperforming	2,70%	outperforming	2,08%	outperforming	0,06%	at the same pace	86,1667	5,5287	0,0642
HU21	Közép-Dunántúl	80	85	86	88	91	92	12	4	15,00%	4,55%	2,07%	catching up, then outperforming	-2,81%	flattening	-0,19%	at the same pace	-2,22%	flattening	87,0000	4,3818	0,0504
HU22	Nyugat-Dunántúl	81	83	85	85	86	92	11	7	13,58%	8,24%	0,65%	outperforming	-4,23%	flattening	3,50%	catching up, then outperforming	1,47%	outperforming	85,3333	3,7238	0,0436
HU23	Dél-Dunántúl	75	80	80	85	86	89	14	4	18,67%	4,71%	5,73%	catching up	0,86%	catching up	-0,03%	at the same pace	-2,06%	flattening	82,5000	5,0892	0,0617
HU31	Észak-Magyarország	74	75	78	81	84	86	12	5	16,22%	6,17%	3,28%	catching up	-1,59%	slower pace	1,44%	catching up	-0,59%	slower pace	79,6667	4,8442	0,0608
HU32	Észak-Alföld	70	76	76	82	85	88	18	6	25,71%	7,32%	12,78%	catching up	7,90%	catching up	2,58%	catching up	0,56%	at the same pace	79,5000	6,6858	0,0841
HU33	Dél-Alföld	71	76	78	81	82	87	16	6	22,54%	7,41%	9,60%	catching up	4,73%	catching up	2,67%	catching up	0,65%	at the same pace	79,1667	5,4924	0,0694
PL	*Poland*	*76*	*78*	*79*	*83*	*90*	*92*	*16*	*9*	*21,05%*	*10,84%*	*8,12%*	*catching up, then outperforming*	*3,24%*	*outperforming*	*6,11%*	*catching up, then outperforming*	*4,08%*	*outperforming*	*83,0000*	*6,6332*	*0,0799*
PL2	Makroregion Poludniowy	76	77	78	83	89	92	16	9	21,05%	10,84%	8,12%	catching up, then outperforming	3,24%	outperforming	6,11%	catching up, then outperforming	4,08%	outperforming	82,5000	6,7157	0,0814
PL4	Makroregion Pólnocno-Zachodni	76	78	81	82	89	92	16	10	21,05%	12,20%	8,12%	catching up, then outperforming	3,24%	outperforming	7,46%	catching up, then outperforming	5,43%	catching up, then outperforming	83,0000	6,2610	0,0754
PL5	Makroregion Poludniowo-Zachodni	76	78	75	85	90	92	16	7	21,05%	8,24%	8,12%	catching up, then outperforming	3,24%	outperforming	3,50%	catching up, then outperforming	1,47%	outperforming	82,6667	7,3666	0,0891
PL6	Makroregion Pólnocny	74	79	82	84	90	92	18	8	24,32%	9,52%	11,39%	catching up, then outperforming	6,51%	catching up, then outperforming	4,79%	catching up, then outperforming	2,76%	outperforming	83,5000	6,7454	0,0808
PL7	Makroregion Centralny	76	77	75	82	89	88	12	6	15,79%	7,32%	2,85%	catching up	-2,02%	flattening, then slower pace	2,58%	catching up	0,56%	at the same pace	81,1667	6,1779	0,0761
PL8	Makroregion Wschodni	76	77	78	82	88	90	14	8	18,42%	9,76%	5,49%	flattening	0,61%	outperforming	5,02%	catching up	2,99%	catching up, then outperforming	81,8333	5,9470	0,0727
PL9	Makroregion Województwo Mazowieckie	:	:	83	85	92	94	:	9	:	10,59%	:	:	:	:	5,85%	catching up, then outperforming	3,83%	outperforming	88,5000	5,3229	0,0601

III

	Households with broadband access (% of households)	Data						Absolute change		Percentage change*		Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021											
RO	*Romania*	*70*	*74*	*79*	*82*	*84*	*88*	*18*	*6*	*25,71%*	*7,32%*	*12,78%*	*catching up, then outperforming*	*7,90%*	*outperforming*	*2,58%*	*catching up*	*0,56%*	*catching up*	*79,5000*	*6,6257*	*0,0833*
RO11	Nord-Vest	72	80	87	85	89	90	18	5	25,00%	5,88%	12,07%	catching up	7,19%	catching up, then outperforming	1,15%	catching up	-0,88%	flattening	83,8333	6,7946	0,0810
RO12	Centru	67	68	76	80	82	90	23	10	34,33%	12,50%	21,39%	catching up	16,52%	cathing up, then outperforming	7,77%	catching up	5,74%	catching up, then outperforming	77,1667	8,7731	0,1137
RO21	Nord-Est	62	68	69	77	77	87	25	10	40,32%	12,99%	27,39%	catching up	22,51%	catching up	8,25%	catching up	6,23%	catching up	73,3333	8,8242	0,1203
RO22	Sud-Est	67	71	69	77	79	84	17	7	25,37%	9,09%	12,44%	catching up	7,56%	catching up	4,36%	catching up	2,33%	catching up	74,5000	6,5651	0,0881
RO31	Sud-Muntenia	65	70	74	79	82	86	21	7	32,31%	8,86%	19,37%	catching up	14,50%	catching up	4,13%	catching up	2,10%	catching up	76,0000	7,8230	0,1029
RO32	Bucuresti-Ilfov	88	88	94	91	92	94	6	3	6,82%	3,30%	-6,12%	flattening	-10,99%	flattening	-1,44%	flattening	-3,46%	flattening	91,1667	2,7142	0,0298
RO41	Sud-Vest Oltenia	71	69	80	83	82	86	15	3	21,13%	3,61%	8,19%	catching up	3,32%	catching up	-1,12%	slower pace	-3,15%	slower pace	78,5000	6,8920	0,0878
RO42	Vest	74	85	85	87	89	90	16	3	21,62%	3,45%	8,69%	catching up	3,81%	catching up, then outperforming	-1,29%	slower pace	-3,31%	flattening	85,0000	5,7619	0,0678
SI	*Slovenia*	*78*	*82*	*87*	*89*	*90*	*93*	*15*	*4*	*19,23%*	*4,49%*	*6,30%*	*catching up, then outperforming*	*1,42%*	*outperforming*	*-0,24%*	*at the same pace*	*-2,27%*	*flattening*	*86,5000*	*5,5408*	*0,0641*
SI03	Vzhodna Slovenija	77	80	84	87	89	91	14	4	18,18%	4,60%	5,25%	catching up	0,37%	outperforming	-0,14%	at the same pace	-2,16%	flattening	84,6667	5,3914	0,0637
SI04	Zahodna Slovenija	80	84	90	92	91	95	15	3	18,75%	3,26%	5,82%	outperforming	0,94%	outperforming	-1,47%	flattening	-3,50%	flattening	88,6667	5,5737	0,0629
SK	*Slovakia*	*78*	*79*	*79*	*80*	*85*	*90*	*12*	*10*	*15,38%*	*12,50%*	*2,45%*	*catching up*	*-2,43%*	*flattening*	*7,77%*	*catching up*	*5,74%*	*catching up, then outper-forming*	*81,8333*	*4,7081*	*0,0575*
SK01	Bratislavský kraj	84	84	87	83	90	96	12	13	14,29%	15,66%	1,35%	outperforming	-3,52%	outperforming	10,93%	catching up, then outperforming	8,90%	outperforming	87,3333	4,9666	0,0569
SK02	Západné Slovensko	77	76	80	81	84	89	12	8	15,58%	9,88%	2,65%	catching up	-2,23%	flattening	5,14%	catching up	3,12%	catching up	81,1667	4,7924	0,0590
SK03	Stredné Slovensko	74	77	75	78	83	91	17	13	22,97%	16,67%	10,04%	catching up	5,16%	catching up, then outperforming	11,93%	catching up	9,91%	catching up, then outperforming	79,6667	6,3770	0,0800
SK04	Východné Slovensko	80	82	77	81	84	87	7	6	8,75%	7,41%	-4,18%	slower pace	-9,06%	outperforming	2,67%	catching up	0,65%	at the same pace	81,8333	3,4303	0,0419

Notes: * Top five regions are marked with green. Last five regions are marked with red. ** In the case of PL9 Makroregion Województwo Mazowieckie the period from 2018 to 2021 is considered. n.r. – not relevant. : – no data.

Source: own elaboration based on Eurostat database and Eurofound (2018).

ANNEX 3.: FREQUENCY OF INTERNET ACCESS: DAILY (DUINT) – DATA & CALCULATIONS

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021	EU-27 avg 2016–2021		CSE-11 avg 2016–2021		EU-27 avg 2019–2021		CSE-11 avg 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
EU-27	European Union	69	72	74	77	80	83	14	6	19,46%	7,12%	n.r.	n.r.	-6,42%		n.r.	n.r.	-2,14%		75,9907	5,1834	0,0682
CSE-11	Central & South-East Europe	57	59	62	66	69	72	15	6	25,88%	9,26%	6,42%		n.r.	n.r.	2,14%		n.r.	n.r.	63,9722	5,6908	0,0890
BG	Bulgaria	49	54	55	60	62	67	18	7	36,73%	11,67%	17,28%	catching up	10,86%	catching up	4,54%	catching up	2,40%	catching up	57,8333	6,4317	0,1112
BG31	Severozapaden	45	49	51	53	53	62	17	9	37,78%	16,98%	18,32%	catching up	11,90%	catching up	9,86%	catching up	7,72%	catching up	52,1667	5,6716	0,1087
BG32	Severen tsentralen	46	56	50	60	55	70	24	10	52,17%	16,67%	32,72%	catching up	26,30%	catching up	9,54%	catching up	7,40%	catching up	56,1667	8,3526	0,1487
BG33	Severoiztochen	49	53	57	58	62	71	22	13	44,90%	22,41%	25,44%	catching up	19,02%	catching up	15,29%	catching up	13,15%	catching up	58,3333	7,6333	0,1309
BG34	Yugoiztochen	43	50	51	57	56	65	22	8	51,16%	14,04%	31,71%	catching up	25,29%	catching up	6,91%	catching up	4,77%	catching up	53,6667	7,4744	0,1393
BG41	Yugozapaden	56	60	63	69	73	71	15	2	26,79%	2,90%	7,33%	catching up	0,91%	at the same pace	-4,22%	slower pace	-6,37%	flattening/ slower pace	65,3333	6,7132	0,1028
BG42	Yuzhen tsentralen	46	50	51	52	56	63	17	11	36,96%	21,15%	17,50%	catching up	11,08%	catching up	14,03%	catching up	11,89%	catching up	53,0000	5,8652	0,1107
CZ	Czechia	65	68	75	76	79	81	16	5	24,62%	6,58%	5,16%	catching up	-1,26%	outperforming	-0,54%	slower pace	-2,69%	flattening	74,0000	6,2610	0,0846
CZ01	Praha	77	80	88	89	93	88	11	-1	14,29%	-1,12%	-5,17%	flattening	-11,59%	flattening	-8,25%	inversion	-10,39%	inversion	85,8333	6,0470	0,0705
CZ02	Střední Čechy	68	74	75	80	77	79	11	-1	16,18%	-1,25%	-3,28%	slower pace	-9,70%	flattening	-8,37%	inversion/diving	-10,51%	inversion	75,5000	4,3243	0,0573
CZ03	Jihozápad	64	69	75	77	78	80	16	3	25,00%	3,90%	5,54%	flattening	-0,88%	outperforming	-3,23%	slower pace	-5,37%	flattening	73,8333	6,1128	0,0828
CZ04	Severozápad	56	56	68	66	77	76	20	10	35,71%	15,15%	16,26%	catching up	9,84%	catching up, then outperforming	8,03%	catching up	5,89%	outperforming	66,5000	9,2033	0,1384
CZ05	Severovýchod	65	62	73	73	76	77	12	4	18,46%	5,48%	-0,99%	slower pace	-7,42%	flattening	-1,64%	slower pace	-3,78%	flattening	71,0000	6,0992	0,0859
CZ06	Jihovýchod	62	67	74	74	77	80	18	6	29,03%	8,11%	9,58%	catching up	3,16%	outperforming	0,99%	at the same pace	-1,16%	at the same pace	72,3333	6,6533	0,0920
CZ07	Střední Morava	64	66	74	75	82	81	17	6	26,56%	8,00%	7,11%	catching up	0,69%	outperforming	0,88%	at the same pace	-1,26%	at the same pace	73,6667	7,4476	0,1011
CZ08	Moravskoslezsko	65	72	78	76	78	84	19	8	29,23%	10,53%	9,77%	catching up, then outperforming	3,35%	outperforming	3,40%	catching up, then outperforming	1,26%	outperforming	75,5000	6,4420	0,0853
EE	Estonia	77	79	82	83	84	85	8	2	10,39%	2,41%	-9,07%	flattening	-15,49%	flattening	-4,71%	flattening	-6,85%	flattening	81,6667	3,0768	0,0377
EE00	Eesti	77	79	82	83	84	85	8	2	10,39%	2,41%	-9,07%	flattening	-15,49%	flattening	-4,71%	flattening	-6,85%	flattening	81,6667	3,0768	0,0377
HR	Croatia	63	58	66	71	74	76	13	5	20,63%	7,04%	1,18%	slower pace	-5,24%	flattening	-0,08%	slower pace	-2,22%	flattening	68,0000	6,8993	0,1015
HR03	Jadranska Hrvatska	63	56	72	76	74	78	15	2	23,81%	2,63%	4,35%	catching up	-2,07%	at the same pace	-4,49%	slower pace	-6,63%	flattening	69,8333	8,5421	0,1223
HR04	Kontinentalna Hrvatska	64	58	64	69	73	73	9	4	14,06%	5,80%	-5,39%	slower pace	-11,81%	flattening	-1,33%	slower pace	-3,47%	flattening	66,8333	5,9133	0,0885
LV	Latvia	68	70	73	75	80	84	16	9	23,53%	12,00%	4,07%	catching up, then outperforming	-2,35%	outperforming	4,88%	catching up, then outperforming	2,74%	outperforming	75,0000	6,0663	0,0809
LV00	Latvija	68	70	73	75	80	84	16	9	23,53%	12,00%	4,07%	catching up, then outperforming	-2,35%	outperforming	4,88%	catching up, then outperforming	2,74%	outperforming	75,0000	6,0663	0,0809
LT	Lithuania	60	64	68	73	74	78	18	5	30,00%	6,85%	10,54%	catching up	4,12%	outperforming	-0,27%	slower pace	-2,41%	flattening	69,5000	6,7454	0,0971
LT01	Sostines regionas	60	64	73	75	81	81	21	6	35,00%	8,00%	15,54%	catching up	9,12%	outperforming	0,88%	at the same pace	-1,26%	at the same pace	72,3333	8,7101	0,1204
LT02	Vidurio ir vakaru Lietuvos regionas	60	64	66	71	72	76	16	5	26,67%	7,04%	7,21%	catching up	0,79%	outperforming	-0,08%	slower pace	-2,22%	flattening	68,1667	5,8793	0,0862

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GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	Absolute change 2016–2021	Absolute change 2019–2021	Percentage change* 2016–2021	Percentage change* 2019–2021	Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
HU	*Hungary*	*71*	*69*	*69*	*75*	*79*	*82*	*11*	*7*	*15,49%*	*9,33%*	*-3,96%*	*flattening, then slower pace*	*-10,38%*	*flattening*	*2,21%*	*catching up*	*0,07%*	*outperforming*	*74,1667*	*5,4559*	*0,0736*
HU11	Budapest	71	69	81	83	89	92	21	9	29,58%	10,84%	10,12%	outperforming	3,70%	outperforming	3,72%	outperforming	1,58%	outperforming	80,8333	9,3041	0,1151
HU12	Pest	71	69	69	78	81	86	15	8	21,13%	10,26%	1,67%	outperforming	-4,75%	at the same pace	3,13%	outperforming	0,99%	outperforming	75,6667	7,0899	0,0937
HU21	Közép-Dunántúl	72	74	75	80	79	80	8	0	11,11%	0,00%	-8,35%	flattening, then slower pace	-14,77%	flattening	-7,12%	flattening, then slower pace	-9,26%	flattening	76,6667	3,4448	0,0449
HU22	Nyugat-Dunántúl	69	65	63	71	78	82	13	11	18,84%	15,49%	-0,62%	slower pace	-7,04%	flattening	8,37%	catching up	6,23%	outperforming	71,3333	7,3937	0,1036
HU23	Dél-Dunántúl	66	66	64	72	78	82	16	10	24,24%	13,89%	4,79%	catching up	-1,63%	outperforming	6,77%	catching up	4,62%	outperforming	71,3333	7,3394	0,1029
HU31	Észak-Magyarország	66	63	63	71	72	76	10	5	15,15%	7,04%	-4,30%	slower pace	-10,73%	flattening	-0,08%	slower pace	-2,22%	flattening	68,5000	5,3198	0,0777
HU32	Észak-Alföld	63	62	64	71	74	76	13	5	20,63%	7,04%	1,18%	slower pace	-5,24%	flattening	-0,08%	slower pace	-2,22%	flattening	68,3333	6,0882	0,0891
HU33	Dél-Alföld	66	66	65	72	73	79	13	7	19,70%	9,72%	0,24%	slower pace	-6,18%	flattening	2,60%	catching up	0,46%	outperforming	70,1667	5,4924	0,0783
PL	*Poland*	*57*	*61*	*64*	*68*	*72*	*74*	*17*	*6*	*29,82%*	*8,82%*	*10,37%*	*catching up*	*3,95%*	*outperforming*	*1,70%*	*at the same pace*	*-0,44%*	*at the same pace*	*66,0000*	*6,5422*	*0,0991*
PL2	Makroregion Poludniowy	59	63	65	68	73	72	13	4	22,03%	5,88%	2,58%	slower pace	-3,84%	flattening	-1,24%	slower pace	-3,38%	flattening	66,6667	5,3914	0,0809
PL4	Makroregion Pólnocno-Zachodni	58	60	64	67	70	73	15	6	25,86%	8,96%	6,41%	catching up	-0,02%	at the same pace	1,83%	at the same pace	-0,31%	at the same pace	65,3333	5,7850	0,0885
PL5	Makroregion Poludniowo-Zachodni	59	64	65	72	76	79	20	7	33,90%	9,72%	14,44%	catching up	8,02%	outperforming	2,60%	catching up	0,46%	outperforming	69,1667	7,7309	0,1118
PL6	Makroregion Pólnocny	56	63	68	68	75	79	23	11	41,07%	16,18%	21,62%	catching up	15,19%	catching up, then outperforming	9,05%	catching up	6,91%	outperforming	68,1667	8,2321	0,1208
PL7	Makroregion Centralny	60	64	59	67	68	68	8	1	13,33%	1,49%	-6,12%	slower pace	-12,54%	flattening, then slower pace	-5,63%	slower pace	-7,77%	flattening, then slower pace	64,3333	4,0332	0,0627
PL8	Makroregion Wschodni	51	54	58	63	64	65	14	2	27,45%	3,17%	7,99%	at the same pace	1,57%	slower pace	-3,95%	slower pace	-6,09%	slower pace	59,1667	5,7764	0,0976
PL9	Makroregion Województwo Mazowieckie	:	:	68	73	80	82	:	9	:	12,33%	:	:	:	:	5,21%	catching up	3,06%	outperforming	75,7500	6,4485	0,0851

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GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021	EU-27 average 2016–2021		CSE-11 average 2016–2021		EU-27 average 2019–2021		CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
Individuals who used the Internet daily (% of individuals)		**Data**						**Absolute change**		**Percentage change***		**Patterns of change**		**Patterns of change**		**Patterns of change**		**Patterns of change**			
RO	***Romania***	*42*	*47*	*53*	*57*	*62*	*69*	*27*	*12*	*64,29%*	*21,05%*	*44,83%*	*catching up*	*38,41%*	*catching up*	*13,93%*	*catching up*	*11,79%*	*catching up*	*55,0000*	*9,8590*	*0,1793*
RO11	Nord-Vest	45	50	61	65	66	75	30	10	66,67%	15,38%	47,21%	catching up	40,79%	catching up, then outperforming	8,26%	catching up	6,12%	catching up, then outperforming	60,3333	11,0574	0,1833
RO12	Centru	44	46	50	57	65	72	28	15	63,64%	26,32%	44,18%	catching up	37,76%	catching up	19,19%	catching up	17,05%	catching up	55,6667	11,1116	0,1996
RO21	Nord-Est	33	40	45	49	55	64	31	15	93,94%	30,61%	74,48%	catching up	68,06%	catching up	23,49%	catching up	21,35%	catching up	47,6667	10,9848	0,2305
RO22	Sud-Est	41	44	46	53	60	64	23	11	56,10%	20,75%	36,64%	catching up	30,22%	catching up	13,63%	catching up	11,49%	catching up	51,3333	9,2448	0,1801
RO31	Sud-Muntenia	36	41	49	54	59	65	29	11	80,56%	20,37%	61,10%	catching up	54,68%	catching up	13,25%	catching up	11,11%	catching up	50,6667	10,9301	0,2157
RO32	Bucuresti-Ilfov	60	63	71	63	67	77	17	14	28,33%	22,22%	8,88%	catching up	2,46%	outperforming	15,10%	catching up	12,96%	catching up, then outperforming	66,8333	6,2743	0,0939
RO41	Sud-Vest Oltenia	38	42	49	55	57	62	24	7	63,16%	12,73%	43,70%	catching up	37,28%	catching up	5,60%	catching up	3,46%	catching up	50,5000	9,2250	0,1827
RO42	Vest	48	52	59	60	69	71	23	11	47,92%	18,33%	28,46%	catching up	22,04%	catching up	11,21%	catching up	9,07%	catching up	59,8333	9,0646	0,1515
SI	***Slovenia***	*64*	*68*	*71*	*74*	*76*	*85*	*21*	*11*	*32,81%*	*14,86%*	*13,36%*	*catching up, then outperforming*	*6,94%*	*outperforming*	*7,74%*	*catching up, then outperforming*	*5,60%*	*outperforming*	*73,0000*	*7,2664*	*0,0995*
SI03	Vzhodna Slovenija	60	63	68	70	73	81	21	11	35,00%	15,71%	15,54%	catching up	9,12%	outperforming	8,59%	catching up	6,45%	outperforming	69,1667	7,4677	0,1080
SI04	Zahodna Slovenija	69	74	74	79	80	89	20	10	28,99%	12,66%	9,53%	outperforming	3,11%	outperforming	5,54%	outperforming	3,39%	outperforming	77,5000	6,8920	0,0889
SK	***Slovakia***	*68*	*69*	*68*	*76*	*80*	*80*	*12*	*4*	*17,65%*	*5,26%*	*-1,81%*	*slower pace*	*-8,23%*	*flattening*	*-1,86%*	*slower pace*	*-4,00%*	*flattening*	*73,5000*	*5,8566*	*0,0797*
SK01	Bratislavský kraj	68	69	68	75	85	90	22	15	32,35%	20,00%	12,90%	catching up, then outperforming	6,48%	outperforming	12,88%	catching up, then outperforming	10,74%	outperforming	75,8333	9,5376	0,1258
SK02	Západné Slovensko	68	70	70	79	80	79	11	0	16,18%	0,00%	-3,28%	slower pace	-9,70%	flattening	-7,12%	flattening, then slower pace	-9,26%	flattening	74,3333	5,5377	0,0745
SK03	Stredné Slovensko	64	66	66	71	79	79	15	8	23,44%	11,27%	3,98%	catching up	-2,44%	at the same pace	4,15%	catching up	2,00%	outperforming	70,8333	6,7355	0,0951
SK04	Východné Slovensko	69	72	67	75	79	78	9	3	13,04%	4,00%	-6,41%	slower pace	-12,83%	flattening	-3,12%	slower pace	-5,26%	flattening	73,3333	4,8442	0,0661

Notes: * Top five regions are marked with green. Last five regions are marked with red. ** In the case of PL9 Makroregion Województwo Mazowieckie the period from 2018 to 2021 is considered. n.r. – not relevant. : – no data.

Source: Own elaboration based on Eurostat database and Eurofound (2018).

ANNEX 4.: INTERNET USE: PARTICIPATING IN SOCIAL NETWORKS (SOCMED) – DATA & CALCULATIONS

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	Abs. change 2016–2021	Abs. change 2019–2021	% change 2016–2021	% change 2019–2021	Patterns EU-27 avg 2016–2021		Patterns CSE-11 avg 2016–2021		Patterns EU-27 avg 2019–2021		Patterns CSE-11 avg 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
EU-27	European Union	55	57	60	61	64	66	12	5	21,19%	7,80%	n.r.	n.r.	8,43%		-8,43%		-2,15%		60,5470	4,2944	0,0709
CSE-11	Central & South-East Europe	50	53	57	59	63	65	15	6	29,62%	9,95%	8,43%		n.r.	n.r.	2,15%		n.r.	n.r.	57,9833	5,6254	0,0970
BG	Bulgaria	45	50	51	53	55	60	15	7	33,33%	13,21%	12,14%	slower pace	3,71%	catching up	5,41%	catching up	3,26%	catching up	52,3333	5,0465	0,0964
BG31	Severozapaden	43	47	49	47	48	60	17	13	39,53%	27,66%	18,35%	catching up	9,91%	catching up	19,86%	catching up	17,71%	catching up	49,0000	5,7619	0,1176
BG32	Severen tsentralen	44	54	51	59	57	66	22	7	50,00%	11,86%	28,81%	catching up	20,38%	catching up, then outperforming	4,07%	catching up	1,91%	outperforming	55,1667	7,4677	0,1354
BG33	Severoiztochen	50	48	51	54	58	66	16	12	32,00%	22,22%	10,81%	catching up	2,38%	outperforming	14,43%	catching up	12,27%	catching up, then outperforming	54,5000	6,6257	0,1216
BG34	Yugoiztochen	38	47	51	51	49	63	25	12	65,79%	23,53%	44,60%	catching up	36,17%	catching up	15,73%	catching up	13,58%	catching up	49,8333	8,0602	0,1617
BG41	Yugozapaden	49	57	56	59	60	59	10	0	20,41%	0,00%	-0,78%	slower pace	-9,21%	slower pace	-7,80%	slower pace	-9,95%	slower pace	56,6667	4,0332	0,0712
BG42	Yuzhen tsentralen	42	42	46	44	51	51	9	7	21,43%	15,91%	0,24%	slower pace	-8,19%	slower pace	8,11%	catching up	5,96%	catching up	46,0000	4,1473	0,0902
CZ	Czechia	45	48	56	59	59	62	17	3	37,78%	5,08%	16,59%	catching up	8,16%	catching up	-2,71%	slower pace	-4,86%	not at the right pace	54,8333	6,7946	0,1239
CZ01	Praha	55	56	63	65	72	62	7	-3	12,73%	-4,62%	-8,46%	slower pace	-16,89%	flattening, then slower pace	-12,41%	slower pace	-14,56%	inversion, then diving	62,1667	6,2423	0,1004
CZ02	Střední Čechy	46	47	57	63	53	57	11	-6	23,91%	-9,52%	2,72%	slower pace	-5,71%	slower pace	-17,32%	inversion, then diving	-19,47%	inversion, then diving	53,8333	6,5243	0,1212
CZ03	Jihozápad	45	51	57	62	55	60	15	-2	33,33%	-3,23%	12,14%	catching up	3,71%	at the same pace	-11,02%	inversion, then diving	-13,18%	inversion, then diving	55,0000	6,2290	0,1133
CZ04	Severozápad	46	44	55	59	56	63	17	4	36,96%	6,78%	15,77%	catching up	7,33%	catching up	-1,02%	slower pace	-3,17%	not at the right pace	53,8333	7,4140	0,1377
CZ05	Severovýchod	41	42	52	57	60	61	20	4	48,78%	7,02%	27,59%	catching up	19,16%	catching up	-0,78%	slower pace	-2,93%	not at the right pace	52,1667	8,8412	0,1695
CZ06	Jihovýchod	42	48	52	52	58	62	20	10	47,62%	19,23%	26,43%	catching up	18,00%	catching up	11,43%	catching up	9,28%	catching up	52,3333	7,0899	0,1355
CZ07	Střední Morava	41	50	53	56	58	61	20	5	48,78%	8,93%	27,59%	catching up	19,16%	catching up	1,13%	at the same pace	-1,02%	slower pace	53,1667	7,0828	0,1332
CZ08	Moravskoslezsko	46	51	57	61	61	66	20	5	43,48%	8,20%	22,29%	catching up	13,86%	catching up, then outperforming	0,40%	at the same pace	-1,75%	slower pace	57,0000	7,3485	0,1289
EE	Estonia	57	60	62	65	65	67	10	2	17,54%	3,08%	-3,65%	flattening	-12,08%	flattening	-4,72%	flattening	-6,87%	flattening	62,6667	3,7238	0,0594
EE00	Eesti	57	60	62	65	65	67	10	2	17,54%	3,08%	-3,65%	flattening	-12,08%	flattening	-4,72%	flattening	-6,87%	flattening	62,6667	3,7238	0,0594
HR	Croatia	50	47	54	58	57	61	11	3	22,00%	5,17%	0,81%	slower pace	-7,62%	slower pace	-2,62%	slower pace	-4,78%	slower pace	54,5000	5,2440	0,0962
HR03	Jadranska Hrvatska	47	44	57	58	54	62	15	4	31,91%	6,90%	10,73%	catching up	2,29%	at the same pace	-0,90%	slower pace	-3,05%	slower pace	53,6667	6,8896	0,1284
HR04	Kontinentalna Hrvatska	52	49	53	58	59	59	7	1	13,46%	1,72%	-7,73%	slower pace	-16,16%	catching up, then outperforming	-6,07%	slower pace	-8,23%	slower pace	55,0000	4,2426	0,0771
LV	Latvia	57	60	61	65	67	70	13	5	22,81%	7,69%	1,62%	outperforming	-6,82%	outperforming	-0,10%	at the same pace	-2,26%	flattening	63,3333	4,8442	0,0765
LV00	Latvija	57	60	61	65	67	70	13	5	22,81%	7,69%	1,62%	outperforming	-6,82%	outperforming	-0,10%	at the same pace	-2,26%	flattening	63,3333	4,8442	0,0765
LT	Lithuania	50	54	58	61	61	65	15	4	30,00%	6,56%	8,81%	catching up	0,38%	at the same pace	-1,24%	slower pace	-3,39%	flattening	58,1667	5,4191	0,0932
LT01	Sostines regionas	50	54	59	65	65	68	18	3	36,00%	4,62%	14,81%	outperforming	6,38%	catching up, then outperforming	-3,18%	flattening	-5,33%	flattening	60,1667	7,0828	0,1177
LT02	Vidurio ir vakaru Lietuvos regionas	50	54	58	59	60	64	14	5	28,00%	8,47%	6,81%	catching up	-1,62%	slower pace	0,68%	at the same pace	-1,47%	slower pace	57,5000	4,8888	0,0850

VIII

	Individuals who used social media channels (% of individuals)	Data						Absolute change		Percentage change*		Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021											
HU	*Hungary*	*66*	*65*	*65*	*69*	*74*	*77*	*11*	*8*	*16,67%*	*11,59%*	*-4,52%*	*flattening*	*-12,96%*	*flattening*	*3,80%*	*outperforming*	*1,64%*	*outperforming*	*69,3333*	*5,0859*	*0,0734*
HU11	Budapest	66	65	71	73	82	84	18	11	27,27%	15,07%	6,08%	outperforming	-2,35%	outperforming	7,27%	outperforming	5,12%	outperforming	73,5000	7,9687	0,1084
HU12	Pest	66	65	66	71	74	78	12	7	18,18%	9,86%	-3,01%	at the same pace	-11,44%	flattening	2,06%	outperforming	-0,09%	outperforming	70,0000	5,2536	0,0751
HU21	Közép-Dunántúl	67	69	71	74	74	78	11	4	16,42%	5,41%	-4,77%	flattening	-13,20%	flattening	-2,39%	flattening	-4,54%	flattening	72,1667	3,9707	0,0550
HU22	Nyugat-Dunántúl	63	61	62	62	71	75	12	13	19,05%	20,97%	-2,14%	at the same pace	-10,57%	flattening	13,17%	outperforming	11,02%	outperforming	65,6667	5,8538	0,0891
HU23	Dél-Dunántúl	62	63	62	66	74	75	13	9	20,97%	13,64%	-0,22%	outperforming	-8,65%	outperforming	5,84%	outperforming	3,69%	outperforming	67,0000	6,0000	0,0896
HU31	Észak-Magyarország	62	62	61	67	72	74	12	7	19,35%	10,45%	-1,83%	at the same pace	-10,27%	flattening	2,65%	outperforming	0,50%	outperforming	66,3333	5,6095	0,0846
HU32	Észak-Alföld	62	60	64	68	73	74	12	6	19,35%	8,82%	-1,83%	at the same pace	-10,27%	flattening	1,03%	outperforming	-1,13%	at the same pace	66,8333	5,8109	0,0869
HU33	Dél-Alföld	62	64	63	67	69	76	14	9	22,58%	13,43%	1,39%	outperforming	-7,04%	outperforming	5,64%	outperforming	3,48%	outperforming	66,8333	5,1929	0,0777
PL	*Poland*	*44*	*48*	*50*	*53*	*55*	*57*	*13*	*4*	*29,55%*	*7,55%*	*8,36%*	*catching up*	*-0,08%*	*slower pace*	*-0,25%*	*slower pace*	*-2,40%*	*slower pace*	*51,1667*	*4,7924*	*0,0937*
PL2	Makroregion Poludniowy	44	48	50	51	54	56	12	5	27,27%	9,80%	6,08%	at the same pace	-2,35%	slower pace	2,01%	at the same pace	-0,15%	slower pace	50,5000	4,2778	0,0847
PL4	Makroregion Pólnocno-Zachodni	47	51	52	54	55	58	11	4	23,40%	7,41%	2,22%	slower pace	-6,22%	slower pace	-0,39%	slower pace	-2,54%	slower pace	52,8333	3,7639	0,0712
PL5	Makroregion Poludniowo-Zachodni	44	50	46	52	56	59	15	7	34,09%	13,46%	12,90%	catching up	4,47%	at the same pace	5,66%	catching up	3,51%	catching up	51,1667	5,7417	0,1122
PL6	Makroregion Pólnocny	44	49	53	56	53	57	13	1	29,55%	1,79%	8,36%	catching up	-0,08%	slower pace	-6,01%	slower pace	-8,16%	slower pace	52,0000	4,8166	0,0926
PL7	Makroregion Centralny	45	48	48	52	50	55	10	3	22,22%	5,77%	1,03%	slower pace	-7,40%	slower pace	-2,03%	slower pace	-4,18%	slower pace	49,6667	3,5024	0,0705
PL8	Makroregion Wschodni	41	44	45	49	51	50	9	1	21,95%	2,04%	0,76%	slower pace	-7,67%	slower pace	-5,76%	slower pace	-7,91%	slower pace	46,6667	3,9328	0,0843
PL9	Makroregion Województwo Mazowieckie	:	:	52	55	63	64	:	9	:	16,36%	:	:	:	:	8,57%	catching up	6,41%	catching up	58,5000	5,9161	0,1011
RO	*Romania*	*44*	*52*	*61*	*60*	*65*	*69*	*25*	*9*	*56,82%*	*15,00%*	*35,63%*	*catching up, then outperforming*	*27,20%*	*catching up, then outperforming*	*7,20%*	*catching up, then outperforming*	*5,05%*	*outperforming*	*58,5000*	*9,0940*	*0,1555*
RO11	Nord-Vest	49	56	65	68	67	73	24	5	48,98%	7,35%	27,79%	catching up, then outperforming	19,36%	catching up, then outperforming	-0,44%	at the same pace	-2,60%	flattening	63,0000	8,8318	0,1402
RO12	Centru	50	52	60	57	64	67	17	10	34,00%	17,54%	12,81%	catching up, then outperforming	4,38%	outperforming	9,75%	catching up, then outperforming	7,59%	catching up, then outperforming	58,3333	6,6533	0,1141
RO21	Nord-Est	44	50	57	60	62	72	28	12	63,64%	20,00%	42,45%	catching up, then outperforming	34,01%	catching up, then outperforming	12,20%	catching up, then outperforming	10,05%	outperforming	57,5000	9,7519	0,1696
RO22	Sud-Est	43	48	55	54	60	63	20	9	46,51%	16,67%	25,32%	catching up	16,89%	catching up	8,87%	catching up	6,72%	catching up	53,8333	7,4140	0,1377
RO31	Sud-Muntenia	37	50	56	60	62	68	31	8	83,78%	13,33%	62,59%	catching up, then outperforming	54,16%	catching up, then outperforming	5,54%	catching up, then outperforming	3,38%	outperforming	55,5000	10,8766	0,1960
RO32	Bucuresti-Ilfov	50	56	71	62	67	67	17	5	34,00%	8,06%	12,81%	catching up, then outperforming	4,38%	outperforming	0,27%	at the same pace	-1,88%	flattening	62,1667	7,8846	0,1268
RO41	Sud-Vest Oltenia	41	46	58	56	62	61	20	5	48,78%	8,93%	27,59%	catching up	19,16%	catching up	1,13%	at the same pace	-1,02%	slower pace	54,0000	8,5557	0,1584
RO42	Vest	42	62	64	66	77	76	34	10	80,95%	15,15%	59,76%	catching up, then outperforming	51,33%	catching up, then outperforming	7,35%	outperforming	5,20%	outperforming	64,5000	12,6768	0,1965

Individuals who used social media channels (% of individuals)		Data						Absolute change		Percentage change*		Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021											
SI	*Slovenia*	*38*	*45*	*49*	*52*	*67*	*64*	*26*	*12*	*68,42%*	*23,08%*	*47,23%*	*catching up*	*38,80%*	*catching up*	*15,28%*	*catching up*	*13,13%*	*catching up*	*52,5000*	*11,1490*	*0,2124*
SI03	Vzhodna Slovenija	36	45	50	51	65	62	26	11	72,22%	21,57%	51,03%	catching up	42,60%	catching up	13,77%	catching up	11,62%	catching up	51,5000	10,7471	0,2087
SI04	Zahodna Slovenija	41	46	48	53	69	66	25	13	60,98%	24,53%	39,79%	catching up	31,35%	catching up, then outperforming	16,73%	catching up	14,58%	catching up, then outperforming	53,8333	11,3034	0,2100
SK	*Slovakia*	*57*	*59*	*60*	*59*	*64*	*65*	*8*	*6*	*14,04%*	*10,17%*	*-7,15%*	*flattening, then slower pace*	*-15,59%*	*flattening*	*2,37%*	*catching up*	*0,22%*	*at the same pace*	*60,6667*	*3,1411*	*0,0518*
SK01	Bratislavský kraj	51	59	62	53	64	71	20	18	39,22%	33,96%	18,03%	catching up, then outperforming	9,59%	catching up, then outperforming	26,17%	catching up, then outperforming	24,01%	catching up, then outperforming	60,0000	7,3756	0,1229
SK02	Západné Slovensko	58	59	61	62	66	64	6	2	10,34%	3,23%	-10,84%	flattening, then slower pace	-19,28%	flattening, then slower pace	-4,57%	flattening/slower pace	-6,72%	flattening/slower pace	61,6667	3,0111	0,0488
SK03	Stredné Slovensko	55	55	55	53	65	66	11	13	20,00%	24,53%	-1,19%	at the same pace	-9,62%	flattening	16,73%	catching up	14,58%	catching up, then outperforming	58,1667	5,7417	0,0987
SK04	Východné Slovensko	60	62	61	63	62	61	1	-2	1,67%	-3,17%	-19,52%	flattening, then slower pace	-27,96%	flattening, then slower pace	-10,97%	inversion/diving	-13,12%	inversion/diving	61,5000	1,0488	0,0171

Notes: * Top five regions are marked with green. Last five regions are marked with red. ** In the case of PL9 Makroregion Województwo Mazowieckie the period from 2018 to 2021 is considered. n.r. – not relevant. : – no data.

Source: Own elaboration based on Eurostat database and Eurofound (2018).

X

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	Absolute change 2016–2021	Absolute change 2019–2021	Percentage change* 2016–2021	Percentage change* 2019–2021	Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
EU-27	European Union	52	53	55	57	61	67	15	10	28,38%	16,95%	n.r.	n.r.	-6,03%		n.r.	n.r.	0,65%		57,3371	5,4608	0,0952
CSE-11	Central & South-East Europe	39	40	42	45	49	52	13	7	34,42%	16,29%	6,03%		n.r.	n.r.	-0,65%		n.r.	n.r.	44,2639	5,1190	0,1156
BG	Bulgaria	19	21	22	25	27	27	8	2	42,11%	8,00%	13,72%	slower pace	7,69%	slower pace	-8,95%	slower pace	-8,29%	slower pace	23,5000	3,3317	0,1418
BG31	Severozapaden	14	20	20	26	17	18	4	-8	28,57%	-30,77%	0,19%	slower pace	-5,84%	slower pace	-47,71%	diving	-47,06%	diving	19,1667	4,0208	0,2098
BG32	Severen tsentralen	17	20	11	14	17	22	5	8	29,41%	57,14%	1,03%	slower pace	-5,00%	slower pace	40,20%	slower pace	40,85%	catching up	16,8333	3,9707	0,2359
BG33	Severoiztochen	21	18	19	25	26	26	5	1	23,81%	4,00%	-4,57%	slower pace	-10,61%	slower pace	-12,95%	slower pace	-12,29%	slower pace	22,5000	3,6194	0,1609
BG34	Yugoiztochen	16	17	23	22	23	19	3	-3	18,75%	-13,64%	-9,63%	slower pace	-15,67%	slower pace	-30,58%	diving	-29,93%	diving	20,0000	3,0984	0,1549
BG41	Yugozapaden	24	29	29	38	41	36	12	-2	50,00%	-5,26%	21,62%	slower pace	15,58%	slower pace	-22,21%	diving	-21,56%	diving	32,8333	6,4936	0,1978
BG42	Yuzhen tsentralen	14	13	21	15	20	25	11	10	78,57%	66,67%	50,19%	slower pace	44,16%	slower pace	49,72%	at the same pace	50,37%	catching up	18,0000	4,7329	0,2629
CZ	Czechia	36	46	53	54	57	68	32	14	88,89%	25,93%	60,51%	catching up, then outperforming	54,47%	catching up, then outperforming	8,98%	catching up, then outperforming	9,63%	outperforming	52,3333	10,7455	0,2053
CZ01	Praha	38	49	64	67	77	81	43	14	113,16%	20,90%	84,78%	catching up, then outperforming	78,74%	outperforming	3,95%	outperforming	4,60%	outperforming	62,6667	16,4762	0,2629
CZ02	Střední Čechy	44	55	55	56	53	67	23	11	52,27%	19,64%	23,89%	catching up	17,86%	outperforming	2,70%	catching up	3,35%	outperforming	55,0000	7,3485	0,1336
CZ03	Jihozápad	39	48	53	53	44	65	26	12	66,67%	22,64%	38,29%	catching up	32,25%	outperforming	5,70%	catching up	6,35%	outperforming	50,3333	8,9815	0,1784
CZ04	Severozápad	33	45	48	47	45	53	20	6	60,61%	12,77%	32,23%	catching up	26,19%	catching up, then outperforming	-4,18%	slower pace	-3,53%	flattening	45,1667	6,6458	0,1471
CZ05	Severovýchod	36	36	49	51	57	71	35	20	97,22%	39,22%	68,84%	catching up, then outperforming	62,81%	catching up, then outperforming	22,27%	catching up, then outperforming	22,92%	outperforming	50,0000	13,2966	0,2659
CZ06	Jihovýchod	37	47	53	52	55	69	32	17	86,49%	32,69%	58,11%	catching up, then outperforming	52,07%	catching up, then outperforming	15,75%	catching up, then outperforming	16,40%	outperforming	52,1667	10,4770	0,2008
CZ07	Střední Morava	27	39	45	52	64	68	41	16	151,85%	30,77%	123,47%	catching up, then outperforming	117,44%	catching up, then outperforming	13,82%	catching up, then outperforming	14,48%	outperforming	49,1667	15,4585	0,3144
CZ08	Moravskoslezsko	33	44	60	53	61	70	37	17	112,12%	32,08%	83,74%	catching up, then outperforming	77,71%	catching up, then outperforming	15,13%	catching up, then outperforming	15,78%	outperforming	53,5000	13,2778	0,2482
EE	Estonia	77	78	79	80	80	82	5	2	6,49%	2,50%	-21,89%	flattening	-27,92%	flattening	-14,45%	flattening	-13,79%	flattening	79,3333	1,7512	0,0221
EE00	Eesti	77	78	79	80	80	82	5	2	6,49%	2,50%	-21,89%	flattening	-27,92%	flattening	-14,45%	flattening	-13,79%	flattening	79,3333	1,7512	0,0221
HR	Croatia	36	32	36	33	41	45	9	12	25,00%	36,36%	-3,38%	slower pace	-9,42%	slower pace	19,42%	catching up	20,07%	catching up	37,1667	4,9565	0,1334
HR03	Jadranska Hrvatska	34	28	35	34	40	47	13	13	38,24%	38,24%	9,85%	slower pace	3,82%	at the same pace	21,29%	catching up	21,94%	catching up	36,3333	6,4704	0,1781
HR04	Kontinentalna Hrvatska	37	34	37	32	42	42	5	10	13,51%	31,25%	-14,87%	slower pace	-20,90%	slower pace	14,30%	at the same pace	14,96%	catching up	37,3333	4,0825	0,1094
LV	Latvia	69	69	66	70	76	77	8	7	11,59%	10,00%	-16,79%	flattening	-22,82%	flattening	-6,95%	flattening	-6,29%	at the same pace	71,1667	4,3551	0,0612
LV00	Latvija	69	69	66	70	76	77	8	7	11,59%	10,00%	-16,79%	flattening	-22,82%	flattening	-6,95%	flattening	-6,29%	at the same pace	71,1667	4,3551	0,0612
LT	Lithuania	45	48	51	55	58	62	17	7	37,78%	12,73%	9,40%	catching up	3,36%	outperforming	-4,22%	slower pace	-3,56%	at the same pace	53,1667	6,3692	0,1198
LT01	Sostines regionas	45	48	58	62	66	66	21	4	46,67%	6,45%	18,29%	catching up	12,25%	outperforming	-10,49%	flattening	-9,84%	flattening	57,5000	9,0719	0,1578
LT02	Vidurio ir vakaru Lietuvos regionas	45	48	48	52	54	60	15	8	33,33%	15,38%	4,95%	at the same pace	-1,08%	outperforming	-1,56%	slower pace	-0,91%	outperforming	51,1667	5,3821	0,1052

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021	EU-27 average 2016–2021		CSE-11 average 2016–2021		EU-27 average 2019–2021		CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
HU	*Hungary*	*48*	*47*	*53*	*53*	*60*	*73*	*25*	*20*	*52,08%*	*37,74%*	*23,70%*	*catching up, then outperforming*	*17,67%*	*outperforming*	*20,79%*	*catching up, then outperforming*	*21,44%*	*outperforming*	*55,6667*	*9,6678*	*0,1737*
HU11	Budapest	48	47	73	68	79	89	41	21	85,42%	30,88%	57,04%	catching up, then outperforming	51,00%	outperforming	13,94%	outperforming	14,59%	outperforming	67,3333	16,8839	0,2508
HU12	Pest	48	47	54	55	63	75	27	20	56,25%	36,36%	27,87%	catching up, then outperforming	21,83%	outperforming	19,42%	catching up, then outperforming	20,07%	outperforming	57,0000	10,5262	0,1847
HU21	Közép-Dunántúl	55	59	62	59	63	73	18	14	32,73%	23,73%	4,35%	outperforming	-1,69%	outperforming	6,78%	outperforming	7,44%	outperforming	61,8333	6,1455	0,0994
HU22	Nyugat-Dunántúl	44	44	52	54	59	72	28	18	63,64%	33,33%	35,26%	catching up, then outperforming	29,22%	outperforming	16,39%	catching up, then outperforming	17,04%	outperforming	54,1667	10,5151	0,1941
HU23	Dél-Dunántúl	43	40	43	41	51	67	24	26	55,81%	63,41%	27,43%	catching up	21,40%	outperforming	46,47%	catching up	47,12%	catching up, then outperforming	47,5000	10,3102	0,2171
HU31	Észak-Magyarország	46	46	42	46	56	65	19	19	41,30%	41,30%	12,92%	catching up	6,89%	outperforming	24,36%	catching up	25,01%	outperforming	50,1667	8,6352	0,1721
HU32	Észak-Alföld	39	39	44	45	51	64	25	19	64,10%	42,22%	35,72%	catching up	29,69%	outperforming	25,28%	catching up	25,93%	outperforming	47,0000	9,4446	0,2009
HU33	Dél-Alföld	41	35	45	47	51	69	28	22	68,29%	46,81%	39,91%	catching up, then outperforming	33,88%	outperforming	29,86%	catching up/outperforming	30,52%	outperforming	48,0000	11,6447	0,2426
PL	*Poland*	*30*	*31*	*35*	*40*	*42*	*47*	*17*	*7*	*56,67%*	*17,50%*	*28,29%*	*catching up*	*22,25%*	*catching up*	*0,55%*	*slower pace*	*1,21%*	*at the same pace*	*37,5000*	*6,6558*	*0,1775*
PL2	Makroregion Poludniowy	36	31	39	44	42	48	12	4	33,33%	9,09%	4,95%	slower pace	-1,08%	slower pace	-7,85%	slower pace	-7,20%	slower pace	40,0000	6,0332	0,1508
PL4	Makroregion Pólnocno-Zachodni	28	31	33	36	40	48	20	12	71,43%	33,33%	43,05%	catching up	37,01%	catching up	16,39%	catching up	17,04%	catching up	36,0000	7,1833	0,1995
PL5	Makroregion Poludniowo-Zachodni	27	30	35	43	43	51	24	8	88,89%	18,60%	60,51%	catching up	54,47%	catching up	1,66%	slower pace	2,31%	catching up	38,1667	9,0866	0,2381
PL6	Makroregion Pólnocny	28	33	36	42	39	51	23	9	82,14%	21,43%	53,76%	catching up	47,73%	catching up	4,48%	slower pace	5,14%	catching up	38,1667	7,9352	0,2079
PL7	Makroregion Centralny	33	33	32	38	37	43	10	5	30,30%	13,16%	1,92%	slower pace	-4,11%	slower pace	-3,79%	slower pace	-3,13%	slower pace	36,0000	4,1952	0,1165
PL8	Makroregion Wschodni	26	26	30	34	38	39	13	5	50,00%	14,71%	21,62%	slower pace	15,58%	at the same pace	-2,24%	slower pace	-1,59%	slower pace	32,1667	5,7417	0,1785
PL9	Makroregion Województwo Mazowieckie	:	:	42	46	52	55	:	9	:	19,57%	:	:	:	:	2,62%	slower pace	3,27%	catching up	48,7500	5,8523	0,1200
RO	*Romania*	*9*	*9*	*9*	*12*	*13*	*15*	*6*	*3*	*66,67%*	*25,00%*	*38,29%*	*slower pace*	*32,25%*	*slower pace*	*8,05%*	*slower pace*	*8,71%*	*slower pace*	*11,1667*	*2,5626*	*0,2295*
RO11	Nord-Vest	9	8	12	11	11	13	4	2	44,44%	18,18%	16,06%	slower pace	10,03%	slower pace	1,24%	slower pace	1,89%	slower pace	10,6667	1,8619	0,1746
RO12	Centru	10	14	11	13	12	17	7	4	70,00%	30,77%	41,62%	slower pace	35,58%	slower pace	13,82%	slower pace	14,48%	slower pace	12,8333	2,4833	0,1935
RO21	Nord-Est	6	8	7	9	10	12	6	3	100,00%	33,33%	71,62%	slower pace	65,58%	slower pace	16,39%	slower pace	17,04%	slower pace	8,6667	2,1602	0,2493
RO22	Sud-Est	6	6	3	9	12	13	7	4	116,67%	44,44%	88,29%	slower pace	82,25%	slower pace	27,50%	slower pace	28,15%	slower pace	8,1667	3,8687	0,4737
RO31	Sud-Muntenia	7	6	11	8	10	10	3	2	42,86%	25,00%	14,48%	slower pace	8,44%	slower pace	8,05%	slower pace	8,71%	slower pace	8,6667	1,9664	0,2269
RO32	Bucuresti-Ilfov	19	13	13	21	29	28	9	7	47,37%	33,33%	18,99%	slower pace	12,95%	slower pace	16,39%	slower pace	17,04%	at the same pace	20,5000	6,9785	0,3404
RO41	Sud-Vest Oltenia	12	7	9	13	13	14	2	1	16,67%	7,69%	-11,71%	slower pace	-17,75%	slower pace	-9,25%	slower pace	-8,60%	slower pace	11,3333	2,7325	0,2411
RO42	Vest	5	9	9	11	11	12	7	1	140,00%	9,09%	111,62%	slower pace	105,58%	slower pace	-7,85%	slower pace	-7,20%	slower pace	9,5000	2,5100	0,2642

XII

Individuals who used the Internet to interact with public authorities (% of individuals)		Data						Absolute change		Percentage change*		Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021											
SI	*Slovenia*	*45*	*50*	*54*	*53*	*67*	*69*	*24*	*16*	*53,33%*	*30,19%*	*24,95%*	*catching up, then outperforming*	*18,92%*	*outperforming*	*13,24%*	*catching up, then outperforming*	*13,90%*	*outperforming*	*56,3333*	*9,5847*	*0,1701*
SI03	Vzhodna Slovenija	42	48	47	47	63	65	23	18	54,76%	38,30%	26,38%	catching up	20,35%	outperforming	21,35%	catching up	22,01%	outperforming	52,0000	9,5499	0,1837
SI04	Zahodna Slovenija	49	52	62	60	71	73	24	13	48,98%	21,67%	20,60%	catching up, then outperforming	14,56%	outperforming	4,72%	outperforming	5,37%	outperforming	61,1667	9,7040	0,1586
SK	*Slovakia*	*48*	*47*	*51*	*59*	*62*	*56*	*8*	*-3*	*16,67%*	*-5,08%*	*-11,71%*	*slower pace*	*-17,75%*	*flattening*	*-22,03%*	*inversion, then diving*	*-21,38%*	*inversion*	*53,8333*	*6,1128*	*0,1136*
SK01	Bratislavský kraj	53	52	58	67	74	77	24	10	45,28%	14,93%	16,90%	outperforming	10,87%	outperforming	-2,02%	at the same pace	-1,37%	slower pace	63,5000	10,7471	0,1692
SK02	Západné Slovensko	47	45	52	57	54	53	6	-4	12,77%	-7,02%	-15,61%	slower pace	-21,65%	flattening	-23,96%	diving	-23,31%	inversion	51,3333	4,5019	0,0877
SK03	Stredné Slovensko	47	47	52	57	65	52	5	-5	10,64%	-8,77%	-17,74%	slower pace	-23,78%	flattening	-25,72%	diving	-25,06%	inversion	53,3333	6,8313	0,1281
SK04	Východné Slovensko	48	49	48	60	63	54	6	-6	12,50%	-10,00%	-15,88%	slower pace	-21,92%	flattening	-26,95%	inversion, then diving	-26,29%	inversion	53,6667	6,5320	0,1217

Notes: * Top five regions are marked with green. Last five regions are marked with red. ** In the case of PL9 Makroregion Województwo Mazowieckie the period from 2018 to 2021 is considered. n.r. – not relevant. : – no data.

Source: Own elaboration based on Eurostat database and Eurofound (2018).

ANNEX 6.: INTERNET USE: INTERNET (ONLINE) BANKING (ONBANK) – DATA & CALCULATIONS

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021	EU-27 avg 2016–2021		CSE-11 avg 2016–2021		EU-27 avg 2019–2021		CSE-11 avg 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
EU-27	*European Union*	*49*	*52*	*54*	*58*	*61*	*65*	*16*	*8*	*32,06%*	*13,10%*	*n.r.*	*n.r.*	*-5,75%*		*n.r.*	*n.r.*	*0,07%*		*56,6441*	*5,9402*	*0,1049*
CSE-11	*Central & South-East Europe*	*37*	*39*	*42*	*45*	*48*	*51*	*14*	*6*	*37,81%*	*13,03%*	*5,75%*		*n.r.*	*n.r.*	*-0,07%*		*n.r.*	*n.r.*	*43,8056*	*5,4944*	*0,1254*
BG	*Bulgaria*	*4*	*5*	*7*	*9*	*13*	*15*	*11*	*6*	*275,00%*	*66,67%*	*242,94%*	*slower pace*	*237,19%*	*slower pace*	*53,57%*	*slower pace*	*53,64%*	*at the same pace*	*8,8333*	*4,4008*	*0,4982*
BG31	Severozapaden	2	4	7	8	7	7	5	-1	250,00%	-12,50%	217,94%	slower pace	212,19%	slower pace	-25,60%	diving	-25,53%	diving	5,8333	2,3166	0,3971
BG32	Severen tsentralen	3	7	6	6	13	17	14	11	466,67%	183,33%	434,60%	slower pace	428,86%	at the same pace	170,23%	catching up	170,31%	catching up	8,6667	5,2409	0,6047
BG33	Severoiztochen	4	3	3	6	5	12	8	6	200,00%	100,00%	167,94%	slower pace	162,19%	slower pace	86,90%	slower pace	86,97%	at the same pace	5,5000	3,3912	0,6166
BG34	Yugoiztochen	4	4	5	8	7	11	7	3	175,00%	37,50%	142,94%	slower pace	137,19%	slower pace	24,40%	slower pace	24,47%	slower pace	6,5000	2,7386	0,4213
BG41	Yugozapaden	8	10	12	15	24	25	17	10	212,50%	66,67%	180,44%	catching up	174,69%	catching up	53,57%	catching up	53,64%	catching up	15,6667	7,2296	0,4615
BG42	Yuzhen tsentralen	2	2	5	4	6	7	5	3	250,00%	75,00%	217,94%	slower pace	212,19%	slower pace	61,90%	slower pace	61,97%	slower pace	4,3333	2,0656	0,4767
CZ	*Czechia*	*51*	*57*	*62*	*68*	*70*	*73*	*22*	*5*	*43,14%*	*7,35%*	*11,08%*	*outperforming*	*5,33%*	*outperforming*	*-5,75%*	*flattening*	*-5,67%*	*flattening*	*63,5000*	*8,4083*	*0,1324*
CZ01	Praha	52	58	68	77	79	80	28	3	53,85%	3,90%	21,78%	outperforming	16,04%	outperforming	-9,20%	flattening	-9,13%	flattening	69,0000	11,7983	0,1710
CZ02	Střední Čechy	52	61	66	69	68	73	21	4	40,38%	5,80%	8,32%	outperforming	2,58%	outperforming	-7,30%	flattening	-7,23%	flattening	64,8333	7,4140	0,1144
CZ03	Jihozápad	52	55	61	66	66	69	17	3	32,69%	4,55%	0,63%	outperforming	-5,12%	outperforming	-8,55%	flattening	-8,48%	flattening	61,5000	6,7750	0,1102
CZ04	Severozápad	44	51	59	58	68	65	21	7	47,73%	12,07%	15,67%	catching up	9,92%	outperforming	-1,03%	slower pace	-0,96%	outperforming	57,5000	8,8713	0,1543
CZ05	Severovýchod	58	58	66	70	71	75	17	5	29,31%	7,14%	-2,75%	outperforming	-8,50%	outperforming	-5,96%	flattening	-5,88%	flattening	66,3333	7,0616	0,1065
CZ06	Jihovýchod	51	58	61	69	68	74	23	5	45,10%	7,25%	13,04%	outperforming	7,29%	outperforming	-5,85%	flattening	-5,78%	flattening	63,5000	8,4083	0,1324
CZ07	Střední Morava	51	54	57	64	68	71	20	7	39,22%	10,94%	7,15%	outperforming	1,41%	outperforming	-2,16%	slower pace	-2,09%	outperforming	60,8333	8,0353	0,1321
CZ08	Moravskoslezsko	50	56	62	68	70	73	23	5	46,00%	7,35%	13,94%	outperforming	8,19%	outperforming	-5,75%	flattening	-5,67%	flattening	63,1667	8,8638	0,1403
EE	*Estonia*	*79*	*79*	*80*	*81*	*80*	*82*	*3*	*1*	*3,80%*	*1,23%*	*-28,26%*	*flattening*	*-34,01%*	*flattening*	*-11,86%*	*flattening*	*-11,79%*	*flattening*	*80,1667*	*1,1690*	*0,0146*
EE00	Eesti	79	79	80	81	80	82	3	1	3,80%	1,23%	-28,26%	flattening	-34,01%	flattening	-11,86%	flattening	-11,79%	flattening	80,1667	1,1690	0,0146
HR	*Croatia*	*38*	*33*	*41*	*46*	*50*	*56*	*18*	*10*	*47,37%*	*21,74%*	*15,31%*	*catching up*	*9,56%*	*outperforming*	*8,64%*	*catching up*	*8,71%*	*outperforming*	*44,0000*	*8,3666*	*0,1902*
HR03	Jadranska Hrvatska	38	28	42	49	49	56	18	7	47,37%	14,29%	15,31%	catching up	9,56%	outperforming	1,19%	slower pace	1,26%	outperforming	43,6667	9,8928	0,2266
HR04	Kontinentalna Hrvatska	39	36	40	45	51	51	12	6	30,77%	13,33%	-1,29%	slower pace	-7,04%	flattening	0,23%	slower pace	0,31%	at the same pace	43,6667	6,3770	0,1460
LV	*Latvia*	*62*	*61*	*66*	*72*	*76*	*80*	*18*	*8*	*29,03%*	*11,11%*	*-3,03%*	*outperforming*	*-8,78%*	*outperforming*	*-1,99%*	*at the same pace*	*-1,92%*	*outperforming*	*69,5000*	*7,7395*	*0,1114*
LV00	Latvija	62	61	66	72	76	80	18	8	29,03%	11,11%	-3,03%	outperforming	-8,78%	outperforming	-1,99%	at the same pace	-1,92%	outperforming	69,5000	7,7395	0,1114
LT	*Lithuania*	*54*	*56*	*61*	*65*	*68*	*72*	*18*	*7*	*33,33%*	*10,77%*	*1,27%*	*outperforming*	*-4,47%*	*outperforming*	*-2,33%*	*flattening*	*-2,26%*	*outperforming*	*62,6667*	*6,9761*	*0,1113*
LT01	Sostines regionas	54	56	65	70	77	79	25	9	46,30%	12,86%	14,23%	outperforming	8,49%	outperforming	-0,24%	outperforming	-0,17%	outperforming	66,8333	10,4579	0,1565
LT02	Vidurio ir vakaru Lietuvos regionas	54	56	59	63	64	70	16	7	29,63%	11,11%	-2,43%	at the same pace	-8,18%	outperforming	-1,99%	flattening	-1,92%	outperforming	61,0000	5,8652	0,0962

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021	Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
HU	**Hungary**	**35**	**38**	**41**	**47**	**51**	**56**	**21**	**9**	**60,00%**	**19,15%**	**27,94%**	**catching up**	**22,19%**	**catching up, then outperforming**	**6,05%**	**catching up**	**6,12%**	**outperforming**	**44,6667**	**8,0664**	**0,1806**
HU11	Budapest	35	38	59	61	68	76	41	15	117,14%	24,59%	85,08%	catching up, then outperforming	79,34%	catching up, then outperforming	11,49%	outperforming	11,56%	outperforming	56,1667	16,3880	0,2918
HU12	Pest	35	38	43	49	51	54	19	5	54,29%	10,20%	22,22%	catching up	16,48%	catching up, then outperforming	-2,90%	slower pace	-2,82%	flattening	45,0000	7,5631	0,1681
HU21	Közép-Dunántúl	37	44	48	56	52	58	21	2	56,76%	3,57%	24,69%	catching up	18,95%	overperforming	-9,53%	slower pace	-9,46%	flattening	49,1667	7,8592	0,1598
HU22	Nyugat-Dunántúl	31	36	42	48	51	57	26	9	83,87%	18,75%	51,81%	cathcing up	46,06%	catching up, then outperforming	5,65%	catching up	5,72%	outperforming	44,1667	9,7040	0,2197
HU23	Dél-Dunántúl	39	35	34	38	45	51	12	13	30,77%	34,21%	-1,29%	slower pace	-7,04%	flattening	21,11%	catching up	21,18%	catching up	40,3333	6,5013	0,1612
HU31	Észak-Magyarország	25	27	29	34	42	48	23	14	92,00%	41,18%	59,94%	catching up	54,19%	catching up	28,08%	catching up	28,15%	catching up	34,1667	9,1086	0,2666
HU32	Észak-Alföld	26	28	32	40	44	46	20	6	76,92%	15,00%	44,86%	catching up	39,12%	catching up	1,90%	slower pace	1,97%	at the same pace	36,0000	8,4853	0,2357
HU33	Dél-Alföld	30	32	36	40	49	52	22	12	73,33%	30,00%	41,27%	catching up	35,53%	catching up	16,90%	catching up	16,97%	catching up	39,8333	8,9981	0,2259
PL	**Poland**	**39**	**40**	**44**	**47**	**49**	**52**	**13**	**5**	**33,33%**	**10,64%**	**1,27%**	**slower pace**	**-4,47%**	**flattening**	**-2,46%**	**slower pace**	**-2,39%**	**flattening**	**45,1667**	**5,1153**	**0,1133**
PL2	Makroregion Poludniowy	45	41	47	50	49	51	6	1	13,33%	2,00%	-18,73%	slower pace	-24,47%	flattening	-11,10%	slower pace	-11,03%	flattening	47,1667	3,7103	0,0787
PL4	Makroregion Pólnocno-Zachodni	38	40	43	45	47	52	14	7	36,84%	15,56%	4,78%	slower pace	-0,97%	flattening	2,46%	slower pace	2,53%	outperforming	44,1667	5,0365	0,1140
PL5	Makroregion Poludniowo-Zachodni	39	41	44	52	52	60	21	8	53,85%	15,38%	21,78%	catching up	16,04%	outperforming	2,29%	at the same pace	2,36%	outperforming	48,0000	8,0250	0,1672
PL6	Makroregion Pólnocny	41	43	48	49	50	53	12	4	29,27%	8,16%	-2,79%	slower pace	-8,54%	flattening	-4,94%	slower pace	-4,86%	flattening	47,3333	4,5019	0,0951
PL7	Makroregion Centralny	40	43	39	43	47	50	10	7	25,00%	16,28%	-7,06%	slower pace	-12,81%	flattening/ slower pace	3,18%	slower pace	3,25%	catching up	43,6667	4,1793	0,0957
PL8	Makroregion Wschodni	30	32	37	39	43	44	14	5	46,67%	12,82%	14,60%	slower pace	8,86%	at the same pace	-0,28%	slower pace	-0,21%	slower pace	37,5000	5,6833	0,1516
PL9	Makroregion Województwo Mazowieckie	:	:	48	53	57	60	:	7	:	13,21%	:	:	:	:	0,11%	slower pace	0,18%	outperforming	54,5000	5,1962	0,0953
RO	**Romania**	**5**	**7**	**7**	**8**	**12**	**15**	**10**	**7**	**200,00%**	**87,50%**	**167,94%**	**slower pace**	**162,19%**	**slower pace**	**74,40%**	**slower pace**	**74,47%**	**catching up**	**9,0000**	**3,7417**	**0,4157**
RO11	Nord-Vest	10	11	9	13	14	17	7	4	70,00%	30,77%	37,94%	slower pace	32,19%	slower pace	17,67%	slower pace	17,74%	slower pace	12,3333	2,9439	0,2387
RO12	Centru	5	7	9	12	14	21	16	9	320,00%	75,00%	287,94%	at the same pace	282,19%	catching up	61,90%	catching up	61,97%	catching up	11,3333	5,7504	0,5074
RO21	Nord-Est	6	7	7	6	8	15	9	9	150,00%	150,00%	117,94%	slower pace	112,19%	slower pace	136,90%	catching up	136,97%	catching up	8,1667	3,4303	0,4200
RO22	Sud-Est	2	6	4	4	7	7	5	3	250,00%	75,00%	217,94%	slower pace	212,19%	slower pace	61,90%	slower pace	61,97%	slower pace	5,0000	2,0000	0,4000
RO31	Sud-Muntenia	2	3	3	5	9	12	10	7	500,00%	140,00%	467,94%	slower pace	462,19%	slower pace	126,90%	slower pace	126,97%	catching up	5,6667	3,9833	0,7029
RO32	Bucuresti-Ilfov	9	13	15	14	23	28	19	14	211,11%	100,00%	179,05%	catching up	173,30%	catching up	86,90%	catching up	86,97%	catching up	17,0000	7,0711	0,4159
RO41	Sud-Vest Oltenia	2	2	4	6	11	11	9	5	450,00%	83,33%	417,94%	slower pace	412,19%	slower pace	70,23%	slower pace	70,31%	slower pace	6,0000	4,1473	0,6912
RO42	Vest	4	4	4	6	6	12	8	6	200,00%	100,00%	167,94%	slower pace	162,19%	slower pace	86,90%	slower pace	86,97%	at the same pace	6,0000	3,0984	0,5164

XV

Individuals who used online banking (% of individuals)		Data						Absolute change		Percentage change*		Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021											
SI	*Slovenia*	*35*	*39*	*42*	*47*	*52*	*57*	*22*	*10*	*62,86%*	*21,28%*	*30,80%*	*catching up*	*25,05%*	*catching up, then outperforming*	*8,18%*	*catching up*	*8,25%*	*outperforming*	*45,3333*	*8,2624*	*0,1823*
SI03	Vzhodna Slovenija	32	37	38	43	51	52	20	9	62,50%	20,93%	30,44%	catching up	24,69%	catching up, then outperforming	7,83%	catching up	7,90%	catching up, then outperforming	42,1667	8,0353	0,1906
SI04	Zahodna Slovenija	39	42	46	52	53	63	24	11	61,54%	21,15%	29,48%	catching up	23,73%	outperforming	8,05%	catching up	8,13%	outperforming	49,1667	8,7044	0,1770
SK	*Slovakia*	*45*	*51*	*50*	*55*	*58*	*58*	*13*	*3*	*28,89%*	*5,45%*	*-3,17%*	*slower pace*	*-8,92%*	*flattening*	*-7,64%*	*slower pace*	*-7,57%*	*flattening*	*52,8333*	*5,1153*	*0,0968*
SK01	Bratislavský kraj	54	51	56	56	68	71	17	15	31,48%	26,79%	-0,58%	outperforming	-6,33%	outperforming	13,69%	catching up, then outperforming	13,76%	outperforming	59,3333	8,1404	0,1372
SK02	Západné Slovensko	41	48	51	55	54	55	14	0	34,15%	0,00%	2,08%	slower pace	-3,66%	at the same pace	-13,10%	slower pace	-13,03%	flattening	50,6667	5,4650	0,1079
SK03	Stredné Slovensko	45	56	48	55	61	57	12	2	26,67%	3,64%	-5,40%	slower pace	-11,14%	flattening	-9,46%	slower pace	-9,39%	flattening	53,6667	5,9889	0,1116
SK04	Východné Slovensko	47	51	47	53	57	57	10	4	21,28%	7,55%	-10,79%	slower pace	-16,53%	flattening	-5,55%	slower pace	-5,48%	flattening	52,0000	4,5166	0,0869

Notes: * Top five regions are marked with green. Last five regions are marked with red. ** In the case of PL9 Makroregion Województwo Mazowieckie the period from 2018 to 2021 is considered. n.r. – not relevant. : – no data.

Source: Own elaboration based on Eurostat database and Eurofound (2018).

ANNEX 7.: ONLINE PURCHASES FROM SELLERS FROM OTHER EU COUNTRIES (ORDER) – DATA & CALCULATIONS

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	Abs. 2016–2021	Abs. 2019–2021	% 2016–2021	% 2019–2021	Patterns EU-27 avg 2016–2021		Patterns CSE-11 avg 2016–2021		Patterns EU-27 avg 2019–2021		Patterns CSE-11 avg 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
EU-27	*European Union*	*23*	*24*	*25*	*27*	*21*	*24*	*2*	*-2*	*7,57%*	*-8,90%*	*n.r.*	*n.r.*	*-21,10%*		*n.r.*	*n.r.*	*-4,74%*		*23,9812*	*2,1214*	*0,0885*
CSE-11	*Central & South-East Europe*	*12*	*12*	*14*	*16*	*12*	*15*	*3*	*-1*	*28,67%*	*-4,17%*	*21,10%*		*n.r.*	*n.r.*	*4,74%*		*n.r.*	*n.r.*	*13,6250*	*1,7770*	*0,1304*
BG	*Bulgaria*	*7*	*6*	*7*	*9*	*5*	*6*	*-1*	*-3*	*-14,29%*	*-33,33%*	*-21,85%*	*diving*	*-42,96%*	*diving*	*-24,43%*	*falling away*	*-29,17%*	*falling away*	*6,6667*	*1,3663*	*0,2049*
BG31	Severozapaden	6	4	5	9	3	3	-3	-6	-50,00%	-66,67%	-57,57%	diving	-78,67%	diving	-57,76%	falling away	-62,50%	falling away	5,0000	2,2804	0,4561
BG32	Severen tsentralen	5	5	3	5	2	4	-1	-1	-20,00%	-20,00%	-27,57%	diving	-48,67%	diving	-11,10%	reacting better	-15,83%	at the same pace	4,0000	1,2649	0,3162
BG33	Severoiztochen	6	6	10	12	5	5	-1	-7	-16,67%	-58,33%	-24,23%	diving	-45,34%	diving	-49,43%	falling away	-54,17%	falling away	7,3333	2,9439	0,4014
BG34	Yugoiztochen	3	3	5	7	3	5	2	-2	66,67%	-28,57%	59,10%	at the same pace	38,00%	slower pace	-19,67%	at the same pace	-24,40%	falling away	4,3333	1,6330	0,3768
BG41	Yugozapaden	12	11	13	14	11	9	-3	-5	-25,00%	-35,71%	-32,57%	diving	-53,67%	diving	-26,81%	falling away	-31,55%	falling away	11,6667	1,7512	0,1501
BG42	Yuzhen tsentralen	4	3	3	5	3	5	1	0	25,00%	0,00%	17,43%	slower pace	-3,67%	slower pace	8,90%	reacting better	4,17%	reacting better	3,8333	0,9832	0,2565
CZ	*Czechia*	*9*	*8*	*11*	*13*	*13*	*17*	*8*	*4*	*88,89%*	*30,77%*	*81,32%*	*catching up*	*60,22%*	*catching up, then outperforming*	*39,67%*	*recovering*	*34,94%*	*recovering, then escaping*	*11,8333*	*3,2506*	*0,2747*
CZ01	Praha	14	16	16	33	26	27	13	-6	92,86%	-18,18%	85,29%	catching up, then outperforming	64,19%	outperforming	-9,28%	underperforming	-14,02%	underperforming	22,0000	7,7201	0,3509
CZ02	Střední Čechy	12	12	8	8	10	13	1	5	8,33%	62,50%	0,77%	slower pace	-20,34%	slower pace	71,40%	recovering	66,67%	recovering	10,5000	2,1679	0,2065
CZ03	Jihozápad	10	9	11	14	13	14	4	0	40,00%	0,00%	32,43%	catching up	11,33%	catching up	8,90%	reacting better	4,17%	reacting better	11,8333	2,1370	0,1806
CZ04	Severozápad	7	5	10	11	13	14	7	3	100,00%	27,27%	92,43%	catching up	71,33%	catching up	36,17%	recovering	31,44%	recovering	10,0000	3,4641	0,3464
CZ05	Severovýchod	3	4	8	10	9	12	9	2	300,00%	20,00%	292,43%	catching up	271,33%	catching up	28,90%	recovering	24,17%	recovering	7,6667	3,5024	0,4568
CZ06	Jihovýchod	8	5	11	10	16	20	12	10	150,00%	100,00%	142,43%	catching up	121,33%	catching up, then outperforming	108,90%	recovering	104,17%	recovering, then escaping	11,6667	5,4650	0,4684
CZ07	Střední Morava	11	10	15	13	10	18	7	5	63,64%	38,46%	56,07%	catching up	34,97%	catching up, then outperforming	47,36%	recovering	42,63%	recovering, then escaping	12,8333	3,1885	0,2485
CZ08	Moravskoslezsko	5	6	9	9	11	13	8	4	160,00%	44,44%	152,43%	catching up	131,33%	catching up	53,35%	recovering	48,61%	recovering	8,8333	2,9944	0,3390
EE	*Estonia*	*23*	*26*	*29*	*30*	*18*	*24*	*1*	*-6*	*4,35%*	*-20,00%*	*-3,22%*	*flattening, then slower pace*	*-24,32%*	*flattening*	*-11,10%*	*underperforming*	*-15,83%*	*underperforming*	*25,0000*	*4,3818*	*0,1753*
EE00	Eesti	23	26	29	30	18	24	1	-6	4,35%	-20,00%	-3,22%	flattening, then slower pace	-24,32%	flattening	-11,10%	underperforming	-15,83%	underperforming	25,0000	4,3818	0,1753
HR	*Croatia*	*15*	*11*	*14*	*18*	*17*	*19*	*4*	*1*	*26,67%*	*5,56%*	*19,10%*	*catching up*	*-2,00%*	*outperforming*	*14,46%*	*recovering*	*9,72%*	*escaping*	*15,6667*	*2,9439*	*0,1879*
HR03	Jadranska Hrvatska	17	10	15	19	21	21	4	2	23,53%	10,53%	15,96%	catching up	-5,14%	outperforming	19,43%	recovering	14,69%	escaping	17,1667	4,2151	0,2455
HR04	Kontinentalna Hrvatska	15	12	14	17	16	16	1	-1	6,67%	-5,88%	-0,90%	slower pace	-22,00%	flattening	3,02%	underperforming	-1,72%	at the same pace	15,0000	1,7889	0,1193
LV	*Latvia*	*20*	*21*	*19*	*21*	*15*	*21*	*1*	*0*	*5,00%*	*0,00%*	*-2,57%*	*slower pace*	*-23,67%*	*flattening*	*8,90%*	*reacting better*	*4,17%*	*defending better*	*19,5000*	*2,3452*	*0,1203*
LV00	Latvija	20	21	19	21	15	21	1	0	5,00%	0,00%	-2,57%	slower pace	-23,67%	flattening	8,90%	reacting better	4,17%	defending better	19,5000	2,3452	0,1203
LT	*Lithuania*	*12*	*14*	*19*	*20*	*13*	*18*	*6*	*-2*	*50,00%*	*-10,00%*	*42,43%*	*catching up*	*21,33%*	*outperforming*	*-1,10%*	*at the same pace*	*-5,83%*	*underperforming*	*16,0000*	*3,4059*	*0,2129*
LT01	Sostines regionas	12	14	27	30	18	24	12	-6	100,00%	-20,00%	92,43%	catching up	71,33%	outperforming	-11,10%	underperforming	-15,83%	underperforming	20,8333	7,2778	0,3493
LT02	Vidurio ir vakaru Lietuvos regionas	12	14	15	15	11	16	4	1	33,33%	6,67%	25,77%	catching up	4,66%	outperforming	15,57%	recovering	10,83%	recovering, then escaping	13,8333	1,9408	0,1403

Individuals who ordered goods online from other EU Member States (% of individuals)		Data						Absolute change		Percentage change*		Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021											
HU	*Hungary*	*12*	*12*	*16*	*22*	*19*	*16*	*4*	*-6*	*33,33%*	*-27,27%*	*25,77%*	*catching up*	*4,66%*	*outperforming*	*-18,37%*	*falling away*	*-23,11%*	*underperforming*	*16,1667*	*3,9200*	*0,2425*
HU11	Budapest	12	12	25	31	27	23	11	-8	91,67%	-25,81%	84,10%	catching up	63,00%	outperforming	-16,90%	underperforming, then falling away	-21,64%	underperforming	21,6667	7,9415	0,3665
HU12	Pest	12	12	14	27	16	13	1	-14	8,33%	-51,85%	0,77%	slower pace	-20,34%	slower pace	-42,95%	falling away	-47,69%	underperforming, then falling away	15,6667	5,7504	0,3670
HU21	Közép-Dunántúl	13	17	25	31	21	19	6	-12	46,15%	-38,71%	38,59%	catching up	17,48%	outperforming	-29,81%	underperforming, then falling away	-34,54%	underperforming	21,0000	6,3246	0,3012
HU22	Nyugat-Dunántúl	15	14	21	23	23	20	5	-3	33,33%	-13,04%	25,77%	catching up	4,66%	outperforming	-4,14%	falling away	-8,88%	underperforming	19,3333	3,9328	0,2034
HU23	Dél-Dunántúl	12	9	12	15	16	16	4	1	33,33%	6,67%	25,77%	catching up	4,66%	outperforming	15,57%	recovering	10,83%	recovering, then escaping	13,3333	2,8048	0,2104
HU31	Észak-Magyarország	7	8	8	13	17	14	7	1	100,00%	7,69%	92,43%	catching up	71,33%	catching up	16,59%	recovering	11,86%	recovering	11,1667	4,0702	0,3645
HU32	Észak-Alföld	9	8	11	16	15	12	3	-4	33,33%	-25,00%	25,77%	catching up	4,66%	at the same pace	-16,10%	falling away	-20,83%	falling away	11,8333	3,1885	0,2695
HU33	Dél-Alföld	12	9	14	14	17	12	0	-2	0,00%	-14,29%	-7,57%	slower pace	-28,67%	slower pace	-5,38%	at the same pace	-10,12%	falling away	13,0000	2,6833	0,2064
PL	*Poland*	*4*	*5*	*6*	*6*	*4*	*6*	*2*	*0*	*50,00%*	*0,00%*	*42,43%*	*at the same pace*	*21,33%*	*slower pace*	*8,90%*	*reacting better*	*4,17%*	*reacting better*	*5,1667*	*0,9832*	*0,1903*
PL2	Makroregion Poludniowy	4	5	6	9	6	6	2	-3	50,00%	-33,33%	42,43%	at the same pace	21,33%	slower pace	-24,43%	falling away	-29,17%	falling away	6,0000	1,6733	0,2789
PL4	Makroregion Pólnocno-Zachodni	3	4	5	6	5	6	3	0	100,00%	0,00%	92,43%	catching up	71,33%	at the same pace	8,90%	reacting better	4,17%	reacting better	4,8333	1,1690	0,2419
PL5	Makroregion Poludniowo-Zachodni	4	4	5	9	5	6	2	-3	50,00%	-33,33%	42,43%	at the same pace	21,33%	slower pace	-24,43%	falling away	-29,17%	falling away	5,5000	1,8708	0,3402
PL6	Makroregion Pólnocny	4	4	5	4	4	5	1	1	25,00%	25,00%	17,43%	slower pace	-3,67%	slower pace	33,90%	recovering	29,17%	recovering	4,3333	0,5164	0,1192
PL7	Makroregion Centralny	6	7	5	4	2	3	-3	-1	-50,00%	-25,00%	-57,57%	diving	-78,67%	diving	-16,10%	reacting better	-20,83%	at the same pace	4,5000	1,8708	0,4157
PL8	Makroregion Wschodni	2	3	3	4	2	3	1	-1	50,00%	-25,00%	42,43%	slower pace	21,33%	slower pace	-16,10%	reacting better	-20,83%	at the same pace	2,8333	0,7528	0,2657
PL9	Makroregion Województwo Mazowieckie	:	:	10	10	6	9	:	-1	:	-10,00%	:	:	:	:	-1,10%	reacting better	-5,83%	at the same pace	8,7500	1,8930	0,2163
RO	*Romania*	*2*	*3*	*3*	*4*	*2*	*4*	*2*	*0*	*100,00%*	*0,00%*	*92,43%*	*at the same pace*	*71,33%*	*slower pace*	*8,90%*	*reacting better*	*4,17%*	*reacting better*	*3,0000*	*0,8944*	*0,2981*
RO11	Nord-Vest	2	3	3	4	3	3	1	-1	50,00%	-25,00%	42,43%	slower pace	21,33%	slower pace	-16,10%	reacting better	-20,83%	at the same pace	3,0000	0,6325	0,2108
RO12	Centru	1	3	2	2	2	4	3	2	300,00%	100,00%	292,43%	catching up	271,33%	at the same pace	108,90%	recovering	104,17%	recovering	2,3333	1,0328	0,4426
RO21	Nord-Est	2	2	3	2	1	2	0	0	0,00%	0,00%	-7,57%	slower pace	-28,67%	slower pace	8,90%	reacting better	4,17%	reacting better	2,0000	0,6325	0,3162
RO22	Sud-Est	2	1	2	3	2	1	-1	-2	-50,00%	-66,67%	-57,57%	diving	-78,67%	diving	-57,76%	at the same pace	-62,50%	falling away	1,8333	0,7528	0,4106
RO31	Sud-Muntenia	3	2	1	2	2	2	-1	0	-33,33%	0,00%	-40,90%	diving	-62,00%	diving	8,90%	reacting better	4,17%	reacting better	2,0000	0,6325	0,3162
RO32	Bucuresti-Ilfov	6	8	7	9	4	13	7	4	116,67%	44,44%	109,10%	catching up	88,00%	catching up	53,35%	recovering	48,61%	recovering	7,8333	3,0605	0,3907
RO41	Sud-Vest Oltenia	3	2	0	3	2	4	1	1	33,33%	33,33%	25,77%	slower pace	4,66%	slower pace	42,24%	recovering	37,50%	recovering	2,3333	1,3663	0,5855
RO42	Vest	1	5	2	4	1	6	5	2	500,00%	50,00%	492,43%	catching up	471,33%	catching up	58,90%	recovering	54,17%	recovering	3,1667	2,1370	0,6748

XVIII

Individuals who ordered goods online from other EU Member States (% of individuals)		Data						Absolute change		Percentage change*		Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021											
SI	*Slovenia*	*17*	*22*	*22*	*25*	*21*	*29*	*12*	*4*	*70,59%*	*16,00%*	*63,02%*	*catching up, then outperforming*	*41,92%*	*outperforming*	*24,90%*	*recovering, then escaping*	*20,17%*	*escaping*	*22,6667*	*4,0332*	*0,1779*
SI03	Vzhodna Slovenija	15	21	20	20	20	26	11	6	73,33%	30,00%	65,77%	catching up, then outperforming	44,66%	outperforming	38,90%	recovering, then escaping	34,17%	escaping	20,3333	3,5024	0,1722
SI04	Zahodna Slovenija	19	23	24	31	23	34	15	3	78,95%	9,68%	71,38%	catching up, then outperforming	50,28%	outperforming	18,58%	escaping	13,84%	escaping	25,6667	5,6451	0,2199
SK	*Slovakia*	*22*	*21*	*23*	*24*	*17*	*24*	*2*	*0*	*9,09%*	*0,00%*	*1,52%*	*at the same pace*	*-19,58%*	*flattening*	*8,90%*	*reacting better*	*4,17%*	*defending better*	*21,8333*	*2,6394*	*0,1209*
SK01	Bratislavský kraj	25	27	30	27	25	30	5	3	20,00%	11,11%	12,43%	outperforming	-8,67%	outperforming	20,01%	escaping	15,28%	escaping	27,3333	2,2509	0,0824
SK02	Západné Slovensko	20	21	21	26	18	23	3	-3	15,00%	-11,54%	7,43%	catching up	-13,67%	at the same pace	-2,64%	falling away	-7,37%	underperforming	21,5000	2,7386	0,1274
SK03	Stredné Slovensko	24	20	23	20	18	25	1	5	4,17%	25,00%	-3,40%	flattening	-24,50%	flattening	33,90%	recovering/escaping	29,17%	escaping	21,6667	2,7325	0,1261
SK04	Východné Slovensko	24	21	23	24	13	21	-3	-3	-12,50%	-12,50%	-20,07%	inversion, then diving	-41,17%	inversion	-3,60%	falling away	-8,33%	underperforming	21,0000	4,1473	0,1975

Notes: * Top five regions are marked with green. Last five regions are marked with red. ** In the case of PL9 Makroregion Województwo Mazowieckie the period from 2018 to 2021 is considered. n.r. – not relevant. : – no data.

Source: Own elaboration based on Eurostat database and Eurofound (2018).

ANNEX 8.: INTERNET USE: SELLING GOODS OR SERVICES ONLINE (ONSELL) – DATA & CALCULATIONS

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	2016–2021	2019–2021	2016–2021	2019–2021	EU-27 2016–2021	pattern	CSE-11 2016–2021	pattern	EU-27 2019–2021	pattern	CSE-11 2019–2021	pattern	Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
EU-27	European Union	15	16	17	17	18	21	6	4	37,10%	24,36%	n.r.	n.r.	2,02%		n.r.	n.r.	0,39%		17,3129	1,9504	0,1127
CSE-11	Central & South-East Europe	11	11	13	12	15	15	4	3	35,07%	23,97%	-2,02%		n.r.	n.r.	-0,39%		n.r.	n.r.	12,9444	1,6403	0,1267
BG	Bulgaria	6	5	8	6	7	6	0	0	0,00%	0,00%	-37,10%	slower pace	-35,07%	slower pace	-24,36%	slower pace	-23,97%	slower pace	6,3333	1,0328	0,1631
BG31	Severozapaden	7	4	6	7	6	4	-3	-3	-42,86%	-42,86%	-79,95%	diving	-77,93%	diving	-67,22%	diving	-66,83%	diving	5,6667	1,3663	0,2411
BG32	Severen tsentralen	5	6	10	5	8	7	2	2	40,00%	40,00%	2,90%	slower pace	4,93%	slower pace	15,64%	slower pace	16,03%	slower pace	6,8333	1,9408	0,2840
BG33	Severoiztochen	6	3	5	8	10	8	2	0	33,33%	0,00%	-3,76%	slower pace	-1,74%	slower pace	-24,36%	slower pace	-23,97%	slower pace	6,6667	2,5033	0,3755
BG34	Yugoiztochen	4	4	8	4	3	5	1	1	25,00%	25,00%	-12,10%	slower pace	-10,07%	slower pace	0,64%	slower pace	1,03%	slower pace	4,6667	1,7512	0,3753
BG41	Yugozapaden	9	6	12	8	9	7	-2	-1	-22,22%	-12,50%	-59,32%	diving	-57,30%	diving	-36,86%	diving	-36,47%	diving	8,5000	2,0736	0,2440
BG42	Yuzhen tsentralen	5	5	6	5	5	5	0	0	0,00%	0,00%	-37,10%	slower pace	-35,07%	slower pace	-24,36%	slower pace	-23,97%	slower pace	5,1667	0,4082	0,0790
CZ	Czechia	12	11	14	12	11	10	-2	-2	-16,67%	-16,67%	-53,76%	diving	-51,74%	inversion, then diving	-41,03%	diving	-40,64%	diving	11,6667	1,3663	0,1171
CZ01	Praha	19	20	18	20	15	17	-2	-3	-10,53%	-15,00%	-47,62%	inversion, then diving	-45,60%	inversion	-39,36%	inversion, then diving	-38,97%	diving	18,1667	1,9408	0,1068
CZ02	Střední Čechy	19	18	16	13	13	6	-13	-7	-68,42%	-53,85%	-105,52%	inversion, then diving	-103,50%	inversion, then diving	-78,21%	diving	-77,82%	inversion, then diving	14,1667	4,7081	0,3323
CZ03	Jihozápad	13	13	14	14	10	9	-4	-5	-30,77%	-35,71%	-67,87%	diving	-65,84%	inversion, then diving	-60,08%	diving	-59,69%	inversion, then diving	12,1667	2,1370	0,1756
CZ04	Severozápad	6	6	14	7	6	8	2	1	33,33%	14,29%	-3,76%	slower pace	-1,74%	slower pace	-10,08%	slower pace	-9,69%	slower pace	7,8333	3,1252	0,3990
CZ05	Severovýchod	11	8	13	11	13	14	3	3	27,27%	27,27%	-9,82%	slower pace	-7,80%	slower pace	2,91%	slower pace	3,30%	at the same pace	11,6667	2,1602	0,1852
CZ06	Jihovýchod	8	9	13	10	11	9	1	-1	12,50%	-10,00%	-24,60%	slower pace	-22,57%	slower pace	-34,36%	diving	-33,97%	diving	10,0000	1,7889	0,1789
CZ07	Střední Morava	8	8	11	10	9	12	4	2	50,00%	20,00%	12,90%	slower pace	14,93%	at the same pace	-4,36%	slower pace	-3,97%	slower pace	9,6667	1,6330	0,1689
CZ08	Moravskoslezsko	13	9	14	14	8	9	-4	-5	-30,77%	-35,71%	-67,87%	diving	-65,84%	inversion, then diving	-60,08%	diving	-59,69%	inversion, then diving	11,1667	2,7869	0,2496
EE	Estonia	19	18	24	18	21	23	4	5	21,05%	27,78%	-16,04%	flattening	-14,02%	at the same pace	3,42%	outperforming	3,81%	outperforming	20,5000	2,5884	0,1263
EE00	Eesti	19	18	24	18	21	23	4	5	21,05%	27,78%	-16,04%	flattening	-14,02%	at the same pace	3,42%	outperforming	3,81%	outperforming	20,5000	2,5884	0,1263
HR	Croatia	28	25	25	22	23	26	-2	4	-7,14%	18,18%	-44,24%	inversion	-42,22%	inversion	-6,18%	at the same pace	-5,79%	outperforming	24,8333	2,1370	0,0861
HR03	Jadranska Hrvatska	23	18	21	19	20	25	2	6	8,70%	31,58%	-28,40%	flattening	-26,38%	flattening	7,22%	outperforming	7,61%	outperforming	21,0000	2,6077	0,1242
HR04	Kontinentalna Hrvatska	30	28	27	23	24	24	-6	1	-20,00%	4,35%	-57,10%	inversion	-55,07%	inversion	-20,01%	flattening	-19,62%	flattening	26,0000	2,7568	0,1060
LV	Latvia	5	8	10	9	12	13	8	4	160,00%	44,44%	122,90%	catching up	124,93%	catching up	20,08%	at the same pace	20,47%	catching up	9,5000	2,8810	0,3033
LV00	Latvija	5	8	10	9	12	13	8	4	160,00%	44,44%	122,90%	catching up	124,93%	catching up	20,08%	at the same pace	20,47%	catching up	9,5000	2,8810	0,3033
LT	Lithuania	5	7	8	9	14	15	10	6	200,00%	66,67%	162,90%	catching up	164,93%	catching up	42,30%	catching up	42,69%	catching up	9,6667	3,9833	0,4121
LT01	Sostines regionas	5	7	11	11	16	19	14	8	280,00%	72,73%	242,90%	catching up	244,93%	catching up, then outperforming	48,37%	catching up	48,75%	catching up, then outperforming	11,5000	5,2820	0,4593
LT02	Vidurio ir vakaru Lietuvos regionas	5	7	7	8	12	13	8	5	160,00%	62,50%	122,90%	catching up	124,93%	catching up	38,14%	catching up	38,53%	catching up	8,6667	3,1411	0,3624

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	Absolute change 2016–2021	Absolute change 2019–2021	Percentage change* 2016–2021	Percentage change* 2019–2021	Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
HU	*Hungary*	*11*	*11*	*11*	*13*	*28*	*27*	*16*	*14*	*145,45%*	*107,69%*	*108,36%*	*catching up, then outperforming*	*110,38%*	*outperforming*	*83,33%*	*catching up, then outperforming*	*83,72%*	*outperforming*	*16,8333*	*8,3046*	*0,4933*
HU11	Budapest	11	11	15	17	32	27	16	10	145,45%	58,82%	108,36%	catching up, then outperforming	110,38%	outperforming	34,46%	outperforming	34,85%	outperforming	18,8333	8,7274	0,4634
HU12	Pest	11	11	7	9	29	29	18	20	163,64%	222,22%	126,54%	catching up, then outperforming	128,56%	outperforming	197,86%	catching up, then outperforming	198,25%	catching up, then outperforming	16,0000	10,1784	0,6362
HU21	Közép-Dunántúl	13	11	10	18	29	28	15	10	115,38%	55,56%	78,29%	catching up, then outperforming	80,31%	outperforming	31,19%	outperforming	31,58%	outperforming	18,1667	8,4715	0,4663
HU22	Nyugat-Dunántúl	12	13	16	12	26	26	14	14	116,67%	116,67%	79,57%	catching up, then outperforming	81,59%	outperforming	92,30%	catching up, then outperforming	92,69%	outperforming	17,5000	6,7454	0,3854
HU23	Dél-Dunántúl	14	11	10	13	25	28	14	15	100,00%	115,38%	62,90%	catching up, then outperforming	64,93%	outperforming	91,02%	catching up, then outperforming	91,41%	outperforming	16,8333	7,6790	0,4562
HU31	Észak-Magyarország	10	10	10	12	28	29	19	17	190,00%	141,67%	152,90%	catching up, then outperforming	154,93%	catching up, then outperforming	117,30%	catching up, then outperforming	117,69%	outperforming	16,5000	9,3327	0,5656
HU32	Észak-Alföld	9	7	11	14	25	22	13	8	144,44%	57,14%	107,35%	catching up, then outperforming	109,37%	catching up, then outperforming	32,78%	catching up, then outperforming	33,17%	outperforming	14,6667	7,2847	0,4967
HU33	Dél-Alföld	9	6	7	10	29	27	18	17	200,00%	170,00%	162,90%	catching up, then outperforming	164,93%	outperforming	145,64%	catching up, then outperforming	146,03%	outperforming	14,6667	10,4435	0,7121
PL	*Poland*	*16*	*16*	*14*	*14*	*12*	*11*	*-5*	*-3*	*-31,25%*	*-21,43%*	*-68,35%*	*inversion, then diving*	*-66,32%*	*inversion, then diving*	*-45,79%*	*diving*	*-45,40%*	*inversion, then diving*	*13,8333*	*2,0412*	*0,1476*
PL2	Makroregion Poludniowy	19	17	15	15	14	10	-9	-5	-47,37%	-33,33%	-84,47%	inversion, then diving	-82,44%	inversion, then diving	-57,70%	diving	-57,31%	inversion, then diving	15,0000	3,0332	0,2022
PL4	Makroregion Pólnocno-Zachodni	16	14	14	14	14	14	-2	0	-12,50%	0,00%	-49,60%	inversion, then diving	-47,57%	inversion, then diving	-24,36%	slower pace	-23,97%	flattening, then slower pace	14,3333	0,8165	0,0570
PL5	Makroregion Poludniowo-Zachodni	15	15	15	18	14	13	-2	-5	-13,33%	-27,78%	-50,43%	diving	-48,41%	inversion, then diving	-52,14%	inversion, then diving	-51,75%	inversion, then diving	15,0000	1,6733	0,1116
PL6	Makroregion Pólnocny	16	16	17	12	13	11	-5	-1	-31,25%	-8,33%	-68,35%	inversion, then diving	-66,32%	inversion, then diving	-32,70%	diving	-32,31%	diving	14,1667	2,4833	0,1753
PL7	Makroregion Centralny	15	17	12	11	9	8	-7	-3	-46,67%	-27,27%	-83,76%	diving	-81,74%	inversion, then diving	-51,63%	diving	-51,25%	diving	12,0000	3,4641	0,2887
PL8	Makroregion Wschodni	12	13	10	9	6	6	-6	-3	-50,00%	-33,33%	-87,10%	diving	-85,07%	inversion, then diving	-57,70%	diving	-57,31%	diving	9,3333	2,9439	0,3154
PL9	Makroregion Województwo Mazowieckie	:	:	17	17	14	15	:	-2	:	-11,76%	:	:	:	:	-36,13%	inverting the trend/diving	-35,74%	inversion	15,7500	1,5000	0,0952

GEO Codes	GEO Labels	2016	2017	2018	2019	2020	2021	Abs. change 2016–2021	Abs. change 2019–2021	% change 2016–2021	% change 2019–2021	Patterns of change Reference: EU-27 average 2016–2021		Patterns of change Reference: CSE-11 average 2016–2021		Patterns of change Reference: EU-27 average 2019–2021		Patterns of change Reference: CSE-11 average 2019–2021		Mean (2016–2021)**	Std. Deviation (2016–2021)**	Coefficient of variation (2016–2021)**
RO	*Romania*	*3*	*3*	*3*	*3*	*4*	*5*	*2*	*2*	*66,67%*	*66,67%*	*29,57%*	*slower pace*	*31,59%*	*slower pace*	*42,30%*	*slower pace*	*42,69%*	*slower pace*	*3,5000*	*0,8367*	*0,2390*
RO11	Nord-Vest	4	4	5	4	5	4	0	0	0,00%	0,00%	-37,10%	slower pace	-35,07%	slower pace	-24,36%	slower pace	-23,97%	slower pace	4,3333	0,5164	0,1192
RO12	Centru	3	3	2	4	3	8	5	4	166,67%	100,00%	129,57%	slower pace	131,59%	catching up	75,64%	at the same pace	76,03%	catching up	3,8333	2,1370	0,5575
RO21	Nord-Est	3	2	4	2	4	4	1	2	33,33%	100,00%	-3,76%	slower pace	-1,74%	slower pace	75,64%	slower pace	76,03%	slower pace	3,1667	0,9832	0,3105
RO22	Sud-Est	2	3	3	2	4	3	1	1	50,00%	50,00%	12,90%	slower pace	14,93%	slower pace	25,64%	slower pace	26,03%	slower pace	2,8333	0,7528	0,2657
RO31	Sud-Muntenia	2	1	2	1	2	2	0	1	0,00%	100,00%	-37,10%	slower pace	-35,07%	slower pace	75,64%	slower pace	76,03%	slower pace	1,6667	0,5164	0,3098
RO32	Bucuresti-Ilfov	6	4	6	4	6	8	2	4	33,33%	100,00%	-3,76%	slower pace	-1,74%	slower pace	75,64%	at the same pace	76,03%	catching up	5,6667	1,5055	0,2657
RO41	Sud-Vest Oltenia	3	1	1	2	2	7	4	5	133,33%	250,00%	96,24%	slower pace	98,26%	at the same pace	225,64%	catching up	226,03%	catching up	2,6667	2,2509	0,8441
RO42	Vest	2	4	3	1	3	5	3	4	150,00%	400,00%	112,90%	slower pace	114,93%	slower pace	375,64%	at the same pace	376,03%	catching up	3,0000	1,4142	0,4714
SI	*Slovenia*	*16*	*21*	*18*	*18*	*18*	*18*	*2*	*0*	*12,50%*	*0,00%*	*-24,60%*	*flattening, then slower pace*	*-22,57%*	*flattening*	*-24,36%*	*flattening, then slower pace*	*-23,97%*	*flattening*	*18,1667*	*1,6021*	*0,0882*
SI03	Vzhodna Slovenija	16	22	17	15	20	17	1	2	6,25%	13,33%	-30,85%	inversion, then div-ing	-28,82%	flattening	-11,03%	slower pace	-10,64%	flattening	17,8333	2,6394	0,1480
SI04	Zahodna Slovenija	17	21	19	22	16	19	2	-3	11,76%	-13,64%	-25,33%	flattening, then slower pace	-23,31%	flattening	-38,00%	inversion, then div-ing	-37,61%	inversion	19,0000	2,2804	0,1200
SK	*Slovakia*	*13*	*12*	*24*	*22*	*25*	*27*	*14*	*5*	*107,69%*	*22,73%*	*70,59%*	*catching up, then outperforming*	*72,62%*	*outperforming*	*-1,63%*	*outperforming*	*-1,25%*	*outperforming*	*20,5000*	*6,4109*	*0,3127*
SK01	Bratislavský kraj	15	15	29	22	29	32	17	10	113,33%	45,45%	76,24%	outperforming	78,26%	outperforming	21,09%	outperforming	21,48%	outperforming	23,6667	7,4744	0,3158
SK02	Západné Slovensko	11	10	26	26	25	24	13	-2	118,18%	-7,69%	81,08%	catching up, then outperforming	83,11%	outperforming	-32,05%	inversion	-31,66%	inversion	20,3333	7,6594	0,3767
SK03	Stredné Slovensko	14	13	17	22	25	27	13	5	92,86%	22,73%	55,76%	catching up, then outperforming	57,78%	outperforming	-1,63%	outperforming	-1,25%	outperforming	19,6667	5,8538	0,2976
SK04	Východné Slovensko	12	12	24	17	25	28	16	11	133,33%	64,71%	96,24%	catching up, then outperforming	98,26%	outperforming	40,34%	outperforming	40,73%	outperforming	19,6667	6,9474	0,3533

Notes: * Top five regions are marked with green. Last five regions are marked with red. ** In the case of PL9 Makroregion Województwo Mazowieckie the period from 2018 to 2021 is considered. n.r. – not relevant. : – no data.

Source: Own elaboration based on Eurostat database and Eurofound (2018).

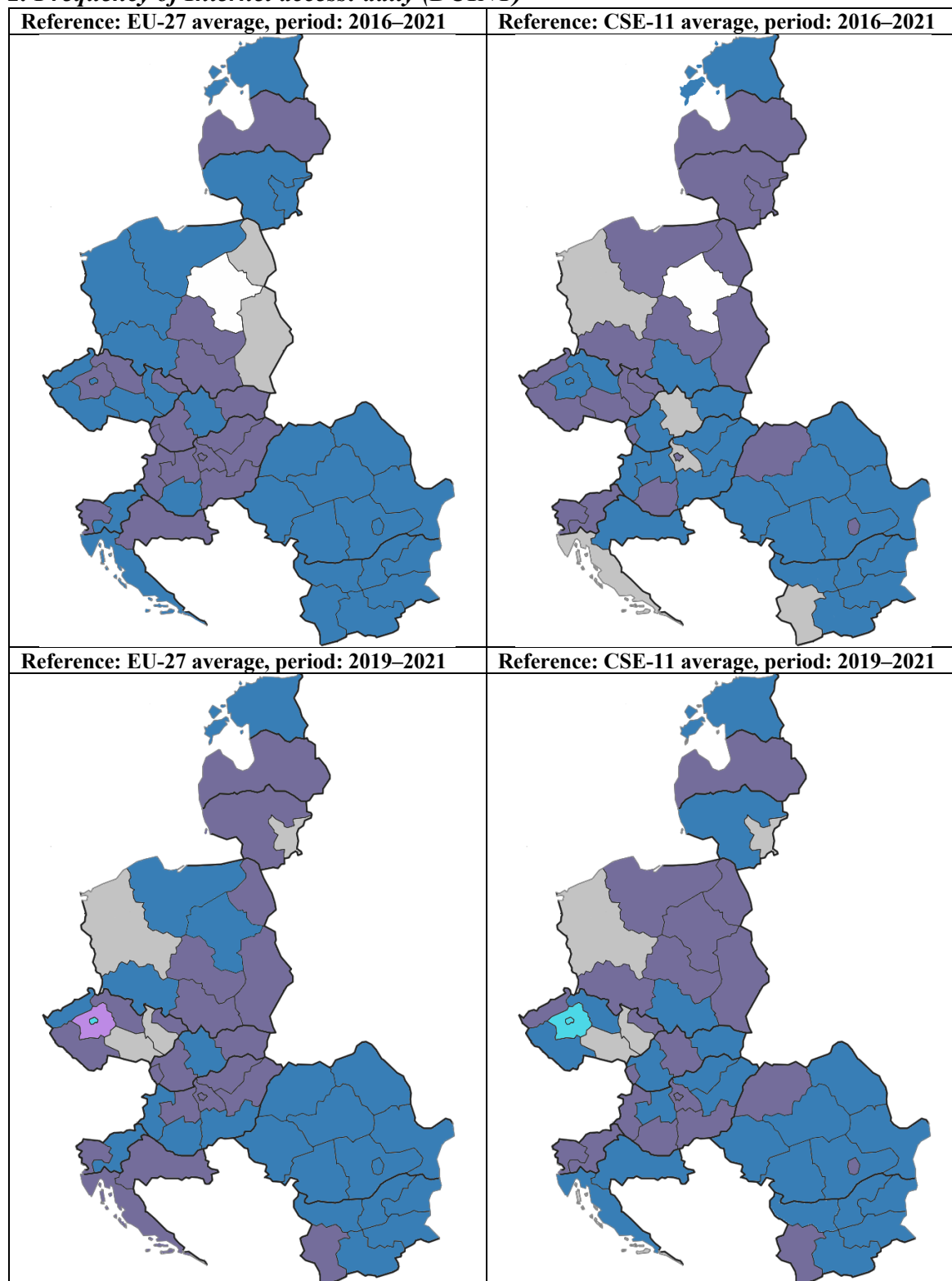**ANNEX 9.: CONVERGENCE VS. DIVERGENCE PATTERNS OF CHANGE IN CSE-11 REGIONS**
1. Households with broadband access (BBACC)
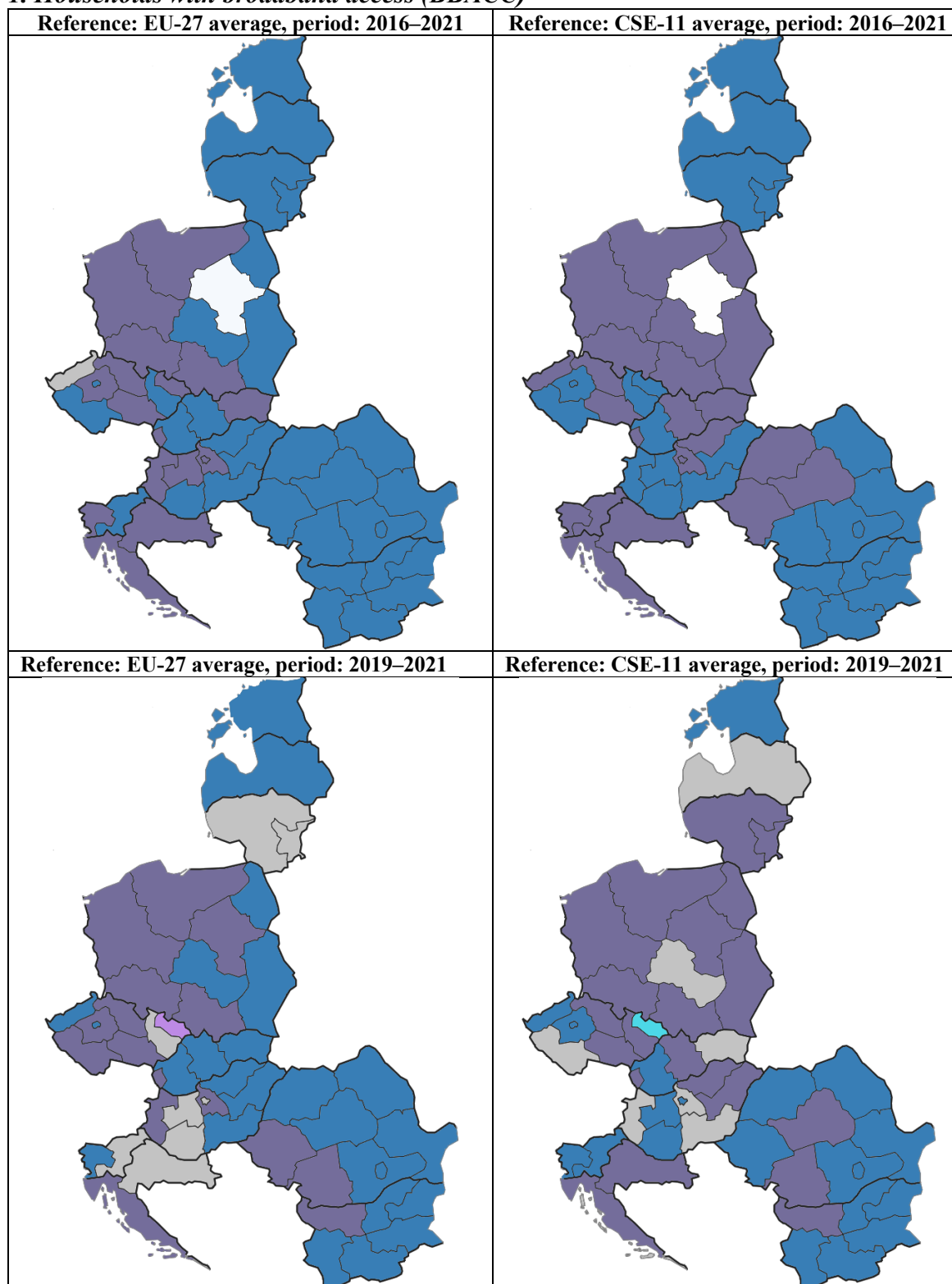
Reference: EU-27 average, period: 2016–2021	Reference: CSE-11 average, period: 2016–2021

Reference: EU-27 average, period: 2019–2021	Reference: CSE-11 average, period: 2019–2021

Legend: dark blue: upward convergence, upward trend; light blue: upward convergence, downward trend; dark purple: upward divergence, upward trend; light purple: upward divergence, downward trend; dark pink: downward divergence, upward trend; light pink: downward divergence, downward trend, dark green: downward convergence, upward trend; light green: downward convergence, downward trend; grey: at the same pace; white: no data.

Source: Own elaboration (design and cartography by the author).

2. Frequency of Internet access: daily (DUINT)

Reference: EU-27 average, period: 2016–2021	Reference: CSE-11 average, period: 2016–2021
Reference: EU-27 average, period: 2019–2021	Reference: CSE-11 average, period: 2019–2021

Legend: dark blue: upward convergence, upward trend; light blue: upward convergence, downward trend; dark purple: upward divergence, upward trend; light purple: upward divergence, downward trend; dark pink: downward divergence, upward trend; light pink: downward divergence, downward trend, dark green: downward convergence, upward trend; light green: downward convergence, downward trend; grey: at the same pace; white: no data.

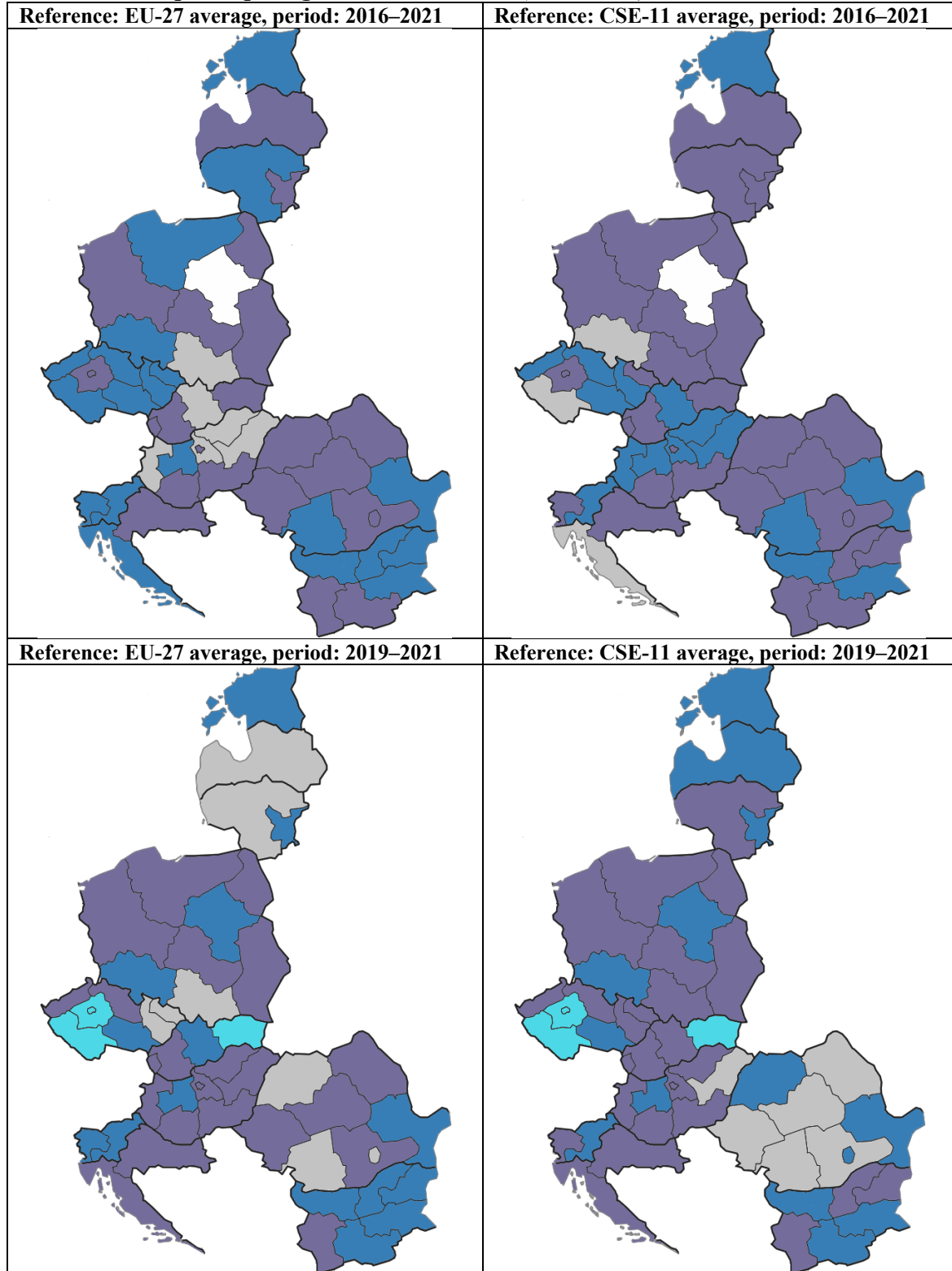Source: Own elaboration (design and cartography by the author).

3. Internet use: participating in social networks (SOCMED)

Reference: EU-27 average, period: 2016–2021	Reference: CSE-11 average, period: 2016–2021

Reference: EU-27 average, period: 2019–2021	Reference: CSE-11 average, period: 2019–2021

Legend: dark blue: upward convergence, upward trend; light blue: upward convergence, downward trend; dark purple: upward divergence, upward trend; light purple: upward divergence, downward trend; dark pink: downward divergence, upward trend; light pink: downward divergence, downward trend, dark green: downward convergence, upward trend; light green: downward convergence, downward trend; grey: at the same pace; white: no data.

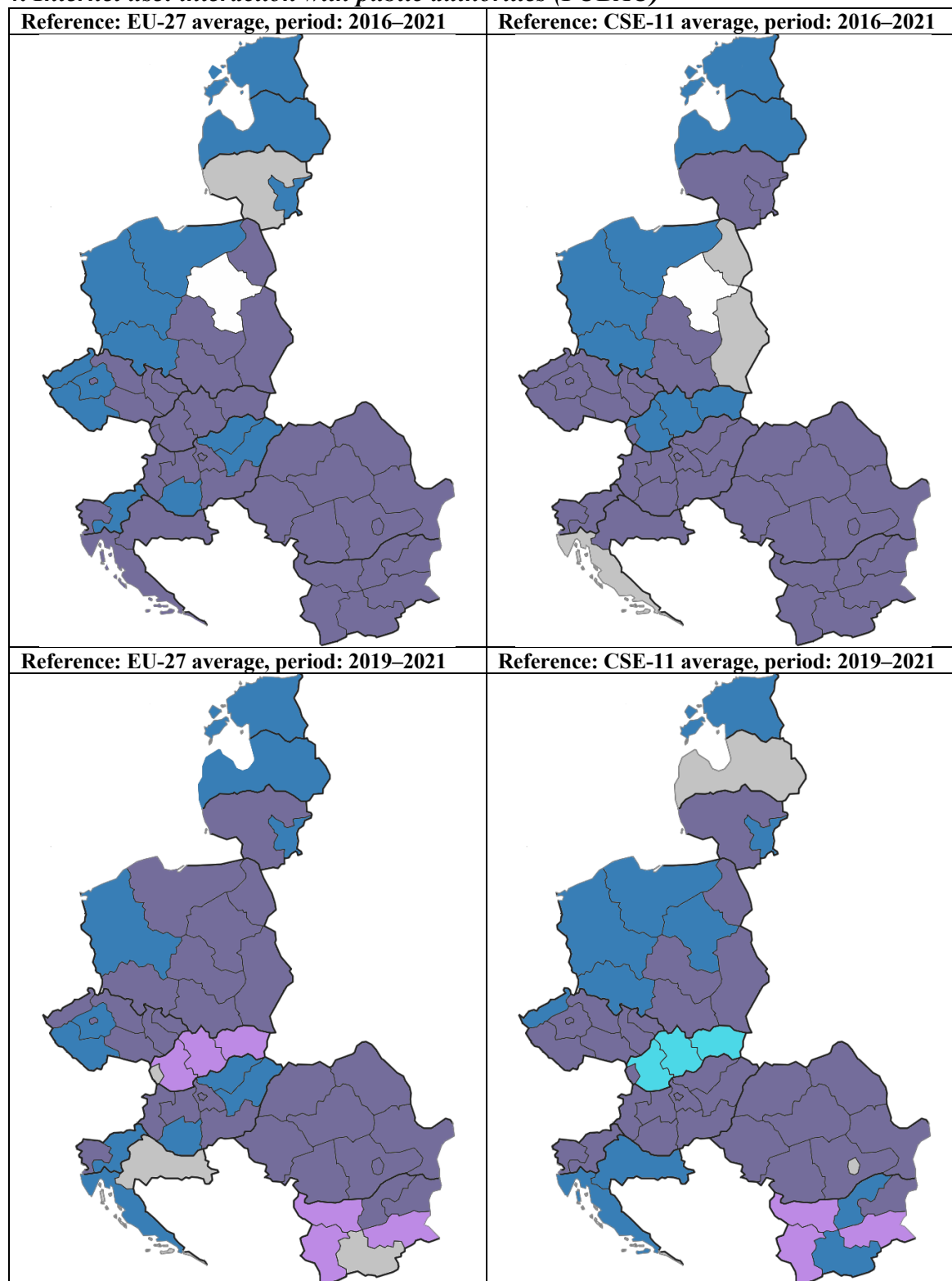Source: Own elaboration (design and cartography by the author).

4. Internet use: interaction with public authorities (PUBAU)

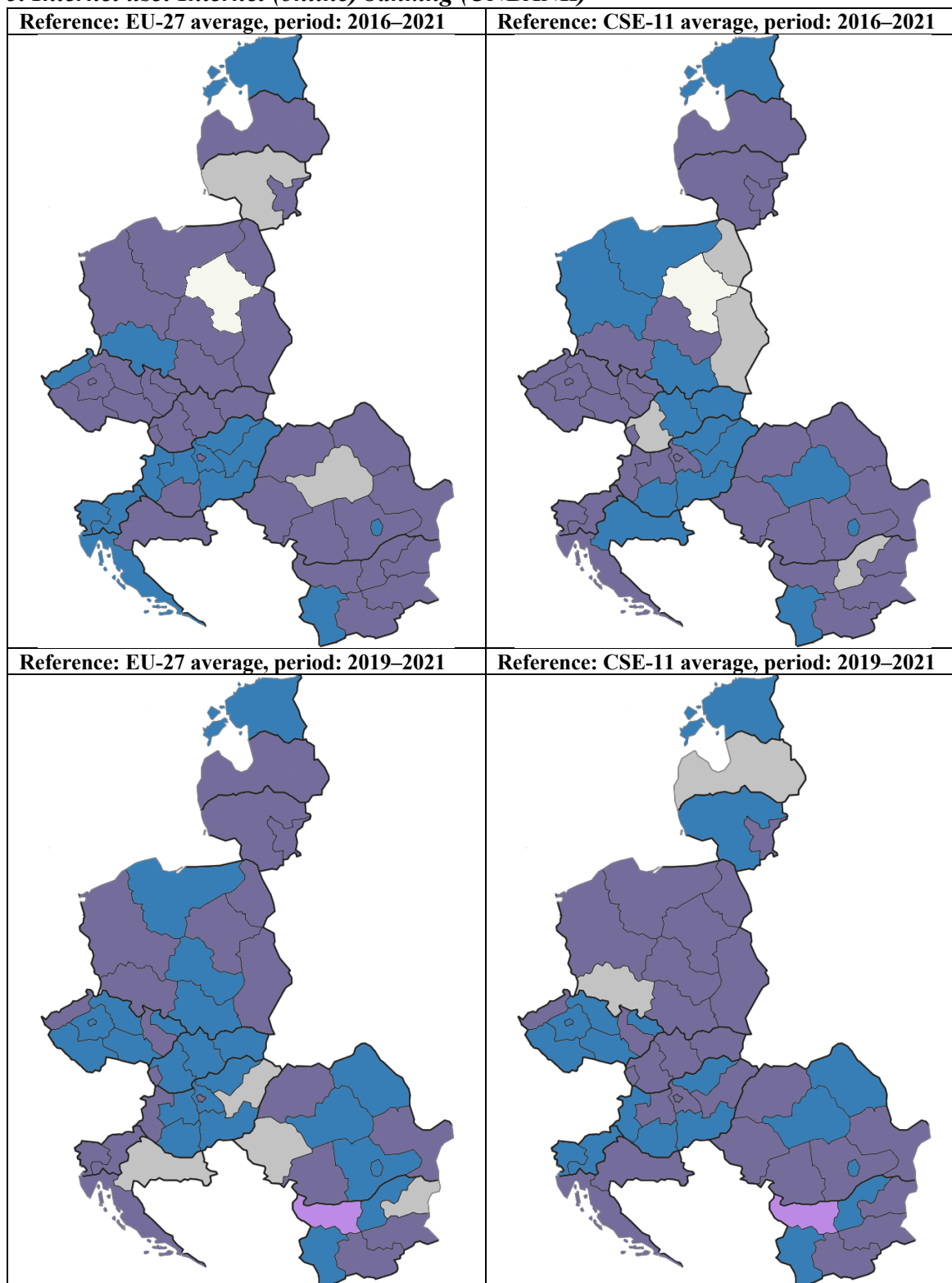| Reference: EU-27 average, period: 2016–2021	Reference: CSE-11 average, period: 2016–2021
Reference: EU-27 average, period: 2019–2021	**Reference: CSE-11 average, period: 2019–2021**

Legend: dark blue: upward convergence, upward trend; light blue: upward convergence, downward trend; dark purple: upward divergence, upward trend; light purple: upward divergence, downward trend; dark pink: downward divergence, upward trend; light pink: downward divergence, downward trend, dark green: downward convergence, upward trend; light green: downward convergence, downward trend; grey: at the same pace; white: no data.

Source: Own elaboration (design and cartography by the author).

5. *Internet use: Internet (online) banking (ONBANK)*

Reference: EU-27 average, period: 2016–2021	Reference: CSE-11 average, period: 2016–2021

Reference: EU-27 average, period: 2019–2021	Reference: CSE-11 average, period: 2019–2021

Legend: dark blue: upward convergence, upward trend; light blue: upward convergence, downward trend; dark purple: upward divergence, upward trend; light purple: upward divergence, downward trend; dark pink: downward divergence, upward trend; light pink: downward divergence, downward trend, dark green: downward convergence, upward trend; light green: downward convergence, downward trend; grey: at the same pace; white: no data.

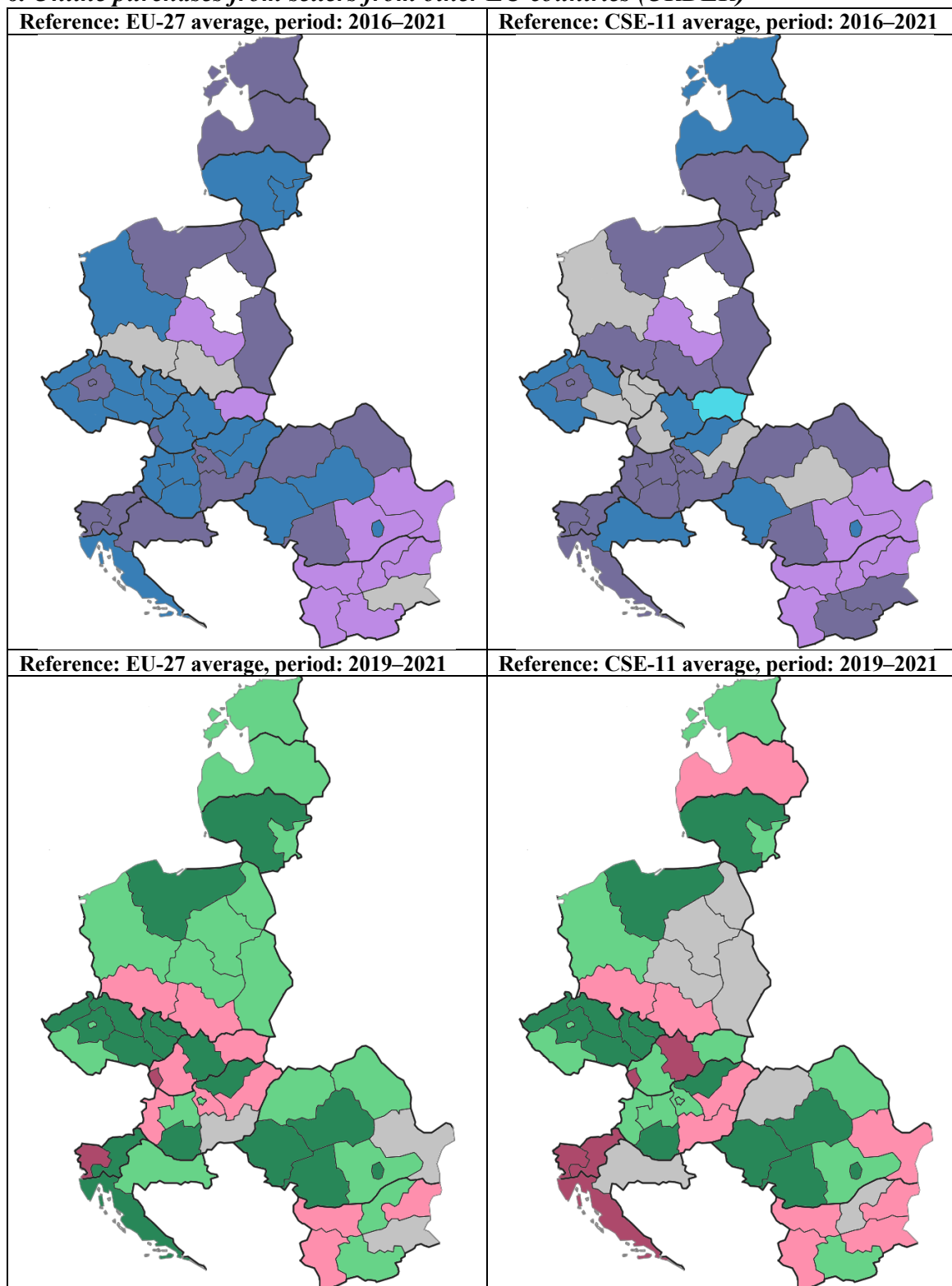Source: Own elaboration (design and cartography by the author).

6. Online purchases from sellers from other EU countries (ORDER)

Reference: EU-27 average, period: 2016–2021	Reference: CSE-11 average, period: 2016–2021
Reference: EU-27 average, period: 2019–2021	**Reference: CSE-11 average, period: 2019–2021**

Legend: dark blue: upward convergence, upward trend; light blue: upward convergence, downward trend; dark purple: upward divergence, upward trend; light purple: upward divergence, downward trend; dark pink: downward divergence, upward trend; light pink: downward divergence, downward trend, dark green: downward convergence, upward trend; light green: downward convergence, downward trend; grey: at the same pace; white: no data.
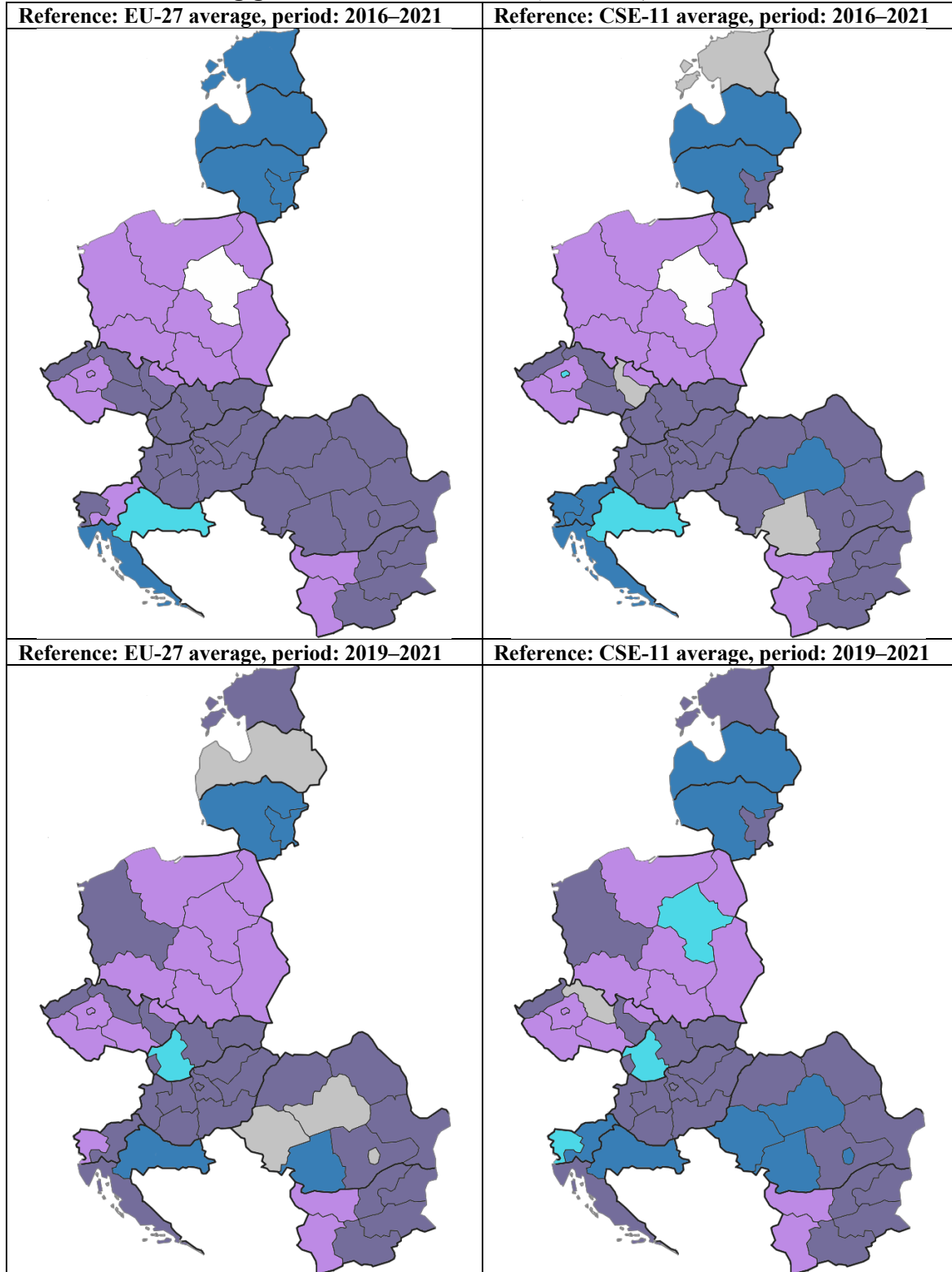Source: Own elaboration (design and cartography by the author).

7. Internet use: selling goods and services online (ONSELL)

| Reference: EU-27 average, period: 2016–2021 | Reference: CSE-11 average, period: 2016–2021 |
| Reference: EU-27 average, period: 2019–2021 | Reference: CSE-11 average, period: 2019–2021 |

Legend: Legend: dark blue: upward convergence, upward trend; light blue: upward convergence, downward trend; dark purple: upward divergence, upward trend; light purple: upward divergence, downward trend; dark pink: downward divergence, upward trend; light pink: downward divergence, downward trend, dark green: downward convergence, upward trend; light green: downward convergence, downward trend; grey: at the same pace; white: no data.

Source: Own elaboration (design and cartography by the author).