

Digitalisation and regional inequality: The hidden shift from convergence to gap

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Abstract. Digitalisation has been widely presented, especially in Central and Eastern European countries, as an additional engine for regional convergence and an accelerator of the catching-up process. Although the pace and depth of this process have varied greatly over the past decade, limiting the possibility of a thorough impact evaluation, recent data combined with nationally representative surveys allow for a better assessment of its promises. This study examines regional variations in digital inequalities in Romania, focusing on how disparities evolve across the three levels of the digital divide (access, skills/usage, and outcomes). The results indicate that, while digitalisation has been hailed as a catching-up engine for the peripheral regions, this appears to be the case mostly for the first-level of the digital divide, namely infrastructure and access. When second- and third-level digital inequalities are taken into consideration, the initial rifts reappear, and digitalisation functions as a new divider and not as a uniformiser. The paper argues for a unitary policy approach in which digitalisation moves beyond a predominantly technological vision and is complemented by strong efforts in fields such as education, skills formation, training, and support actions that enable the effective use and exploitation of digital resources at competitive levels, including in peripheral regions.

1 Introduction: The road of digitalisation from regional panacea to inequality provider

The beginning of the 21st century has been marked by a strong shift towards digitalisation and digital products across the world. Whether framed through smart city and smart strategy agendas, or directly aimed at increasing digitalisation scores, both from a technological and usage perspective, digitally oriented policies have dominated policymakers' discourse over the past two decades ([Dunleavy, Margetts 2010](#), [Dunleavy et al. 2006](#), [Margetts, Dunleavy 2013](#), [Millard 2023](#)).

In Europe, and especially in Central and Eastern European countries, the digitalisation drive has aimed both to catch up technologically with countries that started the process earlier and to increase the effectiveness of public services by creating an additional, more user-friendly, interface between governmental services and citizens ([Janowski 2015](#), [Luna-Reyes, Gil-Garcia 2014](#), [Mettler et al. 2024](#)). National strategies, backed by European initiatives and the EU's overall approach, have sought to address a series of previously identified issues, including the catching-up process and regional convergence. For many policymakers, digitalisation appeared to be a key tool for regional convergence: digital tools are, in principle, uniform across territories, and their infrastructure is often

cheaper to deploy than accessibility infrastructure such as roads and railways, or public infrastructure such as water, gas, sewerage, and public services including medical and educational services (Haefner, Sternberg 2020, Han et al. 2024). Digital tools were therefore seen as a means for citizens to overcome existing shortcomings by enabling access to digital tools, services, and opportunities comparable to those available in more developed regions.

Moreover, recent results suggest that the promised uniformisation has been so compelling in its appeal that some digital strategies have tended to look very similar, reflecting a search for universal solutions for modern governance, inclusive services, and the broader expectation that digitalisation can resolve long-existing internal shortcomings (Ibănescu 2025, Macharis, Geurs 2019, Mettler et al. 2024). However, as highlighted even before the pandemic digital boom, without a clear grasp of what digitalisation can realistically address, and where it lacks the capacity to act, policies risk producing a superficial technological modernisation instead of deep societal convergence (Mergel et al. 2019). In fact, there is a risk that digitalisation-driven policies may even deepen digital inequalities, especially related to usage and outcomes, at the most profound scale of the digital divide.

The digital divide is a three-level approach that began to be drafted during the first years of the digitalisation boom (DiMaggio et al. 2004, Hargittai 2002, 2003, van Dijk 2006) and was later refined in the pre-pandemic and post-pandemic period (van Deursen et al. 2015, Vassilakopoulou, Hustad 2023). Each level focuses on a distinct aspect. The first level covers physical, direct access to digital services and is analysed in terms of connectivity, internet speed, and access to devices (van Deursen, van Dijk 2019). It is the most dependent on territorial, economic, and infrastructure factors. The second level covers differences in digital skills and patterns of technology use, as not all people, despite having similar internet access, use it for the same purposes (DiMaggio et al. 2004, Hargittai 2002, van Dijk 2006). These divides are often difficult for policymakers to detect, as they do not primarily reflect infrastructure gaps, but rather differences related to education, gender, age, or socioeconomic status. The third level is the most difficult to observe but arguably the most important, as it addresses the outcomes users obtain through digital tools and digital connectivity. Therefore, some individuals manage to draw more value from their digital access (e.g., remote work, banking transactions, high-value products) than their peers, even when they share similar levels of access and connectivity and live in comparable territories (DiMaggio et al. 2004, Scheerder et al. 2017, van Deursen, Helsper 2015).

Based on the existing literature, it can be argued that digitalisation, while contributing to the homogenisation of access and a reduction of first-level digital divides, has created deeper gaps at the second and third levels. While these second- and third-level divides are more visible at the individual or community level, we consider that the gaps created tend to follow already existing economic and territorial disparities, and that they can now be observed at a macro-territorial level, reproducing the same rifts as broader economic and territorial inequalities.

2 Romania as a critical case in Central & Eastern Europe

Romania offers an insightful case study for understanding the dynamics of digitalisation in Central and Eastern Europe, due to its contrast between the increasing economic growth rate and the persistence of deep structural gaps. Although since its accession to the EU it has experienced one of the fastest economic convergences, with a GDP per capita PPP representing 78% of the EU average in 2023, compared to only 44% in 2007 (INS 2024), this pattern has not translated into a reduction of social and territorial disparities. The geographical and demographic context accentuates these tensions, and, with around 45% of the population living in rural areas, Romania is one of the least urbanised member countries¹. Regional disparities are wide, with “winners” and “losers”,

¹This percentage has to be taken with a grain of salt; in the Romanian nomenclature of the rural–urban shift, rural localities from metropolitan areas, largely urbanised, are still considered rural, despite the fact that their workforce, infrastructure, and services are closely connected to the metropolitan centre

with agglomerations such as Bucharest, Cluj-Napoca or Iași concentrating investments, innovation and specialised human resources in the digital field, while rural or former industrial areas remain disconnected both physically and digitally (Benedek et al. 2019, Fan et al. 2019).

This social and territorial polarisation makes Romania a barometer for understanding the paradox of digitalisation, where the availability of European funds and emerging technologies does not guarantee digital inclusion (Ibănescu et al. 2020, 2024, Tiganasu, Lupu 2023). On the contrary, in the absence of deliberate policies of equity and access, digitalisation can accentuate existing inequalities between territories, between developed and marginalised regions, between citizens with different levels of education or digital capital (Imran 2022).

The evolution of Romania's digitalisation process reflects a combination of national initiatives and formal alignment with European priorities, but also a visible discontinuity between declared intentions and practical results (Ibănescu et al. 2020, Vevera, Vasiloiu 2024). A great milestone was the adoption in 2014 of the National Strategy on the Digital Agenda for Romania 2020, which set out priorities in areas such as e-government, IT system interoperability, cybersecurity and broadband network expansion (Ministry for Information Society 2015). However, the objectives set out were somewhat modest, and their achievement by 2020 was mainly due to organic technological developments and the pandemic context, and not coherent digital governance or sustained institutional reforms (Edge Institute 2025). The first step towards e-government included the launch of Ghiseul.ro platform in 2011, that allows citizens to pay taxes and fees online, the development of systems such as SEAP, for public procurement, and the PCUe (Single Contact Point), which initially provided access to government forms and later the possibility of submitting documents in digital format. In the health sector, Romania adopted the electronic prescriptions system in 2012, and the electronic health card became operational in 2015, contributing to the digitalisation of medical services (Vevera, Vasiloiu 2024).

However, these isolated achievements have coexisted with systemic bottlenecks and delays in implementation (EC 2025, OECD 2023). Until 2019, successive governments showed limited commitment to extensive digital reform, resulting in one of the least developed e-government systems in the EU, despite having one of the most advanced telecommunications infrastructures. The low level of use was amplified by issues related to public trust, low user friendliness of platforms, and reluctance on the part of local administrations (Edge Institute 2025).

A major turning point was the COVID-19 pandemic, which stimulated the acceleration of initiatives that had previously been stagnant. In 2020, the Romanian Digitalisation Authority (ADR) was established to centralise and drive the digital transformation of the public sector. During the state of emergency, exceptional measures were implemented: electronic signatures on official documents were legalised, and the aici.gov.ro portal was launched in record time to manage requests for support during the pandemic. In this context, platforms such as Ghiseul.ro experienced explosive growth, with the number of users having doubled, exceeding 1 million by mid-2021, and reflecting a process of digitisation forced by circumstances and not strategic planning.

In the last years, Romania has begun to adopt emerging technologies in line with European trends. The government recently approved the National Strategy for Artificial Intelligence 2024-2027, a document that reflects the EU's ambitions in this area but remains at the vision stage for now, without clear implementation and governance tools. Another emblematic project is the development of the government cloud, a major reform for modernising the IT infrastructure of the central administration and ensuring interoperability between governmental agencies (EC 2025). However, despite this flurry of projects and funding, the OECD notes in 2023 that Romania continues to operate without a coherent national strategy for digital governance post-2020, which indicates a lack of strategic vision in the transition from e-government (focused on digital service delivery) to integrated digital governance (which proactively involves data, processes, and users). In the absence of a clear framework to coordinate disparate projects and ensure the sustainability of the reform, the major risk is that the digitalisation of the

and are therefore of an urban nature.

administration will continue to be reactive, dependent on European funding cycles, and insufficiently anchored in the real needs of citizens ([Centrul Roman de Politici Europene 2025](#)).

The actual delivery of digital strategies in Romania has been marked by persistent governance challenges, with an unstable institutional architecture and weak coordination between central and local levels of government. Coordination arrangements have oscillated over time between concentrating responsibilities at the central level and delegating them to corresponding ministries, without managing to generate a functional integrated framework ([OECD 2023](#)). The ADR, established under the Ministry of Research, Innovation and Digitalisation, is responsible for strategic planning, the interoperability of government IT systems (such as national e-government and public procurement platforms), and the standardisation of public digital infrastructure. However, the institution's role remains limited, mainly due to administrative volatility, modest political support at the highest level, and a lack of real executive authority over other central or local institutions ([Edge Institute 2025](#)). ADR mainly provides technical assistance and guidance standards, but they do not have the coercive leverage to enforce compliance by powerful ministries or local authorities.

As it can be observed, the vast majority of the digitalisation process took place under a national umbrella, with very limited, almost non-existent regional initiatives. This situation created two major issues regarding the impact of digitalisation on Romanian regions. First, it limited the extent of the impacts generated by digitalisation to already existing resources; because the strategy was implemented uniformly across the territory, there was no preparation for less developed regions and, therefore, no catching-up process. Second, a mismatch was created between territorial needs and what was delivered by the strategy. The one-size-fits-all approach proved inefficient, even for a medium-sized national territory such as Romania ([Bănică et al. 2020](#), [Bejenaru et al. 2024](#), [Ibănescu et al. 2022](#)).

This mismatch has led to fragmented implementation at local and regional levels, with ministries continuing to run IT projects isolated, non-interoperable and often redundant ([Ibănescu et al. 2022](#)). Furthermore, territorial disparities in the digital capacity of local administrations accentuate institutional divides and generate an uneven pace of digitalisation between the centre and the periphery ([Antonescu 2022](#), [Ionescu et al. 2022](#)). Regional administrations play an essential role in the delivery of digital public services, given the decentralised nature of their provision in Romania. Basic services such as local taxes, civil status documents, and the delivery of permits are managed directly by local authorities. However, recent research indicates that local IT departments are often understaffed, both in terms of numbers and institutional influence, which limits their ability to drive digital innovation ([Bejenaru et al. 2024](#), [Vevera, Vasileoiu 2024](#)). Small municipalities in particular face difficulties in attracting qualified staff and financially supporting the modernisation of IT infrastructure, while the peripheral regions are still struggling in the catching-up process. This lack of capacity is reflected regionally in the slow adoption of national digital platforms, as well as in the digital performances at institutional and individual level.

The paper does not deny the relationship between economic development and digitalisation. Rather, it starts from the acknowledgement that more economically developed territories generally benefit from stronger digital infrastructures, higher levels of access, and more favourable conditions for digital adoption. However, the aim of the paper is to examine whether the widely promoted role of digitalisation as a mechanism for reducing territorial disparities can be observed across all three levels of the digital divide. In this sense, the analysis questions whether digitalisation truly acts as a territorial equaliser, or whether it mainly reduces first-level divides related to infrastructure and access, while preserving, reproducing, or even accentuating second- and third-level divides related to skills, usage, outcomes, and benefits ([Ibănescu et al. 2026](#)). Thus, digitalisation may function as a partial masker of territorial inequalities, creating the appearance of convergence at the level of access, while deeper forms of digital inequality continue to reflect broader socio-economic and territorial rifts.

Table 1: The eight Romanian development regions and their key demographic and economic data

Name	Area in km2	Population 2021	Total GDP 2024	GDP per capita 2024
North-East	36,850	3,226,436	€37.5 bil.	€11,649
South-East	35,762	2,367,987	€33.3 bil.	€14,289
South-Muntenia	34,453	2,864,337	€37.3 bil.	€13,178
South-West Oltenia	29,212	1,873,606	€26.8 bil.	€14,485
West	32,034	1,688,921	€31.6 bil.	€18,902
North-West	34,159	2,521,793	€43.4 bil.	€17,049
Centre	34,100	2,271,066	€39.3 bil.	€17,139
Bucharest-Ilfov	1,821	2,259,669	€104.4 bil.	€45,140

Source of data: Eurostat and Romanian Census

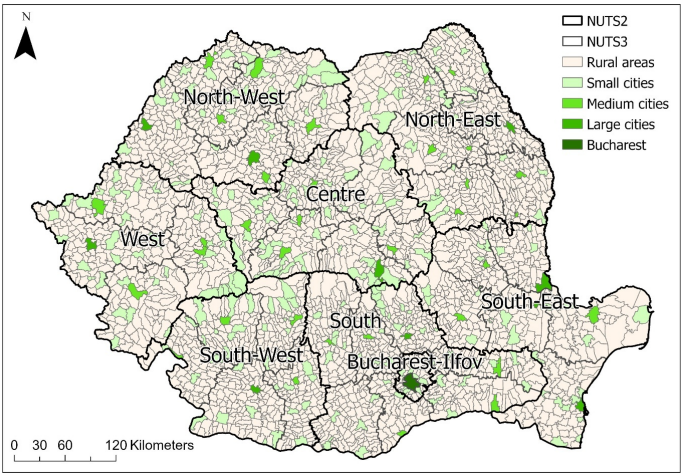


Figure 1: Rural-urban split of the development regions

Furthermore, an additional risk concerns peripheral regions, as they have a higher share of rural localities and a less pronounced private initiative, which can amplify digital inequalities in terms of skills and outcomes. In this context, the digital lens primarily magnifies existing regional deficiencies. Gradually, territorial inequalities in digitalisation extend beyond their local confinement and begin to manifest at the regional level, creating an uneven geography of digitalisation. Initiatives remain fragmented and poorly integrated with the real needs of disadvantaged populations. In the long term, without a coherent policy of reskilling and upskilling for adults, Romania risks maintaining an entire class of “digitally excluded” citizens, deprived not only of online services, but also of social, educational and democratic participation rights in the digital age.

3 Methodology

In order to test regional differences and inequalities in terms of access, skills, usage, and outcomes, covering all three levels of the digital divide, we developed a dedicated instrument: a nationally representative survey applied across the entire territory. We acknowledge that the three levels of the digital divide may have different causes and may depend on different scales of intervention. Some divides are more directly policy-dependent, especially at national level. This is particularly the case for first-level divides, which are mainly related to infrastructure and access. Second-level divides are more strongly shaped by local and intra-regional contexts, especially in relation to skills, patterns of use, and the capacity of individuals and communities to benefit from digital tools. Third-level divides emerge at the intersection of socio-economic conditions, education, local context, and the availability of economic opportunities, including those supported by national and regional actors and policies. Therefore, our study seeks not only to identify these

divides, but also to connect them carefully with the different factors and scales that may contribute to their formation. To date, this is one of the first attempts to identify the three levels of the digital divide and associated territorial differences through a grassroots approach focused on individuals, and not relying solely on statistical indicators related to technological upgrades and numbers of users.

Data were collected using computer-assisted telephone interviewing (CATI) administered by a professional survey agency between July and August 2024. The target population comprised adults aged 18 years and older, and data collection followed a quota sampling design based on random digit dialing (RDD) aiming to mirror the national population distribution across gender, age group, region, and area of residence (rural vs. urban). The overall response rate was about 14% and the final sample size was $N = 1,240$. Post-stratification weights were applied to correct for minor deviations from the population structure (for official population structure and weighted structure, please see Table 2 and Appendix A.5).

In the final sample, 50.6% of respondents identified as women, and 56.4% resided in urban areas. The age structure was concentrated in the 25–44 (35.9%) and 45–64 (35.7%) categories, with smaller proportions in the 18–24 (9.2%) and 65+ (19.2%) age groups. Regionally, respondents were distributed across North-West (11.5%), Centre (12.4%), North-East (15.2%), South-East (15.1%), South-Muntenia (14.8%), Bucharest-Ilfov (11.7%), South-West Oltenia (10.2%), and West (9.1%). The regional distribution reflects the population share of each region. The questionnaire covered a wide range of digital behaviours, as well as references to existing platforms and national digital services. Particular attention was given to the second and third levels of the digital divide, focusing on types of activities and on the types of devices used to access digital services.

In order to cover all three levels of the digital divide, we carried out a structured assessment. The first level was examined through digital device ownership, the second level through awareness of digital services, and the third level through the actual use of digital services. To reduce the length of the interview and support a higher response rate, the second and third levels of the digital divide were combined in a grid question. This allowed for a shorter and more efficient survey instrument, while still ensuring adequate coverage of the relevant dimensions.

4 Results and Discussions

As seen in Appendix A.1, digital awareness is high for most services, with *don't know it exists* values generally below 10% across all regions. It is notable to mention that for some regions (Centre, and North-East in some cases), the percentages of *I don't know it exists* are higher compared to the percentages of the other regions for behaviours such as “Submit applications/requests to the local town hall/another institution”, “Renewal or replacement of documents”, “Electronically sign documents”, “Obtain an appointment in hospitals or for medical consultations”, or “Learn something new or to take online classes”. This pattern reflects a lower penetration of information about digital services in regions with a high share of peripheral or rural populations. This may be due to a lack of coordinated efforts to reach all population groups, as well as a higher number of missing links between digital products and users (see, for example, Ibănescu et al. 2025, on the importance of digital helpers in filling this gap). Equally concerning is the fact that high levels of unawareness concern critical digital services, some of which have been fundamental to digital governance strategies from the outset, including services related to the replacement of official documents, health services, and the submission of applications.

Some behaviours seem to be more easily accessible to users, such as everyday behaviours (reading news) compared to civic or administrative ones (filing complaints, submitting applications), as supported by the percentages of regular usage. Bucharest Ilfov and the West regions are the most digitally active regions while Centre, North-East, and South-East regions tend to have lower regular usage scores. News and education display the broadest diffusion among digital behaviours. For instance, the frequency of online news consumption is consistently high across regions with elevated levels, especially in South-East, Centre, and Bucharest. However, this openness toward information seeking

does not translate into an equivalent level of civic engagement, as interaction with public institutions on social media remains low (below 25%). This discrepancy might suggest a hesitation among citizens to engage institutional actors through this channel. It should be noted, however, that news consumption does not rank very high in terms of second- and third-level digital skills. It is a type of activity that requires a limited set of skills and provides limited outputs. The preference for digital news is also reinforced by the fact that the daily written press in Romania is almost non-existent, with most major daily sources of information having moved online or to television. Similarly, commercial digital practices such as buying products online register relatively high and consistent regular use across most regions (between 25% and 43%).

By contrast, engagement with online medical services occupies an intermediate position. Activities such as getting an online appointment or checking for medical results online, shows moderate regular usage across regions, with Bucharest being among the top adopter. Administrative and civic e-services, however, exhibit the lowest levels of regular usage. Although awareness is relatively high across all regions, western regions seem to demonstrate comparatively greater engagement. The most frequently used services include paying taxes online, with high overall awareness in the West and Centre, and electronic document signing, with Bucharest and the West recording the highest levels of awareness, whereas the North-East displays comparatively lower levels. Limited engagement is reported for submitting applications/requests, filing complaints, or getting documents renewed—services that rarely exceed 20% regular usage across regions. The pattern tends to unfold clearly: as the required skills and the outputs of services become more complex, the more developed regions take the lead, while peripheral, predominantly rural regions, especially the North-East, lag behind.

As we suspected that involvement in various services and digital activities is not merely a product of awareness, but also of technological ownership, we investigated the regional prevalence of different types of digital connections, as some devices offer a wider range of opportunities. Laptops and PCs, for example, are particularly useful for more complex tasks, including working from home, whereas other devices, such as smartphones, may have a more limited impact on outcomes despite providing connectivity.

Smartphone ownership was almost universal across all development regions (Table 2), participants reporting 90.3% to 98.4% access to this type of digital device. The lowest levels of ownership were observed in the North-East and South-East (both 90.3%), however this inequality can be considered rather small on top of a very high baseline. Regional differences are statistically significant, but data shows almost ubiquitous access and it can be considered that mobile access is not a source of digital divide.

Results highlight substantial regional disparities in device ownership of laptops, desktops (PC), with the strongest contrasts observed for laptops and other mobile devices. Bucharest-Ilfov consistently records the highest levels for laptops and mobile ownership, suggesting a stronger integration into mobile and flexible forms of digital access in the capital region. At the opposite side, the North-East emerges as a systematically disadvantaged region, displaying the lowest ownership rates for almost all device categories. Moreover, the findings seem to point to a differentiation by device type: some regions (such as South-West Oltenia, North-West) retain comparatively higher levels of desktop PC ownership whereas others (Bucharest-Ilfov, Centre, South-East) are more oriented toward laptops and other mobile devices. Tablet use does not show statistically significant differences between regions. This may be explained by the fact that tablet use is more strongly dependent on personal and household-specific circumstances than on local or regional factors. More specifically, tablet use tends to be less frequent and more sporadic than the use of smartphones, laptops, or personal computers. As a result, it may reflect individual preferences, household composition, or specific occasional needs rather than broader territorial patterns.

Equally important, in our opinion, is the number of devices that individuals have, as digitalisation is far from being, despite some claims, a one-device-fits-all environment. Having access to a wider range of devices constitutes a competitive advantage. As seen in Table 3, North-East concentrates the highest share of individuals with only one device and the smallest with five devices, indicating lower levels of digital equipment. In

Table 2: Ownership of various access devices (weighted percentages)

Digital devices	Region	No	Yes	χ^2 Region
Smartphone	North-West	4.2	95.8	18.941*
	Centre	8.8	91.2	
	North-East	9.7	90.3	
	South-East	9.7	90.3	
	South-Muntenia	4.9	95.1	
	Bucharest-Ilfov	2.6	97.4	
	South-West Oltenia	1.6	98.4	
	West	5.4	94.6	
Tablet	North-West	68.9	31.1	9.284
	Centre	78.5	21.5	
	North-East	79.5	20.5	
	South-East	78.4	21.6	
	South-Muntenia	71.3	28.7	
	Bucharest-Ilfov	74.0	26.0	
	South-West Oltenia	73.4	26.6	
	West	71.5	28.5	
Laptop	North-West	40.9	59.1	48.717**
	Centre	48.0	52.0	
	North-East	61.0	39.0	
	South-East	53.6	46.4	
	South-Muntenia	47.0	53.0	
	Bucharest-Ilfov	25.2	74.8	
	South-West Oltenia	44.5	55.5	
	West	44.5	55.5	
Personal computer (PC)	North-West	56.0	44.0	23.011*
	Centre	66.8	33.2	
	North-East	73.3	26.7	
	South-East	71.1	28.9	
	South-Muntenia	60.9	39.1	
	Bucharest-Ilfov	65.4	34.6	
	South-West Oltenia	55.2	44.8	
	West	70.6	29.4	
Other mobile devices	North-West	70.8	29.2	34.102**
	Centre	50.4	49.6	
	North-East	64.1	35.9	
	South-East	48.9	51.1	
	South-Muntenia	68.2	31.8	
	Bucharest-Ilfov	60.8	39.2	
	South-West Oltenia	68.7	31.3	
	West	66.1	33.9	

Notes: ** p<0.01; * p<0.05

contrast, Bucharest-Ilfov, the West and South-East regions show higher proportions of individuals with two or more devices suggesting a more favourable level of digital equipment. Other regions, such as South-West Oltenia, display a more polarised pattern with both a substantial share of one-device ownership and relatively high shares of individuals with five devices.

The data indicate two concerning realities. First, aspects related to the first digital divide, namely access, remain visible, although they now manifest in terms of the number and quality of devices that individuals can use. Second, intra-regional inequalities in digital access (the higher concentration, within each region, of population shares located at the two extremes of device ownership) are also highly visible, with South-West Oltenia and North-West representing an example that warrants further consideration.

When it comes to devices combination (Appendix A.2), most participants have access to smartphones only (24.4%), followed by smartphone and laptops (15.7%) and all five types of devices (12%). However, this ownership varies greatly across regions. Bucharest-Ilfov stands out as the most digitally equipped area, with the lowest rate of smartphone only ownership (13.2%, compared to 24.4% overall in the sample), and the highest prevalence of combinations such as smartphones and laptops. Complex multi-device bundles are also more frequent in this region, including smartphone and laptop and other devices

Table 3: Number of individual devices

Region	1 device	2 devices	3 devices	4 devices	5 devices	χ^2 Region
North-West	31.0	24.5	16.1	11.0	17.4	69.476**
Centre	31.4	28.8	12.8	14.9	12.1	
North-East	39.5	28.0	17.8	9.9	4.8	
South-East	22.8	39.0	21.2	9.8	7.1	
South-Muntenia	29.1	31.3	15.5	9.5	14.6	
Bucharest-Ilfov	13.9	37.2	25.6	9.7	13.7	
South-West Oltenia	29.8	30.5	11.7	9.1	18.8	
West	27.1	33.3	21.5	6.7	11.4	

Notes: ** $p < 0.01$; * $p < 0.05$

(14.4%, compared to 6.4% in total) and configurations including all five device types (13.7% vs. 12%). By contrast, the North-East appears to be the most “phone dependent” region. The share of individuals with only smartphones is the highest here, and the proportion of all five devices is clearly below the average (4.8% vs. 12%). A different pattern emerges in North-West and South-West Oltenia, which are characterised by polarisation. Both regions combine high level of smartphone-only ownership (29.6% and 29%) with some of the highest shares of fully equipped individuals owning all the five types of devices (17.4% and 18.8%). The remaining regions occupy intermediate positions. In South-East, individuals are more likely to combine smartphones with “other” devices (17.9%) and above-average shares of smartphones and laptops and other devices (8.8% vs 6.4%). Centre, South-Muntenia, and West mix relatively high proportions of smartphone-only ownership (23.8% to 28%) with negligible complex multi-devices bundles such as smartphone and laptop and PC and other devices (8.5% in the Centre being the highest value).

This raised an additional line of inquiry. As multiple types of digital divides tend to overlap, apparently following a core-periphery pattern, and as certain intra-regional inequalities stand out, we sought to investigate how the most vulnerable group, those with access only via smartphones, perceive and use various digital services, as this can provide a more detailed assessment of the direct impact and current state of digital vulnerability (Table 4). In addition, we conducted an in-depth analysis of how these variations are spatially distributed at the regional level, in order to connect digital vulnerability with spatial peripherality (Appendix A.3).

The largest percentage gap in any use (*used a few times* and *used regularly*) are concentrated in activities that are typically more complex, document-heavy, or institution-facing, suggesting that smartphone-only respondents are systematically less able or less inclined to complete these tasks digitally. The steepest shortfalls are for online learning (37.2% smartphone only vs 59.8% overall) and electronic signatures (35.9% vs 57.1%), followed by submitting applications to townhall/other institutions (27.7% vs 46.7%) and paying taxes online (45.6% vs 62.8%).

These gaps seem to suggest that in the overall population many more respondents manage to translate awareness into actual use, whereas smartphone-only users remain disproportionately excluded from activities that often require handling files, forms, authentication steps or multi-stage processes. In fact, the data reinforces the assumption that first-level inequalities tend to extend into the second and third levels. Similarly, existing economic and social gaps tend to be reproduced in the digital environment, which strongly supports the idea that digitalisation is not a panacea for territorial cohesion, but rather an amplifying lens for existing issues.

Compared to the overall population, when filtering for respondents who use only smartphones, a somewhat different pattern emerged across the behaviours. Not all behaviours have a regional variation, but only a few. For the advanced, formal interactions with the state, such as submitting applications or electronically signing documents, Bucharest-Ilfov stands out through universal awareness and comparatively higher shares of regular users, while the North-East concentrates both more people who do not know these services and almost no regular users. The West often mirrors the capital’s profile for transactional services such as paying taxes online or buying groceries and other prod-

Table 4: Awareness and use of digital services for the most vulnerable group

Digital service	Overall (top) vs. smartphone only (bottom)	Don't Know It Exists	Know It Exists, Never Used	Used a Few Times	Use Regularly
Pay taxes online	1240 302	3.1 4.6	34.1 49.8	28.1 26.4	34.7 19.2
Submit applications/requests to the local town hall/another institution	1240 302	5.7 8.4	47.6 63.9	30.4 20.5	16.3 7.2
To be informed about proposals from local authorities/to express your point of view	1240 302	5.2 6.3	43.3 52.9	35.2 30.5	16.4 10.2
To file a complaint	1240 302	4.6 4.9	53 65.3	30.2 23.8	12.1 6
For the renewal or replacement of documents	1240 302	6.5 8.1	52.9 64.3	28.8 20	11.8 7.6
Electronically sign documents	1240 302	4.5 7.1	38.4 57.1	32.7 26.7	24.4 9.2
To obtain an appointment in hospitals or for medical consultations	1240 302	3.6 3.6	36.5 41.3	36.9 36.8	23 18.4
To check medical test results or their history online	1240 302	3.6 4.6	34.7 47.7	35.5 34.5	26.2 13.2
Learn something new or to take online classes	1240 302	4 5.2	36.2 57.7	30.2 24.1	29.6 13.1
To stay informed about the news	1240 302	1.4 1.8	19.3 27.5	38.1 44.5	41.3 26.2
Buy groceries or other products online	1240 302	3.2 4.9	25 37.9	37.3 36.1	34.6 21
To leave comments or interact with a public institution on social media	1240 302	4.5 4.2	52.5 59.9	27.3 24.9	15.7 11

ucts online where regular use is clearly above that of most other regions. In between these poles, regions such as South-Muntenia and South-West Oltenia, tend to have high awareness but a pattern of *used a few times*, instead of routine use. At the same time, the pattern is not uniform across all significant services, which shows an impact of regions on the type of activity. For health-related services, like online appointments, the occasional practice is present in regions such as North-West, South-East, and South-West Oltenia, whereas in South-Muntenia non-use remains dominant. When it comes to interaction with public institutions via social media, North-West emerges as the most engaged region, while South-Muntenia and Bucharest-Ilfov combine high awareness with very high *never used*.

The results should, however, be interpreted with some caution. Although the sample was structured to reflect the population distribution, the total sample size ($N = 1,240$) may lead to relatively small subsamples in some regions, which could limit statistical power and reduce the sensitivity of chi-square tests to detect weaker differences.

5 Conclusions

Our paper aimed to examine whether existing socio-economic gaps can be reduced through ongoing digitalisation, or whether digitalisation instead reproduces existing demographic and economic inequalities. More specifically, the study investigates whether these inequalities are translated into wider gaps in terms of digital use and the outcomes that people are able to obtain from digital services. Focusing on the second and third levels of the digital divide, while considering first-level divides as mandatory stepping stones, we used a nationally representative instrument to test these assumptions. The results support the conclusion that pre-existing breaks are largely translated into digital gaps, with high discrepancies between core and peripheral regions in terms of device ownership, awareness of existing services, usage, and meaningful outcomes derived from these services.

Although awareness is relatively high across all regions, western regions appear to demonstrate comparatively greater engagement. The most frequently used services in-

clude paying taxes online (with high awareness overall, particularly in the West and Centre) and electronic document signing (highest values in Bucharest and the West leading, while the North-East trails behind). These patterns tend to repeat across the vast majority of variables.

Romania's experience is not only illustrative, but also signals the risks of implementing digital transformation policies without anchoring them in the socio-institutional realities of each state. We consider that similar digital shifts are currently underway in other Central and Eastern European countries, a situation that requires dedicated inquiry, as well as sustained attention from both academia and policymakers.

In addition, the findings indicate several short- and medium-term solutions that stakeholders may consider. First, authorities should follow the principle of *meeting people where they are* and strengthen connections with vulnerable groups through mobile devices, using applications that are easy to understand and operate. While not optimal, this approach can cover most basic services and function as an entry portal for more complex ones. Second, the results suggest that Central and Eastern Europe lags behind in the implementation of digital helpers, as no major national or regional strategy has focused on this topic, despite clear needs across multiple vulnerable groups and socio-economic categories. Third, the analysis raises the need for regionally adapted digitalisation strategies. When decisions on digitalisation are taken exclusively in core areas, peripheral regions are likely to bear the costs, a dynamic that risks consolidating existing territorial disparities into a persistent uneven geography of digital inclusion and opportunity. Furthermore, the prioritisation of national and regional actors should not be limited to infrastructure development, but should also include training and education in digital skills. While the immediate need to ensure infrastructure and reduce the first level of the digital divide remains important, the results of this study, together with other recent research, suggest that the lack of basic digital training risks reinforcing existing territorial inequalities. In the absence of adequate skills, populations may be unable to fully use and benefit from existing digital infrastructure, even where such infrastructure is available and performant. This becomes therefore a policy priority, not only from a social perspective, but also from an economic one. A population with stronger digital skills is more likely to be productive, which can increase and accelerate the return on investment associated with reducing the first level of the digital divide. Moreover, training and skills development could be more easily distributed among local actors, helping to reduce implementation costs while also aligning with the productivity-oriented rationale that often guides digitalisation policies.

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A Appendix:

A.1 Awareness regarding main digital services in percentages

Digital service	Region	Don't Know It Exists	Know It Exists, Never Used	Used a Few Times	Use Regularly	χ^2 Region
Pay taxes online	North-West	2.9	31.6	34.0	31.6	52.11**
	Centre	4.1	34.2	23.1	38.7	
	North-East	6.4	41.7	24.3	27.6	
	South-East	4.0	44.1	22.5	29.5	
	South-Muntenia	1.6	34.9	28.2	35.3	
	Bucharest-Ilfov	2.0	24.8	35.1	38.1	
	South-West Oltenia	0.9	25.2	37.2	36.8	
	West	1.9	28.7	23.5	45.8	
Submit applications/requests to the local town hall/another institution	North-West	4.2	43.8	38.2	13.9	48.35**
	Centre	9.3	42.9	30.2	17.6	
	North-East	8.7	48.3	31.1	11.9	
	South-East	6.3	59.6	19.8	14.3	
	South-Muntenia	3.2	48.6	31.9	16.2	
	Bucharest-Ilfov	3.3	37.1	40.5	19.0	
	South-West Oltenia	5.8	47.4	30.8	16.1	
	West	3.7	50.2	21.1	25.0	

Digital service	Region	Don't Know It Exists	Know It Exists, Never Used	Used a Few Times	Use Regularly	χ^2 Region
To be informed about proposals from local authorities/to express your point of view	North-West	4.3	40.6	38.6	16.5	28.28**
	Centre	5.9	41.3	38.4	14.3	
	North-East	8.5	46.4	34.3	10.8	
	South-East	5.1	50.8	28.0	16.2	
	South-Muntenia	4.9	45.2	33.4	16.6	
	Bucharest-Ilfov	4.1	33.7	38.9	23.3	
	South-West Oltenia	4.7	39.0	40.5	15.9	
To file a complaint	West	2.8	45.6	31.9	19.7	42.17**
	North-West	4.2	43.2	40.2	12.4	
	Centre	7.3	51.2	26.9	14.5	
	North-East	6.3	49.6	33.9	10.2	
	South-East	6.2	63.3	19.6	10.9	
	South-Muntenia	3.2	59.4	28.7	8.8	
	Bucharest-Ilfov	1.3	44.3	36.7	17.7	
For the renewal or replacement of documents	South-West Oltenia	4.1	55.1	29.8	11.1	44.96**
	West	3.7	55.2	28.3	12.8	
	North-West	4.8	57.8	27.3	10.1	
	Centre	11.6	42.5	32.9	13.1	
	North-East	12.9	54.5	24.2	8.5	
	South-East	6.3	55.0	25.0	13.7	
	South-Muntenia	4.9	57.7	24.8	12.5	
Electronically sign documents	Bucharest-Ilfov	2.9	48.2	36.5	12.5	95.99**
	South-West Oltenia	2.5	55.8	29.5	12.2	
	West	3.6	49.9	34.7	11.8	
	North-West	2.1	37.2	38.4	22.3	
	Centre	8.9	43.3	28.0	19.8	
	North-East	9.8	42.1	29.9	18.1	
	South-East	6.8	48.6	22.0	22.6	
To obtain an appointment in hospitals or for medical consultations	South-Muntenia	1.0	33.9	41.8	23.2	47.18**
	Bucharest-Ilfov	0.6	19.6	44.9	34.9	
	South-West Oltenia	2.5	43.3	28.4	25.8	
	West	1.8	36.1	28.9	33.3	
	North-West	2.6	33.0	37.9	26.5	
	Centre	9.3	30.6	38.8	21.3	
	North-East	4.6	37.9	39.4	18.1	
To check medical test results or their history online	South-East	4.0	44.6	28.7	22.7	51.17**
	South-Muntenia	2.1	42.9	34.1	20.9	
	Bucharest-Ilfov	0.0	32.8	41.0	26.2	
	South-West Oltenia	0.9	27.6	44.9	26.6	
	West	4.4	37.9	32.6	25.1	
	North-West	4.2	31.9	42.0	21.9	
	Centre	5.9	32.1	32.9	29.1	
Learn something new or to take online classes	North-East	6.9	37.0	32.3	23.8	82.44**
	South-East	4.1	41.6	25.6	28.7	
	South-Muntenia	1.0	41.3	33.3	24.3	
	Bucharest-Ilfov	0.0	28.8	39.0	32.1	
	South-West Oltenia	0.9	26.8	49.7	22.6	
	West	5.3	32.2	36.1	26.5	
	North-West	3.5	32.5	33.6	30.3	
To stay informed about the news	Centre	8.7	33.6	25.4	32.2	59.91**
	North-East	3.5	46.9	25.6	24.1	
	South-East	5.8	33.2	20.5	40.4	
	South-Muntenia	2.6	49.1	30.5	17.8	
	Bucharest-Ilfov	1.4	22.6	37.5	38.5	
	South-West Oltenia	1.7	30.7	44.1	23.5	
	West	4.6	34.7	30.4	30.4	
	North-West	3.0	24.9	37.8	34.3	
	Centre	4.1	11.4	38.8	45.8	
	North-East	0.6	18.9	41.2	39.4	
	South-East	2.8	20.1	25.6	51.5	
	South-Muntenia	0.0	20.3	38.0	41.7	
	Bucharest-Ilfov	0.0	15.5	41.1	43.4	
	South-West Oltenia	0.0	19.4	52.3	28.3	
	West	0.0	25.1	33.7	41.2	

Digital service	Region	Don't Know It Exists	Know It Exists, Never Used	Used a Few Times	Use Regularly	χ^2 Region
Buy groceries or other products online	North-West	1.4	26.0	43.7	28.8	64.73**
	Centre	6.0	19.0	34.6	40.4	
	North-East	6.9	32.7	34.6	25.7	
	South-East	2.9	30.6	29.0	37.4	
	South-Muntenia	0.6	28.1	37.0	34.3	
	Bucharest-Ilfov	0.0	18.4	38.5	43.1	
	South-West Oltenia	3.4	20.0	49.9	26.6	
To leave comments or interact with a public institution on social media	West	3.5	18.3	35.8	42.4	60.43**
	North-West	2.8	48.2	28.8	20.2	
	Centre	6.6	40.7	30.7	22.1	
	North-East	5.6	53.2	31.6	9.6	
	South-East	5.1	53.1	18.0	23.8	
	South-Muntenia	2.1	59.3	27.9	10.6	
	Bucharest-Ilfov	2.7	46.8	37.9	12.7	
	South-West Oltenia	5.7	60.9	23.6	9.8	
	West	5.5	58.7	19.0	16.8	

Note: ** p<0.01; * p<0.05

A.2 Combinations of device ownership (N=number; percentages afterwards)

	To- tal	NW	Cent- re	NE	SE	South Munte- nia	Bucharest - Ilfov	SW Olte- nia	West
N	1238	142	154	188	186	182	146	127	113
Smartphone + Tablet	1.5	0.7	0.0	1.1	2.1	2.9	1.9	0.9	2.5
Smartphone + Laptop	15.7	14.6	12.1	10.3	13.7	16.1	25.3	19.0	17.6
Smartphone + PC	5.3	5.6	3.8	4.7	4.1	6.5	5.3	8.2	4.4
Smartphone + Other device	7.9	2.9	11.7	10.8	17.9	4.8	2.8	1.7	6.9
Tablet + Laptop	0.3	0.0	0.6	0.0	0.0	0.0	1.3	0.0	0.8
Tablet + PC	0.1	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Tablet + Other device	0.3	0.0	0.0	0.0	1.2	0.0	0.0	0.0	1.0
Laptop + PC	0.2	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.0
Laptop + Other device	0.2	0.0	0.0	0.6	0.0	0.0	0.0	0.7	0.0
PC + Other device	0.2	0.8	0.0	0.0	0.0	0.5	0.6	0.0	0.0
Smartphone + Tablet + Laptop	3.1	2.8	1.2	6.1	1.5	2.8	4.5	0.9	5.1
Smartphone + Tablet + PC	1.0	0.0	0.6	1.6	1.5	1.0	0.7	1.5	0.8
Smartphone + Tablet + Other device	0.5	0.0	0.0	0.6	1.5	0.0	0.0	1.6	0.0
Smartphone + Laptop + PC	5.0	9.9	1.2	2.2	5.1	4.8	5.9	7.0	5.1
Smartphone + Laptop + Other device	6.4	2.1	8.5	4.6	8.8	3.3	14.4	0.7	8.6
Smartphone + PC + Other device	1.1	0.0	1.2	1.7	2.2	1.8	0.0	0.0	0.8
Tablet + Laptop + PC	0.3	0.0	0.0	1.1	0.6	0.6	0.0	0.0	0.0
Tablet + Laptop + Other device	0.2	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0
Tablet + PC + Other device	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Laptop + PC + Other device	0.2	1.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Smartphone + Tablet + Laptop + PC	3.5	7.0	4.5	2.7	3.0	4.2	1.9	1.5	2.5
Smartphone + Tablet + Laptop + Other device	1.5	2.0	1.2	1.5	3.1	0.5	1.3	0.7	0.8
Smartphone + Laptop + PC + Other device	4.5	0.7	8.5	5.2	3.7	3.7	5.8	6.2	1.7
Tablet + Laptop + PC + Other device	0.2	0.7	0.0	0.0	0.0	0.5	0.0	0.0	0.0

	To- tal	NW	Cent- re	NE	SE	South Munte- nia	Bucharest - Ilfov	SW Olte- nia	West
Smartphone + Tablet + Laptop + PC + Other device	12.0	17.4	12.1	4.8	7.1	14.6	13.7	18.8	11.4
Smartphone only	24.4	29.6	23.8	32.1	15.3	28.0	13.2	29.0	24.5
Tablet only	0.2	0.0	0.6	0.0	0.0	0.0	0.0	0.0	1.8
Laptop only	0.5	0.7	1.3	0.0	0.0	0.5	0.6	0.0	0.8
PC only	0.6	0.0	0.0	1.7	1.7	0.0	0.0	0.9	0.0
Other device only	2.6	0.8	5.7	5.7	5.8	0.6	0.0	0.0	0.0
Smartphone + Tablet + PC + Other device	0.6	0.7	0.6	0.5	0.0	0.5	0.6	0.7	1.7

A.3 Regional distribution of digital services use and awareness for the most vulnerable group (in percentages)

Digital service for respondents having Smart- phones Only	Region	Don't Know It Exists	Know It Exists, Never Used	Used a Few Times	Use Regularly	χ^2	Region
Pay taxes online	North-West	2.6	53.7	24.5	19.3	29.37	
	Centre	8.1	57.8	22.6	11.5		
	North-East	10.8	59.3	19.1	10.8		
	South-East	3.8	50.8	31.7	13.7		
	South-Muntenia	0.0	41.7	30.6	27.6		
	Bucharest-Ilfov	0.0	49.6	25.2	25.2		
	SW Oltenia	3.0	48.3	31.4	17.4		
Submit applica- tions/requests to the local town hall/another institution	West	3.9	28.3	31.6	36.2	32.00*	
	North-West	0.0	73.3	19.6	7.1		
	Centre	13.6	60.4	17.0	8.9		
	North-East	19.8	53.9	24.5	1.8		
	South-East	3.8	78.2	10.9	7.1		
	South-Muntenia	3.7	66.5	21.5	8.3		
	Bucharest-Ilfov	0.0	63.5	20.3	16.2		
To be informed about proposals from local authorities/to express your point of view	SW Oltenia	11.8	53.4	28.8	5.9	38.09**	
	West	3.9	70.6	15.2	10.2		
	North-West	2.6	59.6	22.6	15.2		
	Centre	3.0	57.4	28.1	11.5		
	North-East	16.0	59.8	24.2	0.0		
	South-East	3.8	54.6	26.9	14.7		
	South-Muntenia	5.8	54.6	23.9	15.7		
To file a complaint	Bucharest-Ilfov	0.0	39.1	39.8	21.1	25.44	
	SW Oltenia	5.9	36.9	51.3	5.9		
	West	3.9	48.0	41.2	6.8		
	North-West	2.2	72.9	19.6	5.2		
	Centre	5.5	68.5	17.0	8.9		
	North-East	12.6	61.1	20.9	5.4		
	South-East	0.0	64.5	24.6	10.9		
For the renewal or replacement of documents	South-Muntenia	1.8	73.9	19.9	4.3	29.32	
	Bucharest-Ilfov	0.0	74.8	19.5	5.7		
	SW Oltenia	5.9	51.7	33.9	8.5		
	West	3.9	54.8	41.2	0.0		
	North-West	0.0	65.2	22.6	12.2		
	Centre	20.0	57.4	19.6	3.0		
	North-East	14.2	66.7	10.1	9.0		
	South-East	3.8	65.0	20.8	10.4	29.32	
	South-Muntenia	6.1	67.5	16.0	10.4		
	Bucharest-Ilfov	5.7	53.7	30.1	10.5		
	SW Oltenia	5.9	65.3	25.8	3.0		
	West	3.9	66.1	29.9	0.0		

Digital service for respondents having Smart-phones Only	Region	Don't Know It Exists	Know It Exists, Never Used	Used a Few Times	Use Regularly	χ^2 Region
Electronically sign documents	North-West	0.0	67.8	22.6	9.6	39.17**
	Centre	14.5	57.4	22.2	5.9	
	North-East	18.0	61.1	15.7	5.2	
	South-East	3.8	65.0	23.6	7.6	
	South-Muntenia	3.7	52.7	29.5	14.1	
	Bucharest-Ilfov	0.0	39.1	39.8	21.1	
	SW Oltenia	3.0	56.8	37.7	2.6	
To obtain an appointment in hospitals or for medical consultations	West	3.9	44.1	37.3	14.7	36.94**
	North-West	0.0	45.2	24.5	30.4	
	Centre	8.5	40.0	39.6	11.9	
	North-East	9.0	38.7	41.8	10.6	
	South-East	0.0	33.3	42.6	24.1	
	South-Muntenia	0.0	58.6	23.6	17.8	
	Bucharest-Ilfov	0.0	35.0	39.8	25.2	
To check medical test results or their history online	SW Oltenia	3.0	22.9	54.2	19.9	27.12
	West	3.9	48.0	33.9	14.2	
	North-West	2.6	57.4	27.8	12.2	
	Centre	5.5	48.9	28.1	17.4	
	North-East	12.6	47.7	31.2	8.5	
	South-East	0.0	51.8	24.6	23.6	
	South-Muntenia	1.8	46.3	37.2	14.7	
Learn something new or to take online classes	Bucharest-Ilfov	0.0	44.7	39.8	15.4	25.86
	SW Oltenia	3.0	33.9	51.7	11.4	
	West	3.9	49.6	39.6	6.8	
	North-West	2.6	55.2	24.1	18.1	
	Centre	8.1	54.9	25.1	11.9	
	North-East	9.0	73.5	10.3	7.2	
	South-East	3.8	51.3	17.5	27.4	
To stay informed about the news	South-Muntenia	3.7	59.1	29.2	8.0	31.39
	Bucharest-Ilfov	4.9	49.6	35.0	10.5	
	SW Oltenia	3.0	48.7	31.4	17.0	
	West	3.9	52.0	32.8	11.3	
	North-West	5.2	34.5	32.6	27.8	
	Centre	5.5	17.0	57.8	19.6	
	North-East	1.8	33.3	47.2	17.8	
Buy groceries or other products online	South-East	0.0	32.8	21.8	45.4	44.28**
	South-Muntenia	0.0	28.2	36.5	35.3	
	Bucharest-Ilfov	0.0	19.5	50.4	30.1	
	SW Oltenia	0.0	23.7	54.2	22.1	
	West	0.0	22.6	59.9	17.6	
	North-West	0.0	43.3	32.2	24.5	
	Centre	5.1	28.9	45.9	20.0	
To leave comments or interact with a public institution on social media	North-East	14.4	43.1	34.0	8.5	37.76**
	South-East	0.0	55.1	24.6	20.3	
	South-Muntenia	0.0	43.2	32.2	24.6	
	Bucharest-Ilfov	0.0	39.8	40.6	19.5	
	SW Oltenia	8.9	28.4	43.2	19.5	
	West	3.9	14.2	40.1	41.8	
	North-West	0.0	50.4	21.9	27.8	
	Centre	8.1	40.4	34.5	17.0	
	North-East	7.2	66.7	20.9	5.2	
	South-East	3.8	53.6	24.6	18.0	
	South-Muntenia	0.0	76.4	17.8	5.8	
	Bucharest-Ilfov	4.9	64.3	25.2	5.7	
	SW Oltenia	5.9	53.8	34.3	5.9	
	West	3.9	66.1	26.5	3.4	

Note: ** p<0.01; * p<0.05

A.4 Selection of questions used to assess the digital devices ownership and use of digital channels

Digital devices ownership

What types of digital devices do you use at least once a week?

(Select all that apply; multiple answers possible.)

- Smartphone/mobile phone
- Tablet
- Laptop
- Desktop computer (PC)
- Other mobile or digital devices (e.g. Smart TV, smart speakers, game console, e-book reader, smartwatch)

During the last 12 months, have you used digital channels (websites, platforms, or online applications) for any of the following purposes?

- Paying fees, taxes, etc. (e.g. ghiseul.ro, etax)
- Submitting requests/applications/files to the local city hall or other public institutions
- Getting information about proposals made by local authorities and expressing your opinion on them
- Filing a report/complaint (such as rule violations, critical situations regarding energy or gas supply, or other issues)
- Renewing or changing identity documents
- Electronically signing documents
- Booking appointments at hospitals or for medical consultations
- Checking medical test results or medical history online
- Learning something new / taking online courses
- Keeping informed about the news
- Purchasing food or non-food products (e.g. Emag, Bringo, Glovo, etc.)
- Leaving comments or interacting with a state/public institution on social media (Facebook, Instagram, etc.)

A.5 Weighted sample characteristics and official national demographic statistics

		Official percentages	Weighted percentages
Region	North-West	12.71	11.5
	Centre	11.76	12.4
	North-East	17.85	15.2
	South-East	12.64	15.1
	South-Muntenia	14.08	14.8
	Bucharest-Ilfov	12.17	11.7
	South-West Oltenia	9.71	10.2
	West	9.08	9.1
Rural/Urban	Urban	55.53	56.4
	Rural	44.47	43.6
Gender	Men	48.52	49.4
	Women	51.48	50.6
Age	18-24	8.82	9.2
	25-44	34.89	35.9
	45-64	34.74	35.7
	65+	21.56	19.2

