

STUDY

Requested by the PETI committee



Implications of the Digital Transformation on Different Social Groups



Policy Department for Citizens' Rights and Constitutional Affairs
Directorate-General for Internal Policies
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EN

Implications of the Digital Transformation on Different Social Groups

Abstract

This study, commissioned by the European Parliament's Policy Department for Citizens' Rights and Constitutional Affairs at the request of the PETI Committee, analyses the impact of digitalization on vulnerable social groups in terms of lower income and education, age, people affected by disabilities, minority ethnic groups and people living in remote/isolated geographic areas. It includes a review of the relevant academic literature, secondary data analysis, as well as three case studies focused on digital inequality in e-commerce and digital financial services. The study reviews the EU legislations relevant in the policy areas that are the object of the case studies and elaborates some recommendations on the actions that the EU could undertake to tackle the digital divide affecting vulnerable social groups.

This document was requested by the European Parliament's Committee on Petitions.

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LIST OF ABBREVIATIONS

API	Application Programme Interfaces
AI	Artificial Intelligence
DESI	Digital Economy and Society Index
DSA	Digital Services Act
DNR	Digital News Report
GDPR	General Data Protection Regulation
ICT	Information and Communication Technologies
OECD	Organisation for Economic Co-operation and Development
PSD2	Payments Services Directive
SMEs	Small and Medium-sized enterprises
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology
VLOPs	Very Large Online Platforms
VLOSEs	Very Large Online Search Engines
WoS	Web of Science

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EXECUTIVE SUMMARY

Background

The 'digital divide' has been traditionally defined as the gap between different socio-economic groups in relation to their ability to access information and communication technologies (ICT). During recent years, however, a new stream of literature has focused on the socio-economic impact of the digital divide, looking especially at vulnerable social groups. The present study falls within such emerging stream of literature. In particular, the report looks at impact of digitalization on vulnerable social groups in terms of lower income and education, age (i.e. children v. older people), as well as people affected by disabilities, minority ethnic groups and people living in remote/isolated geographic areas.

The study includes a review of the relevant academic literature, secondary data analysis, as well as three case studies focused on digital inequality in e-commerce, digital financial services and the information sphere. Furthermore, the study reviews the EU legislations relevant in the policy areas that are the object of the case studies. Finally, the study elaborates some recommendations on the actions that the EU could undertake to tackle the digital divide affecting vulnerable social groups.

Main findings

While Europe is overall progressing, in comparison to other regions of the world, in relation to availability, affordability and readiness of Internet access, the digital divide has been widening in Europe among marginalised social groups. 'Older' people seem particularly affected by the digital divide, though there are substantial differences across the EU countries. Low education emerges as another significant source of digital divide, with increasing variability and best-worst range values, indicating that Europe has not achieved convergence in this aspect.

The three case studies have shown that, overall digital divide is increasingly affecting vulnerable social groups in terms of e-commerce use, internet banking, and access to digital news. However, different social groups are affected by the digital divide in the three policy areas. For instance, while 'older' people are more likely affected by the digital divide in terms of e-commerce and access to information, they appear less vulnerable to disinformation and other problems related to access to information. The digital divide related to demographic causes, especially 'age', can be expected to gradually diminish unless the technological acceleration is exceedingly disruptive. This is because current 'older' generations will be progressively replaced by today's 'younger' generations, which already engage in digital technologies. Even if the issue could be solved by the passing of time, the choice of a policy intervention has to weigh the financial cost of intervention with the cost of being left behind borne by the older age cohorts of today. The disadvantaged position of other specific groups of society appears, moreover, likely to persist also in the future. This is the case for people with socio-educational, cultural and physical disadvantages. The case studies show that the digital divide can only be addressed via tailored-made policy solutions. In other words, not every intervention should be designed to target necessarily all disadvantaged groups. While enhancing computer skills may be beneficial to individuals with a lower education level, people in rural areas, for instance, may particularly benefit from interventions focusing on high-speed internet access.

The review of the relevant EU acquis shows that some EU legislations touch upon the issue of digital divide. However, the issue is addressed all over 'scattered' regulations. Moreover, some EU legislations address a specific aspect of the digital divide, while others are silent on the same issue. For instance, the Geo-Blocking Regulation and the Regulation on Cross-Border Parcel Delivery address the 'geographic' dimension of the digital divide in the context of e-commerce. By contrast, in the context of the relevant EU legislation concerning e-commerce, the Digital Contents Directive does not

specifically address the issue of the digital divide. It is also worth noticing that most of the EU legislations address the issue of digital divide affecting individuals with disabilities. For example, the Audiovisual Media Contents Directive, the Digital Services Act and the Proposal for an EU Digital Identity Regulation include specific provisions aiming at increasing the transparency and availability of digital services for individuals affected by disabilities. By contrast, no EU legislation specifically targets the digital divide affecting 'older' people, even though, as mentioned above, 'age' is considered the main dimension of the digital divide from a socio-economic perspective.

Policy recommendations

In view of its findings, the study puts forward 3 policy recommendations on the actions that the EU could undertake to decrease the degree of digital divide affecting vulnerable social groups.

- The study proposes the establishment of a European Observatory on the Digital Divide to analyse, from a comparative perspective, the issue of digital divide on vulnerable social groups across Europe. The Observatory could advise national and EU policymakers, collecting up-to-date evidence on this issue, as well as engaging in advocacy and training activities with relevant stakeholders.
- Second, EU policymakers should embark on a general re-assessment of the existing EU digital acquis. Taking into consideration the objectives of the European Declaration on Digital Rights, the digital divide should be considered in any new/revised EU legislation affecting the digital world. From this perspective, in its Impact Assessment, the EU Commission could consider the impact of the digital divide in any new draft legislation, explaining how the proposal copes with such issue.
- The study suggests that the EU Cohesion Policy could include specific funding schemes for awareness and training projects, aiming at decreasing the degree of the digital divide for vulnerable social groups.

1. INTRODUCTION

The OECD (2001) defines the digital divide as 'the gap between individuals, households, businesses, and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of activities'. Despite this definition including not only infrastructural endowments but also socio-economic implications, initially, the main interpretation of digital divide was conceived as the dichotomous distinction between people who have or do not have access to the internet (or lately on a classification based mainly on the speed of this access). The debate on the digital divide started in the late 1990s to address the differences in the infrastructural access to the internet and related opportunities, especially between developed and developing countries. However, influential scholars (see DiMaggio and Hargittai, 2001; Hargittai and Hinnan, 2008; Van Dijk and Hacker, 2003) highlighted its multifaceted nature, advocating for:

- Expanding beyond internet access to encompass competencies and skill proficiency.
- Transitioning from a purely technical perspective to a socially embedded interpretation of the digital divide, emphasising critical dimensions and differences among social groups.

Addressing the first point, Aissaoui (2022) delineates three levels of the digital divide.

The first level pertains to differences in infrastructural endowments, such as connection quality or device availability. The second level focuses on users' skills in employing digital tools, encompassing operational and informational skills. The third level involves the ability to leverage digital resources to enhance performance or reach specific objectives. While analysts increasingly shift their focus from the first to the second level due to available data on digital skills, the third level remains relatively unexplored due to a lack of data and validated theoretical frameworks linking skills with performance and personal outcomes.

Concerning the second point, it is crucial to note that digital tools exist in the 'information society,' where information is a primary good contributing to cultural, social, and economic capital (Van Dijk and Hacker, 2003). Over the past two decades, the internet and digital technologies have progressively permeated numerous daily activities, significantly impacting the organisation of business and social realms (Castells, 2002). This highlights the emerging connection between digital technologies and their role in societies with traditional 'offline' socio-cultural dimensions, forming the foundation of traditional inequality literature (i.e., race, class, gender, etc.), reinforcing existing social inequalities or creating new forms of exclusion (Livingstone and Helsper, 2007). Hargittai and Hinnant (2008) provide concrete examples of these forms of inequality, including political participation, career advancement, and information searches on financial and health services.

In both scientific literature and policy debates, the term 'digital divide' serves as a general umbrella to describe a variety of digital-related gaps. However, in this study, we adopt a narrow perspective, focusing on how digital transformation has evolved and created societal gaps among different types of vulnerable groups. Few studies addressed this problem combining digital divide with offline disparities.

This underscores the importance of promptly addressing the effects of digital transformation on inequalities and marginalised groups, translating the research results into a more policy-oriented perspective. This chapter aims to deepen our understanding of the literature on these terms, exploring the most relevant sub-themes and the social groups most impacted. Despite the digital divide's roots in the late 1990s, the rapid technological advancements of the last decade make it a dynamic and highly debated topic.

Our report is in three parts.

- 1) State of the art: this section includes two main parts. First, we conduct a literature review to understand how scientific debate has evolved, what are the most relevant sub-themes and shared definitions and what social groups have received more attention in the context of such debate. Second, we use available secondary data to complement the review, analysing how digital inequality has developed in different European countries.
- 2) Case studies: we rely on three in-depth case studies to describe how digital inequality has emerged in specific contexts, exploring the multidisciplinary connection between social, legal, technological and economic aspects of the phenomenon. We focus on case studies of general interest and with a widespread impact across social groups, namely e-commerce, digital finance and access to information.
- 3) Policy analysis and recommendations: this section is in two parts. While the first section includes an analysis of the relevant EU legislation and regulatory proposals applicable to the case studies previously analysed, the second section concludes by putting forward some policy recommendations.

2. STATE OF THE ART

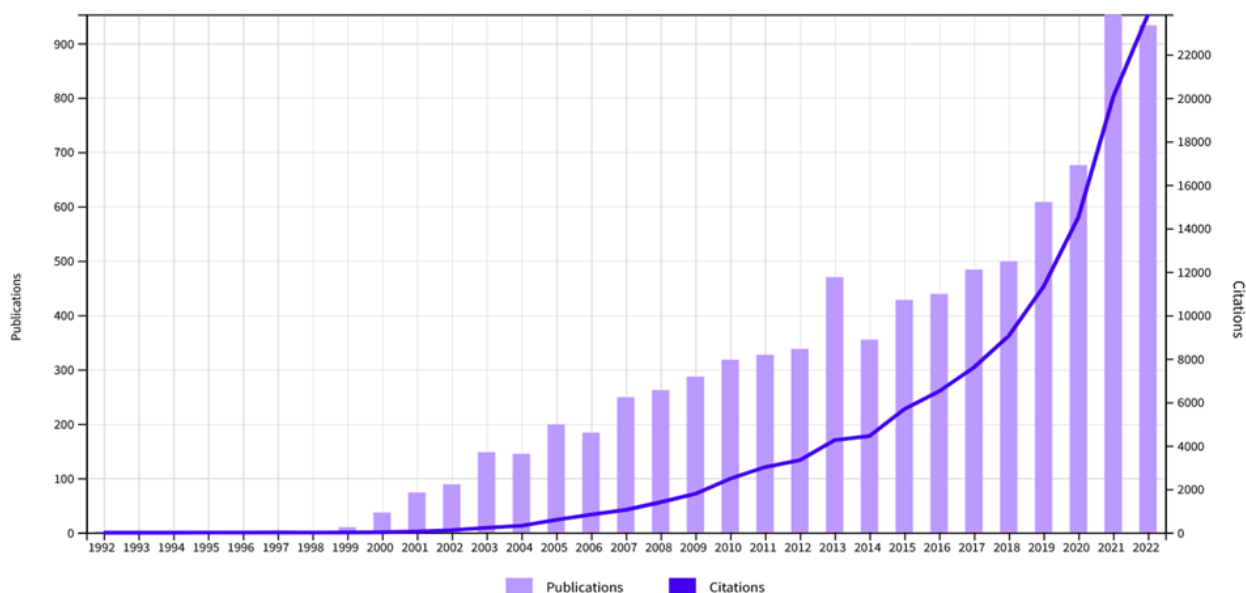
2.1. Literature review: beyond the traditional digital divide

2.1.1. Digital Divide

The scholarly literature concerning the digital divide has accumulated a substantial body of work, particularly in the last two decades. To scrutinise its evolution, we leverage the specialised platform Web of Science (hereinafter WoS). WoS encompasses an extensive bibliometric database comprising indexed papers, books, and conference proceedings, facilitating an evaluation of the significance of scientific themes across multiple dimensions, including research categories, publication years, citation counts, countries, authors, and scientific journals.

Conducting a search within WoS for the term 'digital divide' and related expressions (digital inequality^{*1}; digital gap; digital division; digital disparities; digital equity) in the scientific literature (refer to Lythreitis et al., 2022 for a comparable approach), reveals that 8,519 academic articles have been written between 2000 and 2022, with the count rising to 9,244 up to November 2023 (see Figure 1). Notably, a surge in interest in an emerging research stream at the intersection of information systems and social science was discernible in 2007 when the scientific literature produced until that year surpassed 1,000 citations. The most significant increase was registered in 2021, when the number of papers increased by 40% in comparison to 2020. This mounting interest, awakened prevalently by the increased use of digital instruments during the COVID-19 pandemic, has made even more evident the importance of discussing at academic and policy levels how digital transformation relates to traditional forms of inequality.

Figure 1. Publications and citations related to digital divide



Source: WoS Analytics

Among the indexed academic journals on WoS, *Telecommunication Policy* emerges at the forefront with 144 publications. However, this constitutes just 1.6% of the total contributions, indicative of the considerable fragmentation of this subject across scientific communities, lacking a definitive

¹ Asterisk * indicates that any number of letters at the end of a word are included in the search. In this case both inequality and inequalities are included.

leadership. Scientific journals such as *Telecommunications Policy, Information, Communication & Society*, and *New Media Society*, all rooted in the social sciences, are dedicated to assessing the repercussions of digital transformation on the economy and society, as well as the role of information. On the other hand, the *Journal of Medical Internet Research*, centred on the impact of informatics on health services and medicine, and *Lecture Notes in Computer Science*, predominantly focused on computer science-related topics, corroborate the interdisciplinary nature of the debate on the digital divide.

The interdisciplinary nature becomes even more conspicuous when examining the data presented in Table 2. Despite the dominance of computer science, nine other research categories make significant contributions, each accounting for a minimum of 5% of the publications. These scientific domains include engineering, business economics, and sociology.

Table 1. Most popular scientific journal for the topic digital divide

Publication Titles	Record Count	% of 9254
TELECOMMUNICATIONS POLICY	144	1,6%
JOURNAL OF MEDICAL INTERNET RESEARCH	135	1,5%
INFORMATION COMMUNICATION SOCIETY	129	1,4%
NEW MEDIA SOCIETY	127	1,4%
LECTURE NOTES IN COMPUTER SCIENCE	122	1,3%

Source: authors' elaboration on WoS database

Table 2. Most popular research areas for the topic digital divide

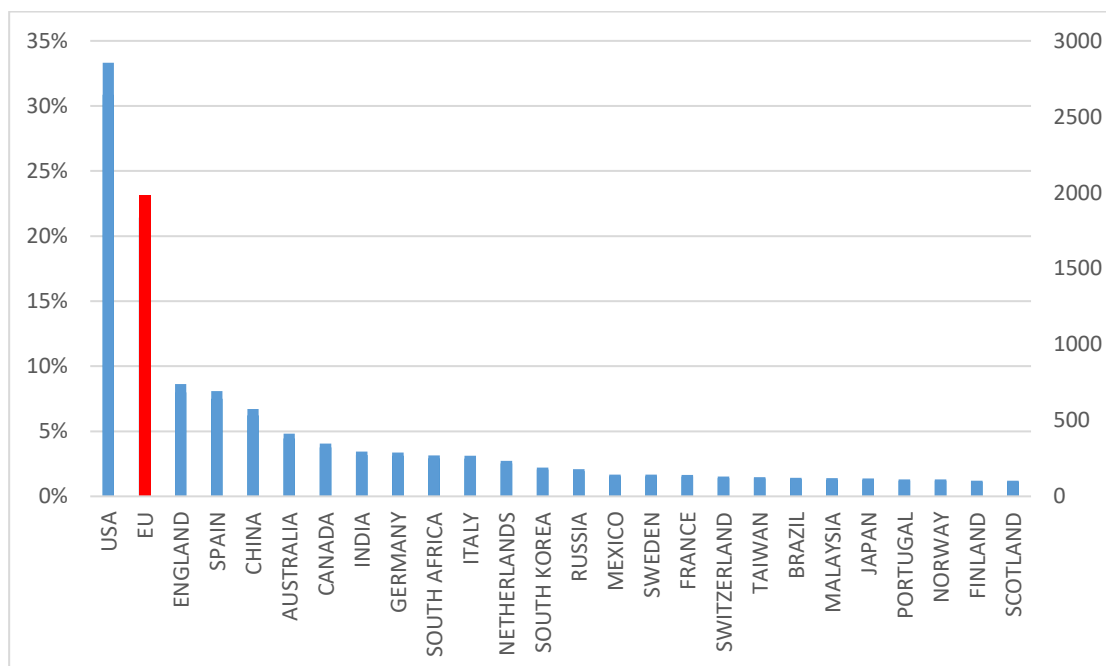
Research Areas	Record Count	%
Computer Science	1758	19%
Education, Educational Research	1470	16%
Information Science, Library Science	1449	16%
Communication	1275	14%
Business Economics	862	9%
Engineering	631	7%
Social Sciences, Other Topics	598	6%
Health Care, Sciences Services	565	6%
Telecommunications	460	5%
Sociology	448	5%

Source: authors' elaboration on WoS database

We further extend our analysis to include the countries of the departments to which the authors are affiliated, concentrating on nations with a minimum of 100 publications, a threshold deemed as critical for considering the presence of a critical mass. Notably, the United States emerges with a significant dominance, contributing to over 30% of the total publications. Following closely is the European Union, although with a marked gap of approximately 9.5%, with Spain predominating among the EU members².

² Values for the EU are obtained summing up values for the EU members with at least 100 publications.

Figure 2. Percentage of the most proficient countries in terms of publications



Source: authors' elaboration on WoS database

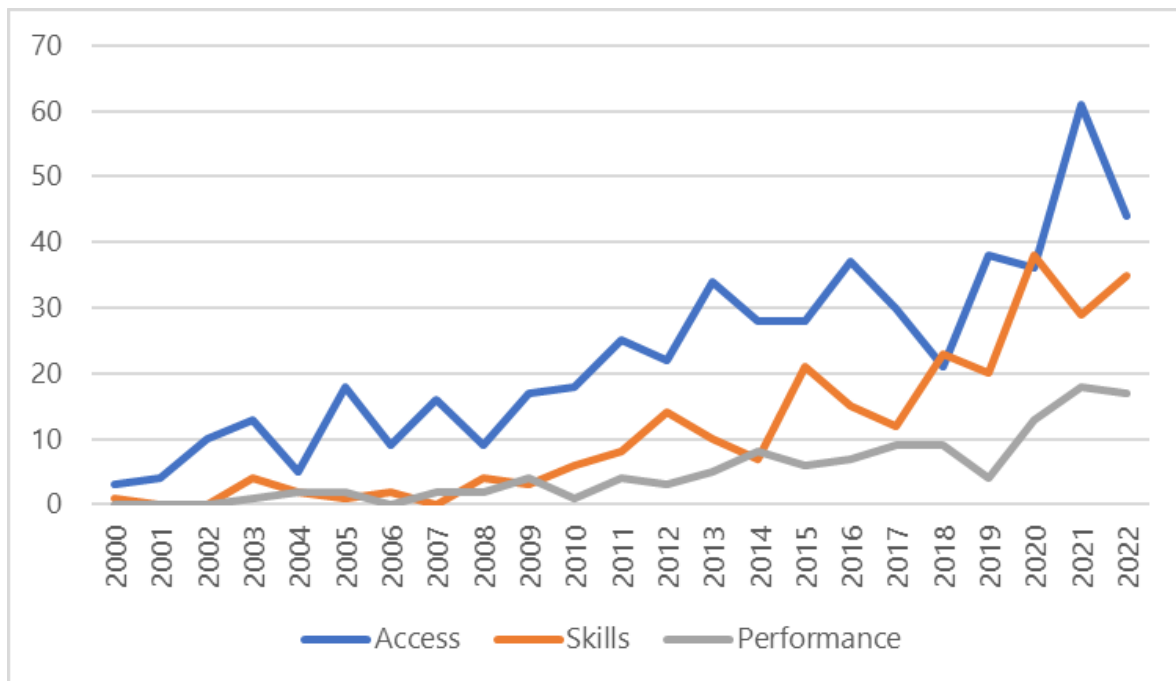
In our quest to comprehend the three delineated types of digital divide outlined in the literature, we undertake bibliometric research, combining the previous query related to digital divide with three different queries corresponding to each level³:

- First level, Access with the query: 'access'
- Second level, Skills with the query: 'skill*' or 'competenc*'
- Third level, Performance with the query: 'performanc*' or 'outcom*'

Unsurprisingly, the analysis reveals a distinct prevalence of contributions related to the sub-topic of 'access,' amounting to a total of 566 from 2000 to 2022. In comparison, there are 277 contributions for the sub-topic of 'skills' and 127 for 'performance' (refer to Figure 3). Noteworthy is the intriguing convergence between the sub-topics of 'access' and 'skills' in the years 2018 and 2020, suggesting a shift in focus from infrastructural concerns to the associated skills in recent years. However, a transient surge in the sub-topic 'access' is observed in 2021, immediately in the post-COVID phase, considering the typical publication timeline for scientific journals, accompanied by a slight decrease in 'skills.' This could be interpreted as a heightened awareness of the imperative to ensure equal access to digital infrastructure during the pandemic, given the widespread shift to digital formats for various activities. Consequently, in 2022, we observe a renewed convergence between the sub-topics of 'access' and 'skills.' As for the sub-topic of 'performance,' the number of contributions is notably lower, although a discernible increase in interest appears from 2019 onwards.

³ While in our first query we broadly search digital divide by topic, which includes title, abstract and keywords of the author, in this combined query we narrow down the broad search adding the three queries related to the level of digital divide in the title of the scientific contributions, as some terms may be too generic to be included in the abstract. This focused strategy aims to mitigate the likelihood of including the same paper in more than one category, ensuring a more precise classification.

Figure 3. Number of publications by types of digital divide across time



Source: authors' elaboration on WoS database

2.1.2. Digital Divide in marginalised groups

As detailed in Section 1.1., the digital divide has become pervasive on a global scale due to its escalating significance in society, representing one of the most pernicious forms of inequality. Nevertheless, the impacts of digital transformation are not uniform across all citizens, as certain social groups may face additional vulnerabilities based on factors such as age, education level, occupational status, disabilities, geographical location, and ethnicity. This subsection aims to explore how the scientific literature addresses the digital divide concerning marginalised groups that may be subject to more adverse conditions.

Vulnerabilities may stem from inherent human conditions, such as age and health, as well as situational contexts, including location and economic circumstances. Where possible, the digital divide within marginalised groups has been examined from an evolutionary perspective. For instance, in the case of age, newer cohorts of older adults may have developed new skills, experiencing a lower impact than their predecessors (Friemel, 2016). Similar considerations apply to the macro-economic scenario, which can critically influence a country's capabilities to invest in new technologies. This, in turn, can have cascading effects on unemployment and migrants, influenced by implemented policy measures.

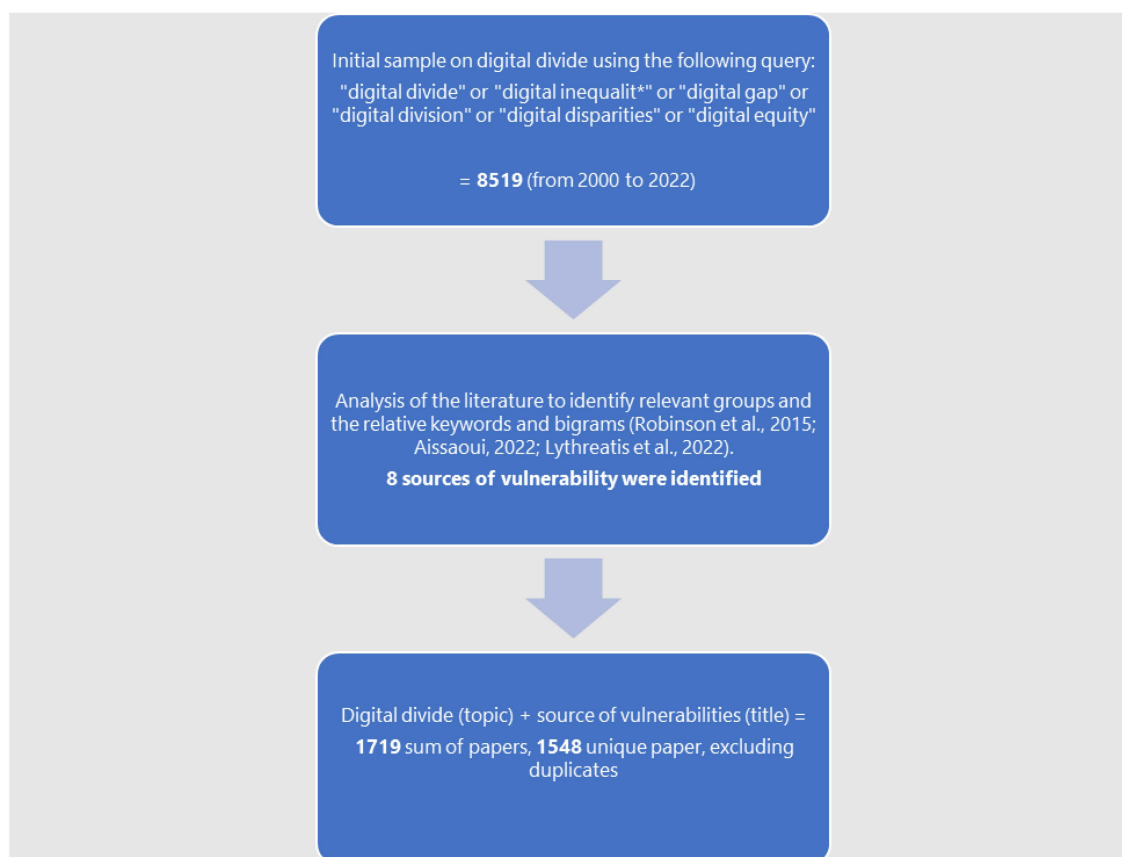
Furthermore, it is essential to acknowledge the internal heterogeneity within marginalised groups. Previous experiences, motivations, and existing knowledge may either mitigate or reinforce individual levels of the digital divide (Hargittai et al., 2019). Another complex aspect arises from the challenge of equating marginalised groups according to their distinct causes and consequences, influencing the goals, expectations of individuals, and the capabilities of each group.

This preamble highlights the challenges in delineating substantial and stable groups that can be consistently identified in scientific analyses. Figure 4 illustrates our selection process, commencing with our initial sample: 8,519 academic papers published between 2000 and 2022 related to the concept of 'digital divide'. We expand our analysis with additional queries constructed ad hoc for each marginal group.

We have identified eight vulnerable groups for an analysis based on the existing literature reviews on digital divide (Robinson et al., 2015; Aissaoui, 2022; Lythreatis et al., 2022). The identified sources of vulnerabilities include: 'age', 'income', 'geography', 'education', 'health', 'ethnicity', 'employment', and 'marginal groups'⁴. It is important to note that the category 'marginal groups' does not represent an actual 'group', but it implies an attempt to explore in the literature whether the theme of marginalised groups is already recognised as significant by scholars who focus on inequalities.

To balance the accuracy and breadth of the search results, we chose to search for 'digital divide' as a 'topic' and the sources of vulnerability only in the 'title' of scientific contributions (refer to the individual queries for marginalised groups in Table 3). This approach involves a combined search for 'digital divide' and related terms in the title, abstract, and authors' keywords of a scientific work. However, the query related to marginalised groups is restricted to the title to ensure that the topic is not treated merely marginally. In total, we have identified 1,719 papers, reduced to 1,548 after excluding duplicates. The substantial overlap, with only 171 papers retrieved by more than one query, indicates that the queries built for marginalised groups captured distinct phenomena in the literature, accounting for approximately 18% of the total literature on the digital divide⁵.

Figure 4. Process to identify scientific articles related to digital divide in vulnerable marginalised groups



Source: authors' elaboration

⁴ In order to broaden the scope of the bibliographic research, we have also incorporated general terms such as 'marginal groups'.

⁵ To keep track of the dynamics of each subgroup, we decided to maintain the sources of vulnerabilities separate, including the 171 duplicate papers in our analysis. This approach is also functional to the fact that the same paper may be relevant for more than one theme.

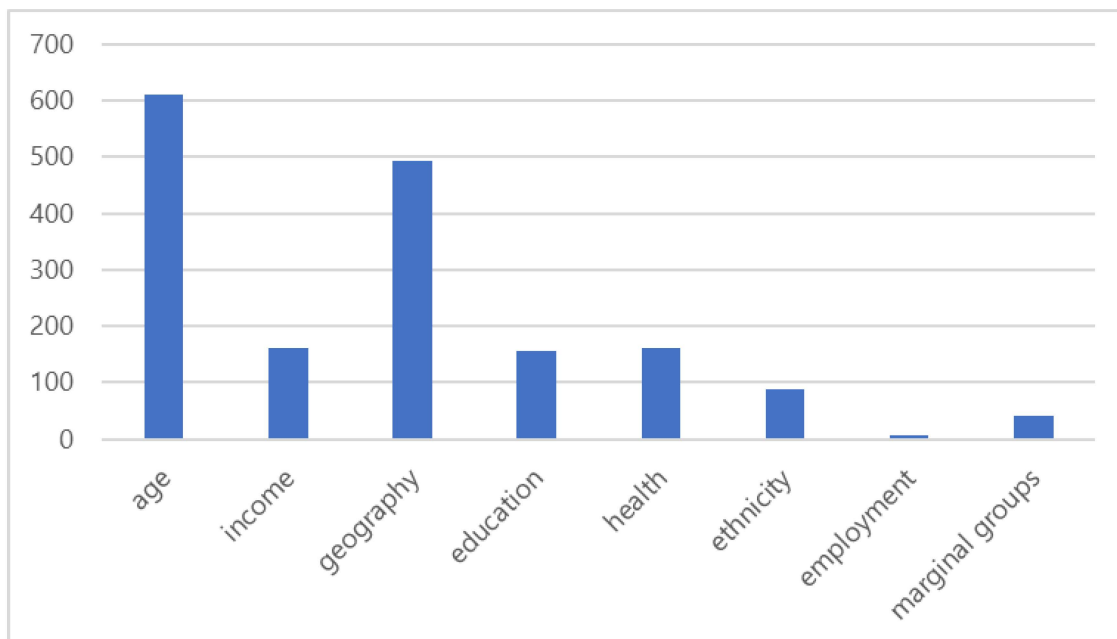
Table 3. Queries adopted for the eight sources of vulnerabilities

Group	Query
Age	old* or 'young*' or 'elderly' or 'child' or 'teenager**'
Income	income or 'financial situation' or 'poverty' or 'household* wealth' or 'low*income' or 'cost of living'
Geography	rural or 'isolated village**'
Education	school or 'low*education' or 'low*literacy'
Health	disabilit* or 'disease**' or 'mental*health' or 'illness**' or 'poor health' or 'health*issue**'
Ethnicity	ethnicit* or 'race' or 'migrant**' or 'refugee**'
Employment	unemploy* or 'jobless' or 'workless' or 'out of work' or 'unwaged'
Marginal Groups	marginali*ed group* or 'vulnerable group**' or 'minorit**' or 'marginali*ed communit**' or 'vulnerable communit**'

Source: authors' elaboration

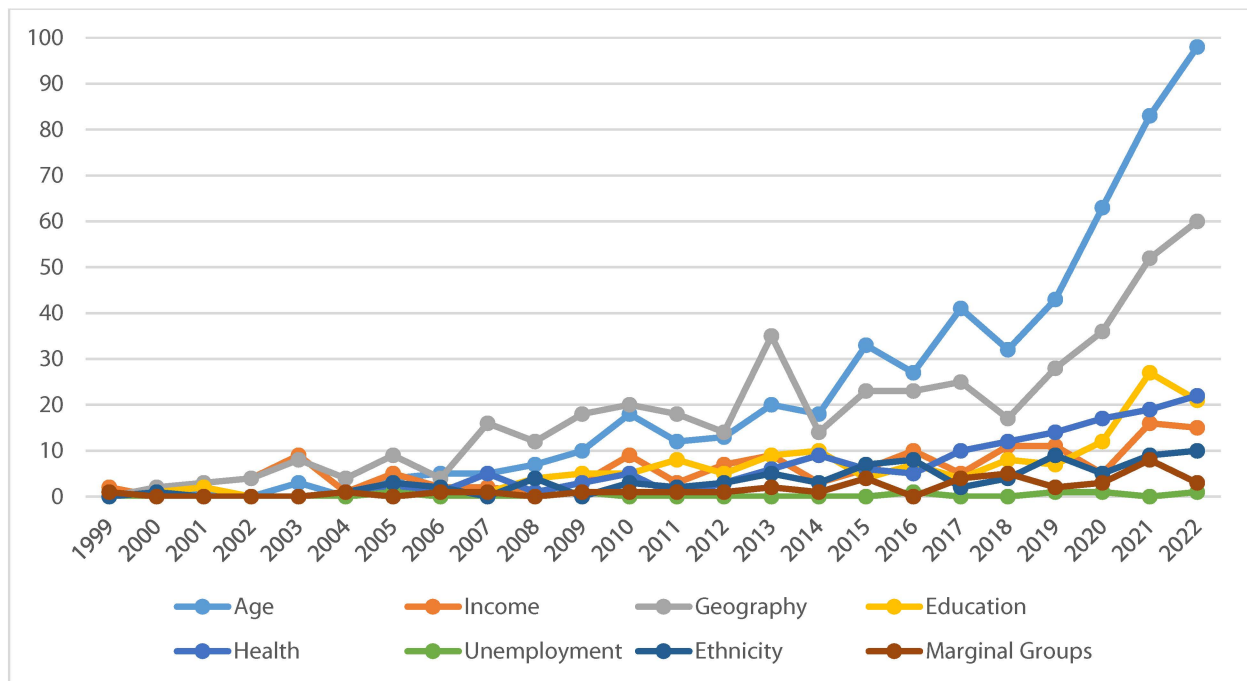
Figure 5 displays the number of contributions across different sources of vulnerabilities, with age ranking first with 612 papers, followed by geography, representing the two most studied sources of vulnerabilities among the eight topics. Health, income, and education have a much smaller number of contributions, approximately 150 for each group. Ethnicity and marginal groups have a relatively low number of papers, while employment counts only for 6 contributions. As illustrated in Figure 6, up to 2006, few contributions were produced across the topic, with the geographical divide starting to emerge with at least 20 papers on average in the period 2009-2011. Interestingly, from 2014 onwards, the topic of age divide has begun to grow, surpassing geography, with a steep increase from 2019. Regarding health and education, we observe signs of growth in the very last years of the period under consideration, namely 2020-2021, possibly driven by the pandemic.

Figure 5. Distribution of Digital Divide across sources of vulnerability



Authors' elaboration on WoS database

Figure 6. Evolution of subtopics across the years



Authors' elaboration on WoS database

To assess the importance attributed by different universities to the topic of digital divide, we evaluate the relevance of each topic for each country with at least 30 publications related to digital divide and the sources of vulnerabilities (Table 4). The overall ranking does not vary significantly compared to the general one concerning digital divide. However, it is interesting to note the prevalence of European universities in studying age and education in comparison to the US, where the debate has rather focused on ethnicity, geographical divide, and income. Finally, health records an equal number of contributions.

Table 4. Countries with more publications for each topic

	Age	Education	Ethnicity	Geographical	Health	Income	Marginal	Total
USA	159	38	56	112	44	75	20	504
EU	211	46	20	73	44	14	9	417
CHINA	64	10	7	61	8	21	1	172
SPAIN	66	27	4	32	13		2	144
ENGLAND	61	7	2	34	17	9	4	134
AUSTRALIA	27	7	2	26	14	2		78
CANADA	20	3	5	20	10	6	1	65
SOUTH KOREA	25		1	11	14	2		53
GERMANY	26	5		10	6	4	1	52
INDIA		6	1	33	4	5	1	50
ITALY	15	5		9	3	6		38
SOUTH AFRICA		5		23	2	6		36
MALAYSIA	7	4		16	2		1	30
Total	631	159	102	493	184	161	48	1778

Authors' elaboration on WoS database

In our final analysis of the literature, we conduct three-layered bibliographic research, seeking the co-occurrence of topics alongside digital divide. We follow the criteria outlined in Figure 4, adding an extra layer. Constructing a symmetric matrix comprised of 28 unique combinations, excluding self-ties $(7 \times 8) / 2 = 28$, we observe that the most frequently discussed pairings are geography and age with 19 contributions, health and age with 15 contributions, and income and geography with 13 contributions (see Table 5). The concurrent examination of sources of vulnerable groups provides an intriguing avenue for discussion, as it may unveil different combinations of causal mechanisms that warrant joint exploration.

Table 5. Co-occurrence of topics of vulnerable groups

	Age	Income	Geography	Education	Health	Ethnicity	Employment	Marginal Groups
Age		9	19	11	15	5	0	3
Income	9		13	3	1	3	0	4
Geography	19	13		8	0	2	0	1
Education	11	3	8		0	1	0	1
Health	15	1	0	0		1	0	0
Ethnicity	5	3	2	1	1		0	0
Employment	0	0	0	0	0	0		0
Marginal Groups	3	4	1	1	0	0	0	

Authors' elaboration on WoS

2.2. Secondary data analysis

2.2.1. The digital transformation in Europe

A preliminary data scouting has been conducted to report available information sources to describe the state of the art on digital divide and inequalities among different marginal social groups. To depict the general level of digital divide we have relied on the Digital Economy and Society Index (DESI)⁶ published every year by European Commission, and on the Inclusive Internet Index⁷ commissioned by META, as significant sources to compare European countries across the last 5 years (2017-2022).

To specifically assess the performance of the European Union over the years and facilitate comparisons between European countries, we have chosen to rely on the Digital Economy and Society Index (DESI). This index has been measuring the level of digital development in European countries since 2014, focusing on four pillars: Connectivity, Digital Public Services, Human Capital, and Integration of Digital Technologies. Connectivity measures the quality of fixed and mobile connection, Digital Public Services measures the quality of digital services such as e-government and e-health. Human Capital measures the level of digital skills and the presence of ICT graduates and specialist. The Integration of Digital Technologies measures the business digitalisation level as well as the development of e-commerce.

In Figures 7-10, we illustrate the trajectory of 27 European Member States across the four sub-dimensions of the DESI indicator. To interpret the scores for each sub-indicator, read the names of the countries from left to right. The blue dots represent their performance in 2017, while the red dots represent their performance in 2022. The grey stripes indicate the number of points each country has

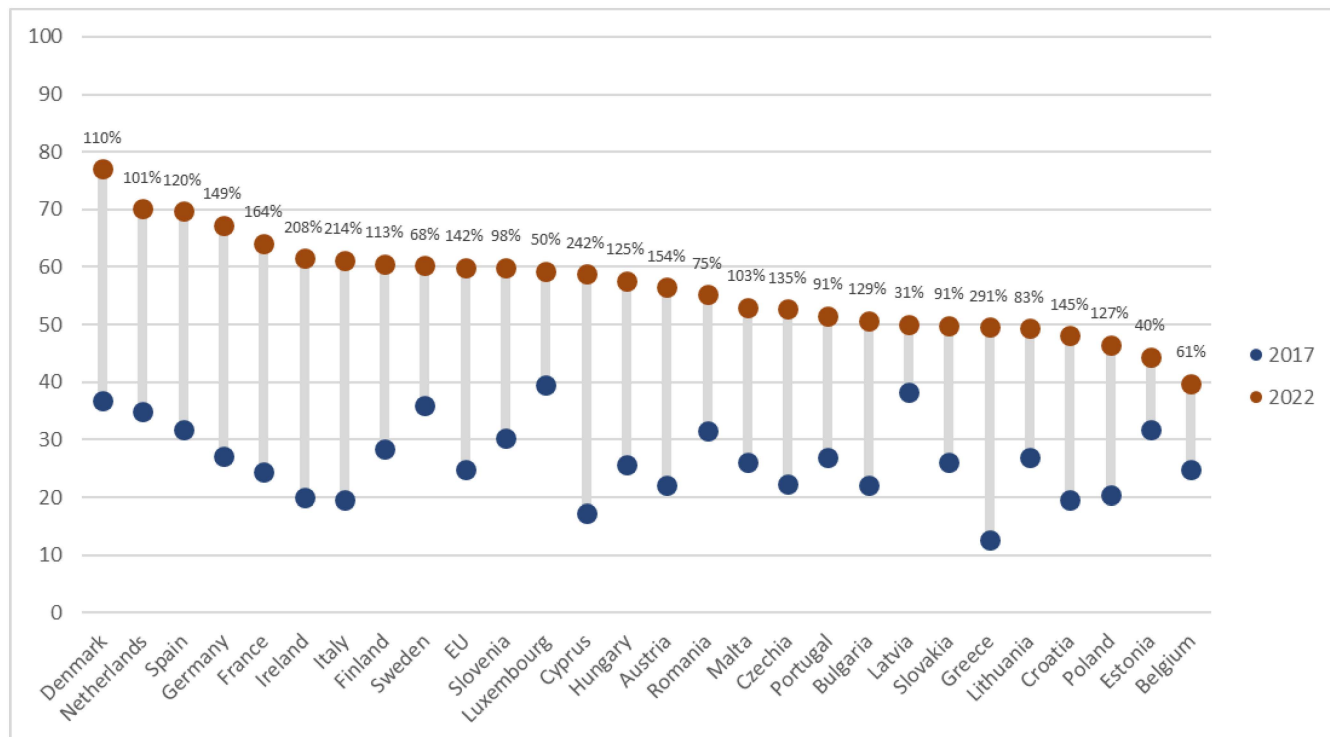
⁶ <https://digital-strategy.ec.europa.eu/en/policies/desi>

⁷ <https://impact.economist.com/projects/inclusive-internet-index/>

gained or lost during the mentioned period, while the percentages reflect the growth rate of each country, calculated using the following simple formula: $(time_{n+1} - time_n) / time_n$.

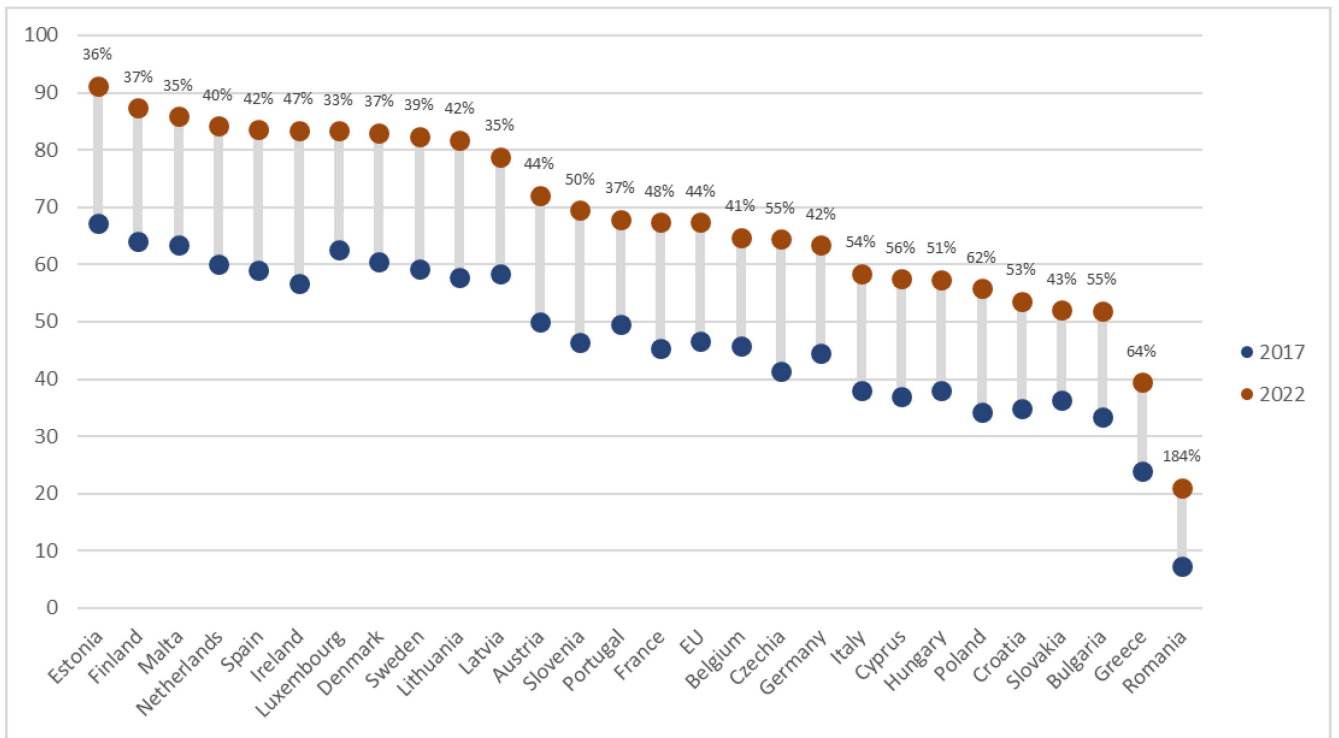
Connectivity records the highest average growth among the four sub-indicators (123%), followed by Integration of Digital Technologies with 62%, Digital Public Services with 50%, and Human Capital with only 11%. The enhancement or establishment of infrastructure to boost connectivity has accelerated over the last five years. However, the same cannot be said for the development of digital skills, which naturally requires more time for implementation. Finland, Denmark, and the Netherlands are the top three countries that consistently demonstrate the best performance across all four indicators.

Figure 7. Connectivity evolution from 2017 to 2022



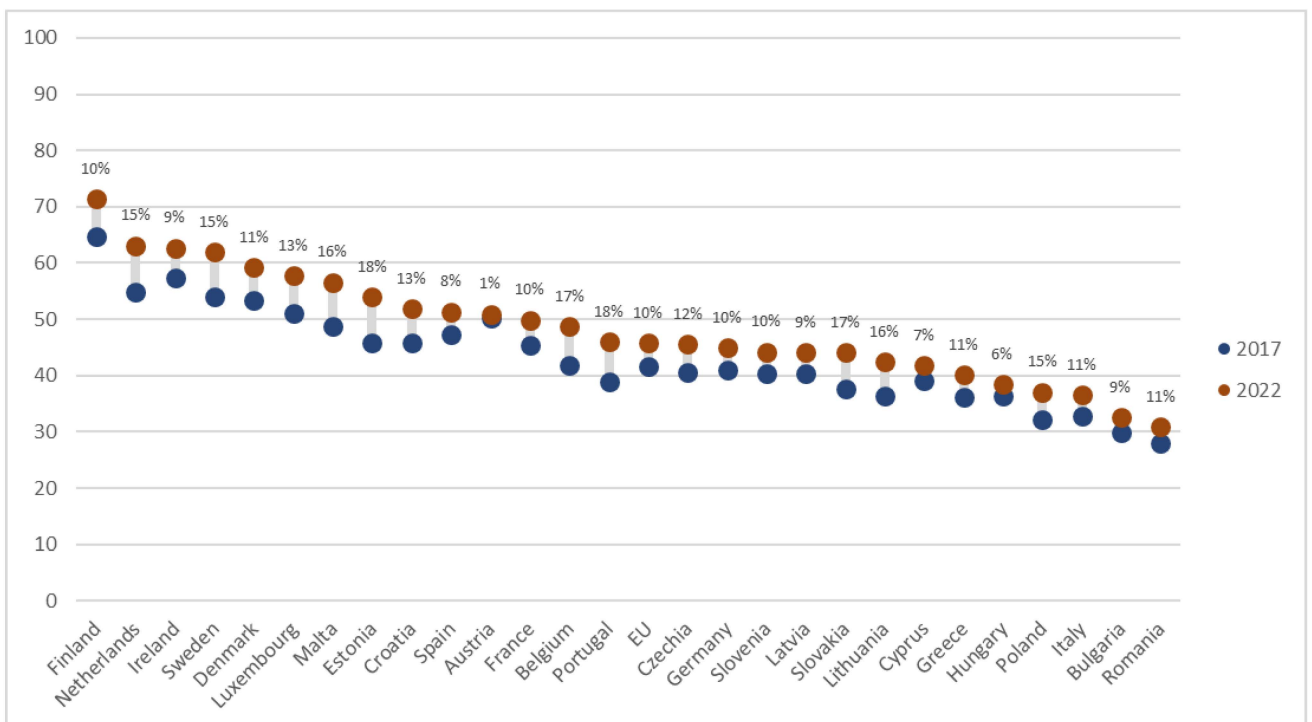
Source: authors' elaboration on DESI data

Figure 8. Digital Public Services evolution from 2017 to 2022



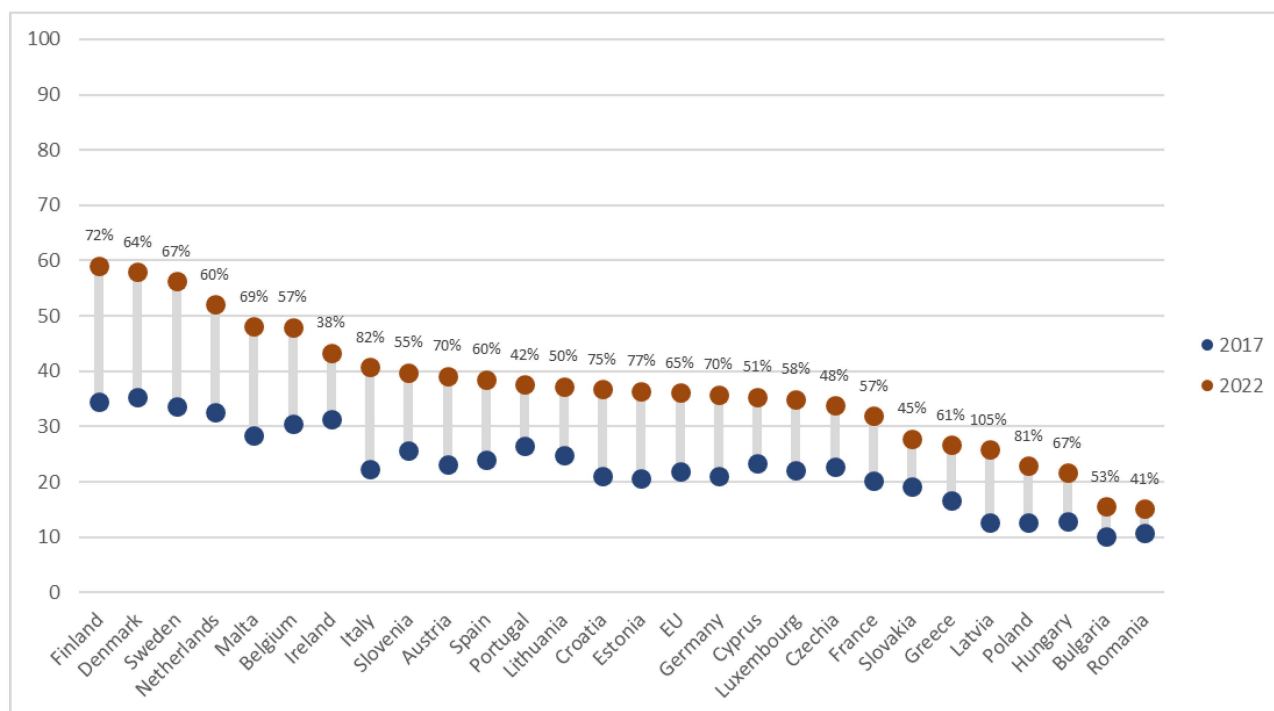
Source: authors' elaboration on DESI data

Figure 9. Human Capital evolution from 2017 to 2022



Source: authors' elaboration on DESI data

Figure 10. Integration of Digital Technologies evolution from 2017 to 2022



Source: authors' elaboration on DESI data

The Inclusive Internet Index commissioned by META measures the infrastructural and economic accessibility of the internet across 100 countries (accounting for 99% of the world's population and 97% of GDP) assessing the extent to which it fosters economic and social mobility. This index facilitates global comparisons, encompassing 80 core countries consistently featured in each edition of the report (currently in its sixth edition) and an additional 20 rotating countries included in every new edition. The index is composed of 4 indicators, namely Availability, Affordability, Relevance, Readiness and by 62 sub-indicators, whose relevance is continuously monitored to understand if updates are needed. Availability measures quality of connectivity and infrastructure. Affordability measures costs associated with the internet. Relevance measures the value of being connected to internet at a local level in terms of available services and economic-related opportunities. Readiness measures digital literacy and accessibility of information and privacy regulation. Each sub-indicator accounts for 25% of the total index, which goes from 0 to 100, where 100 indicates the most favourable digital environment⁸. For Europe 18 out of 27 Member States have been selected, namely Austria, Belgium, Bulgaria, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, the Netherlands, Poland, Portugal, Romania, Spain, Sweden.

The extensive coverage of the index enables a global comparison and competitive benchmarking of Europe against other regions of the world. In the overall index for 2022, EU countries secure the second position globally, following the United States. An analysis of the four sub-indicators reveals that the ranking of EU countries remains consistent, except in the Relevance category, which gauges the perceived value of internet connectivity for socio-economic purposes. In this category, Gulf and East Asia countries claim the 2nd and 3rd positions, respectively (see Table 6). It is important to note that the rank among geographical areas is based on group averages. This implies that European Union countries, overall, exhibit a lower level of variability, ensuring a more balanced level of digital development compared to other global regions.

⁸ For more information visit: <https://impact.economist.com/projects/inclusive-internet-index/about>

Table 6. The 4 Sub-Indicators of the Inclusive Internet Index for 2022

AVAILABILITY				
	Group Lowest	Group Average	Group Highest	Group # countries
All countries	18,3	63,3	89,9	100
Regional groups				
North America	80,1	80,1	80,1	2
Europe (EU)	71	78	85,3	18
Europe	69,1	77,7	85,3	22
East Asia	60,6	76,9	87,1	5
Gulf Cooperation Council	71,8	76,3	83,4	6
Southeast Asia-Pacific	52,8	71,6	89,9	10
Middle East and North Africa	59,2	69,9	83,4	12
Asia	45,8	69,5	89,9	22
Central Asia	66,3	67,3	68,7	3
North Africa	59,2	64,6	67,7	3
Latin America	49,7	63,9	76,4	16
South Asia	45,8	56,6	62,2	4
Africa	18,3	43,6	69,6	29
Sub-Saharan Africa	18,3	41,2	69,6	26

AFFORDABILITY				
	Group Lowest	Group Average	Group Highest	Group # countries
All countries	34,3	77,4	89,6	100
Regional groups				
North America	86,3	86,6	86,9	2
Europe (EU)	82,1	85,2	88,3	18
Europe	79,8	85,1	89,6	22
East Asia	77,6	81,8	85,4	5
Southeast Asia-Pacific	75	80,8	88,8	10
Asia	69,3	80,1	88,8	22
South Asia	76,9	79,9	86,4	4
Latin America	63,9	78,6	86,4	16
Gulf Cooperation Council	73,8	78,3	82,6	6
Middle East and North Africa	69,1	76,6	82,6	12
Central Asia	69,3	75,4	80,8	3
North Africa	69,1	73,6	76	3
Africa	34,3	68,2	80,8	29
Sub-Saharan Africa	34,3	67,6	80,8	26

RELEVANCE				
	Group Lowest	Group Average	Group Highest	Group # countries
All countries	31,6	71,2	92,6	100
Regional groups				
North America	79,3	84,9	90,5	2
Gulf Cooperation Council	80,6	84,2	88,4	6
East Asia	75,6	83,5	89,7	5
Europe	72,7	81	91	22
Europe (EU)	72,7	80,5	91	18
Central Asia	76,4	79,8	84,1	3
Asia	57,2	78,6	89,7	22
Southeast Asia-Pacific	57,8	78,1	89	10
Middle East and North Africa	57,7	76,4	89	12
North Africa	62,8	74,1	89	3
South Asia	57,2	72,9	82,1	4
Latin America	42,2	72,3	92,6	16
Africa	31,6	54,9	89	29
Sub-Saharan Africa	31,6	52,7	84,6	26

READINESS				
	Group Lowest	Group Average	Group Highest	Group # countries
All countries	35,9	62,9	81,6	100
Regional groups				
North America	75	75,7	76,4	2
Europe	56,3	71,2	80,9	22
Europe (EU)	56,3	71,1	80,9	18
Gulf Cooperation Council	60,6	70,9	76,5	6
East Asia	60,3	69,9	76,6	5
Central Asia	62,9	68,2	76,9	3
Southeast Asia-Pacific	50,1	66,5	81,6	10
Asia	50,1	66,1	81,6	22
Middle East and North Africa	39,6	62,9	76,5	12
Latin America	39,4	61,8	80	16
North Africa	54,6	59,6	66	3
South Asia	51,7	58,5	71	4
Africa	35,9	53,6	73,9	29
Sub-Saharan Africa	35,9	52,9	73,9	26

Source: Economist Impact⁹.

⁹ <https://impact.economist.com/projects/inclusive-internet-index/about>

2.2.2. Digital Divide and marginalised social groups

To complete and fine tune the analysis of the digital divide across Europe, we have sourced data directly from EUROSTAT - ICT_HH survey - on various digital-related activities, focusing on the same seven marginalised social groups identified in the literature, namely age groups (young people 16-25 years old vs. older people, 65-74 years old), education levels (no education or low, medium, high), ethnicity (people born outside the EU), geographical location (rural areas), occupation (unemployment), health (disability) and income (Individual living in a household with income in first quartile). The indicators employed include the percentage of use in the last 12 months for both computer and internet use. This section aims to assess: a) the progress made by the EU countries over the past decade, and b) the level of digital inclusion among EU countries, evaluating whether this has increased or shrunk in recent years. Finally, specific indicators associated with digital inequality have been identified within the two indicators, namely 'Trust and Safety' and 'Prices of the Inclusive Internet Index'.

To evaluate the digital divide over the last decade in the following subsections, we use three typologies of indicators, (a) the level of average growth, (b) variance and (c) the range between best and worst performers (using the formula reported in Section 1.2.1, when comparing the two periods).

A surge in the average growth between the two periods is construed positively, pointing out an enhancement in overall performance. Additionally, our analysis delves into whether an observed improvement is coupled with a contraction in data variability and a reduction in the range between the best and worst performers, thus indicating a convergence of countries towards a similar level of digital divide¹⁰.

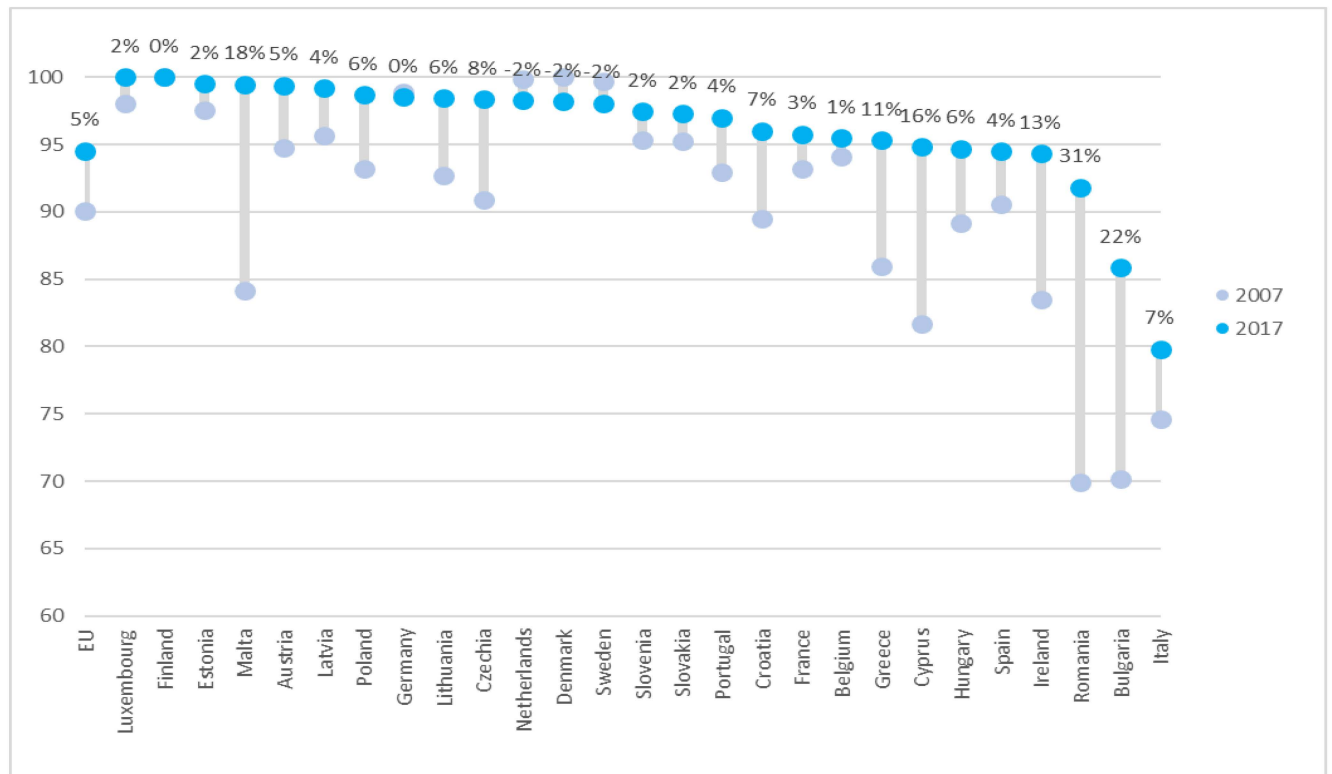
a. Computer use

As expected, the younger population (aged 16-25 years old) has exhibited significant improvement from 2007 to 2017 in terms of computer use, with an average increase of 6 percentage points and a notable reduction in data variability disparities. The gap between the best and worst country performers has markedly diminished by 33%¹¹, indicating a reduction in the digital divide between the EU countries (see Figure 11).

¹⁰ Nevertheless, it is essential to underscore that variance indicators may unveil disparities in terms of other socio-economic conditions and national measures, factors that are not explicitly addressed in this analysis. Consequently, heterogeneity in complementary resources and contextual factors may play a pivotal role in providing a comprehensive assessment of such a multifaceted phenomenon.

¹¹ For percentage calculation hereinafter see formula reported in Section 1.2.1.

Figure 11. Percentage of young people (16-24 years old) using a computer within last 12 months. Change between 2007 and 2017¹²

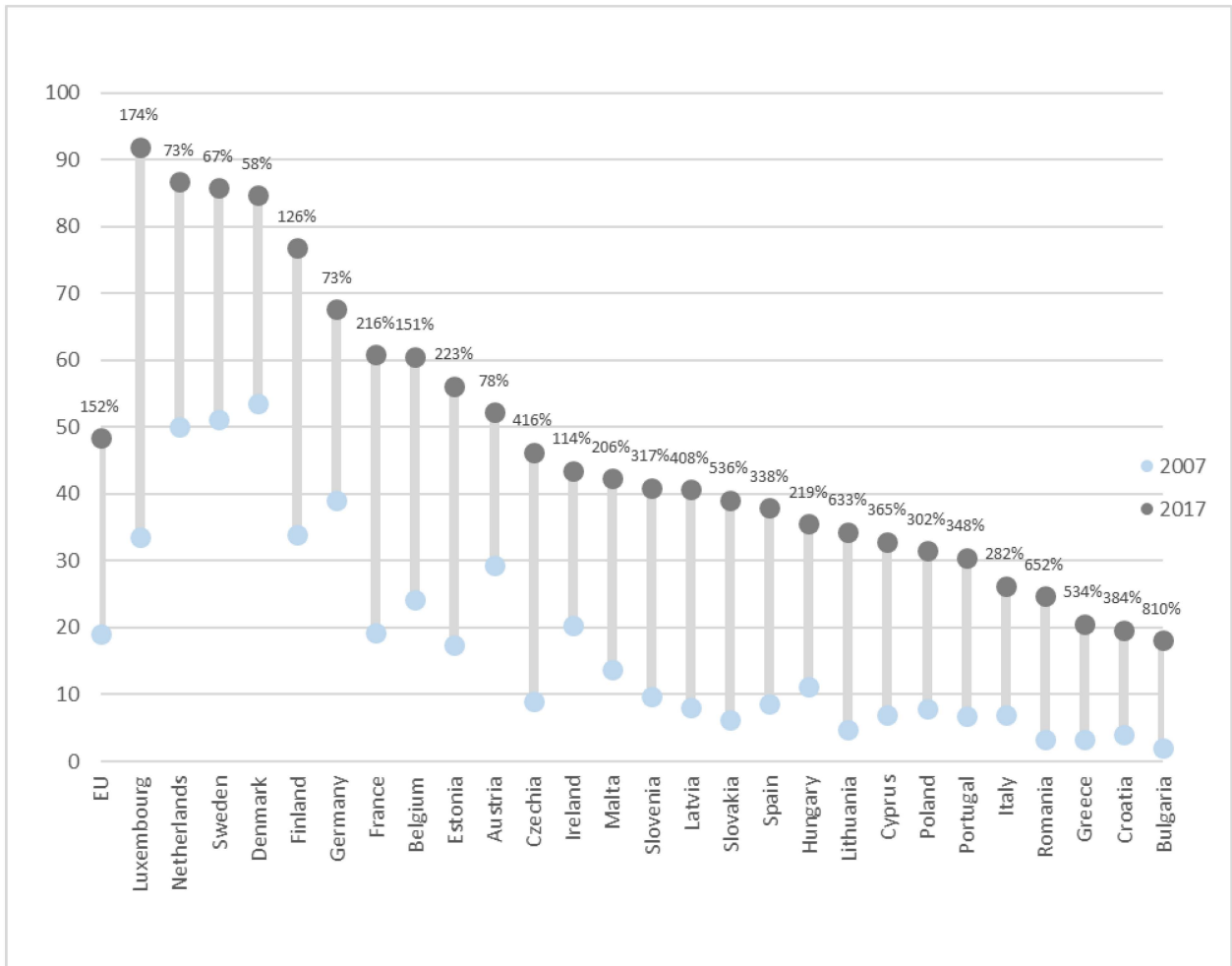


Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

Regarding older people (aged 65-74), the average growth of countries has nearly reached 300% between 2007 and 2017. However, it is essential to note that the variability of data has increased by almost 100%, along with a 43% rise in the distance between the best and worst performers. Nonetheless, it is fundamental to highlight that even in 2017 there are still five countries with less than 30% computer usage among older adults (Italy, Romania, Greece, Croatia, Bulgaria), while five countries exceed 70%, namely Luxembourg, the Netherlands, Sweden, Denmark, and Finland (refer to Figure 12).

¹² Starting year for Estonia, Germany, Portugal refer to 2008 instead of 2007.

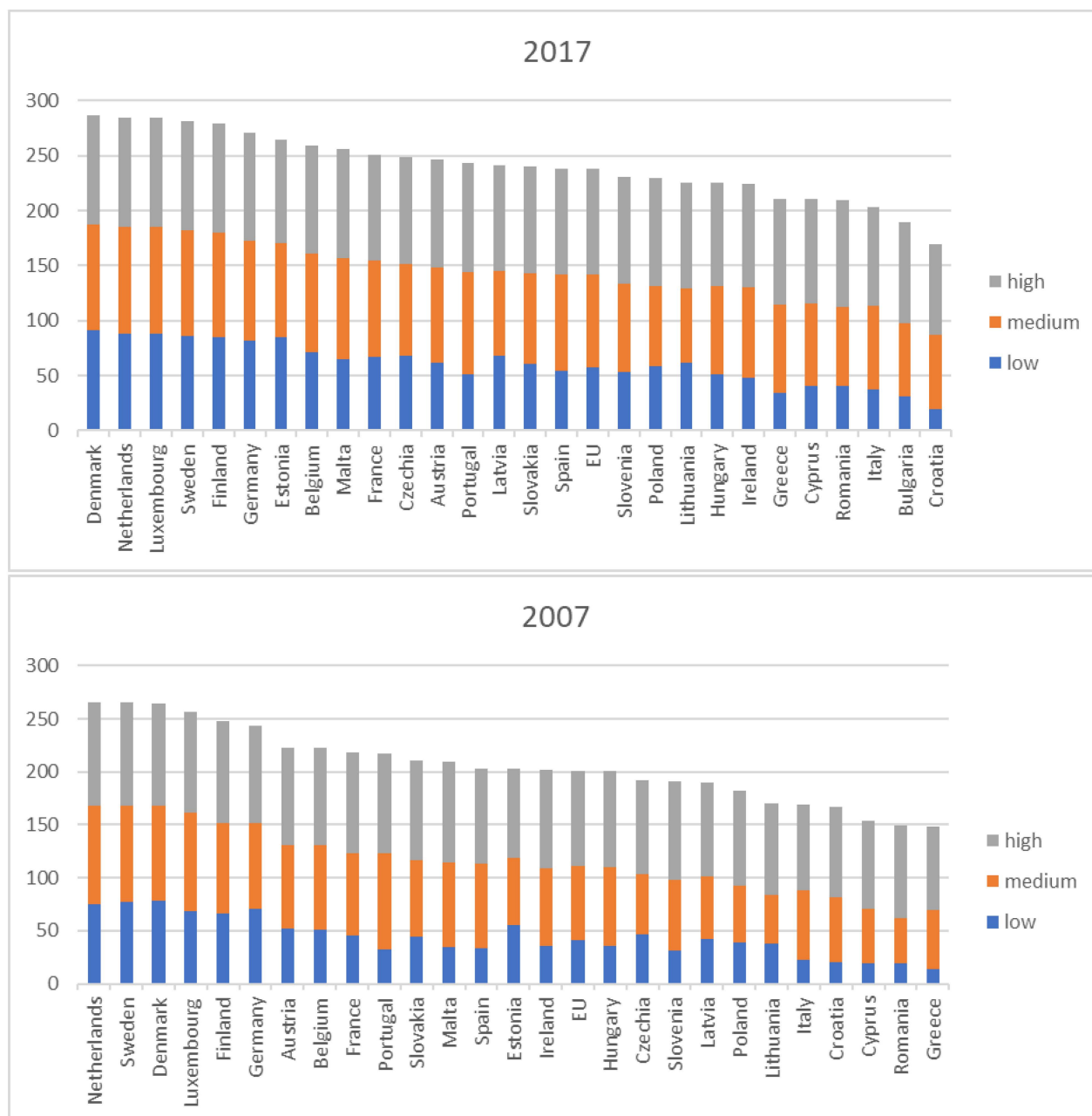
Figure 12. Percentage of older adults (65-74 years old) using a computer within last 12 months. Change between 2007 and 2017



Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

Regarding Education levels, distinctive patterns emerge among the three levels considered (low or absent, medium, and high). Figure 13 illustrates the country rankings based on their average values across the three education levels, with Denmark and the Netherlands, as well as Luxembourg and Sweden, exhibiting the best average values both in 2007 and in 2017. Analysing changes across the two periods, a significant improvement in average values from 2007 to 2017 is evident, without a reduction in variability (which remains substantially constant) between the EU countries. This suggests that disparities persist in EU countries for people with no formal education or low levels of education. This is further confirmed by the increased difference between the best-performing and least-performing countries over the two periods. Conversely, for the other two categories, the pattern is inverse: a more moderate increase in average values but a consistent reduction in variance (65% and 58%, respectively, for medium-level education and high education). This may signify a positive trend indicating a balancing out of the digital divide in these groups.

Figure 13. Percentage of individuals using a computer within last 12 months by education level¹³

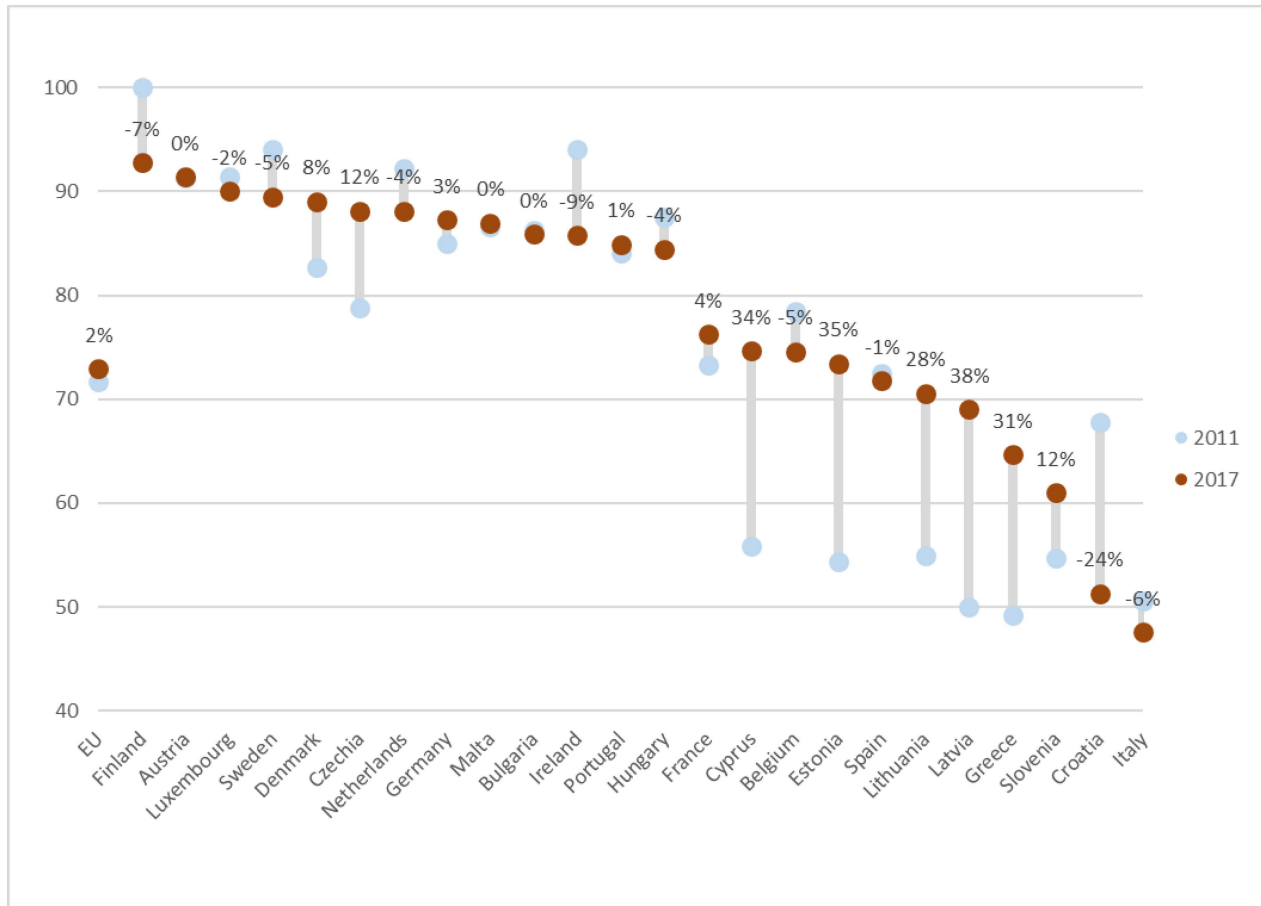


Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

Analysing individuals born outside Europe, we observe a positive average growth in computer use from 2011 to 2017, accompanied by a consistent decrease in variability between the two datasets by 42%, along with a reduction in the best-worst range by 11%. However, the latter data should be interpreted with caution, as the maximum value from 2011 to 2017 has decreased from 100% to 92.7%. Thus, in general terms, we are not witnessing a universal improvement towards the highest level. Accordingly, 10 out of 27 countries experience a decrease in values, with both the first and last places in the rank affected, as shown in Figure 14. In any case, we suggest caution in interpreting of this change, which also includes other socio-economic trends not taken into consideration in the table.

¹³ The values reported in the vertical axis of the figure represent the cumulative percentage sum of the three categories.

Figure 14. Percentage of individuals born outside Europe using a computer within last 12 months. Change between 2011 and 2017¹⁴



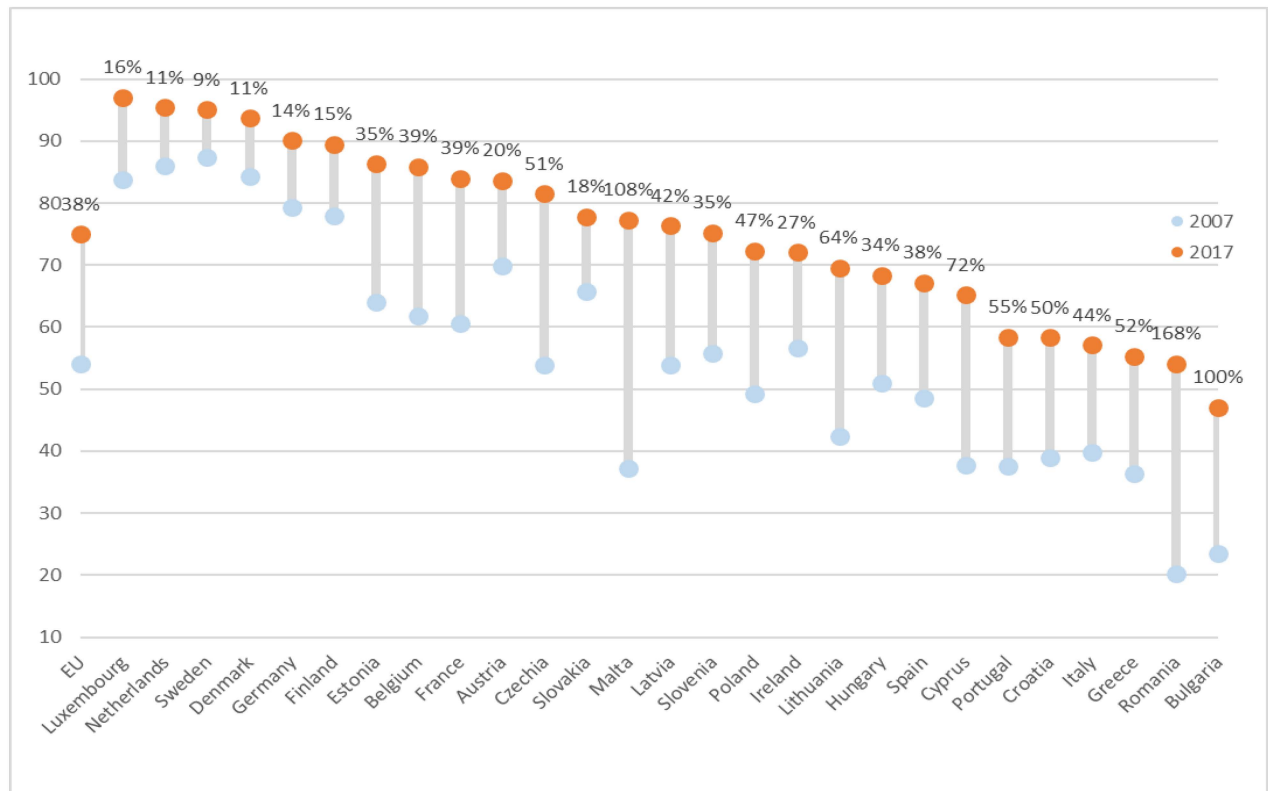
Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

In relation to the degree of computer use by individuals residing in rural areas, we observe a general improvement of 45% in computer use between 2007 and 2017, with notable advancements in Romania and Bulgaria (refer to Figure 15). Simultaneously, there is a reduction in variability between 2007 and 2017, along with a decline in the best-worst range by 26%. The last source of vulnerability considered in terms of computer use concerns unemployed people (refer to Figure 16). Between 2008 and 2017, there was an average growth of 38% and a reduction in variability, as well as a decline in the best-worst range by 52% and 30%, indicating substantial progress for this vulnerable group at the European level.

Figure 17 illustrates the percentage of individuals accessing the internet via mobile phones or smartphones. Notably, between 2012 and 2017, no significant improvements were observed in the best-worst range, accompanied by a notable increase in variability by 58%. However, individual Member States such as Romania, Bulgaria, Portugal, and Hungary showcased remarkable growth during this period.

¹⁴ Data for Slovakia are not available. Data for Romania are available only for 2017, thus the country is excluded from this graph. Data for Croatia in the first period (2011) refer to 2012.

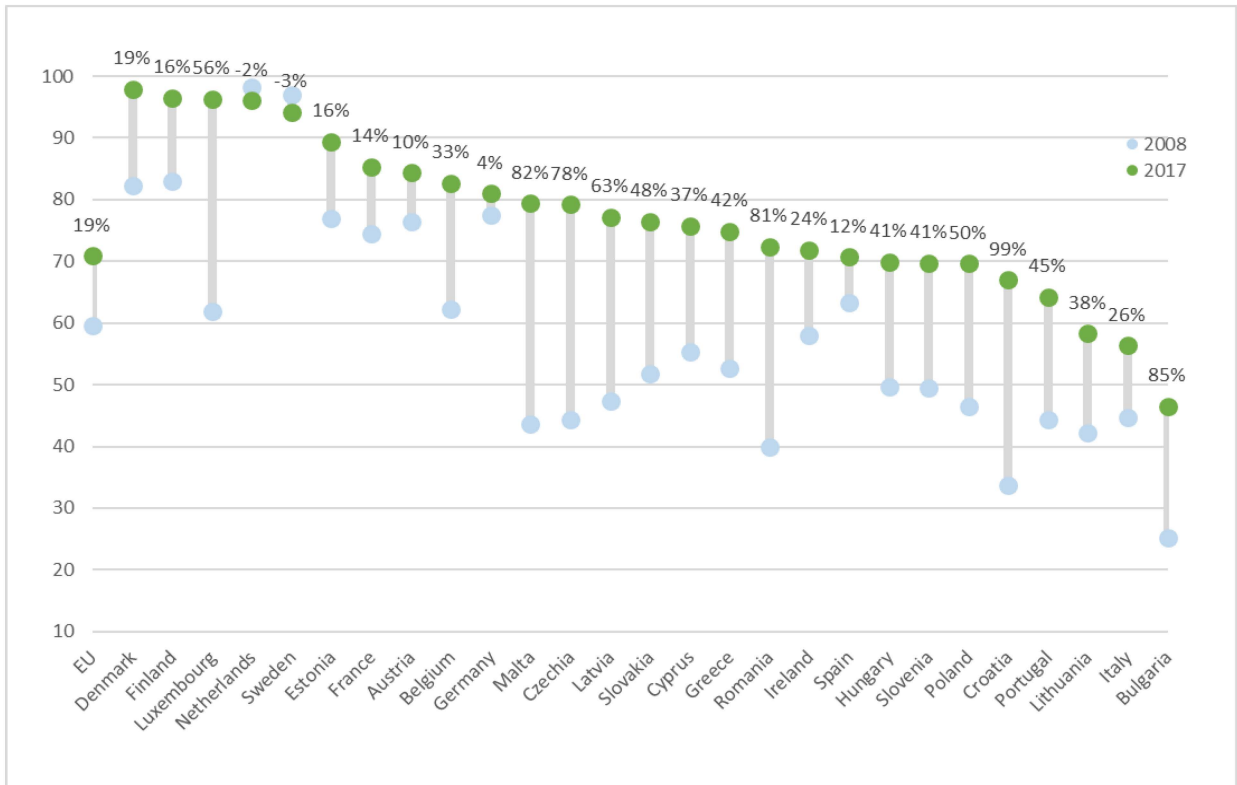
Figure 15. Percentage of individuals living in rural areas using a computer within last 12 months. Change between 2007 and 2017¹⁵



Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

¹⁵ Data for Germany in the first year refer to 2008.

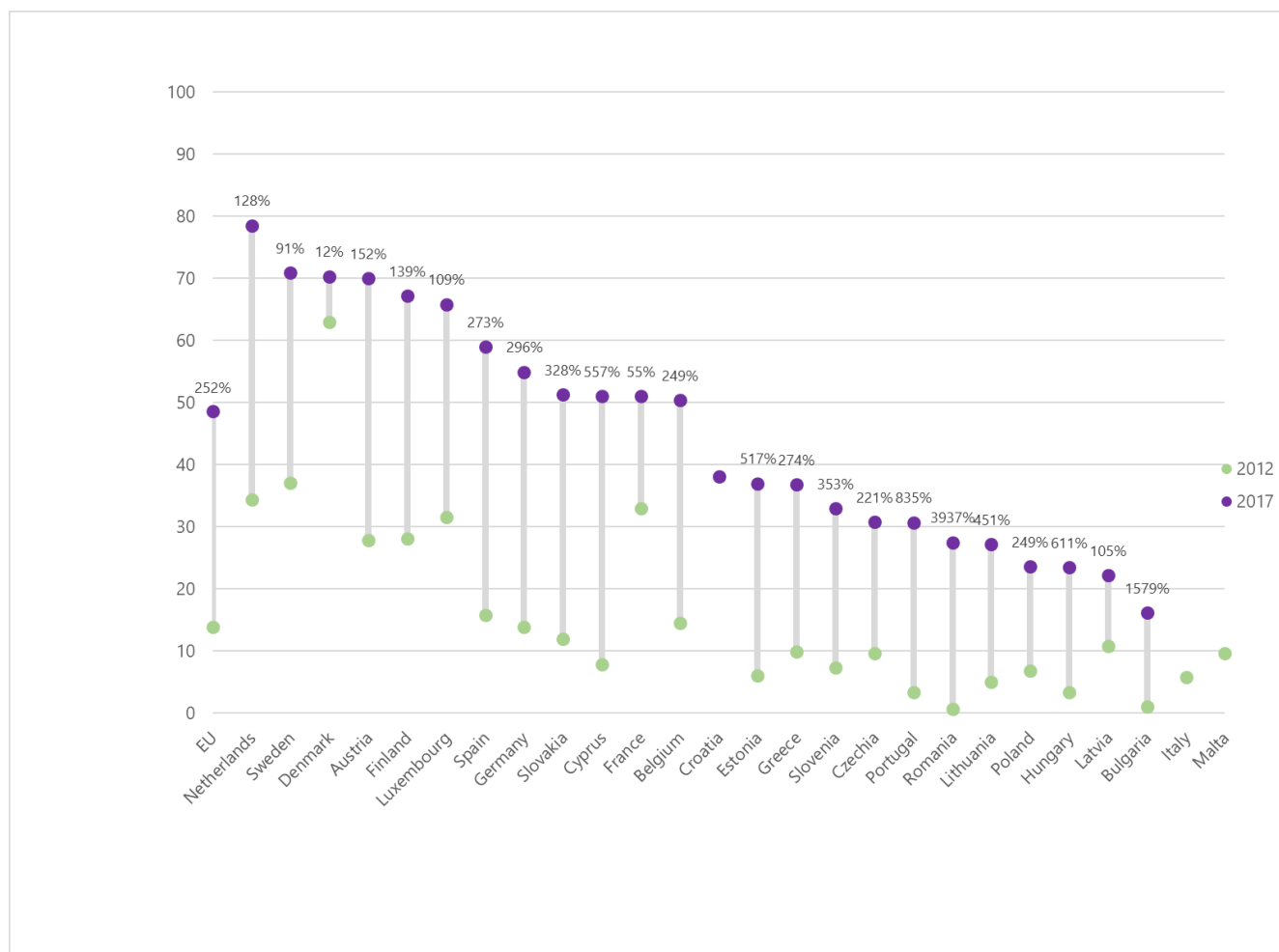
Figure 16. Percentage of unemployed individuals using a computer within last 12 months. Change between 2007 and 2017¹⁶



Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

¹⁶ Data for Denmark in the first year refer to 2008. Data for Malta for the second year refer to 2015.

Figure 17. Percentage of individuals in fourth income class using accessing internet using a mobile phone within last 12 months. Change between 2012 and 2017¹⁷



Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

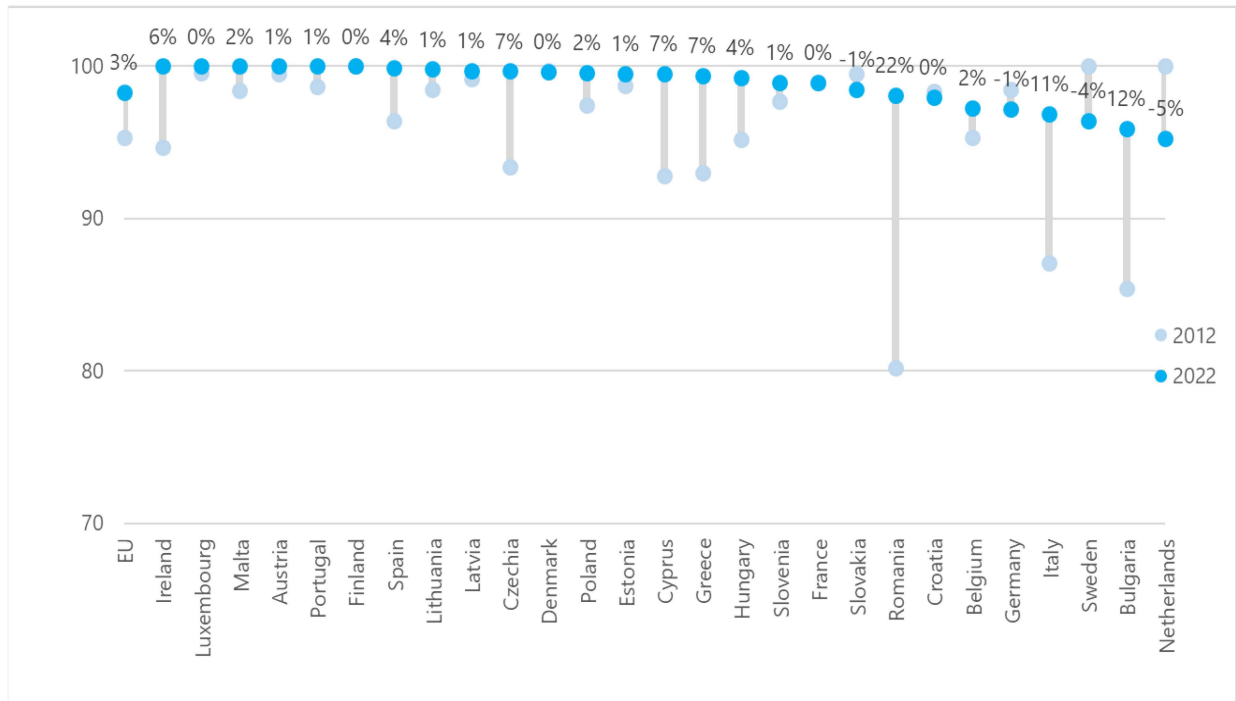
b. Internet use

Despite the potential overlap between data on computer and internet use (as a high correlation may be suggested by ownership of the machine and frequency of internet use), we choose to report this data to confirm or deny findings related to computer use. Additionally, this data covers 2022, while data on computer use (divided by specific group) are reported only up to 2017.

The positive trends observed for young people in terms of computer use are corroborated by internet use, indicating a reduction of the best-worst range by 76% and a decrease in data variability by 91%. This shift is attributed to the migration of numerous youth-related activities from offline to online contexts and the massive adoption of social media over the past decade. Nevertheless, it is intriguing to observe the declining values for the Netherlands and Sweden; i.e., countries that frequently secure the top positions in the rank for other demographic groups. In this context, they hold the 25th and 27th positions, experiencing a slight decrease of 4% and 5% from 2012 to 2022. Speculation arises regarding whether these values reflect the outcomes of specific public policies aimed at fostering a more responsible use of the internet among the younger population.

¹⁷ Data for Ireland are not available. Data for Italy and Malta are not available for the second period. Data for Croatia are not available for the first period. Data for France and Czechia in the first year refer to 2013.

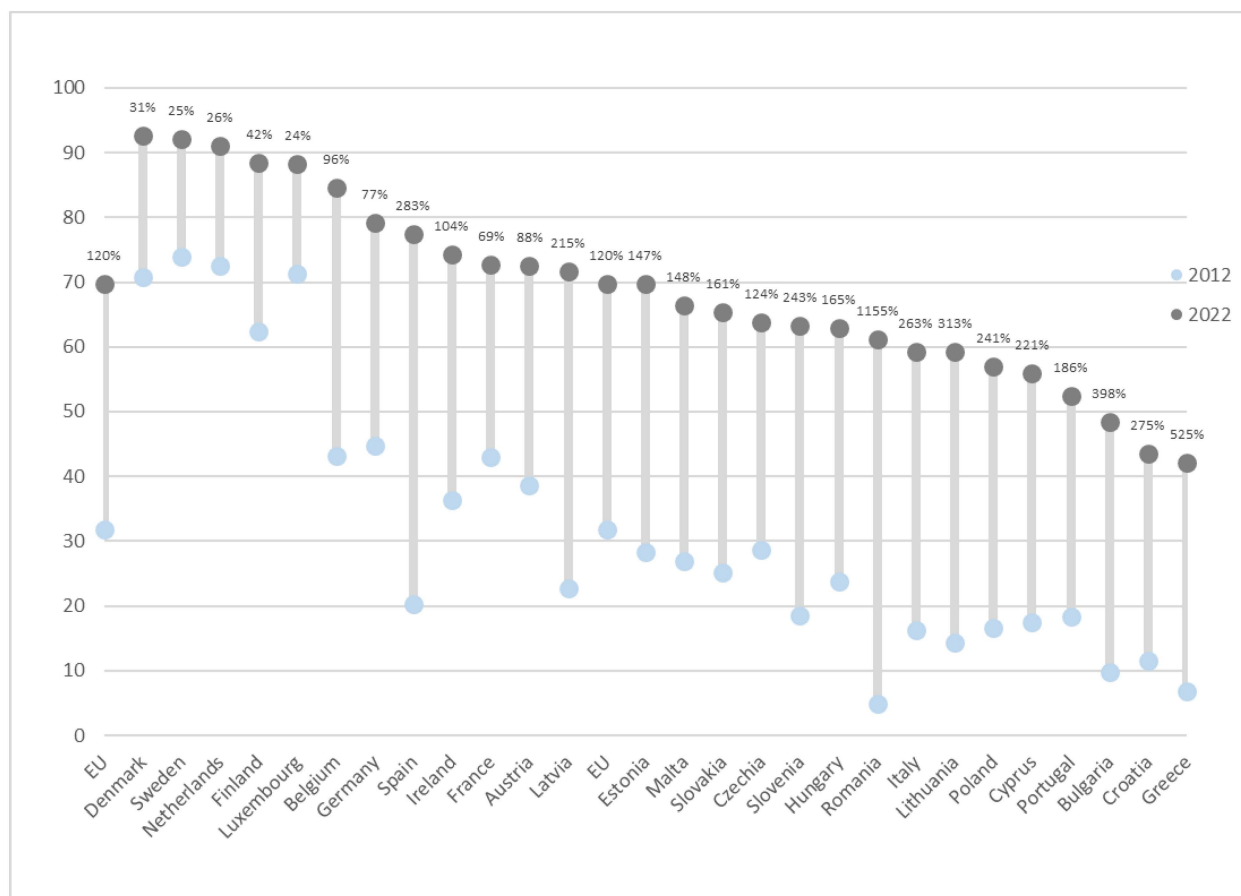
Figure 18. Percentage of young people (16-24) using internet within last 12 months. Change between 2012 and 2022



Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

Regarding older people, a distinct pattern emerges compared to the previous subsection, displaying not only an average growth between the two periods (from 2012 to 2022) but also a substantial reduction in variance (-114%) and the best-worst range (-27%). It is crucial to note that the extended analysis up to 2022 unveils different dynamics than those observed in 2017. External factors such as the COVID pandemic and the gradual adoption of digital services might have compelled several adults to access the internet for the first time. However, it is essential to acknowledge that, in 2022, there are still countries where less than 50% of older adults use the internet at least once per year, such as Greece, Croatia, and Bulgaria, while others surpass 90%, including Denmark, Sweden and the Netherlands.

Figure 19. Percentage of older adults (65-74) using internet within last 12 months. Change between 2012 and 2022



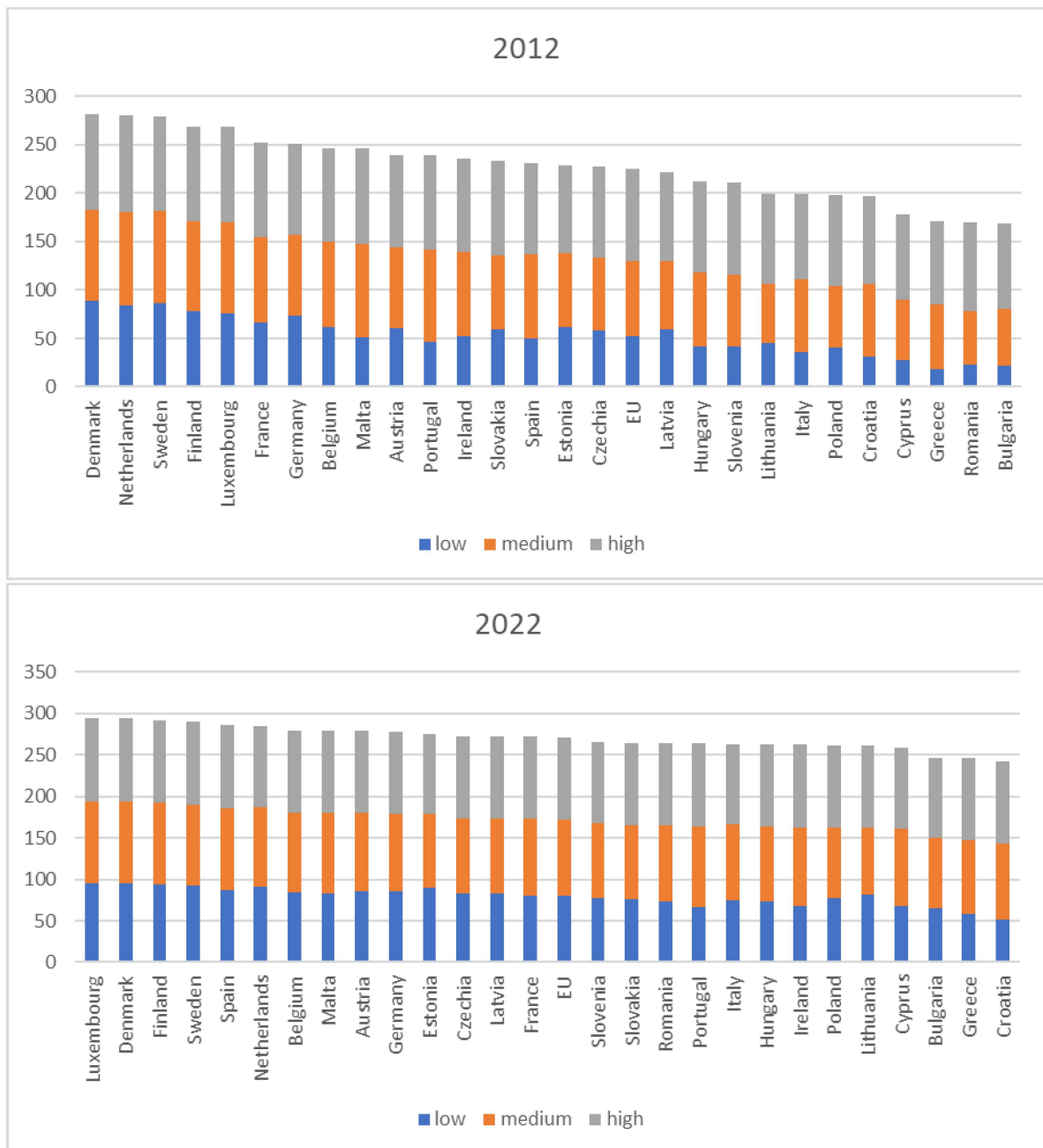
Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

In terms of education (Figure 20), a significant advancement is noted in terms of average growth (+49%) for individuals with no education or low levels of education who have access to the internet, surpassing the progress observed, during the same period of time, for those with medium and high levels (16% and 4%, respectively). This finding could be interpreted as a gradual integration of the internet into working environments and job profiles, which were previously not aligned with general social trends.

Furthermore, progress is evident in the best-worst range, which contracts by 38% between 2012 and 2022 for individuals with no or low levels of education, witnessing a noteworthy increase in the minimum level, from 18% in 2012 to 52% in 2022. However, it is essential to emphasise that there still exists approximately a 43-point difference between the top country and the worst performers. Additionally, a comparison with other education levels reveals that much improvement in terms of range reduction has been achieved for medium and high levels of education, with reductions of 59% and 70% respectively. This is corroborated by the analysis of variance progress between 2012 and 2022, indicating a decrease among countries for people with a low level of education (68%), although this falls below the performance of medium and high levels of education, which show reductions of 87% and 93%, respectively.

Figure 20. Percentage of individuals using internet within last 12 months, by education level¹⁸

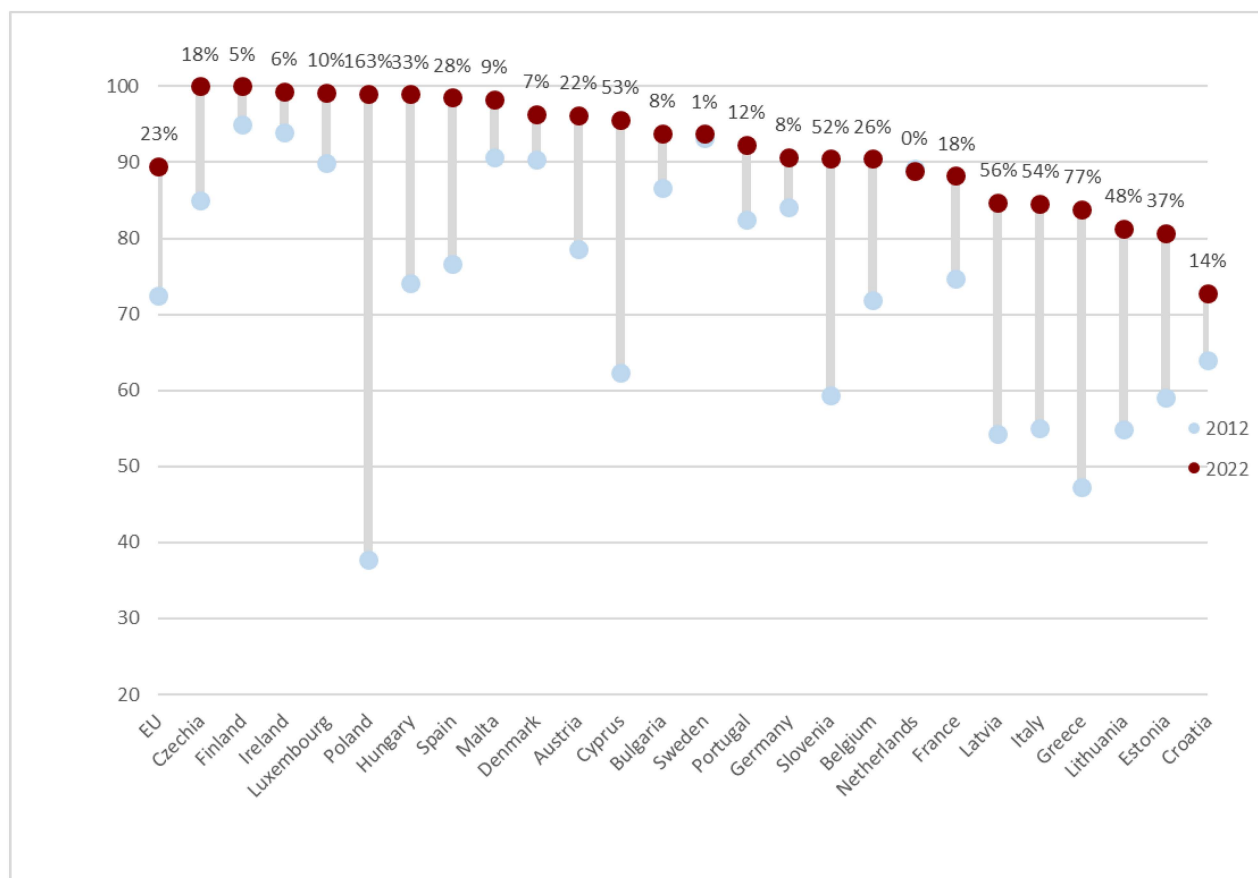
¹⁸ The values reported in the vertical axis of the figure represent the cumulative percentage sum of the three categories.



Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

Examining data on internet use for individuals born outside the EU, a distinct improvement over the last decade becomes evident, marked by an 80% reduction in data variability and a 52% decrease in the best-worst range from 2012 to 2022. Poland demonstrates the most significant increase, progressing from the last position in the rank in 2012 to the 5th position in 2022 (see Figure 21). A comparable scenario unfolds for rural areas, which exhibit an identical average growth, accompanied by values in data variability and best-worst range closely mirroring the trend concerning internet use by individuals born outside of the EU (see Figure 22).

Figure 21. Percentage of individuals born outside Europe using internet within last 12 months. Change between 2012 and 2022¹⁹

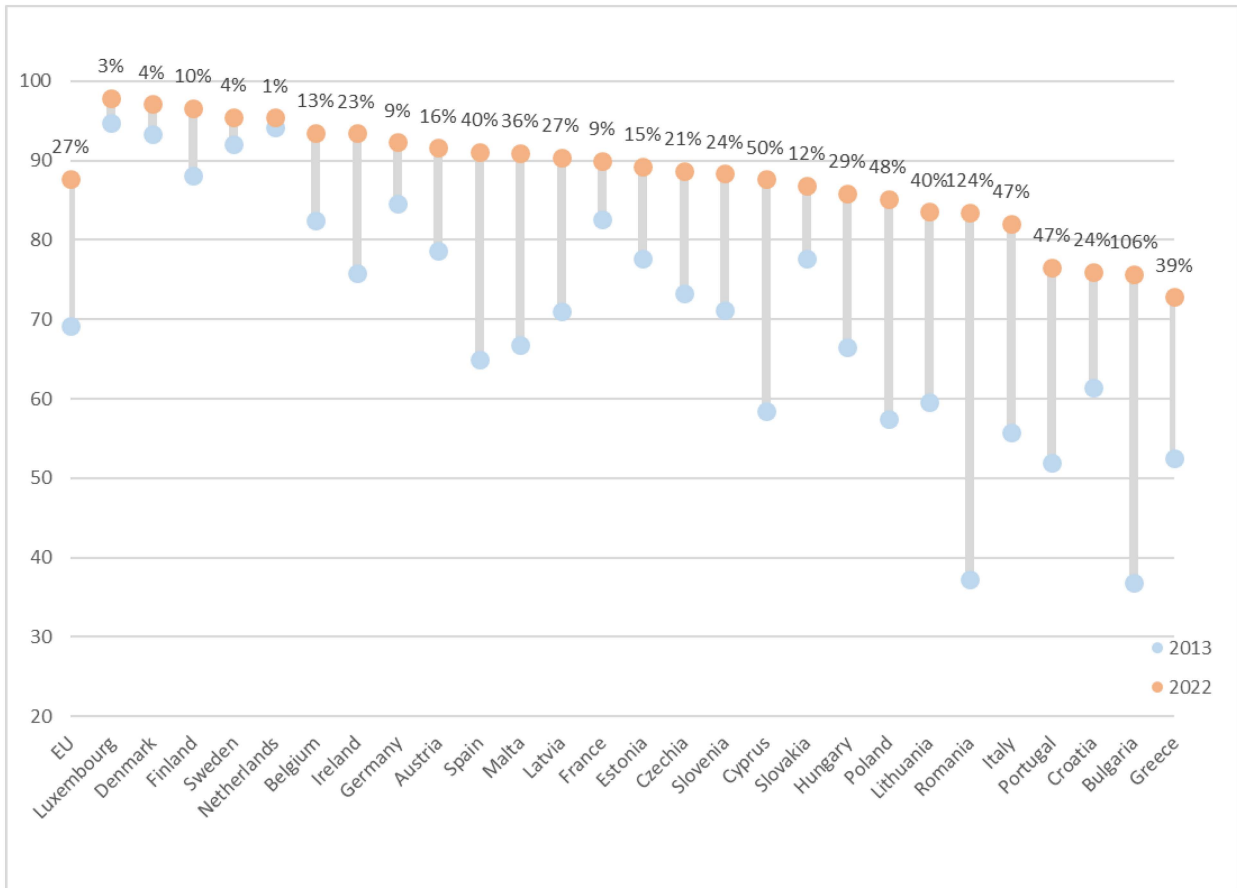


Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

The patterns identified in Figures 21 and 22 are also confirmed when looking at data concerning the unemployment rate, indicating an overall reduction in disparities in internet use from 2013 to 2022 (Figure 23). It is noteworthy to consider that internet usage has evolved into a pivotal tool for job searching, with many employment opportunities now exclusively available through online platforms.

¹⁹ Data for Slovakia are not available. Data for Romania are available only for 2016, thus the country is excluded from this graph.

Figure 22. Percentage of individuals living in rural areas using internet within last 12 months. Change between 2013 and 2022²⁰

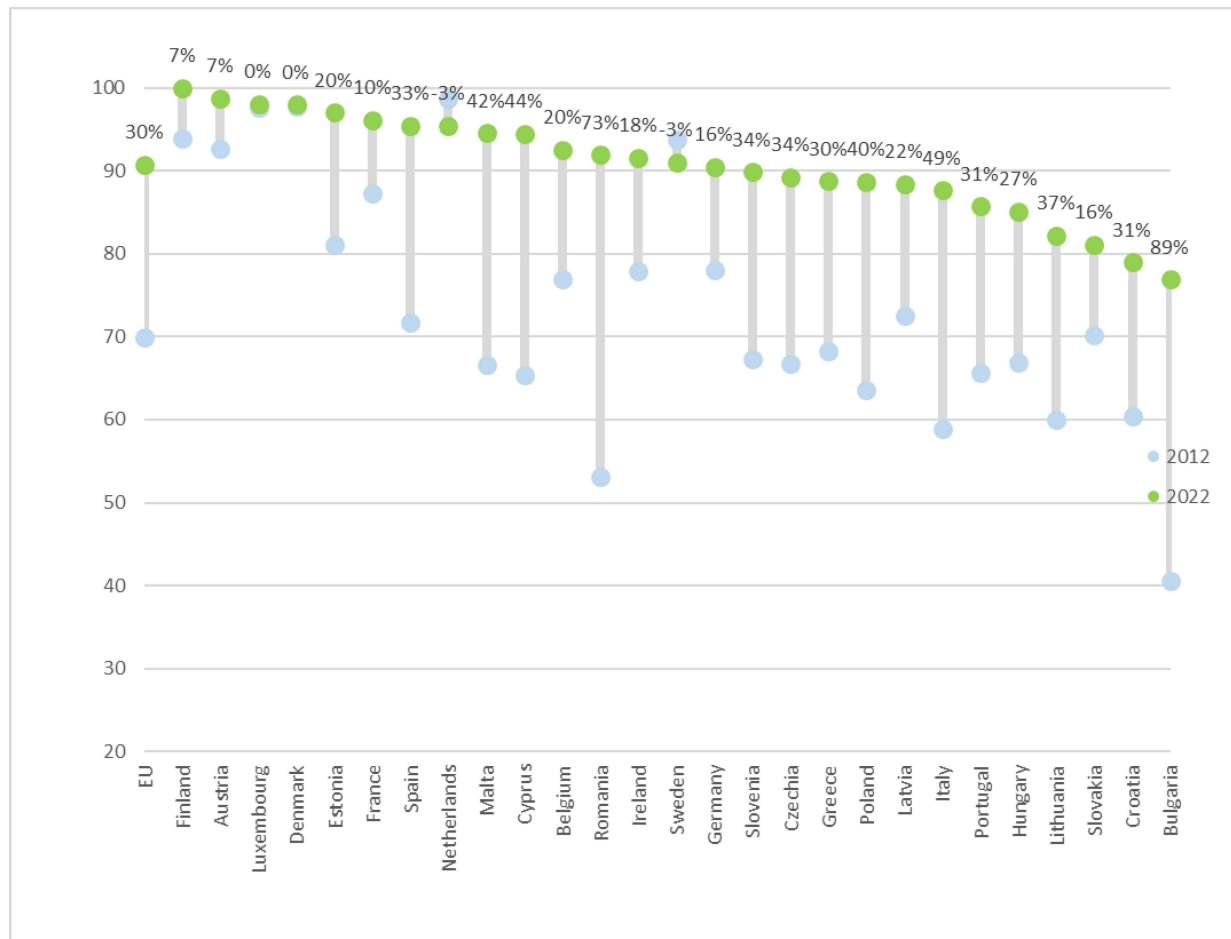


Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

We also have data on internet use by people affected by disabilities, in terms of limited and severely limited disabilities. Figure 24 presents aggregate percentage values: blue bars denote the former, while orange bars denote the latter. In 2022, Ireland ranks first for both categories of impairment. As anticipated, there is substantial data variability, more pronounced for more severe disabilities than for limited ones, which also exhibit lower average values. While specialised technologies and user experiences are advancing, it is evident that the diverse needs associated with disabilities cannot be easily assessed by a singular indicator. Lastly, we analysed data pertaining to individuals residing in households with a low level of income. Our findings indicate a reduction in the best-worst range from 2012 to 2020, representing a decrease of 19%, along with a decrease in variability by 46%. Notably, Romania and Slovenia exhibit the most noteworthy individual Member State performances in terms of growth over the two periods, recording increases of 210% and 137%, respectively.

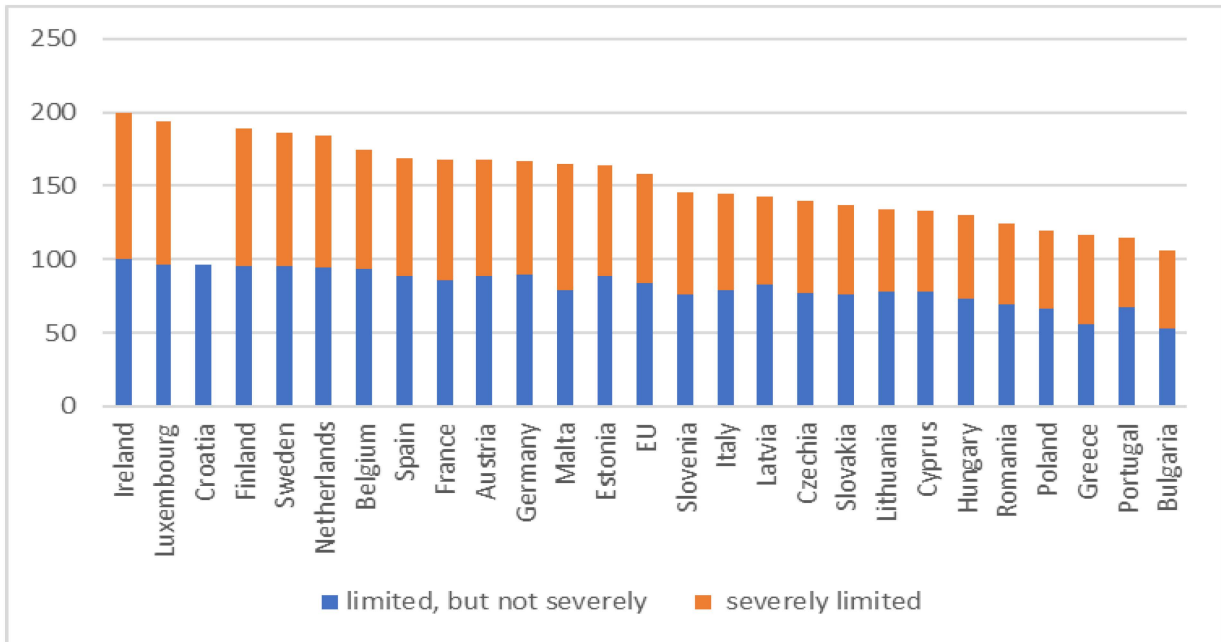
²⁰ Data for Germany in the first year refer to 2014.

Figure 23. Percentage of unemployed individuals using internet within last 12 months. Change between 2012 and 2022



Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

Figure 24. Percentage of individuals with disability using internet within last 12 months in 2022^{21,22}

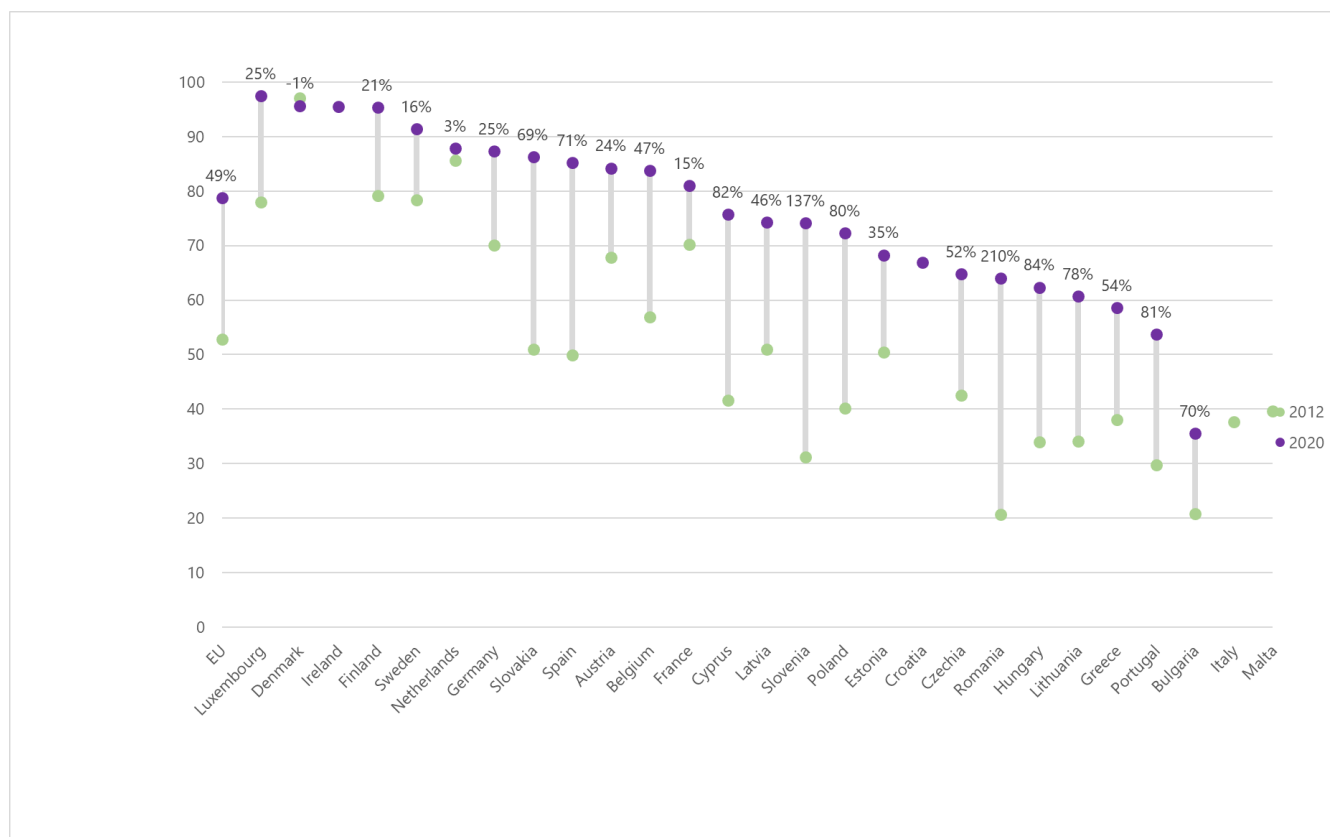


Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

²¹ The values reported in the vertical axis of the figure represent the cumulative percentage sum of the two categories.

²² Data for Denmark are not available. Croatia lacks data on severely limited disability.

Figure 25. Percentage of individuals living in households in fourth income class using internet within last 12 months. Change between 2012 and 2020²³



Source: authors' elaboration based on EUROSTAT survey - ICT usage in households and by individuals.

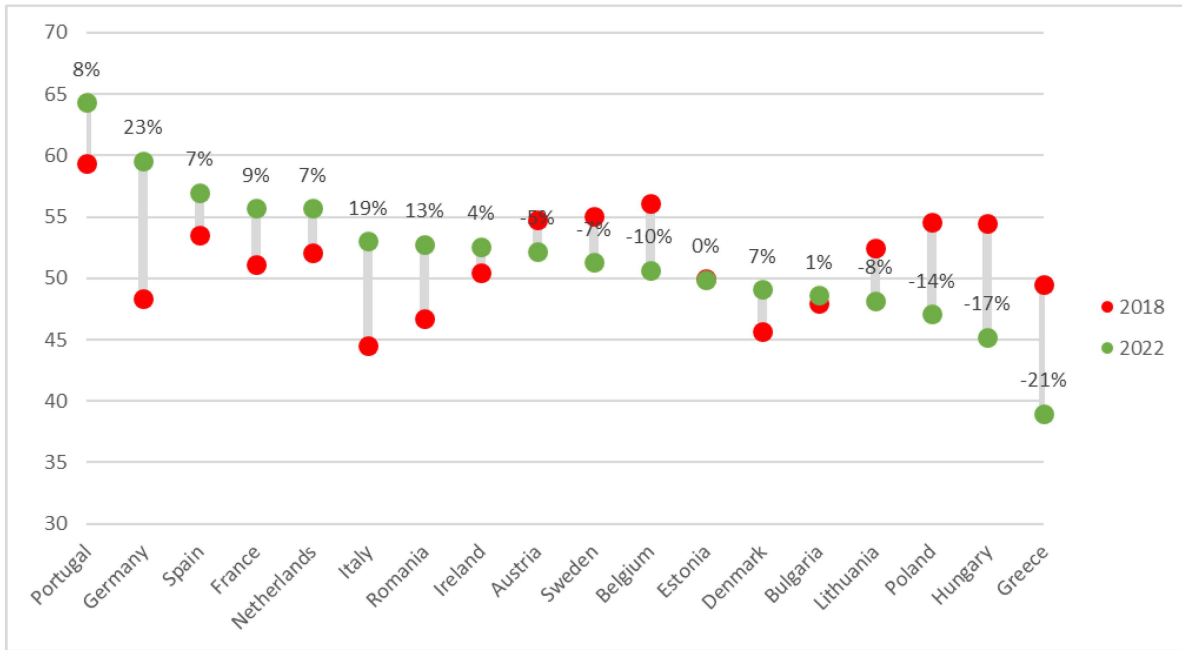
c. Inclusive Internet Index indicators insights

To supplement our analysis of secondary sources, we have included Trust & Safety and Price as additional indicators. Trust & Safety gauges internet safety and its cultural acceptance, while Price factors in the cost of the internet, considering the income levels of countries. The latter indicator, to some extent, allows for an assessment of potential income disparities in EU countries.

Trust and Safety encompasses sub-indicators such as Privacy regulation, Trust in online privacy, Trust in information from social media, and in e-Commerce safety. Out of the 18 Member States examined, 11 witnessed a growth in trust over the last 5 years, with Germany and Italy recording the highest percentages. Conversely, some countries experienced significant decreases, notably Greece, Hungary, and Poland. It is noteworthy that Portugal leads the trust ranking in both years, with a relatively modest increase. On average, the values have remained consistent, albeit with a variance that saw a significant increase in 2022 of more than 100%. Additionally, the gap between the last and first country in the rank has widened, indicating a broader distribution of diversity in Europe and greater distances between countries.

²³ Data for France for the first period refer to 2013 and for the second period refer to 2019. Data for Italy and Malta are not available for the second period. Data for Croatia are not available for the first period.

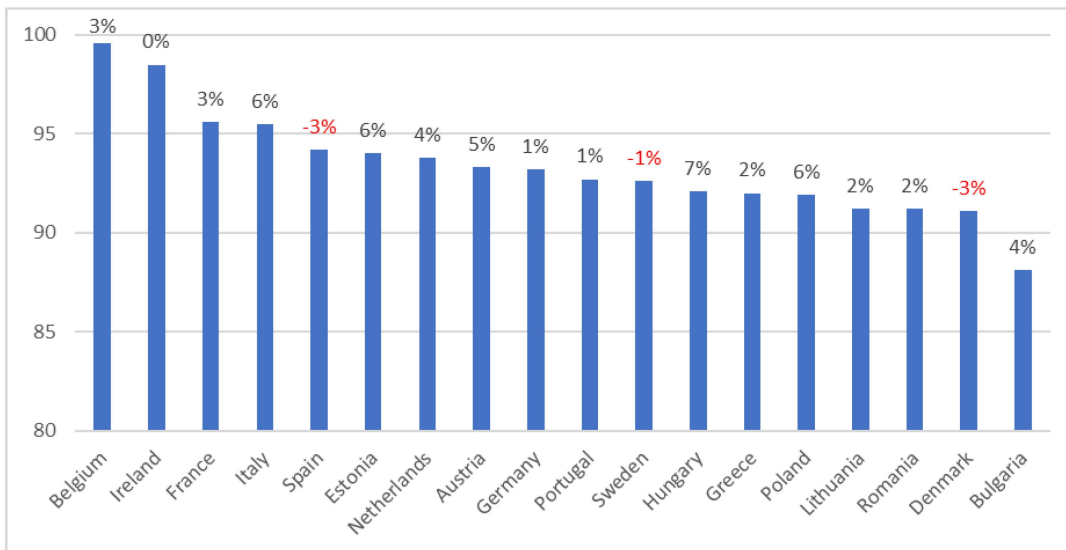
Figure 26. Trust and Safety relative to Internet. Change between 2018 and 2022²⁴



Source: authors' elaboration on The Inclusive Internet Index

The Price indicator is an averaged measure of smartphone, mobile phone, and fixed-line monthly subscription fee. 15 out of 18 examined Member States showed an improvement in the Price indicator, with values close to 100 for the best performers. The percentages represent the level of growth in countries comparing 2018 and 2022. Over this period, internet access has become more affordable on average, showing a 2% improvement compared to 2018. Moreover, the difference between the last performer and the best performer has reduced by 17% from 2018 to 2022. Additionally, the variability has decreased by 46%, indicating an enhancement in general conditions.

Figure 27. Cost of internet in 2022. Percentages indicate change since 2018²⁵



Source: authors' elaboration on the Inclusive Internet Index

²⁴ Data for the first period for Lithuania refer to 2020.

²⁵ Percentage of growth for Lithuania refers to 2020.

3. CASE STUDIES

3.1. Introduction

Section 3 presents three case studies, focused on digital inequality in e-commerce, digital financial services and the information sphere. The case studies serve the purpose of further exploring the topic of the study by looking in more detail at the potential and actual inequalities produced by digital technologies for vulnerable groups of citizens/consumers in specific areas.

3.2. E-commerce

E-commerce is generally defined as the purchase and sale of services and goods via an electronic network. E-commerce has globally skyrocketed in the last decade. In 2022, over 91% of the European population aged between 16 and 74 reported using the internet in the past 12 months, with 68% of them indicating an activity of online purchases of products or services in the preceding year (Eurostat, 2023). This marked an increase from the 55% recorded in 2012, with more substantial growth observed in initially disadvantaged countries, contributing to a partial reduction of the digital divide among EU nations. A similar trend is reflected in the European e-commerce turnover, which amounted to 899 billion dollars in 2022. While showing a contraction compared to the previous year in real terms, due also to a rebound effect following the significant growth observed during the COVID-19 pandemic, projections anticipate a return to sustained growth in the coming years, with an impact on the European GDP exceeding 5% from 2023 onwards (EuroCommerce, 2023).

Revenue distribution in e-commerce remains highly polarised in different European regions, with Western countries holding a clear advantage, while Eastern countries exhibit lower market shares although with higher growth rates. Regarding online retail market concentration, Amazon, among the top 20 online stores by revenue, commands a market share exceeding 40% (Uzunoglu, 2024). Nevertheless, an increasing number of businesses (Eurostat, 2023²⁶) are adopting online sales channels, reaching 22.8% in 2022. Forecasts for the share of online sales in total retail sales, which was 13.4% in 2022, indicate a continuation of this growth trend (Uzunoglu, 2023). The most purchased online product categories in 2022 included clothing, food and catering home delivery, and cosmetic, beauty, and wellness products (EuroCommerce, 2023).

The wide adoption of e-commerce has often been indicated as a means to reduce disparities in terms of access to business opportunities, bridging the rural-urban gap by reducing the impact of physical distance. However, this view has been soundly challenged, considering that 'offline' socio-economic inequalities might propagate in the digital world, increasing the existing digital divide and worsening the position of groups of citizens lacking the needed skills. In this respect, some groups profit less from digital opportunities not only due to limited access but also due to limited abilities to use information and communication technologies, while at the same time, they can find themselves more exposed to the possibility of incurring digital frauds. Indeed, less digitally literate users could also have a lower perception of risk. In addition, price discrimination strategies can be perpetrated online, after careful planning and metrics evaluation of (often) unaware consumers. This mechanism can worsen the effects of the digital divide, as people less equipped with digital skills (e.g. in terms of information search strategies) can be more exploited by firms.

The next section briefly reviews the literature on the digital divide in e-commerce. The following sections report an analysis conducted using the Eurostat data and conclude.

²⁶ See https://ec.europa.eu/eurostat/databrowser/view/isoc_ec_esels/default/table?lang=en

3.2.1. A review of the literature

In the literature, e-commerce is considered a specific use of the internet and is typically analysed within the context of the second-level digital divide, along with various other internet uses. Specific literature on the subject is limited, as many causes and effects are common to other types of digital divide. Additionally, there is extensive research analysing consumer behaviour in online shopping, often without reference to the digital divide.

Access to digital devices and internet connections is a fundamental requirement for engaging in e-commerce (Augustine et al., 2020). Thus, the development of broadband infrastructure is a primary and driving goal in a country's digital advancement (Banhidi, 2020), but alone it is insufficient to ensure the utilisation of online commerce and its associated benefits (Crespo, Cuaresma et Lutz, 2021). Another crucial aspect is having the necessary digital skills and competencies (Dennis et al., 2007; Van Deursen et al., 2015) for using a computer, an internet browser, and tools required for online purchases. Skills related to searching and evaluating commercial information online play a central role in e-commerce usage (De Marco et al., 2016). It appears that these two aspects explain a significant portion of the development of e-commerce in a country (Amaral et al., 2019; Martínez-Domínguez et Mora-Riva, 2019; Rehman et Nunziante, 2023).

The actual use of e-commerce by individuals is further explained by widely studied²⁷ demographic and socioeconomic factors exhibiting the same trends already observed for various levels of the digital divide. Răileanu Szeles (2018) specifically points out that many of the determinants explaining the first level of the digital divide are also applicable to e-commerce usage. This is due to a strong interrelation and the fact that the development of e-commerce does not entail an additional amount of technical knowledge beyond what is required for basic internet usage. Education and income levels are generally the most important factors, followed by age, occupation and job type, urban or rural residence, and the number of family members in the household. Younger, more educated, higher-income employed individuals, residing in urban areas, and those in smaller families are the users making more online purchases. Gender also plays a role, with males typically having an advantage (Lissitsa et Kol, 2016; Webber et al., 2008), although there are exceptions (Zhu et al., 2013), and the gender gap in the European Union has been decreasing since 2007 (López-Martínez et al., 2021). A study from 2016 (Lissitsa et al., 2016) examines the differences in e-commerce usage between Generation Y, the so-called 'digital natives,' and Generation X, the so-called 'digital immigrants.' Although digital natives make greater use of the internet, significant differences in online shopping are not observed. The authors highlight, instead, how the likelihood of engaging in online shopping decreases with age in Generation X, while it increases with age in Generation Y.

Several studies²⁸ measure and analyse the digital divide between countries or within a country, using various variables, including the e-commerce usage rate. For instance, Amaral's study (2021) shows a convergence in e-commerce usage across different age groups, genders, and residential areas in recent years in Spain. However, the divide is widening between users with different education and digital skills. In the global context, there is a clear divergence between countries, with the most significant gains in e-commerce occurring in the five most advanced economies (Murthy et al., 2021).

In the European Union, in 2023, 70% of individuals aged 16 to 74 purchased products or services online, compared to 58% in 2018, though substantial differences persist between countries (Eurostat, 2023;

²⁷ Among which Serrano-Cinca et al., 2018; Răileanu Szeles, 2018; Zhu et Chen, 2013; Martínez-Domínguez et Mora-Rivera; 2019; Lissitsa et Kol, 2016; Huang et al., 2016; Akhter, 2003; Dias et al., 2020; Dennis et al. 2007, Ameral et al., 2019; Garín-Munoz et al., 2019.

²⁸ See Văeallyai et al., 2015; Cruz-Jesus et al., 2016; Cruz-Jesus et al., 2012; Amaral et al., 2021; Lutz 2019.

Lutz 2019). Crespo Cuaresma and Lutz (2021) suggest that while broadband access and daily internet use disparities within EU countries may likely close in the next decade, the same cannot be said for the e-commerce usage gap. Targeted policies at the national level are deemed necessary to reverse this trend (Kolupaieva et al., 2023).

Concerning developing countries, Qureshi and Davis (2007) illustrated the benefits and potential of e-commerce in bridging the existing digital divide with developed countries. However, Lund and McGuire (2005) cautioned against introducing e-commerce without addressing infrastructure and human capital development, as this could exacerbate inequalities to the detriment of economic development.

The use of e-commerce can also give rise to third-level divide. Some users may derive greater benefits from online purchases, such as paying less for a product or selling a product they might not have been able to sell otherwise (Van Deursen et Helsper, 2015). In this context, individuals with higher education and income levels who use the internet more frequently enjoy the greatest advantages. However, in this scenario, what people do online and the digital skills they possess are more critical than who they are (Van Deursen et Helsper, 2018). Punj (2012) has suggested focusing on improving digital skills to utilise online tools better and find more satisfying products at lower prices.

Some studies approach the phenomenon from the perspective of consumer behavioural theories. According to Punj (2012), while the initial digital divide was mainly due to differential access to technology, the remaining differences are essentially behavioural. For instance, Sánchez-Torres (2019) explores the influence of the first-level digital divide on the choice to use e-commerce through the Technology Acceptance Model, concluding that the perception of ease of use of online commerce diminishes when the perception of the digital divide is higher, influencing consumer choice. Zhu and Chen (2016) use diffusion and innovations theory and the Theory of Planned Behaviour to demonstrate the influence of 'social norms' (positive word of mouth among relatives and friends, etc.) on e-commerce usage in the absence of a recorded divide between urban residents, migrants from rural to urban areas, and urbanised in situ rural residents.

This approach has often been adopted in digital divide literature (Van Dijk, 2020; Goncalves et al., 2018), especially through Technology Acceptance Models, which analyse consumer attitudes and perceptions underlying behaviour in the digital world. These theories are also employed to study determinants of online consumer behaviour beyond the digital divide theme (Zerbini et al., 2022). To enhance the specificity of policies aimed at addressing the digital divide, referring to this branch of literature might be useful to better understand what impedes individuals from using e-commerce. In its periodic surveys, for example, Eurostat also analyses perceived barriers to online shopping. In 2021, individuals not making online purchases cited personal preferences as the primary reason, followed by a lack of necessary skills, concerns about electronic payment security or privacy, reliability or speed of deliveries, and shipping costs (EuroCommerce, 2022)²⁹.

Figure 26 reproduces perceived barriers to online shopping reported in the Eurostat E-commerce report of 2022. Interestingly their importance differs substantially between countries in the EU.

3.2.2. Analysis of Eurostat data

Secondary data on the use of e-commerce are available from Eurostat survey on ICT usage in households and by individuals. We use this data to assess the impact of the digital divide on e-commerce, across different countries and across different groups in society.

²⁹ https://ecommerce-europe.eu/wp-content/uploads/2022/06/CMI2022_FullVersion_LIGHT_v2.pdf

a. The use of e-commerce across EU countries

Table 7 shows the percentage of people that engage in e-commerce in each EU country and on average in the EU. The first column reports the use in 2013, the second column the use in 2022 and the third column the percentage increase in use between 2013 and 2022.

Table 7. Engagement in e-commerce by country and year in the EU

COUNTRY	2013	2022	% increase
AUSTRIA	46,52	62,98	35%
BELGIUM	40,08	65,66	64%
BULGARIA	12,48	28,76	130%
CROATIA	23,83	55,97	135%
CYPRUS	18,05	32,56	80%
CZECHIA	29,13	66,97	130%
DENMARK	68,15	80,39	18%
ESTONIA	22,39	61,83	176%
FINLAND	52,80	70,57	34%
FRANCE	53,69	66,62	24%
GERMANY	61,98	67,65	9%
GREECE	17,83	45,79	157%
HUNGARY	24,65	65,08	164%
IRELAND	35,88	75,43	110%
ITALY	18,00	42,79	138%
LATVIA	22,71	45,68	101%
LITHUANIA	19,79	49,72	151%
LUXEMBOURG	60,26	69,26	15%
MALTA	42,39	64,85	53%
NETHERLANDS	70,08	82,07	17%
POLAND	24,5	51,72	111%
PORTUGAL	17,56	47,03	168%
ROMANIA	5,23	28,69	447%
SLOVAKIA	31,10	66,45	114%
SLOVENIA	41,83	54,88	31%
SPAIN	24,72	57,34	132%
SWEDEN	59,47	77,32	30%
	2013	2022	% increase
EU AVERAGE	35,00	58,66	68%
EU MIN	5,23	28,60	
EU MAX	70,08	82,07	

Source: authors' elaboration on EUROSTAT

The spread between the minimum and the maximum percentage of e-commerce use was wide (just less than 65 percentage points) in 2013 and had declined (to approximately 54 percentage points) by 2022. Romania and Bulgaria were the countries in which use of e-commerce was the lowest both in

2013 and 2022, with Greece and Cyprus third lowest in 2013 and 2022 respectively. The Netherlands and Denmark were the countries in which the use was the highest. The percentage increase in the use of e-commerce in the decade varies highly across countries and appears in general inversely correlated with the rate of e-commerce engagement in 2013: quite predictably countries with higher initial engagement in e-commerce in 2013 tend to be the ones that have experienced the lowest percentage increase (Denmark and the Netherlands) and countries with the lowest initial use are the ones that experienced the highest increase (Romania, Bulgaria and Greece)³⁰.

The digital divide in the use of e-commerce across EU countries seems to have declined substantially, while still far from having disappeared.

b. The use of e-commerce across different groups in society

The digital divide in the EU may play a role not only between countries but also within countries in relation to disadvantaged groups in society. Consistently with the literature review, when looking at Eurostat data, the factors that appear to affect the level of usage of e-commerce within a country are: belonging to an older age group (with an EU average in 2022 for the age group 65-74 of 31% compared to an overall EU average of 59%); having a low level of education (38%); being born outside the EU (50%); living in a rural area (59%); being unemployed (48%); and being severely limited due to a disability (42%).

We focus here on people in the age group 65-74 and on people with a low education level as these two characteristics are correlated with the lowest degree of usage of e-commerce compared to the other factors of disadvantage.

The first part of Table 8 shows the percentage of people in the age group 65-74 that engage in e-commerce in each EU country and on average in the EU. The first column reports the use in 2013, the second column the use in 2022 and the third column the percentage increase in use between 2013 and 2022.

³⁰ Exceptions are Germany and Luxembourg, which experienced a growth of only 9% and 15% respectively while being at the medium-high value of 60% in terms of usage of e-commerce in 2013.

Table 8. Engagement in e-commerce by country and year in the EU by people in the age group 65-74 and by people with low education

COUNTRY	Age group 65-74			Low education		
	2013	2022	% increase	2013	2022	% increase
AUSTRIA	12,8	28,55	123%	24,10	42,36	76%
BELGIUM	15,77	35,85	127%	22,27	42,89	93%
BULGARIA	0,6	3,95	558%	1,86	8,69	367%
CROATIA	2,74	10,81	295%	10,42	21,02	102%
CYPRUS	3,46	6,37	84%	6,21	14,28	130%
CZECHIA	4,85	25,83	433%	18,73	52,31	179%
DENMARK	39,97	60,2	51%	63,40	70,40	11%
ESTONIA	2,14	22,55	954%	16,00	55,00	244%
FINLAND	20,21	41,77	107%	38,93	59,37	53%
FRANCE	25,14	36,52	45%	33,64	43,51	29%
GERMANY	27,	41,71	54%	43,91	48,61	11%
GREECE	1,82	8,6	373%	3,58	20,52	473%
HUNGARY	4,19	31,94	662%	8,76	38,75	342%
IRELAND	10,26	38,78	278%	14,47	26,43	83%
ITALY	3,02	15,9	426%	7,91	24,14	205%
LATVIA	2,14	11,97	459%	11,40	31,79	179%
LITHUANIA	1,23	10,38	744%	8,62	39,35	356%
LUXEMBOURG	39,3	44,73	14%	34,62	46,34	34%
MALTA	9,34	19,81	112%	23,42	48,86	109%
NETHERLANDS	40,63	64,62	59%	52,13	69,22	33%
POLAND	3,2	14,42	351%	9,68	35,33	265%
PORTUGAL	3,56	10,43	193%	6,79	17,54	158%
ROMANIA	0,22	5,31	2314%	1,55	12,32	695%
SLOVAKIA	4,23	27,27	545%	15,47	49,00	217%
SLOVENIA	7,27	20,53	182%	20,21	33,22	64%
SPAIN	4,54	24,57	441%	9,78	36,76	276%
SWEDEN	34,5	57,63	67%	44,33	62,33	41%
	2013	2022	% increase	2013	2022	% increase
EU AVERAGE	16,64	31,34	88%	20,48	38,86	90%
EU MIN	0,22	3,95		1,55	8,69	
EU MAX	40,63	64,62		63,4	70,4	

Source: authors' elaboration on Eurostat

E-commerce use in the EU for people in the age group 65-74 was on average 17% in 2013 and 31% in 2022, compared to an average for all groups of 35% and 59% respectively.

The spread between the minimum and the maximum percentage of e-commerce use was substantial (approximately 40 percentage points in absolute value and 182 times in relative terms) in 2013 and had widened in absolute value (to approximately 61 percentage points) in 2022 but declined in relative terms (to 16 times). Romania and Bulgaria were the countries in which engagement in e-commerce

was the lowest both in 2013 and 2022. The Netherlands and Denmark were the countries in which it was the highest in both years, with Sweden third in both years.

The percentage increase in the use of e-commerce in the age group 65-74 in the decade was on average 88%, varying widely across countries but always substantial, even if again it resulted inversely correlated to the rate of e-commerce use in 2013, ranging from a minimum of 14% for Luxembourg to 2314% for Romania.

In evaluating the increase in engagement in e-commerce in the age group 65-74 it is important to consider a dynamic effect: those aged 65 to 74 in 2022 were those who were 55 to 64 in 2013: The observed increase in e-commerce use in 2022 may thus be just a cohort effect. Indeed, looking at the data, albeit with some variability across countries, this effect appears to explain a sizable part of the observed increase, as for example the EU average for the group 55-64 in 2013 was 5% percentage points higher than that for the group 65-74, and the percentage increase for the group 65-74 of 2022 over the group 55-64 of 2013 was 44%, just about half of that for the group 65-74 between 2013 and 2022.

Another important disadvantaged group appears to be that of people with a low education. The second part of Table 8 shows the percentage of people with low education that engage in e-commerce in each EU country and on average in the EU. As before, the first column reports engagement in 2013, the second column engagement in 2022 and the third column the percentage increase in use between 2013 and 2022

Engagement in e-commerce in the EU for low educated people was on average 20% in 2013 and 39% in 2022, compared to an average for all groups of 35% and 59% respectively.

The spread between the minimum and the maximum percentage of e-commerce engagement among low educated people in different countries was very substantial (approximately 62 percentage points in absolute value and 41 times in relative terms) in 2013 and had not changed in absolute value by 2022, although it declined in relative terms (to 8 times). Once again, Romania and Bulgaria were the countries in which engagement in e-commerce was the lowest both in 2013 and 2022. Denmark and the Netherlands were the countries in which it was the highest in both years, with Finland and Sweden following at a distance.

The percentage increase in the use of e-commerce in the group of low educated people in the decade varied highly across countries with an average increase of 48%, lowest levels of 11% for Denmark and Germany and highest level at 695% and 473% for Romania and Greece respectively. Overall, the rate of increase of engagement in e-commerce has a similar average but a lower variability than that for the age group 65-74.

3.3. Access to digital financial services

In recent years, the financial sector has been witnessing a structural revolution in terms of its distribution network. When it comes to the relationship with their customer base, more and more financial institutions are offering their services, partly or wholly, online; more and more customers are opting for these online services. Existing financial institutions have been closing physical branches and have moved part of their services online, while part of the new financial institutions have chosen to offer their service online-only. Among them the so-called exclusively 'digital banks'.

This is a world-wide trend. According to a study by Accenture 2021, globally, 23% of banking and insurance customers now hold accounts with a digital bank, representing an impressive number of around 450 million customers. This phenomenon is expected to further increase, soon bringing the global percentage to almost 70%. Despite growth being a significant trend in all markets, some

countries are experiencing a faster speed of adoption of digital banking than others, even among the EU's largest economies³¹ Presently Italy records the highest percentage of banking customers using an exclusively digital account (26.1% of total customers), France and Spain are at 19.7% and 15.3%, respectively; Germany instead stands at only 10%³².

More generally, the phenomenon of e-banking is gaining increasing prominence. Indeed, e-banking offers advantages to both customers and banks. Thanks to home banking, users can perform quickly and remotely various informative functions (e.g. checking account movements and balances or monitoring card payments) and transactional functions (e.g. executing bank transfers or topping up mobile phone credit). In addition, online banking service has brought global accessibility (i.e. access from abroad and 24/7 access) and multi-account management to customers while substantially reducing management costs for banks (e.g. due to the closure of bank branches).

Whereas online banking offers numerous advantages, it has also brought some security concerns. By 2020, cyberattacks became one of the main threats to banks, and it was predicted that the rate of cybercrime would continue to increase in the near future³³. This issue caught the attention of the European Commission, leading to the adoption of Directive 2015/2366/EU in January 2016, also known as the Payment Services Directive 2 (PSD2)³⁴. This Directive repealed the previous directive in force since 2007 (PSD). The main objective of the directive was to enhance consumer protection in a context where fraud is constantly on the rise³⁵.

In 2022, the European Commission conducted a thorough assessment of the current regulatory framework³⁶. The analysis revealed that PSD2 has largely achieved its goals, notably reducing fraud through the implementation of Strong Customer Authentication (SCA), improving efficiency and transparency for consumers, and expanding payment options. Despite these successes, the analysis emphasised the need for further improvement and a review of the regulatory framework. The proposed PSD3 initiative by the European Commission aims to tackle the challenges arising from PSD2 implementation. It proposes, among other things, a series of articulated actions to strengthen payment service security, promote greater efficiency, and enhance competitiveness in the sector.

However, some of the measures introduced by European regulations risk exacerbating issues related to the digital divide, making access to banking channels increasingly challenging for some groups in society. One can think, for example, of the difficulties faced by more 'vulnerable' individuals when asked for multi-factor authentication to access online services. As multi-factor authentication becomes a requirement (to ensure security) and the number of physical branches declines (to reduce costs and increase competitiveness) the process risks leaving groups of society unable to access banking services or imposes on them substantial costs of access. A similar case could be made for customers that do not have access to high-speed internet because they live in a rural area. In addition, the changes introduced

³¹ As of 2020, Saudi Arabia (54%), the United Arab Emirates (51%), Brazil (44%), and China (42%) lead with the highest share of customers in their financial services markets already having an exclusively digital bank account. Europe, despite starting later, is also moving in this direction. Source: N26 x Accenture – Global Digital Banking Index 2021.

³² Source: N26 x Accenture – Global Digital Banking Index 2021.

³³ Source: Banca d'Italia. 2023. Cyber sicurezza: una continua sfida per l'economia e per la società.

³⁴ Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC

³⁵ A second key objective is the opening of payment markets to new operators, promoting greater competition, a wide range of choices, and potentially better prices for consumers. Another important motivation behind the creation of this directive was the need to address pre-existing regulatory gaps and ensure legal clarity in the field of payment services.

³⁶ Source: Assaro, I; Portale, V; Ruggieri, M. 2023. Payments Package e PSD3: così la Ue guida l'innovazione nei pagamenti. Agenda digitale.

by the Payments Services Directive (PSD2), enabling data sharing between banks and third-party providers through Application Programme Interfaces (APIs), can contribute to enlarging existing gaps in the use of digital financial services. While data sharing unlocks digital competition with generally positive effects in terms of innovation and prices, it can also put less-equipped groups of customers in terms of digital literacy in an even more asymmetric position in their relationship to the banks. It is fair to assume that data protection awareness might be related (although not exclusively) to digital literacy and that digital literacy might be related to the level of education. As a result, less educated people, or immigrants that do not yet speak properly the local language, may also be left behind.

The next section reviews the existing literature on the digital divide in e-banking. Those that follow report the results of an analysis on existing secondary data and draw some conclusions.

3.3.1. Literature review

Our analysis began with a quantitative search for articles related to the digital divide and its effects on e-banking services usage. This search yielded 13 articles, from which we identified the 4 most relevant. These studies generally confirm that the digital divide represents a significant barrier to access to banking services, generating socio-economic disparities and limiting financial inclusion.

The first study in chronological order, Gounaris and Koritos (2008), aimed at understanding which of three competing models was more effective in predicting consumers' adoption of internet banking³⁷. Interestingly it highlighted that, regardless of the model used³⁸, the integration of demographic and psychographic data of consumers resulted in a significant increase in the predictive capabilities of the models.

According to Akhter (2015), the perceived level of comfort in using the internet significantly and positively influences e-banking services. It shows that demographic variables such as income and age play a significant role, with lower income and higher age having a negative effect on usage.

While a segment of the population enjoys the benefits of banking digitisation – leveraging conveniences such as online account management, digital transactions, and access to advanced services –, another segment, due to the digital gap, is excluded from these opportunities. Those in rural areas or economically disadvantaged contexts may have limited access to the internet or lack the digital skills necessary for using online services. This gap results in inequality in access to financial products, loans, and investment tools, contributing to the economic marginalisation of certain groups. Addressing the digital divide becomes essential, therefore, to promote a financially inclusive society and ensure that everyone can fully benefit from the opportunities offered by the modernisation of the banking sector.

In a study conducted by Garín-Muñoz et al. (2017), the primary objective was to examine various models of internet service adoption, focusing specifically on crucial sectors such as e-commerce, e-banking, and e-government within Spain. The focus of the study was to identify and analyse the multiple factors influencing user utilisation of these services.

Gender was found to play a significant role in the analysis of e-banking service adoption, as well as age, highlighting that individuals below 64 years old show a higher inclination to use digital services offered by the bank compared to older individuals. Additionally, there is an increased likelihood of adopting e-banking the higher the education level; those with a master's or Ph.D., completing 17 to 20 years of

³⁷ The three models were the TAM (Technology Acceptance Model), the DoI (Diffusion of Innovations) model and the PCI (Perceived Characteristics of the Innovation) model.

³⁸ For completeness, the PCI achieved the most promising results.

education, have a 2.21 times higher probability of practising e-banking compared to individuals with no education or only primary level.

Internet skills also emerge as a vital predictive factor in explaining the adoption of services; those with very high skills have a 26.52 times higher probability of adopting e-banking compared to individuals with low skills in this field. Predisposition to adopting e-banking is closely connected to the income variable, which also emerges as a key element. Study results indicate that the likelihood of embracing e-banking is 2.53 times higher among those with a monthly net income exceeding 3,000 euro, compared to those with a monthly income below 900 euro.

In addition to those mentioned, other variables were considered in the analysis but did not show significant relevance. Among these are internet usage frequency, the size of the population of the place of residence and the number of family members. Furthermore, trust in the internet in general emerged as a non-significant variable, while trust in the service provider was, suggesting that trust is intrinsically linked to the perception of the quality and reliability of the offered service.

Finally, Inder et al. (2022) studied the factors preceding the behavioural intention to adopt e-banking in a developing economy like India, where challenges related to the digital divide are even more pronounced compared to other economic contexts. Through the administration of a questionnaire to over 400 participants, the research revealed that the key elements significantly influencing the use of the examined services include performance expectations, hedonic motivation, experience, habit, and attitude, as well as the perceived ease of use of the website, security, and reliability. In the Indian context, internet banking is perceived as user-friendly and supported by robust organisational infrastructures and support systems.

Other studies reported in the literature³⁹ have delved into various facets of consumer behaviour in the e-banking domain across different nations, utilising the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). The TAM, focused on the customer process to assess the adoption of new technologies, suggests that various factors influence consumers' decisions on how and when to use the examined technology. These factors include both perceived usefulness and perceived ease of use. The first is the extent to which an individual believes that implementing a particular method would enhance his/her work performance. The second refers to the effort a person thinks s/he would need to use a specific system. Additionally, significant external factors, such as social influence, have emerged in determining attitudes towards technology. The analysis highlights that a positive attitude and the intention to use a technology occurs when these factors are present. However, overall, there is a considerable complexity in the dynamics guiding technology adoption in the e-banking context, emphasising the need to consider a wide range of variables to gain a comprehensive perspective on consumer behaviour driving the digital divide.

3.3.2. Analysis of Eurostat data

Secondary data on the use of e-banking are available from Eurostat. We use these data to assess the impact of the digital divide on e-banking, across different countries and across different groups in society.

³⁹ Among which (1) Davis, Fred D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly* 13: 319–40. (2) Alalwan, Ali Abdallah, Yogesh K. Dwivedi, Nripendra P. Rana, and Raed Algharabat. 2018. Examining factors influencing Jordanian customers' intentions and adoption of internet banking: Extending UTAUT2 with risk. *Journal of Retailing and Consumer Services* 40: 125–38. (3) Sharma, Rashmini, Gurmeet Singh, and Shavneet Sharma. 2020. Modelling internet banking adoption in Fiji: A developing country perspective. *International Journal of Information Management* 53: 102–16.

a. The use of e-banking across EU countries

Table 9 shows the percentage of people that use e-banking in each EU country and on average in the EU. The first column reports the use of e-banking in 2013, the second column the use in 2022 and the third column the percentage increase in use of e-banking between 2013 and 2022.

Table 9. Percentage of persons using e-banking by country and year in the EU

	2013	2022	% Increase
AUSTRIA	48,6	73,13	50%
BELGIUM	57,83	79,51	37%
BULGARIA	4,57	22,44	391%
CROATIA	23,32	57,96	149%
CYPRUS	23,26	63,94	175%
CZECHIA	41,49	77,09	86%
DENMARK	82,46	94,35	14%
ESTONIA	72,22	83,36	15%
FINLAND	84,4	94,68	12%
FRANCE	57,56	67,86	18%
GERMANY	47,12	48,58	3%
GREECE	10,72	49,78	364%
HUNGARY	26,9	61,04	127%
IRELAND	45,58	86,29	89%
ITALY	21,72	48,35	123%
LATVIA	54,89	82,45	50%
LITHUANIA	46,42	74,82	61%
LUXEMBOURG	62,93	69,96	11%
MALTA	43,24	66,32	53%
NETHERLANDS	82,01	90,72	11%
POLAND	32,01	55,55	74%
PORTUGAL	22,62	57,45	154%
ROMANIA	4,3	19,19	346%
SLOVAKIA	38,74	48,08	24%
SLOVENIA	32,31	56,86	76%
SPAIN	32,91	69,6	111%
SWEDEN	81,81	83,5	2%
	2013	2022	% Increase
EU average	43,78	66,03	51%
EU min	4,3	19,19	
EU max	84,4	94,68	

Source: authors' elaboration on EUROSTAT

The spread between the minimum and the maximum percentage of e-banking use was wide (just more than 80 percentage points) in 2013 and had slightly declined (to approximately 75 percentage points) in 2022. Romania and Bulgaria were the countries in which use of e-banking was the lowest both in 2013 and 2022. Denmark and Finland recorded the highest use of e-banking. The percentage increase in the use of e-banking in the last decade varies highly across countries and appears in general inversely correlated with the rate of e-banking use in 2013: countries with higher initial use of e-banking in 2013 tend to be the ones that have experienced the lowest percentage increase (i.e., Denmark, Finland and the Netherlands), while countries with the lowest initial use are the ones that experienced the highest increase (Romania, Bulgaria and Greece)⁴⁰. Yet the digital divide in the use of e-banking across EU countries seems, in great part, to have persisted. This is probably due to both supply-side factors (i.e. the degree of development of the banking industry) and demand-side factors (i.e. demand for e-banking services from people). Both are likely to depend on the availability of high-speed internet connections. In any case, at the current rate of convergence it would take a few decades to achieve a substantially uniform rate of use of e-banking across EU countries.

b. The use of e-banking across different groups in society

The digital divide in the EU may play a role not only between countries but also within countries in relation to disadvantaged groups in society. Consistently with the literature review, when looking at Eurostat data, factors that appear to affect the level of usage of e-banking within a country are: belonging to an older age group (with an EU average in 2022 for the age group 65-74 of 39% compared to an overall EU average of 66%); having a low level of education (38%); being born outside the EU (54%); living in a rural area (58%); being unemployed (51%); and being severely limited due to a disability (43%).

We focus here on people in the age group 65-74 and on people with a low education level as these two characteristics are correlated with the lowest degree of usage of e-banking compared to the other factors of disadvantage.

The first columns of Table 10 show the percentage of people in the age group 65-74 that use e-banking in each EU country and on average in the EU. The first column reports the use in 2013, the second the use in 2022 and the third the percentage increase in use between 2013 and 2022.

E-banking use in the EU for people in the age group 65-74 was on average 19% in 2013 and 39% in 2022, compared to an average for all groups of 44% and 66% respectively.

The spread between the minimum and the maximum percentage of e-banking use was quite wide (approximately 61 percentage points in absolute value and 340 times in relative terms) in 2013 and had widened in absolute value (to approximately 84 percentage points) in 2022 but declined in relative terms (to 26 times). Romania and Bulgaria were the countries in which the use of e-banking was the lowest both in 2013 and 2022. Denmark and Sweden were the countries in which it was the highest in both years, with the Netherlands and Finland joining them in 2022.

The percentage increase in the use of e-banking in the age group 65-74 in the decade varied highly across countries but was always substantial, even if again inversely correlated to the rate of e-banking use in 2013, ranging from a minimum of 27% and 33% for Luxembourg and Sweden respectively to 1761% and 1327% for Bulgaria and Romania.

⁴⁰ The exception is Germany, which experienced a growth of only 3% despite being only 4 percentage points above the EU average in terms of usage of e-banking in 2013. As a result, Germany, with its 48%, fell well below the EU average of 66% in 2022.

In evaluating the increase in use of e-banking in the age group 65-74 it is again important to consider a dynamic effect: those aged 65 to 74 in 2022 were those who were 55 to 64 in 2013. The observed increase in e-banking use in 2022 may thus be in part a cohort effect. However, looking at the data, albeit with some variability across countries, this effect appears to explain the observed increase only marginally as, for example, the EU average for the group 55-64 in 2013 was just percentage points higher than that for the group 65-74. Most likely, a substantial part of the observed increase in the use of e-banking for the group 65-74 between 2013 and 2022 has to do with supply-side factors rather than demand-side factors.

Another important disadvantaged group appears to be that of people with a low education. The second part of Table 10 shows the percentage of people with low education that use e-banking in each EU country and on average in the EU. As in the previous tables, the columns report first the use in 2013, then the use in 2022 and finally report the percentage increase in use between 2013 and 2022.

Table 10. Percentage of people using e-banking, divided by country, year, as well as percentage of people in the age group 65-74 and with low education

	Age group 65-74			Low Education		
	2013	2022	% increase	2013	2022	% increase
AUSTRIA	12,66	41,2	225%	20,09	52,12	159%
BELGIUM	30,48	65,69	116%	32,98	59,2	80%
BULGARIA	0,18	3,35	1761%	0,11	1,36	1136%
CROATIA	5,47	15,2	178%	5,25	16,72	218%
CYPRUS	6,71	23,2	246%	2,64	21,56	717%
CZECHIA	8,73	42,41	386%	9,12	45,2	396%
DENMARK	61,5	87,55	42%	75,4	88,48	17%
ESTONIA	25,59	52,57	105%	43,6	77,18	77%
FINLAND	55,31	82,32	49%	65,28	86,99	33%
FRANCE	30,07	45,14	50%	33,39	43,38	30%
GERMANY	21,13	29,65	40%	24,34	25,15	3%
GREECE	1,37	14,96	992%	0,79	16,87	2035%
HUNGARY	5,67	29,83	426%	3,9	23,52	503%
IRELAND	14,66	57,34	291%	13,73	34,26	150%
ITALY	7,61	25,85	240%	7,29	25,93	256%
LATVIA	13,14	52,43	299%	27,79	63,5	128%
LITHUANIA	6,75	33,44	395%	13,02	49,93	283%
LUXEMBOURG	47,38	60,01	27%	35,67	42,82	20%
MALTA	11,99	26,02	117%	22,01	44,68	103%
NETHERLANDS	56,79	81,83	44%	63,29	80,22	27%
POLAND	5,73	21,8	280%	5,9	24,62	317%
PORTUGAL	7,34	23,95	226%	8,67	27,9	222%
ROMANIA	0,3	4,28	1327%	0,12	3	2400%
SLOVAKIA	4,71	22,61	380%	8,34	27,05	224%
SLOVENIA	7,84	22,99	193%	7	28,1	301%
SPAIN	8,63	42,99	398%	11,64	48,35	315%
SWEDEN	60,31	80,03	33%	62,25	59,31	-5%
	Age group 65-74			Low Education		
	2013	2022	% increase	2013	2022	% increase
EU average	19,38	38,63	99%	19,5	37,85	48%
EU min	0,18	3,37		0,11	1,36	
EU max	61,5	87,55		75,4	88,48	

Source: authors' elaboration on EUROSTAT

E-banking use in the EU for low educated people was on average 19% in 2013 and 38% in 2022, compared to an average for all groups of 44% and 66% respectively.

The spread between the minimum and the maximum percentage of e-banking use among low educated people in different countries was very substantial (approximately 75 percentage points in absolute value and 685 times in relative terms) in 2013 and widened in absolute value (to approximately 87 percentage points) by 2022, although it declined in relative terms (to 65 times). Once again, Romania and Bulgaria were the countries in which use of e-banking was the lowest both in 2013 and 2022. Denmark was the country in which it was the highest in both years, with Finland and the Netherlands joining it in 2022.

The percentage increase in the use of e-banking in the group of low educated people in the decade varied highly across countries with an average increase of 48% and peaks of 2400% and 2035% for Romania and Greece respectively, as they started from a very low level in 2013⁴¹.

3.4. Access to information

3.4.1. Introduction

Freedom of information is a corollary of freedom of expression, as guaranteed under art. 11 of the Charter of Fundamental Rights and art. 10 of the European Convention on Human Rights. The right to receive and impart information and ideas, 'without interference by public authority and regardless of frontiers' (art. 10.1 ECHR), is therefore to be considered as constituent of our democracies. For this right to be effective, a free and pluralistic media environment is needed, in which diverse information and views are available and accessible (Recommendation 2018/1 Council of Europe). The digital transformation has profoundly transformed the way in which information is provided, distributed, and accessed. Its revolutionary impact on the public sphere is synthesised by Jurgen Habermas as follows: (it) 'is not just a matter of an expansion of the range of media previously available, but of a caesura in the development of the media in human history comparable to the introduction of printing' (Habermas 2022, p. 158).

The digital transformation has changed the definition of 'media', together with many characteristics that have shaped the media ecosystem during the past century (European Commission 2022, pp. 7-18). Lowering costs, increased speediness of communications, and easy access to distribution channels, have lowered the barriers to entry for the providers and the limits for access of the consumers, and enormously amplified the availability of information.

In the digital era, the 'abundance' of information (both in terms of provision of and access to the news) comes with the 'scarcity' of other factors that are fundamental for an informed public opinion, which in turn is essential for an inclusive democratic process to work: attention (due to the overload of information, which increases the role and importance of algorithmic recommendations systems); transparency (on the source of information and on the process of selection/recommendation/removals); individual control (personalisation of the media offer and distribution); professionalism (user generated content brings huge potential for democratic participation but also risks the spread of inaccurate or false information, for which nobody is held responsible). On the supply side, the risks are related to the viability of a plural and sustainable news media offer (for the growing tendency towards concentration of media providers and digital

⁴¹ Exceptions were Germany where e-banking use by low educated people appears to have increased by only 3%, the equivalent to the average increase in all groups, and Sweden where e-banking use by low educated people seems to have marginally declined, while the average use of all groups increased by 2%. As a result, Germany, which was at 24% in 2013, fell well below the EU average, while Sweden, which started from 62% in 2013 with an EU average of 19%, still remained around 20 percentage points above the EU average of 38% in 2022.

intermediaries). On the demand side, the risks are related to the way in which people access news, the exposure to algorithmic selection and vulnerability to disinformation and to dangerous content online.

The digital transformation has increased access to information, by thus lowering the social differences in terms of physical access to information (i.e., first-level digital divide), and gaps in digital skills (second-level digital divide). On the other hand, a third degree of digital divide has emerged in terms of effective access to pluralistic and diverse information; to the vulnerability towards disinformation and other information disorders; to the different impact, on different societal groups, of the new forms in which media content is created and provided. In the next pages we discuss the third degree of digital divide, looking at media 'consumption' and 'offer'. In both cases, the demographic and socio-economic characteristics of the users are analysed to identify differences and vulnerabilities.

3.4.2. The media consumption divide

a. Diversity Exposure

In the digital information environment, media diversity is no longer dependent only on the number of media outlets and sources (external pluralism), nor on the provision of diverse types of content by a single media provider (internal pluralism). It also depends, more than in the analogical media environment, on individuals' willingness and ability to navigate and choose from among (potentially) innumerable media and different voices. Since the first decade of the 2000s, with the birth and rise of the online platforms, the way and extent in which people access news increasingly depends on the algorithmic selection made by social media, search engines and automatic aggregators. Filtering and selecting (also) media content, the information digital intermediaries acquired a central role in media consumption and in the media market, even though they do not produce original media content. Users thus generate media diversity, which has two consequences. On one hand, citizens/consumers have easy access to innumerable sources of news and ideas in the world wide web, and they can themselves be sources or content creators. This bottom-up process can be deemed as more egalitarian and democratic, de-centralising and reducing the differences in access to (and representation in) the media. Moreover, it challenges and undermines the traditional role of the professional media as gatekeepers. This aspect has been emphasised, mainly at the beginning of the digital revolution, by the stream of thought on the egalitarian and libertarian impact of the internet (Benkler 2003). On the other hand, users can choose and share only the news/ideas that are 'similar' to (i.e., confirm) their previous views, and thus tend to get closed in isolated information spaces (i.e., echo chambers) (Sunstein 2001, Jamieson & Cappella 2008). Users can thus be reached and targeted mainly by news and opinions they are interested in, and which they will probably like (i.e., filter bubbles) (Parisier 2011). As Habermas (2022) puts it, analysing the impact of the new media on the political public sphere, 'the egalitarian and unregulated nature of the relationships between participants and the equal authorisation of users to make their own spontaneous contributions constitute the communicative pattern that was originally supposed to be the hallmark of the new media. Today, this great emancipatory promise is being drowned out by the desolate cacophony in fragmented, self-enclosed echo chambers' (p.159).

The phenomena of echo chambers and filter bubbles, and more generally the fragmentation of the public discourse on social media, increasingly depend on the key-feature of the online platforms business model, which is personalisation, on the two sides of the market: to gather users' attention, and to sell it to advertisers. The information intermediaries give the people 'what they want', and in so doing they may narrow the information diet of users; at the same time, accessing news online brings with it the possibility of being casually exposed to news and opinions not contemplated in one's personal information habits (more than in the pre-digital era) (Newman and Fletcher, 2018, argue that 'incidental exposure' online is greater than offline).

A consensus has emerged that the personal attitudes and the socio-economic characteristics of users make the difference, both in taking advantage of the enlarged variety of sources online and in avoiding a selection exclusively driven by the platforms' algorithms. Lindell (2018) has argued that there is a link between 'voluntary choices' in terms of online news selection and socio-economic factors. Similarly, Kalegeropoulos and Nielsen (2018), have found a correlation between the social grade⁴² of individuals and the number of news sources accessed, the dependence on algorithmic-driven selection and news avoidance. According to this study, which builds on the data from the 2018 Digital News Report Survey in the UK, social inequality in news consumption is greater online than offline. Higher social grade individuals generally rely upon a larger number of sources online (i.e. 2.11 vs. 1.6 news consulted sources). In addition, higher social grade individuals tend more often to access the websites or apps of news outlets directly (instead of depending on an algorithmic recommendation by the platform). Direct access to the news is 57% for the higher social grade, vs 45% for the lower social grade.

b. Vulnerability to disinformation

Another key issue to take into consideration in analysing the social divide in the access to online information is the spread of disinformation and misinformation⁴³. Both phenomena are not just online and were not born with the internet. Traditional media are disinformation actors (Tsfaty et al. 2020). What is new, in the online environment, is the enormous potential of dissemination and capacity to 'go viral' of disinformation and misinformation content, particularly via social media and automated aggregators (Parcu 2018; Lazer et al., 2018). Also in this respect, different habits in news consumption may contribute to reducing, or increasing, vulnerability to disinformation⁴⁴. Indicators of vulnerability can be tracked in the way in which people access news: number of sources, direct access vs algorithmic-mediated access, interest in news vs news avoidance. In their study on 'Social Media and Fake News in the 2016 Elections' Allcott and Gentzkow (2017), after analysing data on the access to (and consumption of) of false information via social media, ask what factors predict the ability to distinguish true from false information. Three correlations are found as being significant: education, age and total media consumption. 'People who spend more time-consuming media, people with higher education, and older people have more accurate belief about news' (p. 228). In a similar study conducted on the 2019 UK political election, Vaccari et. al. (2023) reveal 'a stark campaign disinformation divide', finding that 'citizens' exposure to campaign coverage by professional news organisations was associated with their greater ability to differentiate true from false information', whereas 'exposure to campaign news from social media was associated with lower level of discernment, as their heavier users were more likely to believe false information (...), and, in turn, more inclined to share it'. This has consequences on the online sharing: 'the more respondents perceived a headline as accurate, the more likely they were to share it, but this was more the case for false than true headlines (...). Thus, false information was more "sharable" than true information'. (p. 19).

⁴² Social grade classification of the survey respondents is based on the occupation level of the chief income earner in their household.

⁴³ As defined in the EC policy documents: disinformation = false or misleading content spread with an intention to deceive or secure economic or political gain and which may cause public harm; misinformation = false or misleading information spread without a malicious intent but the effects can be still harmful. This terminology substituted, in the literature as well as in policy documents, the use of the term 'fake news', emerged soon after the first outburst of the phenomenon in the 2016 US elections and the 2016 UK referendum on Brexit.

⁴⁴ Here we understand vulnerability as 'the susceptibility of being placed in a position of economic, social, ecological or legal disadvantage with potential harm as result' (Ranchoradas and Beck, 2023).

c. The digital divide in the consumption of news

In the European Union, television is still the most relied upon media outlet. According to the last Eurobarometer Media & News Survey (2022)⁴⁵, 75% of the respondents have television in their information consumption, followed by online news platforms (43%) and radio (39%). Social media and platforms run fourth (26%), overtaking the written press (21%). The survey also shows a relevant difference in media usage among socio-economic groups: among the youngest, television is at 58% and the second more frequent way to access news is through social media (46%).

When it comes specifically to the way in which people access news online in the EU, the same survey shows that direct access to the website of a news source (e.g. a newspaper) is – on average – at 43%, but this percentage decreases to 33% for the youngest respondents and to 32% for the group with low education.

These data are useful to understand the changes in the information diet in the European Union and the growing reliance of the youngest generations on side-door access to the news (via social media and other automated aggregators of information). Yet, the data do not allow for going into details of the demographic, social and economic divide in news consumption online; the survey envisages multiple answers and therefore it does not show which is the *main* source of news for the respondents, and there is no information on their economic status.

To deepen the analysis, we use the dataset of the Digital News Report 2023 (Newman et al., 2023), whose survey is focused on digital news consumption across 46 markets (covering half of the world's population). For Europe, 20 countries are included⁴⁶. One of the main findings of the survey is the continuous declining share of direct access to the news online, decreased from 32% in 2018 to 22% in 2023. Conversely, access via social media increased in the same years from 23 to 30%; other side-door (not direct) access to the news are search engines (25%, + 1% in comparison with 2018); mobile alerts (9%; + 3%); aggregators (8%; + 2%). Finally, 5% of respondents have as their main access notifications via email (5%; - 1%).

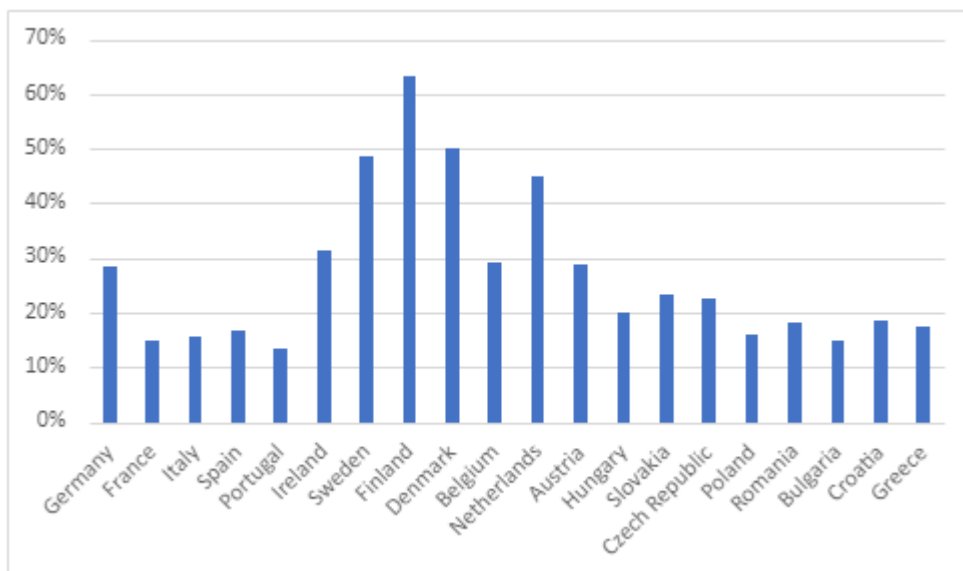
Direct access to news websites, as seen above, can be considered an indicator of higher individual agency; i.e., choosing individually from among the wide range of sources available on the web. Moreover, it is related to access to professional media providers, which are not immune to spreading inaccurate or false information, but which are acknowledgeable and responsible for the content they publish.

Among the European Union countries included in the DNR (Digital News Report), direct access to the news online is on average at 28%; the highest level is in Finland (63%), the lowest is in Portugal (see Figure 27).

⁴⁵ <https://europa.eu/eurobarometer/surveys/detail/2832>

⁴⁶ Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, United Kingdom.

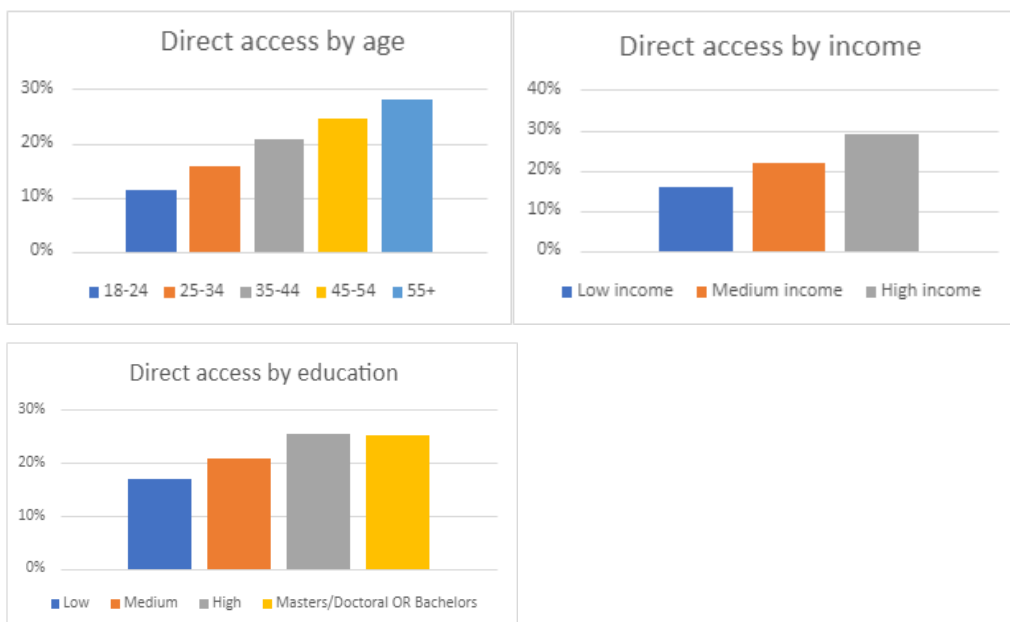
Figure 28. Direct access to news online, per country



Source: DNR 2023. (question: Which of these was the ****MAIN**** way in which you came across news in the last week?; answer: Went directly to a news website or app (e.g. BBC News, Guardian, Mail online, Huffington Post))

Together with geographical differences, there is also an evident socio-economic divide, with direct access to the news online prevalent among older, highly educated and high-income respondents (see Figure 28).

Figure 29. Direct access to news online, by demo-socio-economic characteristics



Source: DNR 2023.

Question: "Which of these was the ****MAIN**** way in which you came across news in the last week?"

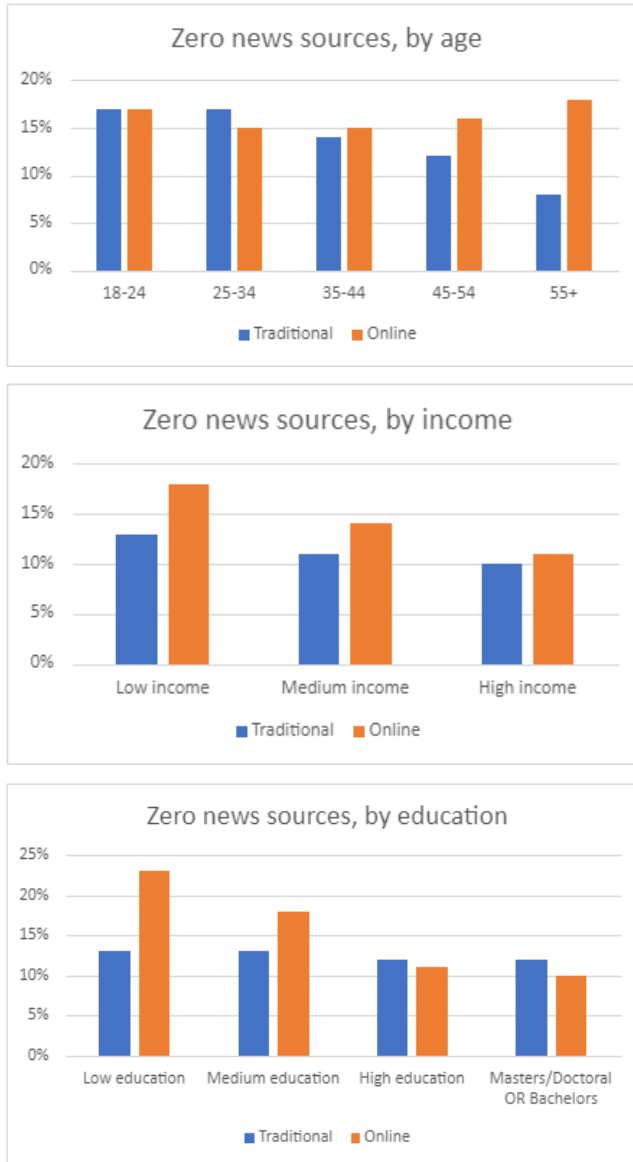
Answer: "I went directly to a news website or app (e.g. BBC News, Guardian, Mail online, Huffington Post)".

NB Data for all the countries covered by the survey.

Another indicator of inequalities in news consumption is the number of sources accessed. The DNR survey's results show that on average, 16% of respondents do not access any news online, whereas the percentage of no-news users offline is 12%. This tendency is not in contrast with all the indicators

showing an increase in time spent online, as the attention of online users can be attracted (and more easily monetised) towards other content and activities (Prior, 2005)⁴⁷. In this case, the demographic divide is less relevant, whereas greater differences appear in relation to educational and economic status (see Figure 29).

Figure 30. No news sources, per demo-socio-economic characteristics



Source: DNR 2023, authors' elaboration. NB: Data for all the countries covered by the survey.

News avoidance, and lower direct access to the information online, other than a consumption choice can also be seen as a consequence of the media presence online, which increasingly shifted from free offer to paid offer. This will be the object of the next paragraph.

⁴⁷ In Prior's view, the widening knowledge gap arises from voluntary consumption decisions, and therefore is not caused by the socio-economic divide.

3.4.3. The media offer online

a. The disruption of the media business model

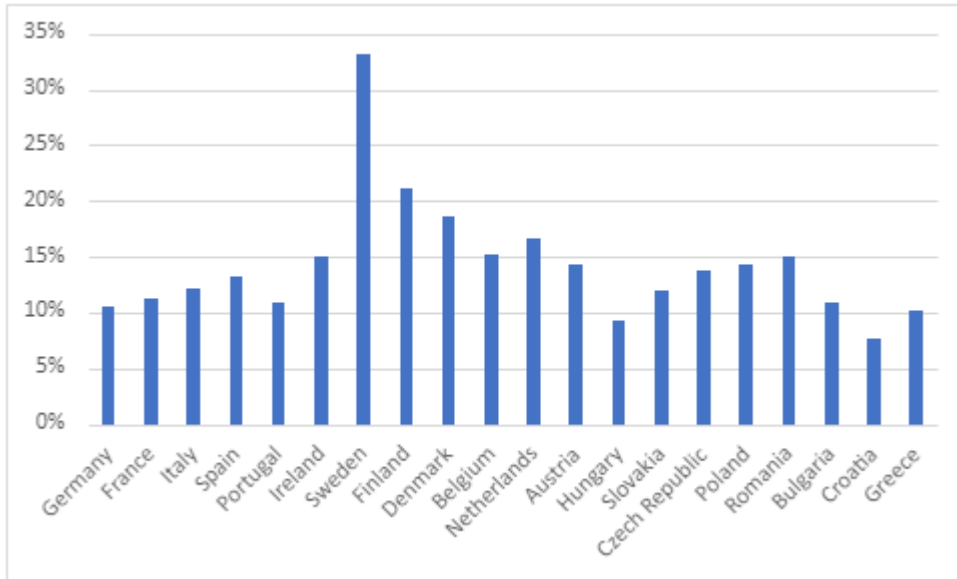
The digital transformation has also disrupted the business model of traditional media. On the one hand, the digital innovation has opened up great opportunities for media providers both in terms of cost reduction and of dissemination of the contents. On the other hand, digital transformation has affected the revenues that traditionally funded journalistic activity: sales and advertising (Martens et al., 2018; Cairncross 2018; Pickard 2019; Moore and Tambini 2018; Finger and Montero 2021). Availability of 'free' online content has reduced the 'paying' demand for news, while digital platforms have become the new gatekeepers of information in the attention markets (see Chapter 2 of the Study on Media Plurality and Diversity online, European Commission 2022). According to the European Media Industry Outlook 2023, in the European Union, the news media lost almost 20% of their revenues between 2016 and 2021; employment in the news media sector declined by 30% between 2008 and 2020 in the EU (from 850,000 to 600,000). The results of the Media Pluralism Monitor show an increasing risk for media viability (the indicator that assesses the risks for the economic sustainability of the media industry), with the highest risk level for the sub-sector of newspapers. (Centre for Media Pluralism and Media Freedom 2023).

After the first years in which new digital media providers emerged, and the legacy media tried to shift to the free digital offer to improve their reach and gain from the online advertising market, the difficulties in monetising media content in the digital environment suggested another strategy, with the introduction of paywalls and other forms of distribution of paid content. To access information provided by media professionals online, users increasingly must pay, and they are not often willing to do so. Therefore, another divide emerges, and it is related to willingness/possibility to pay for the news.

b. Who pays for the news

According to the Eurobarometer Media & News Survey 2022, 70% of respondents uses only 'free' content online. Interestingly, in this case the generational divide takes the opposite direction, in comparison with the habits discussed in the previous sub-sections: 60% of younger users rely exclusively on free news content. The DNR survey highlights, as a general trend, that paid access to the news online has decreased in recent years, also due to the economic crisis and inflation. In the average of the EU countries covered by the DNR survey, paid access is reported at 14%. Willingness to pay for the news is higher in Sweden and in the Nordic countries, as can be seen in Figure 30.

Figure 31. Percentage of the population available to pay a subscription fee to get access to online news, divided by EU Member State.

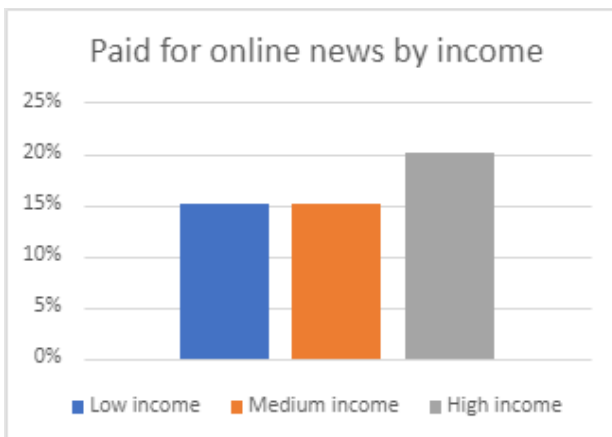
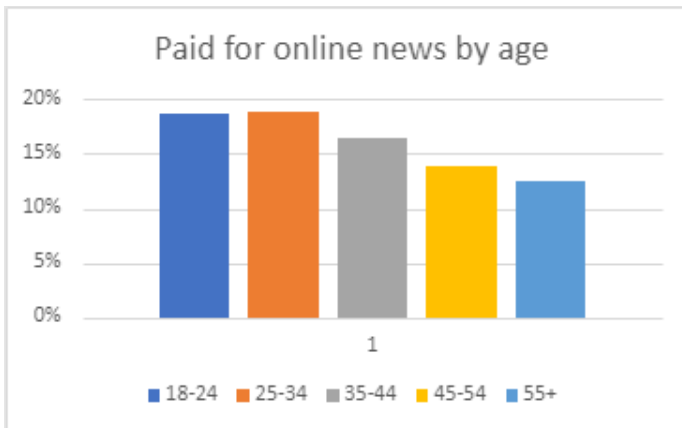


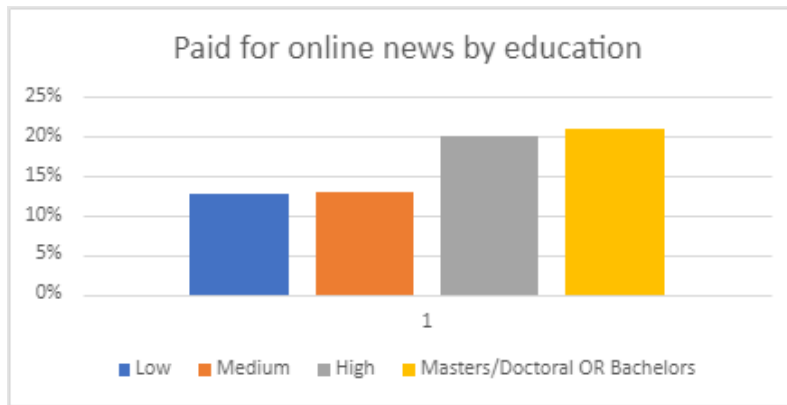
Source: DNR 2023.

Question: "Have you paid for ONLINE news content, or accessed a paid for ONLINE news service in the last year?" – i.e., subscription, combined digital/print subscription, a donation, or one off payment for an article or app or e-edition.

The socio-economic details of the respondents confirm that willingness to pay for the news decreases with age; whereas it is positively related to education and income (see Figure 31).

Figure 32. Paid access to news online, per demo-socio-economic characteristics





Source: DNR 2023.

Question: "Have you paid for ONLINE news content, or accessed a paid for ONLINE news service in the last year?" i.e., digital subscription, combined digital/print subscription, a donation, or one off payment for an article or app or e-edition.

It is not clear if the shift towards the paid news offer will favour a resilient, new business model for media content providers. The latest tendencies, after the shock of the COVID-19 crisis and the slight post-COVID 19 recovery, still show difficulties for media content creators in building a resilient business model to finance quality journalism. The crisis also invests the digital native media. For the USA, 2023 has been defined as the 'worst year in the digital media story', (Stenberg 2023). What is clear is a tendency towards a reduction of free professional media online content, which would deepen the divide between groups that access quality journalism and other groups that rely, in accessing information online, on the free content intermediated by an online platform. This phenomenon could widen not only social inequalities in news consumption, but also diversity and pluralism of the media. 'If the economics rewards increasingly go to platforms rather than the creators of content, then the range and diversity of content may also rise up – undermining the benefits to consumers or greater choice' (Newman and Fletcher, 2018, p. 151).

4. POLICY ANALYSIS AND RECOMMENDATIONS

4.1. Introduction

This section concludes the report, by discussing the policy implications suggested by the review of the literature, secondary data analysis and the three case studies carried out in Sections 1 and 2. In particular, Section 3.2. includes an analysis of the EU legislation affecting e-commerce, access to financial services and information, as well as the EU Declaration on Digital Rights and Principles for the Digital Decade.⁴⁸ From a methodological perspective, the legislative analysis cannot be exhaustive, since the assessment of national law falls outside the scope of the present report. The regulations analysed in the following pages have been selected since they represent the main EU legislations affecting e-commerce, as well as access to financial services and information. The objective of Section 3 is to assess whether and to what extent the relevant EU legislations include specific rules addressing vulnerable social groups, in regulating a specific area affected by the digital transformation.

In Section 3.2, the study briefly summarises the content of the EU Declaration on Digital Rights and Principles with a special emphasis on its application to those social groups that are mostly affected by the digital divide. Second, the sub-section analyses the EU legislation applicable to the three case studies, discussing especially how such regulations address the digital divide. Third, the study analyses EU legislations, such as the General Data Protection Regulation, that intertwines with the applicable regulations to the three case studies and contributes to expanding and/or reducing the digital divide. Furthermore, other proposed EU legislations is also explored to unveil the impact of the legislative proposals on different societal groups affected by the digital transformation. Finally, Section 3.3. summarises the main findings of the study and proposes some recommendations on the actions that the EU could undertake to decrease the degree of digital divide affecting marginalised social groups.

4.2. Policy analysis of the relevant EU legislation

4.2.1. Declaration on the EU Digital Rights and Principles for the Digital Decade

The Declaration on Digital Rights and Principles for the Digital Decade (hereinafter the Declaration) was officially signed by the Presidents of the European Commission, the European Parliament and the Council Presidency in December 2022⁴⁹. The Declaration puts forward the digital transformation model that the European Union (EU) aims to promote and acts as a soft law instrument for policymakers and technology companies. The text takes as a starting point EU law, more specifically Article 2 of the Treaty on European Union, the Charter of Fundamental Rights and the case law by the European Court of Justice that develops such rights. It specifically mentions 'human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities'⁵⁰.

The rights and principles for the digital transformation covered by the Declaration include 'placing people and their rights at its centre, supporting solidarity and inclusion, ensuring the freedom of choice online, fostering participation in the digital public space, increasing safety, security and empowerment of individuals and promoting the sustainability of the digital future'⁵¹. According to the Commission,

⁴⁸ European Declaration on Digital Rights and Principles for the Digital Decade.

⁴⁹ 'Declaration on Digital Rights and Principles' (European Commission - European Commission) <https://ec.europa.eu/commission/presscorner/detail/en/IP_22_452> accessed 20 November 2023.

⁵⁰ European Declaration on Digital Rights and Principles for the Digital Decade, Preamble 1.

⁵¹ *ibid.*

the Declaration operationalises these rights and principles into 'affordable and high-speed digital connectivity everywhere and for everybody, well-equipped classrooms and digitally skilled teachers, seamless access to public services, a safe digital environment for children, disconnecting after working hours, obtaining easy-to-understand information on the environmental impact of our digital products, controlling how their personal data are used and with whom they are shared'⁵².

The rights and principles are more general mandates, stating the aspirations of the EU digital transformation roadmap. While the operationalisation by the Commission entails more specific measures that are more related to the impact of the digital transformation on specific social groups. For instance, the enhanced connectivity seems to target more those who do not have access to such connectivity based on economic ('those with low income') or geographic grounds. Further, children and the education field are mentioned within such an operationalisation exercise as a target group. Along the same lines, children and young people are mentioned within the Preamble regarding 'safety, security and empowerment in the digital environment'⁵³ and Articles 20, 21 and 22 explicitly refer to the 'Protection and empowerment of children and young people in the digital environment'.

Article 2 of the Declaration refers to those groups they consider most affected by the digital transformation. More specifically, paragraph b states that 'a digital transformation that leaves nobody behind. It should benefit everyone, achieve gender balance, and include notably elderly people, people living in rural areas, persons with disabilities, or marginalised, vulnerable or disenfranchised people and those who act on their behalf. It should also promote cultural and linguistic diversity.' Further, regarding digital education, training and skills, the digital gender divide is explicitly mentioned.

4.2.2. E-commerce

a. Regulation (EU) 2018/302 of the European Parliament and of the Council of 28 February 2018 on addressing unjustified geo-blocking and other forms of discrimination based on customers' nationality, place of residence or place of establishment within the internal market and amending Regulations (EC) No 2006/2004 and (EU) 2017/2394 and Directive 2009/22/EC

The Geo-Blocking Regulation entered into force on 22 March 2018, and applies from 3 December 2018⁵⁴. According to Article 1, '[t]he purpose of this Regulation is to contribute to the proper functioning of the internal market by preventing unjustified geo-blocking and other forms of discrimination based, directly or indirectly, on the customers' nationality, place of residence or place of establishment, including by further clarifying certain situations where different treatment cannot be justified under Article 20(2) of Directive 2006/123/EC.'

From its first Article it can be seen that it is a Regulation aimed at addressing the digital divide, mostly based on geographical grounds. According to Recital 3 of the Geo-Blocking Regulation, 'Removing unjustified geo-blocking and other forms of discrimination based on customers' nationality, place of residence or place of establishment could foster growth and increase consumer choice throughout the internal market.' Following the legislator, Article 20 of Directive 2006/123/EC, which established that 'Member States are to ensure that service providers established in the Union do not treat recipients of services differently on the basis of their nationality or place of residence' was partially unsuccessful in

⁵² *ibid.*

⁵³ European Declaration on Digital Rights and Principles for the Digital Decade, Preamble 7.

⁵⁴ 'Geo-Blocking: A New Regulation Enters into Force - EUR-Lex' <<https://eur-lex.europa.eu/content/news/geo-blocking-regulation-enters-into-force.html>> accessed 28 November 2023.

combatting discrimination, among other things, for being ambiguous. Therefore, the Geo-Blocking Regulation intends to clarify Article 20 of Directive 2006/123/EC by specifying scenarios in which differing treatment based on nationality, place of residence, or place of establishment cannot be justified under that provision⁵⁵.

To sum up, the Geo-Blocking Regulation ensures that traders do not implement or use technological measures to 'block or limit a customer's access to the trader's online interface for reasons related to the customer's nationality, place of residence or place of establishment'⁵⁶. Further, for the same reasons, traders are not allowed to 'redirect customer to a version of the trader's online interface that is different from the online interface to which the customer initially sought access, by virtue of its layout, use of language or other characteristics [...] unless the customer has explicitly consented to such redirection'⁵⁷. Finally, 'traders should not design their online interface, or apply technological means, in a way that would, in practice, not allow customers from other Member States to easily complete their orders'⁵⁸. The same regime applies to access to goods or services (Article 4) and the conditions of the payment (Article 5).

The above-mentioned prohibitions will not apply 'where the blocking or limitation of access, or the redirection is necessary in order to ensure compliance with a legal requirement laid down in Union law, or in the laws of a Member State in accordance with Union law, to which the trader's activities are subject. In such instances, the trader shall provide a clear and specific explanation to customers regarding the reasons why the blocking or limitation of access, or the redirection is necessary in order to ensure such compliance. That explanation shall be given in the language of the online interface that the customer initially sought to access'⁵⁹.

b. Regulation (EU) 2018/644 of the European Parliament and of the Council of 18 April 2018 on cross-border parcel delivery services

The Regulation on Cross-Border Parcel Delivery services is directly applicable in all Member States from 22 May 2018, with the exception of Article 8 which is applicable from 23 November 2019. The Regulation aims to 'foster better cross-border parcel delivery services'⁶⁰. In particular, within the context of Protocol No 26 on services of general interest and Article 14 TFEU which includes 'differences in the needs and preferences of users that might result from different geographical, social or cultural situations as well as a high level of quality, safety and affordability, equal treatment and the promotion of universal access and of user rights'⁶¹.

Regarding the digital divide, the Regulation on cross-border parcel delivery services focuses on promoting 'e-commerce and to offer new opportunities for remote or sparsely populated areas to participate in online trade, and to enhance their regional economies'⁶². More specifically, Article 6(2)(d) urges national regulatory authorities to consider 'the likely impact of the applicable cross-border tariffs on individual and small and medium-sized enterprise users including those situated in remote or sparsely populated areas, and on individual users with disabilities or with reduced mobility, where

⁵⁵ Recital 3.

⁵⁶ Article 3(1).

⁵⁷ Article 3(2).

⁵⁸ Recital 19.

⁵⁹ Article 3(3).

⁶⁰ Article 1.

⁶¹ Recital 3.

⁶² Recital 26.

possible without imposing a disproportionate burden.' This mandate aims at improving 'the access to and transparency of public lists of tariffs for a limited set of cross-border parcel delivery services'⁶³.

c. [Directive \(EU\) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services](#)

The Digital Contents Directive applies to the supply of digital content or digital services which occurs from 1 January 2022, with the exception of Articles 19 and 20, which apply only to contracts concluded from that date⁶⁴. The Directive does not expressly address the digital divide, but it does regulate to avoid an inoperative distribution of digital content creating one.

According to Article 1, the Directive aims at contributing 'to the proper functioning of the internal market while providing for a high level of consumer protection, by laying down common rules on certain requirements concerning contracts between traders and consumers for the supply of digital content or digital services'. It aims to establish fully 'harmonised contractual rights in certain core areas concerning the supply of digital content or establishing services across the Union'⁶⁵. Such harmonisation intends to address the issues experienced by customers 'related to the quality of, or access to, digital content or digital services'⁶⁶. Here, the legislator points out the example of a lack of accessibility to digital content or services, resulting in 'financial and non-financial detriment'⁶⁷. As previously mentioned, in this case, the Regulation does not address how the digital divide could affect access to digital content and digital services but how the provision of such content or services can create a digital divide on economic grounds.

4.2.3. Access to digital financial services

a. [Directive \(EU\) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation \(EU\) No 1093/2010, and repealing Directive 2007/64/EC](#)

The Payment Services Directive 2 (PSD2) was implemented by Member States by 13 January 2018⁶⁸. The Regulation promotes access to digital financial services across the EU. It is also relevant for e-commerce, since e-commerce platforms manage their payments digitally. The PSD2 does not directly address the digital divide for marginalised social groups. The only relevant provision in this regard is Article 106(5), whereby financial service providers have the obligation to inform consumers of their rights, which 'shall be made available in an accessible format' for persons with disabilities.

⁶³ Recital 9.

⁶⁴ Article 24(2).

⁶⁵ Recital 6.

⁶⁶ Recital 5.

⁶⁷ *ibid.*

⁶⁸ Article 115.

4.2.4. Access to information

- a. Directive (EU) 2018/1808 of the European Parliament and of the Council of 14 November 2018 amending Directive 2010/13/EU on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services (Audiovisual Media Services Directive) in view of changing market realities

The Audiovisual Media Services Directive entered into force on 18th December 2018 and should be implemented in national regulation by 9th September 2020 at the latest⁶⁹. Article 7 of the Directive tackles the accessibility of people with disabilities to services provided by media providers. It also establishes a reporting system to the national regulatory bodies and the Commission regarding the implementation of accessibility criteria (paragraph 2). Further, the Directive stirs Member States to 'encourage media service providers to develop accessibility action plans in respect of continuously and progressively making their services more accessible to persons with disabilities' (paragraph 3). Finally, Member States should designate an online point of contact 'for providing information and receiving complaints regarding any accessibility issues referred to in this Article.' (paragraph 4). In a more general sense, Article 30(2) of the Audiovisual Media Services Directive establishes that 'Member States shall ensure that national regulatory authorities or bodies exercise their powers impartially and transparently and in accordance with the objectives of this Directive, in particular media pluralism, cultural and linguistic diversity, consumer protection, accessibility, non-discrimination, the proper functioning of the internal market and the promotion of fair competition.'

- b. Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services and amending Directive 2000/31/EC (Digital Services Act)

The Digital Services Act (DSA) is fully applicable from 17th February 2024. However, since the end of August 2023, the DSA rules are already applicable to designated platforms with more than 45 million users in the EU; i.e., the so-called very large online platforms (VLOPs) and very large online search engines (VLOSEs). The DSA regulates online intermediaries and platforms such as marketplaces, social networks, content-sharing platforms, app stores, and online travel and accommodation platforms. Its main goal is to prevent illegal and harmful activities online and the spread of disinformation. The DSA includes a number of provisions aiming at facilitating access to information for disadvantaged social groups. First of all, under Art. 47 DSA, online platforms are encouraged to draw codes of conduct in order to adapt their digital services for persons with disabilities 'by making them perceivable, operable, understandable and robust'. Second, the DSA includes specific provisions to safeguard children from sexual abuses and from the exposure to pornographic materials in the online environment. In particular, under Art. 34 DSA, VLOPs and VLOSEs are expected to carry out a specific risk assessment of potential systemic risks in relation to the dissemination of illegal content through their platform that could harm children. Second, VLOPs and VLOSEs are required to adopt specific measures to mitigate such systematic risks, including the introduction of age verification and parental control tools, aiming at safeguarding children from sexual abuses (Art. 35).

⁶⁹ 'Directive 2018/1808 - Amendment of Directive 2010/13/EU on the Coordination of Certain Provisions Laid down by Law, Regulation or Administrative Action in Member States Concerning the Provision of Audiovisual Media Services (Audiovisual Media Services Directive) in View of Changing Market Realities - EU Monitor' <https://www.eumonitor.eu/9353000/1/j9vvik7m1c3gyxp/vktv9ux1kapm> accessed 6 December 2023.

4.2.5. Other relevant EU legislation

a. Regulation of the European Parliament and of the Council laying down harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union legislative acts COM/2021/206 final

In April 2021, the European Commission proposed the first EU regulatory framework for Artificial Intelligence (AI)⁷⁰. The Regulation aims at establishing unambiguous rules and duties for certain AI uses to AI developers, deployers, and users. Simultaneously, it aims at minimising administrative and financial constraints on businesses, including small and medium-sized firms (SMEs). Although it is a Regulation directed to the market, the regulator acknowledges the impact of AI technologies on fundamental rights and this can be traced back to its regulatory process. In December 2022, the Council adopted its common position with a stronger emphasis on fundamental rights protection,⁷¹ non-discrimination and social and environmental wellbeing⁷² on the Regulation, which should be adopted in the coming months⁷³.

The AI Act establishes 'specific transparency obligations without prejudice to the requirements and obligations for high-risk AI systems' to systems 'intended to interact with natural persons or to generate content may pose specific risks of impersonation or deception'. Recital 70 addresses the digitally illiterate, who 'should be notified that they are interacting with an AI system unless this is obvious from the circumstances and the context of use.' Further, the Recital adds that 'such information and notifications should be provided in accessible formats for persons with disabilities.' In this way, people with fewer digital skills (or people with those skills but incapable of distinguishing artificially generated content, which is more and more difficult nowadays) will always be warned when interacting with those systems. Additionally, such messages will be made accessible to disabled people. Finally, Recital 81 also emphasises the need to encourage providers to 'apply on a voluntary basis additional requirements related, for example, to environmental sustainability, accessibility to persons with disability.'

Whilst adopted by the European Parliament at its plenary on 13th March 2024, the regulation is still subject to a final lawyer-linguist check and is expected to be finally adopted before the end of the legislature (through the so-called corrigendum procedure). The law also needs to be formally endorsed by the Council. It will enter into force twenty days after its publication in the official Journal, and be fully applicable 24 months after its entry into force, except for: bans on prohibited practises, which will apply six months after the entry into force date; codes of practise (nine months after entry into force); general-purpose AI rules including governance (12 months after entry into force); and obligations for high-risk systems (36 months).

⁷⁰ <https://www.europarl.europa.eu/news/en/headlines/society/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence#:~:text=In%20April%202021%2C%20the%20European,mean%20more%20or%20less%20regulation.>

⁷¹ <https://www.consilium.europa.eu/en/press/press-releases/2022/12/06/artificial-intelligence-act-council-calls-for-promoting-safe-ai-that-respects-fundamental-rights/>

⁷² <https://www.europarl.europa.eu/news/en/press-room/20230609IPR96212/meps-ready-to-negotiate-first-ever-rules-for-safe-and-transparent-ai>

⁷³ <https://www.consilium.europa.eu/en/press/press-releases/2023/12/09/artificial-intelligence-act-council-and-parliament-strike-a-deal-on-the-first-worldwide-rules-for-ai/>. At the moment of writing this study there is no publicly available final text of the AI Act. Therefore, this study will take as a reference the original proposed text of April 2021.

b. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)

The role of the General Data Protection Regulation (GDPR) is of relevance regarding the use of certain digital technologies since most of them are in one way or another personal data driven. Further, a particular trade-off arises regarding the willingness of citizens to use such technologies and such a trade-off is related to the fear of function creep. According to the Collins dictionary, function creep is 'the gradual widening of the use of a technology or system beyond the purpose for which it was originally intended, esp when this leads to potential invasion of privacy'⁷⁴ Taking as an example the COVID-19 pandemic, research has shown⁷⁵ that the use of certain digital technologies to avoid the spread of the COVID-19 disease was reported by the media following a 'digital surveillance' narrative. This example shows how the balancing between the protection of personal data and privacy with other rights and values such as security or the protection of the public interest, including within the health area, sometimes collide with public perception affecting the willingness of citizens to interact with certain digital technologies. Finally, the scholarship has also devoted many works to the study of the "conundrum" between security and privacy⁷⁶ concluding that trust is an essential value that will play a key role in this respect.⁷⁷ The more trustworthy the technologies are perceived by civil society, the more willingness they will show to benefit from the technological advantage they provide without the fear of sacrificing their rights to data protection and/or privacy.

The General Data Protection Regulation (GDPR) is applicable from 25th May 2018. The GDPR provides binding rules concerning the processing of personal data within the EU and it regulates the conditions for transferring personal data of EU citizens to third countries. The Regulation includes specific provisions to safeguard children to limit the degree of marketing activities targeting children. In particular, parents should authorise the processing of personal data on behalf of their children, when the latter are below 16 years old (Art. 8). Second, Art. 12 GDPR requires the data controller to provide clear and transparent information on the way the children's personal data are collected and processed. Finally, data controllers are encouraged to draw up a specific code of conduct to improve the manner whereby parents provide their consent to the processing of personal data concerning their children (Art. 40). By safeguarding the processing of children's personal data, the GDPR also contributes to limiting the digital divide.

⁷⁴ Collins English Dictionary, <http://www.collinsdictionary.com> (accessed 8 February 2024).

⁷⁵ Leigha Comer and others, 'An Investigation of Media Reports of Digital Surveillance within the First Year of the COVID-19 Pandemic' (2023) 5 *Frontiers in Digital Health* 1215685.

⁷⁶ See, for instance, Derek E. Bambauer, *Privacy Versus Security*, 103 *J. Crim. L. & Criminology* 667 (2013). <https://scholarlycommons.law.northwestern.edu/jclc/vol103/iss3/2>; Răzvan Șerbu, Irina Rotariu, *Privacy Versus Security in the Internet Era*, *Procedia Economics and Finance*, Volume 27, 2015, Pages 73-76, ISSN 2212-5671, [https://doi.org/10.1016/S2212-5671\(15\)00974-0](https://doi.org/10.1016/S2212-5671(15)00974-0). (<https://www.sciencedirect.com/science/article/pii/S2212567115009740>) and van Schoonhoven, B., Roosendaal, A., Huijboom, N. (2014). *Privacy Versus Collective Security*. In: Hansen, M., Hoepman, JH., Leenes, R., Whitehouse, D. (eds) *Privacy and Identity Management for Emerging Services and Technologies*. Privacy and Identity 2013. IFIP Advances in Information and Communication Technology, vol 421. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-55137-6_7

⁷⁷ Șerbu, *ibid.*

4.2.6. Proposed EU Regulations

a. Proposal for a Regulation of the European Parliament and of the Council establishing a common framework for Media services in the internal market (European Media Freedom Act) and amending Directive 2010/13/EU COM/2022/457 final

The Proposal for a European Media Freedom Act does not specifically address the digital divide. However, its Recital 29 underlines the importance 'to avoid diverging technical standards creating barriers and additional costs for the industry and consumers while encouraging solutions to implement existing obligations concerning audiovisual media services'.

b. Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) No 910/2014 as regards establishing a framework for a European Digital Identity COM/2021/281 final

The Proposal for an EU Digital Identity Regulation follows the mandate of Paragraph 7(a) of the Declaration on Digital Rights and Principles for the Digital Decade which established that 'We commit to: a. ensuring that people living in the EU are offered the possibility to use an accessible, voluntary, secure and trusted digital identity that gives access to a broad range of online services'. Applying this, Article 6(a)(10) of the Digital Identity Regulation states the duty to make the European Digital Identity Wallet 'accessible for persons with disabilities in accordance with the accessibility requirements of Annex I to Directive 2019/882.' Further, Article 15 establishes duties of accessibility for persons with disabilities regarding the 'provision of Trust services and end-user products used in the provision of those services'.

4.3. Recommendations and conclusions

4.3.1. Evidence of the digital divide among vulnerable social groups

The study analyses the impact of the on-going digital transformation on vulnerable social groups. In particular, the study looks at vulnerable social groups in terms of lower income and education, age (i.e. children and older people), as well as people affected by disabilities, minority ethnic groups and people living in remote/isolated geographic areas.

The 'digital divide' has been traditionally defined as the gap between different socio-economic groups in relation to their ability to access information and communication technologies (ICT). The analysis of the scientific publications on the Web of Science (WoS) carried out in Section 1 has pointed out the increasing attention in the literature to the topic of the digital divide, across different scientific disciplines. The increased dependency on digital tools during the COVID-19 pandemic could explain the increasing attention in the literature given to this subject. In particular, a new stream of literature is focusing on the impact of the digital divide on vulnerable social groups.

In this regard, it is worth noticing that 18% of the WoS articles published on the topic during recent years focus on the impact of the digital divide on vulnerable social groups. 'Age' is by far the main aspect of vulnerability analysed in the context of this stream of literature, followed by 'geography' in Europe and 'income' and 'ethnicity' in the USA. This is an interesting finding, which may indicate a diverging understanding of 'vulnerability', in the context of the digital divide, on the two sides of the Atlantic. On the one hand, an ageing population in both Europe and in the USA calls for a better understanding of the impact of digital transformation on 'older' people. On the other, diverse aspects of digital vulnerability seem to be perceived differently in Europe (i.e., mostly connected to remote/isolated geographic areas), in comparison to the USA, where the main issue is how

disadvantaged ethnic groups may cope with the digital divide. Overall, this tendency in the literature indicates a 'broad' understanding of the meaning of 'digital divide', going beyond the traditional definition of access and use of ICT technologies and thus encompassing socio-economic aspects of the digital transformation.

The secondary data analysis carried out in Section 1.2 has broadly confirmed the main findings of the literature review based on WoS. In particular, the analysis of data extrapolated from the Inclusive Internet Index in the period 2017-2022 shows that Europe is in second place in the world, after North America, in terms of 'availability' (i.e. quality of connectivity and infrastructure), 'affordability' (costs of internet access) and 'readiness' (i.e., digital literacy) of internet access. While Europe is generally improving in terms of digital connectivity, the analysis of the data extrapolated from Eurostat in relation to access to internet and computer use for vulnerable social groups shows that the digital divide is widening in Europe: older people seem particularly affected by the digital divide, though there are substantial differences across EU countries. Low education emerges as another significant source of digital divide, with increasing variability and best-worst range values, indicating that Europe has not achieved convergence in this aspect. The secondary data analysis has also highlighted that there is a growing demand for more specific data on the digital divide, particularly in anticipation of the upcoming generative AI revolution. It is becoming increasingly important to shift the focus of data collection from mere 'access' to the internet and to the ICT technologies to a more nuanced examination of skills and performance in the digital realm.

Section 2 presented three case studies, focused on digital inequality in e-commerce, access to digital financial services and the information sphere. The case studies aim at further exploring the topic of the study by looking in more detail at the potential and actual inequalities produced by digital technologies for vulnerable groups of citizens/consumers in three specific areas affected by the digital transformation.

Both the review of the literature and the analysis of the secondary data from Eurostat provide evidence that a digital divide exists and plays a significant role in relation to e-commerce. Whereas digital access and digital competencies are generally increasing and so is engagement in e-commerce, such digital divide has declined only in part in the last decade. It is evident that the EU needs to implement policies aimed at reducing, and ideally eliminating, the obstacles faced by those affected by the digital divide, if it wants e-commerce services to be enjoyed by the entire community. From the analysis above attention should be focused in the first place on people in the older age group, on people with lower income and people with a low education level; in the second place on people with disabilities and people from rural areas, immigrants and unemployed people. Data and studies investigating the main reasons for which certain categories of users do not use e-commerce are likely to be crucial. Interestingly we have shown that the Eurostat E-commerce report of 2022 documents that the relative importance of the possible categories of reasons (concerns about costs of delivery, preference for physical examination of products, concerns for payment security and lack of skills) differ substantially between countries in the EU. This suggests that the relative attention given to specific policy measures in different countries should also differ. While the review of the literature has argued that relevant data exist for the near past, they may not be valid for the near future, since both the e-commerce environment and the attitude of people to its features may soon change. For policymakers to identify, therefore, the most suitable policies to target the digital divide in e-commerce, it is important that surveys aimed at understanding the reasons behind the persisting digital divide are regularly carried out.

The second case study has shown that the digital divide also plays a significant role in relation to access to digital financial services. Whereas digital access and digital competencies in general are increasing

and so is the use of e-banking, such digital divide does not appear to have been shrinking substantially by itself over the past decade. In part this is probably due to the ever-changing requirements in terms of capabilities that digitisation in the banking sector, and its regulation, mandate. A number of social groups are able to keep up with the pace of innovation in the banking sector, while others may not be able to. As a result, we should not expect the digital divide in e-banking to automatically disappear in the future. It is evident that the EU not only needs to promote innovation and security in the banking sector but also needs to implement policies aimed at reducing, and ideally eliminating, the obstacles faced by those affected by the digital divide if it wants e-banking services to be enjoyed by the entire community. One should observe that there is little or no data, and therefore no studies in the literature, investigating the main causes for which certain categories of users do not use all or some of the services offered by e-banking. In other words, no systematic study has been conducted that inquiries into aspects such as the varying accessibility experienced in using different services comprised in an e-banking package. Additionally, there is a lack of exploration into the perceived relevance of different channels offered by banks to connect with their clients. Consequently, there is no analysis of the preferences clients may have in using one channel over another based on the type of transaction they need to carry out. Indeed, people may prefer online channels for specific operations, while there might be other services that clients would prefer to be offered in person at a physical location. Without this knowledge it is harder for policymakers to identify the most suitable policies to target the digital divide and enable the full utilisation of the potential offered by e-banking services.

The third case study has shown that the digital transformation is deeply affecting the way in which individuals access news. Individuals, in fact, increasingly rely on news pointed out by social media and search engines, rather than directly accessing traditional media outlets, such as newspapers, radio and TV. On the one hand, this phenomenon has increased the availability and accessibility of news, lowering social differences in terms of physical access to information and gaps in digital skills. On the other hand, filter bubbles and echo chambers have reduced the exposure of individuals to pluralistic information, while misinformation and disinformation have become serious problems in the online world. Finally, the digital transformation has also disrupted the supply of news: 'free' online news and digital advertising affect the revenues of traditional news providers, thus hampering the sustainability and hence the quality of professional journalism. In view of these considerations, the case study has highlighted that a new form of digital divide is currently emerging, in terms of access to pluralistic and diverse information across different social groups. In this regard, it is worth mentioning that 'age', 'income' and 'education' are the factors that most influence the degree of access to information across different social groups. Older people, in fact, are more likely to rely on traditional media and thus they are less exposed to echo chambers, filter bubbles and disinformation issues. Similarly, people who have a higher degree of education and higher income seem more willing to pay for the news that they access, even in the online environment. On the other hand, younger people seem to be less willing to pay for the news, less likely to compare different sources of information, and thus they are most vulnerable to lack of access to truly pluralistic information.

The case studies have shown that vulnerable social groups are differently affected by the digital divide in e-commerce, access to financial services and information. For instance, while older people are more likely affected by the digital divide in terms of e-commerce and access to information, they are less vulnerable to disinformation and other problems related to access to pluralistic information. The case studies show that the digital divide can only be addressed via tailor-made policy solutions. In other words, not every intervention should be designed to target necessarily all disadvantaged groups.

The digital divide for younger generations, both between and within European countries, has significantly reduced over the past fifteen years in terms of computer and Internet usage. This shift can

be attributed to the migration of numerous youth-related activities from offline to online contexts, alongside the widespread adoption of social media over the past decade. Nonetheless, it is intriguing to note a slight decline in computer and Internet usage among young people aged 16-25 in the Netherlands and Sweden, countries often leading in other digital-related indicators. Speculation arises regarding whether these trends reflect the outcomes of specific public policies aimed at promoting more responsible internet usage among the younger demographic. Our study also reports that younger individuals appear to be less inclined to pay for news, rendering them more vulnerable to limited access to diverse information sources. Despite this may be reconducted to other intergenerational economic disparities, as we find evidence from previous studies regarding the absence of a clear difference in e-commerce usage between the so-called 'Generation X' and 'Generation Y'.

The European Declaration on Digital Rights and Principles aims at '.... putting people at the centre of digital transformation' (para. 7, Preamble). In particular, Art. 2b emphasises that the EU should aim at achieving '...a digital transformation that leaves nobody behind'. Decreasing the degree of digital divide should thus be one of the main objectives both for the EU and national policymakers. The review of the relevant EU *acquis* in Section 3.2 has shown that several EU legislative acts touch upon the issue of digital divide. However, the issue is addressed all over 'scattered' regulations. Furthermore, some EU legislation addresses a specific aspect of the digital divide, while some is silent on the same issue. For instance, the Geo-Blocking Regulation and the Regulation on Cross-Border Parcel Delivery address the 'geographic' dimension of the digital divide in the context of e-commerce, by preventing a platform from discriminating among its customers based on the country where the consumer is based and by promoting e-commerce delivery services in isolated and less populated areas. In contrast, in the context of the relevant EU legislation concerning e-commerce, the Digital Contents Directive does not specifically address the issue of the digital divide.

It is also worth noticing that most of the EU legislation analysed in Section 3.2 addresses the issue of digital divide affecting individuals with disabilities. For example, the PSD2, the Audiovisual Media Contents Directive, the Digital Services Act and the Proposal for an EU Digital Identity Regulation all include specific provisions aiming at increasing the transparency and availability of digital services for individuals affected by disabilities. By contrast, in the EU legislation analysed in Section 3.2, there is nothing that targets the digital divide affecting older people, individuals with low education and income, as well as immigrants and minority ethnic groups. The literature review and the secondary data analysis in Section 1 have clearly shown that 'age' is one of the main dimensions of the digital divide from a socio-economic perspective. On the one hand, it could be argued that, in the context of an ageing European population, the digital divide increasingly affects older people; such an issue should thus be considered in the context of the EU digital *acquis*. On the other hand, the digital divide related to demographic causes, especially 'age', can be expected to gradually diminish, unless the technological disruption is too rapid. This is because current older generations will be progressively replaced by today's younger generations that already engage with digital technologies. Also, considering the extent that the issue could be solved, at least partially, by the passing of time, the choice of a policy intervention should anyway weigh the financial cost of intervention with the cost of being left behind borne by the older age cohorts of today. The disadvantaged position of other specific groups in society appears, moreover, likely to persist also in the future. It is the case of people with socio-educational, cultural and physical disadvantages.

4.3.2. Policy recommendations

We conclude the study by proposing three connected policy initiatives that may contribute to tackling the digital divide, especially for the more vulnerable groups, in the future of the EU.

- A) **European Observatory on the Digital Divide:** the digital divide is an evolving socio-economic phenomenon, which requires a constant and up-to-date analysis across Europe. The European Parliament could consider the establishment of a new Observatory, in charge of:
- a. Monitoring the digital divide among vulnerable social groups across the EU Member States.
 - b. Keeping a publicly available database of national and EU legislation and policy initiatives addressing the issue of digital divide, to favour the exchange of best practices.
 - c. Advising national and EU policymakers on how new legislative proposals and policy initiatives could target the issue of digital divide.
 - d. Engaging in advocacy and training activities with relevant stakeholders.

The new Observatory would complement the Digital Economy and Society Index (DESI), published by the European Commission since 2014. DESI, in fact, is focused on a limited number of indicators, such as measuring the digital skills of the EU population, deployment of digital infrastructures, as well as the implementation of digital technologies by private firms as well as by public institutions. By contrast, the new Observatory could focus on the assessment of the digital divide in the functioning of the entire society with a special emphasis on the more vulnerable social groups.

- B) **Review of the existing EU digital *acquis*:** EU policymakers should embark on an overall re-assessment of the existing EU digital *acquis*. Taking into consideration the objectives of the European Declaration on Digital Rights, the digital divide should be considered in any new/revised EU legislation affecting the digital world. At the moment, disabled people are the main vulnerable social group addressed in the EU *acquis* in terms of digital divide. However, the digital divide should also be considered by the EU *acquis* in relation to other disadvantaged social groups. Our study suggest that these should primarily include 'age', 'geography', 'income', 'education' and 'ethnicity'. Since the digital divide affects different social groups in the different policy areas, one size fits all EU legislation addressing the issue of digital divide from a socio-economic perspective would not be feasible; target solutions in specific policy areas would represent a better policy approach. From this perspective, in its Impact Assessment, the EU Commission could consider the impact on digital divide of any new/revised EU legislation, explaining how the legislative proposal copes with such issue. In addition, the European Observatory on Digital Divide could support the EU Commission in providing evidence to prepare the Impact Assessment.
- C) **Strengthening EU Cohesion Policy to tackle the digital divide:** the EU Cohesion Policy has specific lines of funding to digitise the European industry and to promote the digitalisation of the public administration of the EU Member States. In particular, the EU Cohesion policy has planned more than EUR 40 billion of investment in digitisation through the 2021-2027 programmes funded by European Regional Development Fund (ERDF), the European Social Fund (ESF+), the Cohesion Fund, Interreg and the Just Transition Fund.⁷⁸ The funding is mostly

⁷⁸ <https://cohesiondata.ec.europa.eu/stories/s/Cohesion-policy-supporting-the-digital-transition/vaxt-7rsr/>.

focused on projects fostering the digital skills of the EU population, supporting the digital transition of SMEs, enhancing research & innovation, and improving digital connectivity as well as smart energy systems. In view of the findings of the present study, the EU Cohesion Policy could include further and specific funding schemes for projects aiming at decreasing the degree of the digital divide for vulnerable social groups. For instance, the EU Cohesion Policy could further support learning programmes aiming at increasing the digital skills of older people. Similarly, in view of the findings of the third case study, the EU Cohesion Policy could further promote awareness programmes, aiming to educate specific social groups on the issues affecting access to digital information.

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This study, commissioned by the European Parliament's Policy Department for Citizens' Rights and Constitutional Affairs at the request of the PETI Committee, analyses the impact of digitalization on vulnerable social groups in terms of lower income and education, age, people affected by disabilities, minority ethnic groups and people living in remote/isolated geographic areas. It includes a review of the relevant academic literature, secondary data analysis, as well as three case studies focused on digital inequality in e-commerce and digital financial services. The study reviews the EU legislations relevant in the policy areas that are the object of the case studies and elaborates some recommendations on the actions that the EU could undertake to tackle the digital divide affecting vulnerable social groups.

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