EUROSHIP

closing gaps in European social citizenship

EU Citizens' attitudes to digitalisation and the use   of digital public services: Evidence from Eurobarometers and eGovernment Benchmark

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i)   to advance the knowledge base that underpins the formulation and implementation of relevant policies in Europe with the aim of exercising the EU social rights as an integral part of EU citizenship and promoting upward convergence, and

ii) to engage with relevant communities, stakeholders and practitioners in the research with a view to supporting social protection policies in Europe. Contributions to a dialogue about these results can be made through the project website euroship-research.eu, or by following us on Twitter: @EUROSHIP_EU.

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Abstract

This report examines citizens' attitudes to digital technologies in the context of national strategies to extend access to and use of digital public services.

Using comparative EU Eurobarometer data, we measure citizens' perceptions of:
   i)   digital technologies in general,
   ii)   their ability to navigate these digital technologies in their daily and work lives, and
   iii)   their level of digital skills.

We provide an intersectional comparative analysis of these perceptions by age, education, gender and household type; unfortunately, there is no data on ethnicity.

In addition, the report includes an examination of the most up to date comparative eGovernment Benchmark 2021 data to compare user perspectives on national provisions of digital public services.

It concludes by discussing the policy implications of these differences in citizens' perceptions both within and between countries and the differential rollout of public sector digital technologies across the Euroship countries.

The overall findings indicate:

1. Attitudes to digital technology in general are quite contradictory with both positive and negative perceptions of its expected outcomes.
2. Individuals' perceptions of their digital skills produce some expected differences in the gaps between different communities across all countries. For example, women, older people, the less well-educated groups and those living in households without children have a lower evaluation of their skills compared to men, younger, better educated, and those living in households with children.
3. However, while this is more or less similar across all countries, the extent of these differences varies between countries. Italians and Hungarians have lower levels of confidence in their digital skills than those in countries like Estonia, Spain and the UK. These findings chime with evidence discussed in D8.1 and D8.2 concerned with cross national differences in the take up of digital jobs and the roll out of digitalisation and e-government (O'Reilly and Verdin 2021and Verdin and O'Reilly 2021a).
4. Comparing eGovernment Benchmark for 2021 data suggests provision and usability of digital services is not always associated with citizens' improved perceptions of their digital capabilities. This may be a time lag factor or may reflect more entrenched divisions around accessibility and skills, particularly for less well-connected groups.
5. Policy makers will need to address not only the digital provision of public services but also the skills and abilities of citizens to access and use these services to ensure comprehensive digital inclusion.

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Acronyms

AI Artificial Intelligence

DESI Digital Economy and Society Index

Acknowledgements

1. Introduction

This report compares the attitudes and self-reported digital competences of adults across Europe, with a particular focus on access to public services. The pertinence of this analysis is linked to the context of national government strategies to rollout digital public services, and the EU aim of increasing digitalisation of public services across Europe (O'Reilly and Verdin 2021; Verdin and O'Reilly 2021a; European Commission 2020; Choroszewicz and Mäihäniemi 2020). This report focuses on a cross national comparison of citizens' attitudes to these technologies and their perceived and actual capabilities to use them. It also draws on up to date eGovernment Benchmarks from 2021 on the extent and roll out of digital public services in Europe drawing on the most up to date comparative data at the time of writing in January 2022.

The analysis demonstrates that attitudes to digital technologies are quite contradictory with both positive and negative perceptions of its expected outcomes. Cross national examination reveals differentiated trends relating to how varying levels of national digital advancement impact citizens' digital skills confidence, alongside within country intersectional differences. The gaps in self-defined perceptions of their confidence to access and use digital public and educational services flag up risks of social exclusion and disconnectedness for different vulnerable groups, regardless of the extent to which these services are being rolled out. The extent of this digital exclusion will be affected not only by government policies to enhance their digital infrastructure and offer, but also around user focused policies to make this transition inclusive.

2. The problem: 'accessibility gaps', 'user gaps' and intersectional inequalities

The film *I, Daniel Blake* poignantly captures the challenges for older, traditionally skilled manual workers, with underlying health conditions, to access welfare or apply for work; this experience from the UK has resonance across Europe. The ability to digitally connect to learning, employment and social support services is very unequal distributed (Van Dijk 2020; Mathers et al. 2020; Helsper 2021; Ofcom 2021). These inequalities stem not only from intersectional differences between groups and individuals, but also between households. These inequalities, evident before the pandemic (Atkinson, 2018), became vividly transparent during periods of lockdown (Skountridaki et al., 2020). Some high digital density households eased into learning and working from home; others, lacking the hardware and connectivity, were marginalised, or disconnected (Ayllón et al. 2021; Zheng and Walsham 2021).

Access to digital public services and experiences is marked by two types of gaps: 'accessibility gaps' and 'user gaps'. These affect motivation, skills and effective use of digital technologies (Negreiro, 2015). Digital divisions are often a reflection of other forms of social inequalities in society (Van Dijk, 2012, 2020; Van Deursen, 2015). The process of digitalisation can exacerbate these if little is done to acknowledge and address how inclusive digital policies can be developed beyond the extension of high scale infrastructure.

The digitalisation of public services has been prominent on national and European government agendas (Cabinet Office 2014; European Commission 2020; Choroszewicz and Mäihäniemi 2020). Policy tends to focus on connectivity infrastructure, while giving a more fragmented understanding of the training and support required to improve individuals' digital assets. Digital assets include having access, or not, to hardware and the skills to use the software. However, a number of gaps between access and usage can be identified along the lines of gender, class, age, ethnicity, disability and region (Zheng and Walsham, 2021). Policy to address these intersectional inequalities in terms of access and usage tends to be disjointed and poorly coordinated.

Appreciating the complexity of intersectional inequalities and power problematises over-simplistic divisions between the 'haves and the have nots' and the 'can and the cannots'. It also underestimates the variety of barriers for different kinds of people to access digital public services. Technological 'solutions' will not simply be about 'connecting the disconnected'. A wider understanding includes who is able to access these services, how they do this, and how effectively can they use these provisions to reinforce their citizenship rights.

The analysis presented here can go part way to contributing to understanding this problem by comparing citizens' perceptions of digitalisation and their ability to use these services across Europe. In subsequent work we will use more qualitative interviews to complement this analysis from the perspective of policy makers and citizens involved in the rollout of digital public services.

In this report we explore how Europeans feel about the increased use of artificial intelligence (AI), about how it affects their work and daily life, and whether they feel they have the digital skills necessary to navigate these new channels in particular for accessing public services (Allen QC and Masters, 2021; Gilbert et al., 2021; Dølvik and Jesnes, 2018: 16). Broad trends in the data and individual attitudes are explored over time by gender, age, education and household composition.[1]

The analysis shows notable differences in attitudes and competencies between countries. Within countries perceptions also vary, evidencing how social demographic characteristics reflect intersectional inequalities underlining the risks of digitalisations for already marginalised groups.

These attitudes are then cross referenced to explore the ease of use of online service provision and the rollout of digital services according to the eGovernment Benchmark data for 2021. This analysis is useful to help target initiatives, understand how risks of social exclusion may progress and importantly indicate where gaps are seemingly resilient to change. A major challenge to economic growth and social cohesion within and beyond the EU will be to identify effective policy solutions to bridge these digital divisions and increase citizens' abilities to connect to digital infrastructures to realise their citizenship rights.

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[1] Unfortunately, the Eurobarometer data does not include analysis of intersectional markers such as ethnicity and disability.

3. The data: Eurobarometer 460 (2017) & Eurobarometer 503 (2019)

Drawing on a selection of Eurobarometer[2] data we aim to identify changing patterns and attitudes to digitalisation of daily and working life in Europe. Since the initial EUROSHIP project proposal a new Eurobarometer survey has been conducted in 2019. To keep abreast of this emerging data and provide a comparative analysis, the first part of this report examines two large European surveys and special reports emerging from them: Eurobarometer 460 survey (2017) and the report 'Attitudes towards the impact of digitisation and automation on daily life', along with the Eurobarometer 503 survey (2019) and report 'The impact of digitalisation on our daily lives'. The data from both surveys and reports is interrogated comparatively to reveal country level differences showing how there is not a consistent story across Europe. Analysis concentrates on the six EUROSHIP countries that are represented in the survey (Estonia, Germany, Hungary, Italy, Spain and the UK; Norway was not included). The Eurobarometer results are subsequently evaluated and linked to the eGovernment Benchmarks and earlier comparisons of public sector digitalisation and skills in Europe, both including Norway (O'Reilly and Verdin 2021 and Verdin and O'Reilly 2021a).

Analysis of these large-scale Eurobarometer surveys helps identify who is most at risk of being digitally disconnected and consequently socially excluded. An intersectional analysis of this data considers how different groups reflect upon their own capabilities and the impacts on existing social inequalities.

The Eurobarometer 460 (2017) report contains statistical information and some demographic analysis regarding how Europeans feel about digitalisation. The data used was secured through a large survey carried out between 18 and 27 March 2017. Some 28,000 EU citizens from different social and demographic categories were interviewed in the 28 EU Member States in their native language.

Subsequently Eurobarometer 503 (2019) was carried out between 6 and 19 December 2019. 27,498 respondents from different social and demographic groups were interviewed in the 28 EU surveyed states in their native language. The surveys, commissioned by the European Commission, Directorate General for Communications Networks, Content and Technology were carried out by the TNS political and social network and Kantar network respectively.

Overall, the reports show that women, those over 55, those who consider themselves working class and those who left education at a younger age are less likely to be confident about their digital skills and less positive about digitalisation. Alongside these broad social demographic trends, we know from previous analyses of the survey data that countries, such

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[2] "Eurobarometer is the polling instrument used by the European Commission, the European Parliament and other EU institutions and agencies to monitor regularly the state of public opinion in Europe on issues related to the European Union as well as attitudes on subjects of political or social nature. Eurobarometer provides quality and relevant data for experts in public opinion, researchers, media and the public." https://europa.eu/eurobarometer/about/eurobarometer

as Hungary, Romania, Greece and Bulgaria, are more digitally vulnerable with lower levels of the spread of digitalisation in public and private life (Vasilescu et al., 2020: 35).

This report goes beyond existing research by seeking to understand the nuanced differences between and within countries and how this has changed over time. Given the progressive expectation of engagement with new technologies and exponential speed of automation and digitalisation, there is a pressing need to ensure all citizens are equipped with the skills to navigate daily life. This is and will be particularly important for them to sustain working lives that can respond to both labour market and welfare state transformations (Schwab, 2016; O'Reilly et al., 2018; WEF, 2016). In this context, understanding how citizens' confidence in digital skill differs will inform the next phase of analysis in work package 8 focusing on policy makers' assessment of the roll out of these services. We begin this micro level analysis of the data with an assessment of individual perceptions of AI.

4. Perceptions of Artificial Intelligence

Eurobarometer 460 (2017) considers individuals perceived impact of AI, robots and new technology on work and daily life. The key findings from the survey, given as a percentage of all respondents, were largely very positive showing that:

- 68% agree robots and AI are a good thing for society because they help people do their jobs or carry out daily tasks at home;
- 84% agree robots are necessary as they can do jobs that are too hard or too dangerous for people.

The broad levels of agreement demonstrate how respondents perceive the importance of assisting people in their work, with daily needs, or in terms of those in more dangerous occupations.

However, evidence from this survey also highlights the significant levels of reticence around these technologies. Interestingly the survey indicated that those who know more about robots and AI are more positive in their assessment (75%), compared to those that know less (49%) (Eurobarometer 460, 2017: 61). Social demographic factors further mark how respondents differed, demonstrating universal trends between countries. Younger respondents, those who use the internet more frequently, those who stayed in education longer and those with the least difficulty paying bills are less concerned about these developments (Eurobarometer 460, 2017: 60). The inverse is true for older people with limited internet use, low levels of education and more financial difficulties.

More negative opinions were found about the impact of robots and AI on the future of work, but with lower expectations that it would have a direct impact on their own jobs:

- 74% of respondents expect that due to the use of robots and AI, more jobs will disappear than new jobs will be created;
- 72% of respondents believe robots steal peoples' jobs;
- 44% of respondents who are currently working think their current job could at least partly be done by a robot or AI

While the importance and benefit of AI is widely acknowledged, this is accompanied by concern over the implications of these developments. The contradictions that are emerging demonstrate how the risks associated with the future of work are infiltrating public perceptions (White et al., 2019; Arntz et al., 2016; Verdin and O'Reilly, 2021; Goos and Manning, 2007; Frey and Osborne, 2017). This may further reflect the different experiences and understanding citizens have of new technologies, informed by social demographic factors, such as employment and the sectors they work in (Moreno, 2019: 21).

There are relatively low levels of support for the use of these technologies for personal services and greater concern with the need for robust management with the introduction of automated services:

- 26% of respondents are comfortable with having a robot to provide them services and companionship when infirm or elderly, or with having a medical operation performed on them by a robot;
- 22% would be comfortable being driven in a driverless car in traffic;
- 88% of respondents agree robots and AI are technologies that require careful management

The pandemic has enhanced the speed of change, highlighting the potential benefits of new technologies. However, the need for a public policy response in terms of the usage of AI is also marked, as both opportunity and risk are significant (Berg et al., 2016, WEF, 2018). Changes are evolving at an exponential rate without any clear understanding or framework to control usage. Companies profiting from technological developments are doing so in an unregulated environment and without limitation (Moreno, 2019: 22). The levels of confidence amongst respondents underline the risks described by Verdin and O'Reilly (2021a), with reference to the emerging digital employment labour market (Hauben et al., 2020). Future EUROSHIP deliverables will build upon these findings by seeking to understand how national digital strategies are intending to offset these risks.

The responses discussed here demonstrate an inherent paradox. On the one hand citizens see AI and robots as a force for good, while also expressing concerns and contradictions in their perceived effects. Given these mixed findings, we now turn to consider how individuals perceive their capacity to engage with the infiltration of digitalisation in work and daily life.

5. Perceptions of Skill and Confidence

Cross-national comparisons of responses to the Eurobarometers related to individual perceptions of their skills and confidence in using digital technologies illustrate significant variability both within and between countries. Some of this variation between countries is related to how digitally advanced countries are (Vasilescu et al., 2020). Country differences reinforce the trends observed in O'Reilly and Verdin's (2021a) analysis of the EU Digital Economy and Society Index (DESI) data. This section first outlines overall trends in Eurobarometer 460 (2017), with a comparison over time with Eurobarometer 503 (2019). Cross-national and within country differences are compared according to gender, age, education, and household composition.

Eurobarometer 460 (2017) found overall quite positive perceptions:

- 75% of respondents think the most recent digital technologies have a positive impact on the economy, 67% on their quality of life, and 64% on society at large;
- 71% agreed that they had sufficient digital skills for daily life;
- 65% consider themselves sufficiently skilled in the use of digital technology to use online public services;
- 76% of those who use the internet every day say the impact of these technologies on their quality of life has been positive (compared to 38% who never use the internet).

The impact of the change associated with digital technologies was also assessed in relation to the skills needed for work:

- 80% of respondents who were employed agreed that they were sufficiently skilled in the use of digital technologies to do their work;
- 64% say they are sufficiently skilled to benefit from digital and online learning opportunities.

While a large majority of Europeans consider themselves sufficiently skilled in the use of digital technology for work and daily life, a substantial minority of between 20-36% do not. There is a notable difference between countries in the size of this gap. Understanding this lack of confidence and the factors that shape it is critical if countries are to equip all their citizens with the skills they require to meet the structural rollout of these technologies in public and private life.

As you would expect, in countries that are more digitally advanced citizens report higher levels of confidence in the digital skill levels for daily life: Estonia (85%), the UK (79%), Germany (73%), Spain (68%), Italy (66%), and Hungary (52%) (Eurobarometer 460, 2017: 26). This suggests that increased exposure to digitalisations improves the perceptions of confidence amongst individuals.

There are subtle differences between countries when analysing responses to levels of confidence with the digital skills needed for work. The level of agreement in EUROSHIP countries is as follows: the UK 89%; Estonia 86%; Spain 80%; Italy 79%; Germany 78%; and Hungary 57% (Eurobarometer 460, 2017: 28). The data shows that confidence is higher overall, most notably in the UK (+10%), Spain (+12%) and Italy (+13%). This suggests that work is a positive influence in shaping confidence in digital skill.

According to Eurobarometer 503 (2019), the proportion of respondents who consider themselves to be sufficiently skilled in their use of digital technologies for daily life / or to do their job, remained relatively stable, dropping only by 1%. However, there was an overall 5% decline in those 'totally agreeing' with the statement, suggesting that the complexity of tasks and speed of change is outpacing how some citizens' perceive their abilities to meet these changes.

The original data from both surveys has been cross referenced with social demographic features to help understand how intersectional differences may impact the capabilities of

those with certain characteristics in variable ways. Respondents in both surveys were asked their level of agreement with the statement, 'I have sufficient digital skills within my daily life'.[3] In the following analysis the level of agreement, measured on a Likert scale, is evaluated with reference to gender, age, education and household composition.[4] This illustrates areas of consensus and difference both within and between countries. We begin with analysis of gender.

5.1 Gender

Men are more likely than women to agree, that they have sufficient digital skills for daily life across all EU countries (75% v 68%) (Eurobarometer 460, 2017: 26). Specific scrutiny of EUROSHIP countries (see Figure 1) supports this finding. The largest gender difference can be observed in Italy (12%), and the smallest in the UK (5%). Both men and women in Hungary reported the lowest levels of confidence with their digital skills for daily life. While the variability in confidence by gender is limited, it remains notable and of concern.

Change in this attitudinal data over time can be seen when comparing Figure 1 (2017) with Figure 2 (2019). In all countries male participants still agree with the statement more than females. In the German case, levels of agreement by both men and women increased, however the gender gap also grew (6% in 2917 - 11% in 2019). The data shows an increasing gender gap in confidence levels in the UK, Spain, Germany and Estonia. Conversely, in Italy and Hungary the gender gap in confidence level has declined. Interestingly, while overall levels of confidence for both sexes in digital skill grew in Hungary, in the Italian case overall agreement declined between the two surveys.

Gender differences with women's lower level of confidence in their digital skills is clearly evident from this data. Despite the well-established importance of ensuring women's inclusion in the digital transformation of society, this comparative data suggests existing inequalities are at risk of being exacerbated for particular groups of women (Criado-Perez, 2019; Mariscal et al., 2019; Sorgner et al., 2017; Verdin and O'Reilly, 2021).

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[3] For figures 1, 3, 7 and 9 participants for the Eurobarometer 460 report who were asked if they had sufficient digital skills within daily life are reported as: Estonia n= 1017, Germany n=1537, Hungary n= 1053, Italy n= 1022, Spain n=1024, UK n=1037. For figures 2, 4, 8, and 10 participants for the Eurobarometer 503 report who were asked if they had sufficient digital skills within daily life are reported as: Estonia n=1001, Germany n=1526, Hungary n=1026, Italy n= 1020, Spain n= 1014, UK n=1023

[4] For the purposes of this paper the number of participants who responded to the statements discussed 'totally agree' and 'tend to agree' were added together. The Likert scale is a typical psychometric response scale in which respondents are asked to categorise their level of agreement with a statement.

Figure 1: Gender perspective on sufficiency of digital skill for daily life (2017)

PERCENTAGE OF PARTICIPANTS BY GENDER AGREEING OR
DISAGREEING WITH THE STATEMENT 'I HAVE SUFFICIENT
DIGITAL SKILLS WITHIN MY DAILY LIFE' (460 DATA 2017)

■ Male agree   ■ Female agree   ■ Male disagree   ■ Female disagree

	ESTONIA	GERMANY	HUNGARY	ITALY	SPAIN	UK
Male agree	79%	76%	57%	74%	73%	82%
Female agree	71%	70%	49%	62%	64%	77%
Male disagree	16%	20%	39%	22%	24%	15%
Female disagree	22%	27%	43%	32%	30%	18%
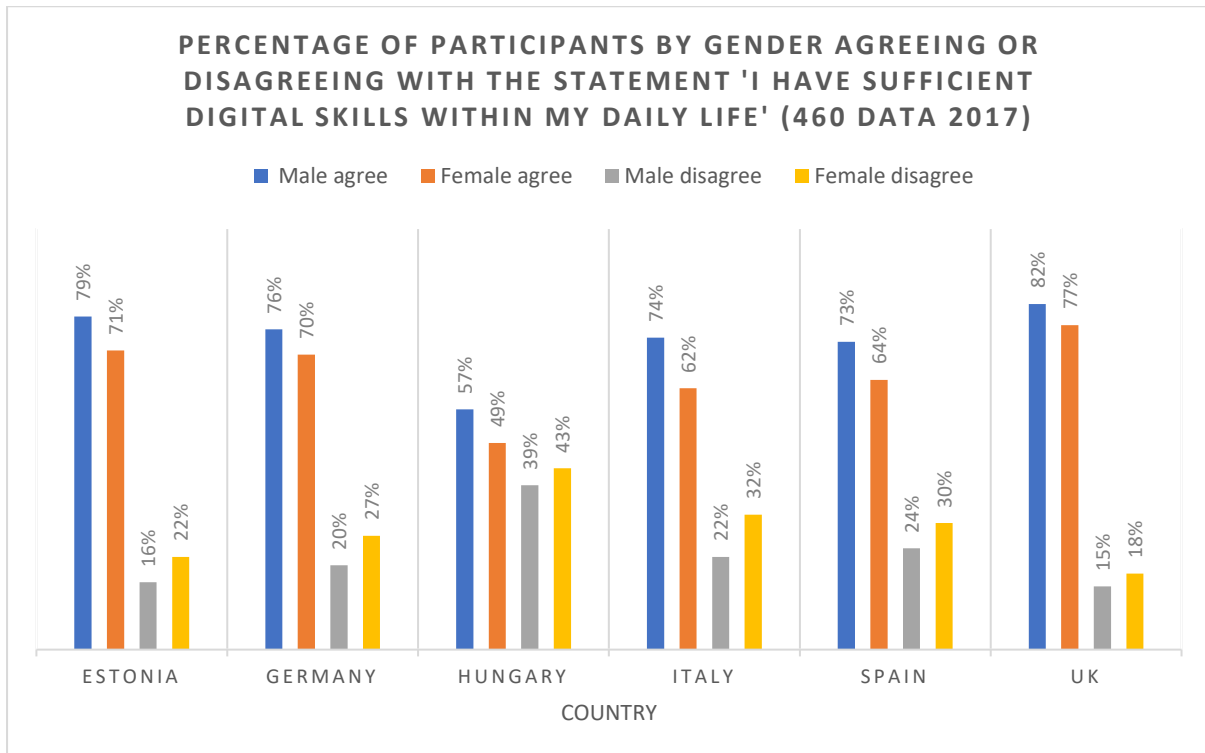
COUNTRY

Figure 2: Gender perspective on sufficiency of digital skill for daily life (2019)

PERCENTAGE OF PARTICIPANTS BY GENDER AGREEING OR
DISAGREEING WITH THE STATEMENT 'I HAVE SUFFICIENT
DIGITAL SKILLS WITHIN MY DAILY LIFE' (2019 503 DATA)

■ Male agree   ■ Female agree   ■ Male disagree   ■ Female disagree

	ESTONIA	GERMANY	HUNGARY	ITALY	SPAIN	UK
Male agree	79%	86%	70%	61%	68%	80%
Female agree	68%	75%	64%	52%	58%	74%
Male disagree	15%	11%	29%	37%	29%	18%
Female disagree	25%	21%	35%	44%	39%	24%

COUNTRY

13
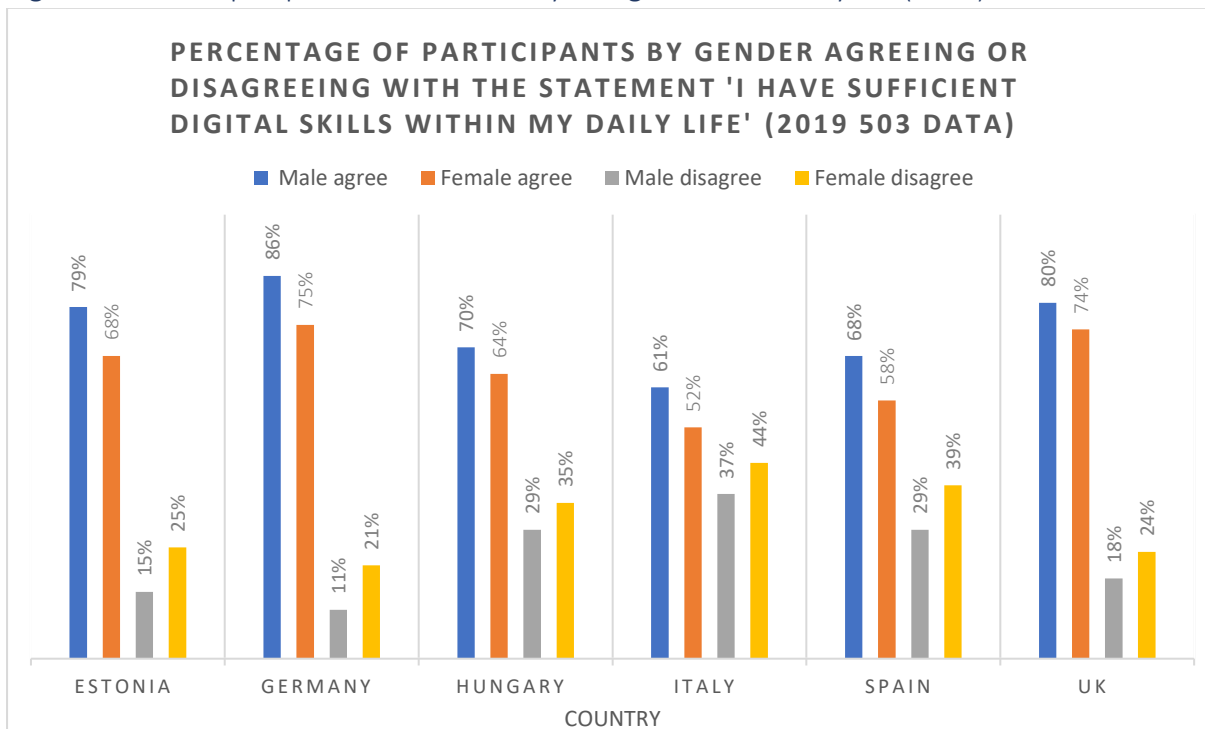
5.2 Age

Confidence in the digital skills needed for daily life are higher amongst the young. Across all countries those aged 39 and under are more confident in their skill set than those over 40; the over 55s report the lowest levels of confidence (see Figure 3).

Between countries there is a more mixed picture in terms of the levels of confidence. Figure 3 reiterates the findings of Vasilescu et al. (2020), who suggest that levels of confidence in digital skill relate to how digitally advanced countries are. For example, the overall lower levels of confidence across all ages in the Hungarian case reflects evidence from the DESI data indicating the overall low take up of a number of different digital technologies in Hungary, compared to other European countries (O'Reilly and Verdin 2021).

Changes in these attitudes over time presents a mixed picture (see Figure 4). Age remains a defining feature in 2019: confidence levels decrease with age. Both Spain, and more markedly Italy, have seen declining levels of confidence overall in their digital skill set. Conversely in Hungary and Germany levels of confidence have increased across all age categories.

Figure 3: Age perspective on sufficiency of skill for daily life (2017)

PERCENTAGE OF PARTICIPANTS BY AGE AGREEING WITH THE STATEMENT 'I HAVE SUFFICIENT DIGITAL SKILLS WITHIN MY DAILY LIFE' (2017 460 DATA)

- 15-24
- 25-39
- 40-54
- 55+

	ESTONIA	GERMANY	HUNGARY	ITALY	SPAIN	UK
15-24	98%	93%	64%	92%	96%	94%
25-39	99%	88%	71%	91%	93%	92%
40-54	86%	83%	60%	82%	82%	89%
55+	48%	52%	32%	41%	34%	58%

COUNTRY
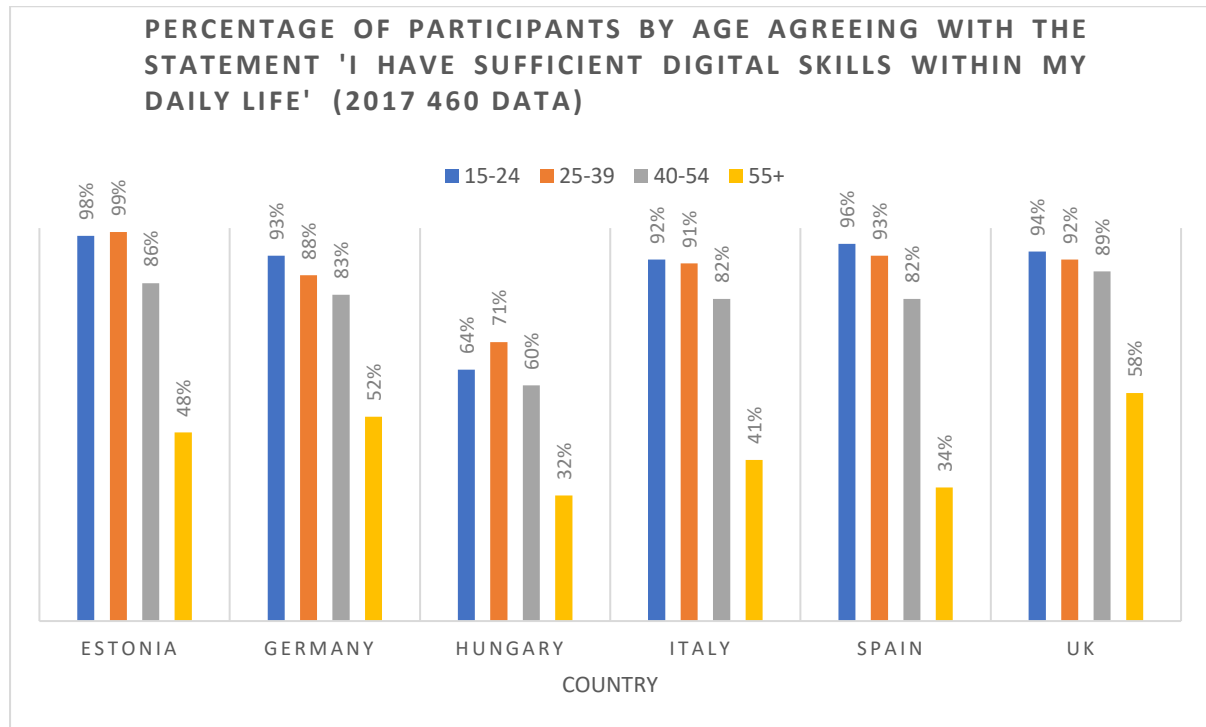
Figure 4: Age perspective on sufficiency of skill for daily life (2019)

PERCENTAGE OF PARTICIPANTS BY AGE AGREEING WITH THE STATEMENT 'I HAVE SUFFICIENT DIGITAL SKILLS WITHIN MY DAILY LIFE' (2019 503 DATA)

- 15-24
- 25-39
- 40-54
- 55+

	ESTONIA	GERMANY	HUNGARY	ITALY	SPAIN	UK
15-24	91%	94%	88%	78%	85%	100%
25-39	94%	93%	79%	78%	83%	92%
40-54	85%	90%	71%	70%	73%	88%
55+	47%	64%	49%	31%	36%	51%

COUNTRY
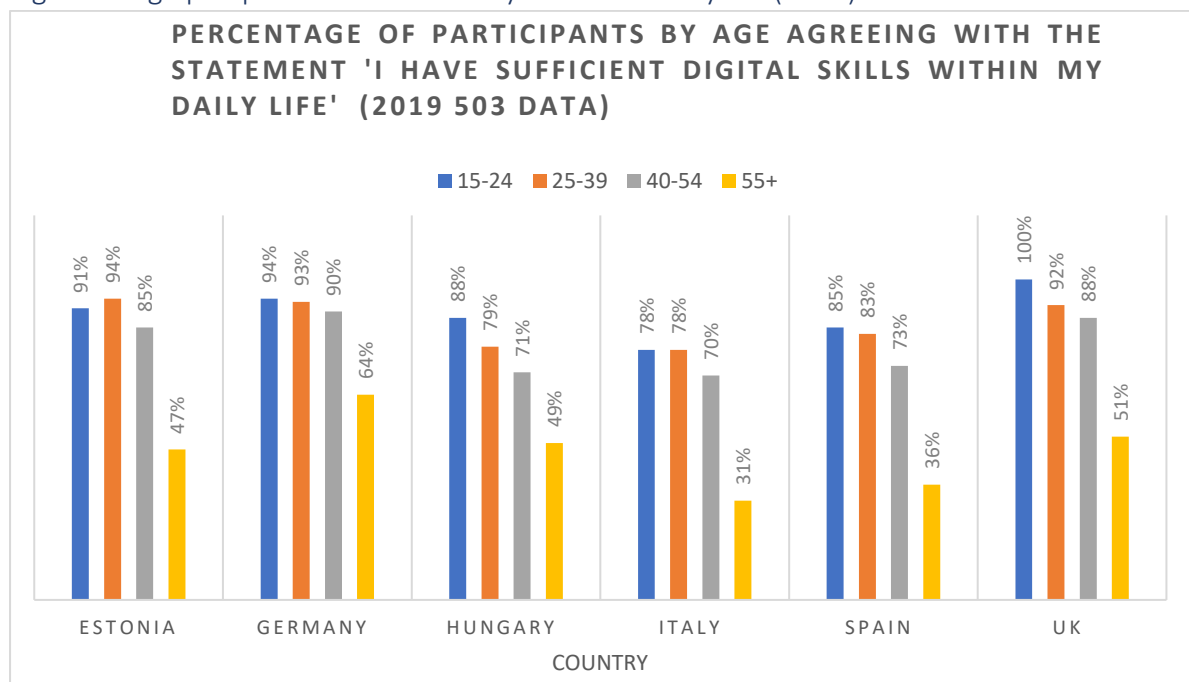
Given the low levels of confidence reported for respondents aged 55+, further consideration is now given to how respondents felt about the digital skills required for work. Comparison between Figures 5 and 6 shows a marked increase in the level of agreement from respondents aged 55+ over time. Given only those in work were asked this question, this demonstrates how on the job experiences may help to alleviate some of the reskilling needs experienced by this age cohort.

Figure 5: Age perspective on sufficiency of digital skill for work (2017) [5]

PERCENTAGE OF PARTICIPANTS BY AGE AGREEING WITH THE
STATEMENT 'I HAVE SUFFICIENT DIGITAL SKILLS TO DO MY
JOB' (2017 460 DATA)

■ 15-24   ■ 25-39   ■ 40-54   ■ 55 +

Estonia: 94%, 95%, 83%, 75%
Germany: 73%, 82%, 79%, 82%
Hungary: 62%, 65%, 56%, 45%
Italy: 77%, 84%, 80%, 68%
Spain: 96%, 86%, 80%, 56%
UK: 94%, 91%, 90%, 77%

COUNTRY
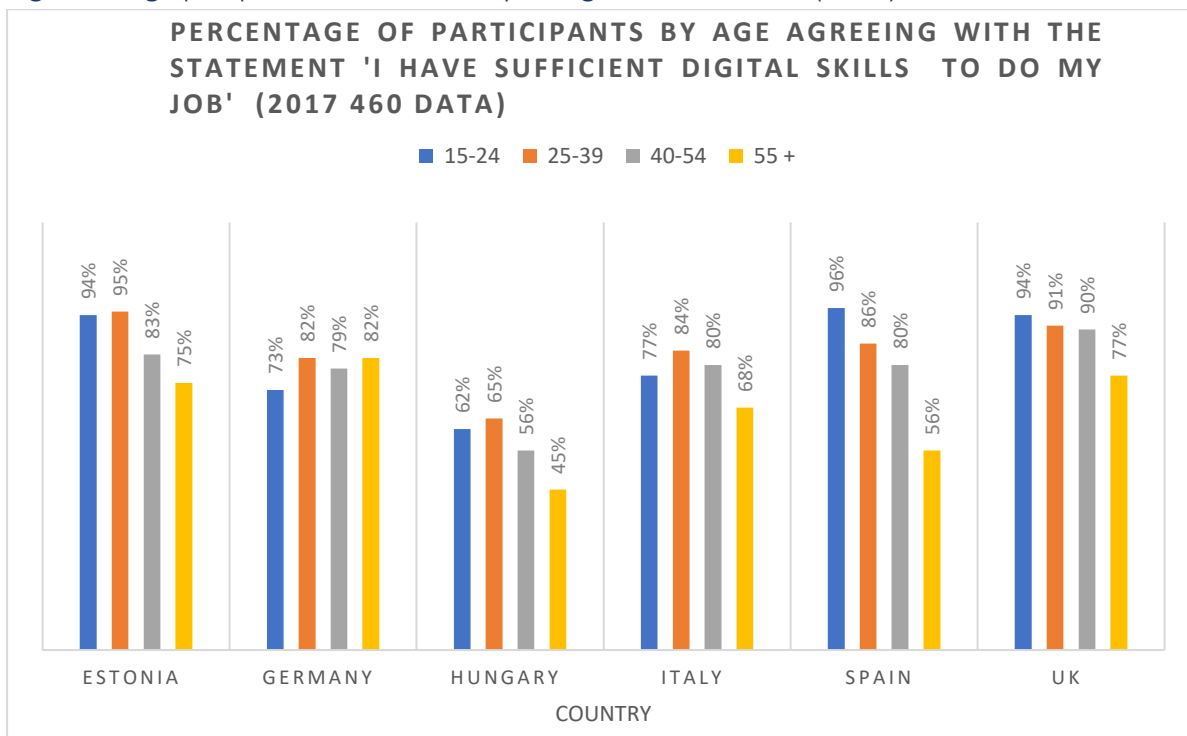
Figure 6: Age perspective on sufficiency of digital skill for work (2019) [6]

PERCENTAGE OF PARTICIPANTS BY AGE AGREEING WITH THE
STATEMENT 'I HAVE SUFFICIENT DIGITAL SKILLS TO DO MY
JOB' (2019 503 DATA)

■ 15-24   ■ 25-39   ■ 40-54   ■ 55 +

Estonia: 94%, 96%, 87%, 73%
Germany: 99%, 89%, 90%, 87%
Hungary: 67%, 78%, 73%, 66%
Italy: 34%, 74%, 73%, 66%
Spain: 83%, 87%, 78%, 63%
UK: 100%, 92%, 92%, 76%

COUNTRY
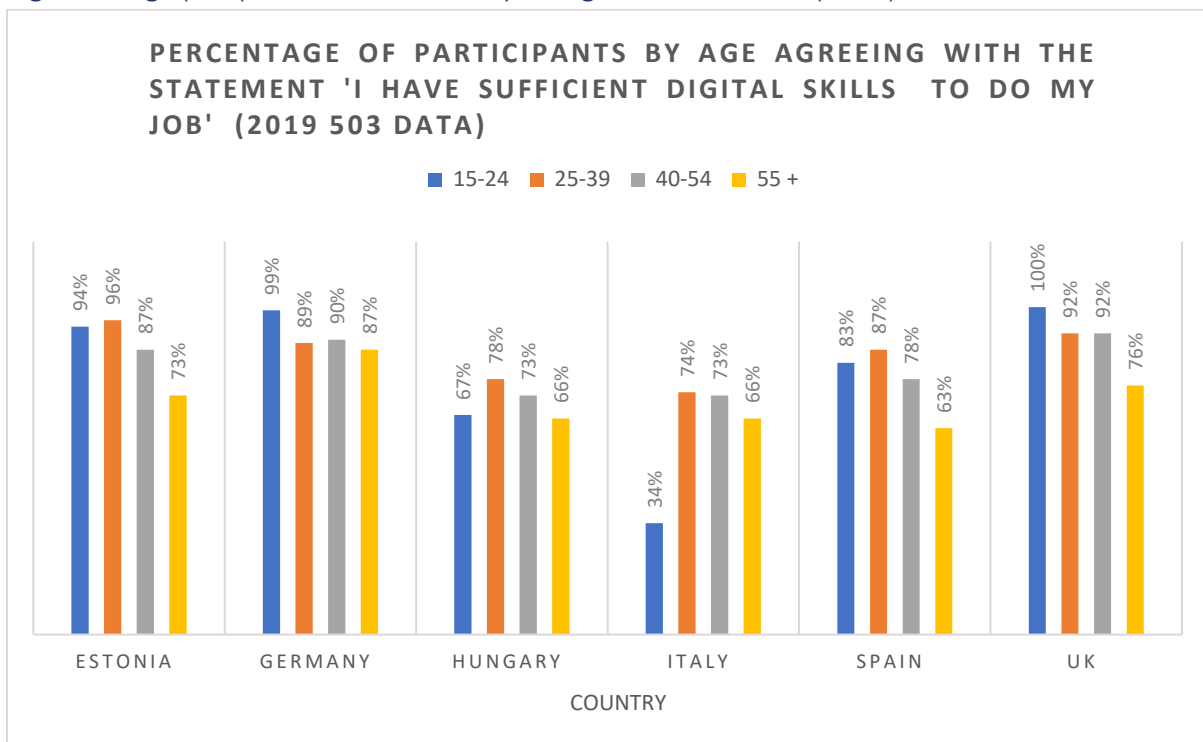
[5] For figure 5 and 6 participants for the Eurobarometer 460 report who were asked if they had sufficient digital skills to do their job are reported as: Estonia n=540, Germany n=777, Hungary n= 568, Italy n= 441, Spain n=426, UK n= 563

[6] Participants for the Eurobarometer 503 report who were asked if they had sufficient digital skills to do their job are reported as: Estonia n=571, Germany n=793, Hungary n= 650, Italy n= 501, Spain n=508, UK n= 522

Further comparison between Figures 5 and 6 shows a more mixed picture of confidence levels with the digital skills needed for work amongst younger age cohorts. There is a marked rise for those aged 15-24 in Germany and in Hungary for those aged 40-54. Although in Italy the youngest age cohort (15-24) demonstrates a decline of 43%, this is skewed by the very small numbers of respondents in this case (2017 n=6 and 2019 n=4).

The survey data shows the potential risk of digital exclusion associated with age. This challenge is likely to increase, given populations are ageing. What is also clear, through this country specific analysis over time, is the nuance that is needed in order to address these gaps. This underlines the importance of understanding how different age cohorts acquire necessary digital skills and confidence, alongside ensuring that this knowledge can keep pace with the speed of advancement (Betts et al., 2019: 1148).

The relatively low levels of confidence in the digital skills needed for work amongst the younger age cohort in both Hungary (67% in 2019) and Italy (34% in 2019) may suggest that, despite the contention that young people are 'digital natives', they too are not a homogenous group (Helsper and Eynon, 2010). Patterns of confidence are not consistent. It is therefore necessary to understand this variability in order to target appropriate skill provision (Dutton and Reisdorf, 2019). For example, ensuring developments within school, retraining in the workplace and adult education, alongside a focus relevant for older people is targeted according to the specific needs of these age cohorts (Betts et al., 2019: 1161). This will be picked up in the expert interview phase of the research to explore how policy makers are addressing these challenges.

5.3 Education

Length of time in education is a strong indicator of digital skills confidence. Those who left education at age 15 are typically the least confident with the digital skills they need for daily life. An increasing level of confidence with the statement 'I have sufficient digital skills within my daily life' runs parallel to the increased length of time spent in education (see Figure 7).

In all EUROSHIP countries the levels of agreement with the statement for those leaving school at 15 is low, particularly in Hungary (24%), Estonia (30%) and Italy (31%). The inclusion of Estonia in this grouping is interesting, given their relative digital advancement. This data again supports the conclusions from O'Reilly and Verdin (2021) and Verdin and O'Reilly (2021a). In addition, it underlines the importance of third sector organisations (i.e. Good Things Foundation in the UK (Mathers et al., 2020)), to counter the risks of digital illiteracy for all age groups, alongside government policies to provide a more universal infrastructure to address this major societal transition.

Comparison over time confirms this pattern across all countries with longer levels of education being associated with higher levels of personal confidence in digital skills (see Figure 8). The notable gap in agreement between those leaving school at age 15, and indeed

for each progressive marker indicating the extent of education acquired, starkly highlights the risks of marginalisation for those who are less educated; and this is evident across Europe.

Figure 7: Impact of education on sufficiency of digital skill for daily life (2017)

PERCENTAGE OF PARTICIPANTS AGREEING WITH THE STATEMENT 'I HAVE SUFFICIENT DIGITAL SKILLS WITHIN MY DAILY LIFE' CATOGORISED BY THE AGE THE RESPONDENT STOPPED FULL TIME EDUCATION (2017 460 DATA)

■ 15 ■ 16-19 ■ 20+ ■ Still studying

COUNTRY	15	16-19	20+	Still studying
ESTONIA	30%	66%	85%	97%
GERMANY	44%	70%	84%	93%
HUNGARY	24%	54%	68%	83%
ITALY	31%	79%	90%	96%
SPAIN	36%	78%	93%	98%
UK	44%	81%	93%	93%
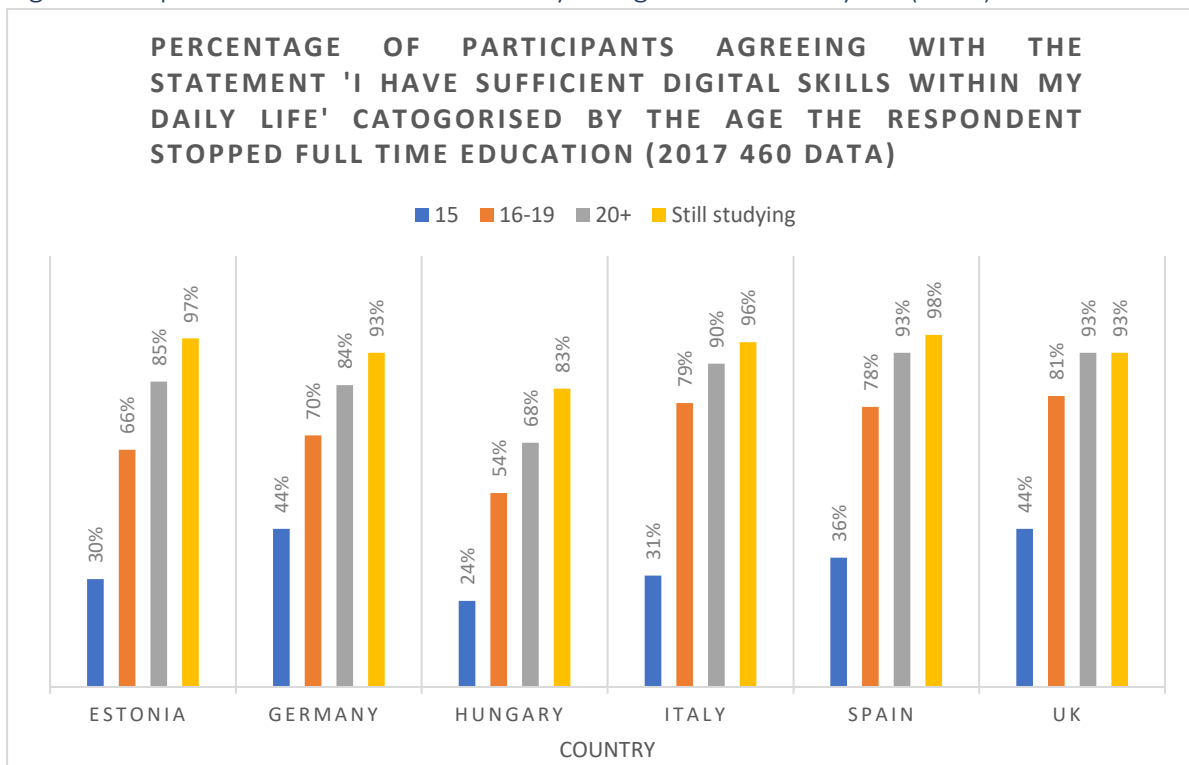
Figure 8: Impact of education on sufficiency of digital skill for daily life (2019)

PERCENTAGE OF PARTICIPANTS AGREEING WITH THE STATEMENT 'I HAVE SUFFICIENT DIGITAL SKILLS WITHIN MY DAILY LIFE' CATOGORISED BY THE AGE THE RESPONDENT STOPPED FULL TIME EDUCATION (2019 530 DATA)

■ 15 ■ 16-19 ■ 20+ ■ still studying

COUNTRY	15	16-19	20+	still studying
ESTONIA	27%	65%	81%	88%
GERMANY	55%	78%	88%	95%
HUNGARY	39%	65%	84%	92%
ITALY	20%	62%	76%	79%
SPAIN	36%	69%	81%	91%
UK	43%	77%	88%	98%
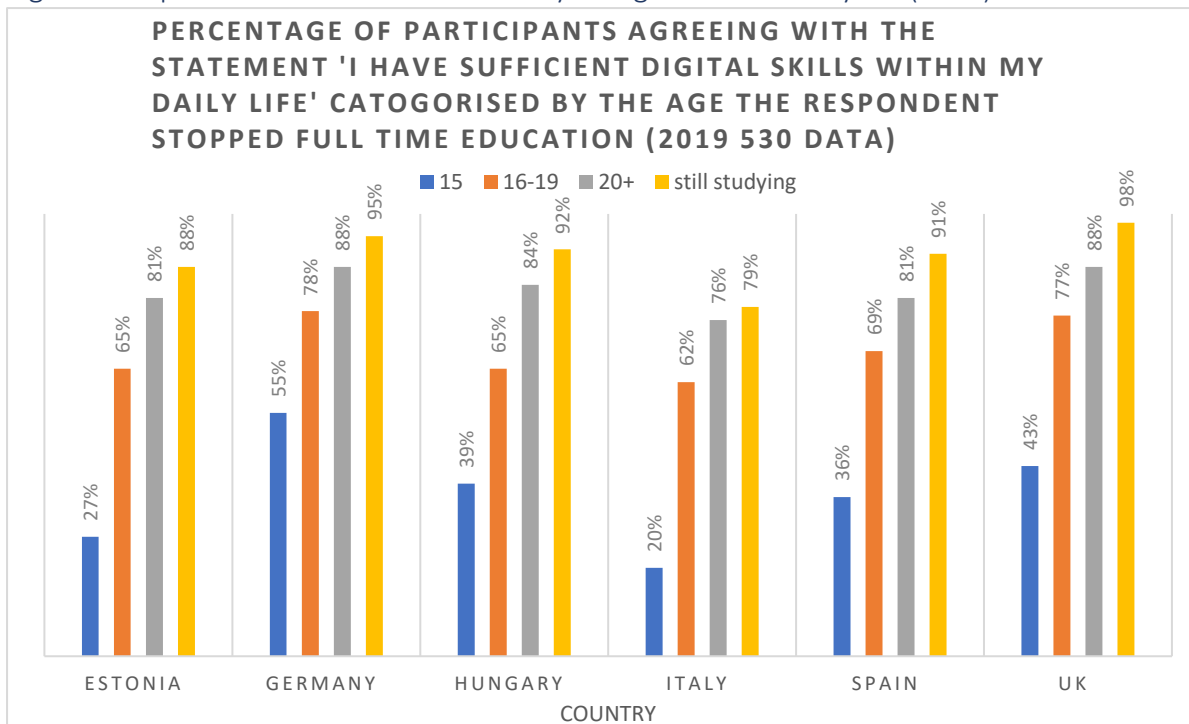
Alongside this consistent characteristic, comparison between the surveys also shows a surprising finding. Agreement with the statement in Hungary has increased (by 15% in the age 15 cohort, 11% in the 16-19 cohort, 16% in the 20+ cohort, and then 9% for those still studying). A similar trend of increased confidence across these age cohorts is also evident, to a more limited degree, in Germany.

In other countries, such as Italy, digital confidence has declined across age cohorts (by 11% for those leaving education at age 15, 17% in the 16-19 cohort, 14% in the 20+ cohort and by 17% for those still studying). Given there has been an increase in efforts to improve digital literacy (O'Reilly and Verdin 2021), individuals' perceptions of their digital confidence are faltering.

5.4 Household composition

Turning to examine the impact of household composition on digital skills confidence Eurobarometer findings show that households with children across Europe are more likely to agree they have sufficient digital skills within their daily life (80%), compared to those without children (64%) (Eurobarometer, 2017: 22). However, single parent households with children have the lowest levels of confidence in the digital skills needed for daily life compared to those with two parents (multiple households) (see Figure 9). These gaps may reflect a relative degree of deprivation for single parent households who may have limited access to hardware or connectivity, as discussed in O'Reilly and Verdin (2021) and as reported through periods of lockdown and home schooling during the course of the pandemic (Ayllón et al., 2021; Baker, 2020).

Comparative analysis of the 2019 survey data shows that respondents in multiple households with children still express the greatest confidence in their digital skills (see Figure 10), except in the case of Italy. Levels of agreement have increased in both Germany and Hungary across all household types. Conversely Estonia, Italy, Spain and the UK see declining levels of agreement with the statement across all household types. These declines have been most marked for single households with children in Estonia (21%) and Italy (18%). These findings again highlight the risks for already marginalised groups, given the significant reshaping of attitudes in this two-year period from when the surveys were conducted.

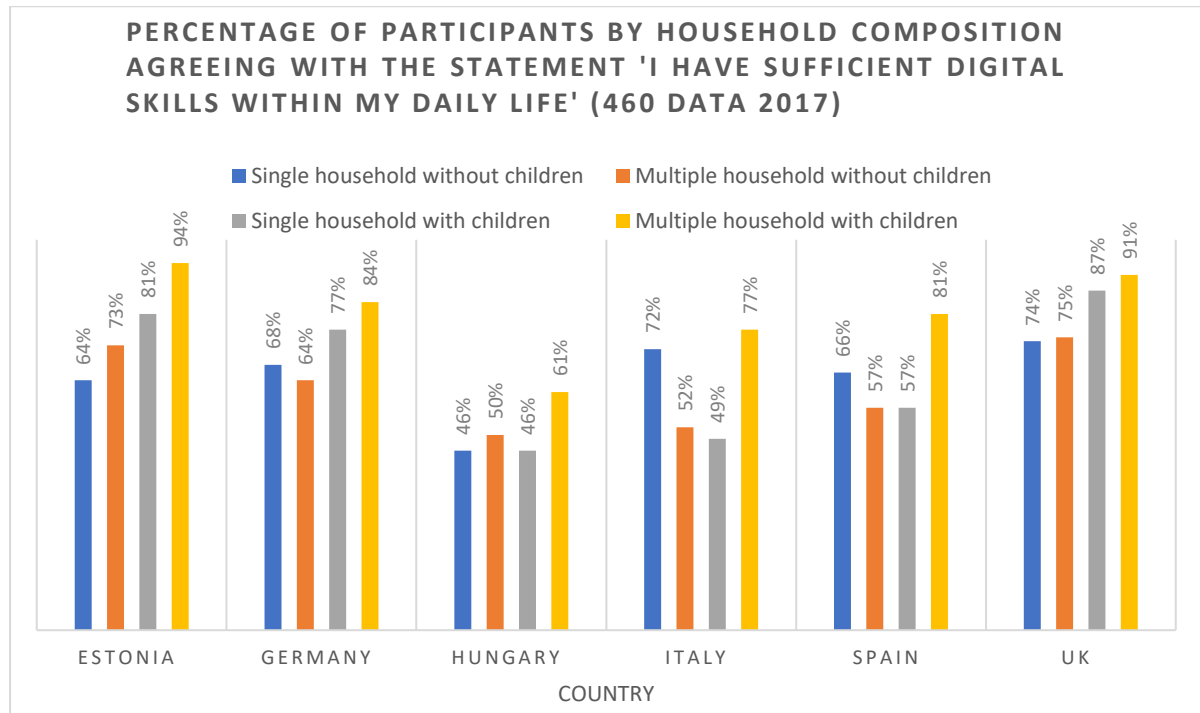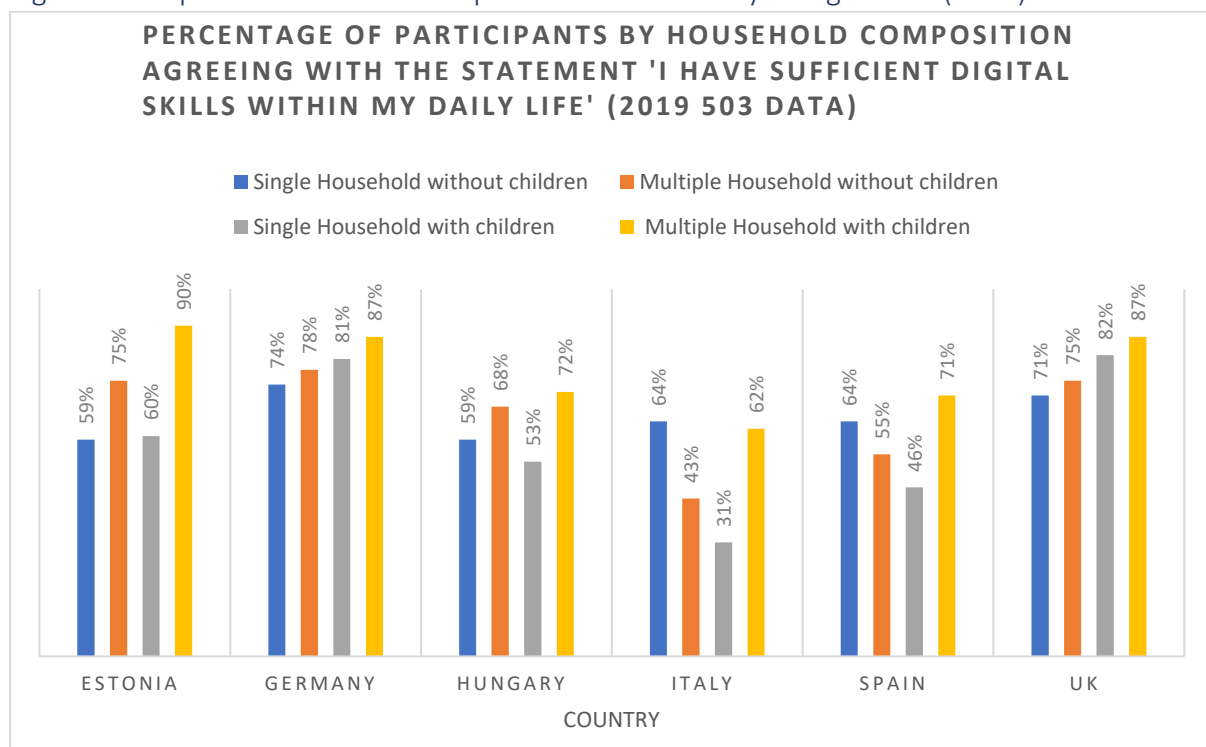Figure 9: Impact of household composition on sufficiency of digital skill (2017)

PERCENTAGE OF PARTICIPANTS BY HOUSEHOLD COMPOSITION AGREEING WITH THE STATEMENT 'I HAVE SUFFICIENT DIGITAL SKILLS WITHIN MY DAILY LIFE' (460 DATA 2017)

- Single household without children
- Multiple household without children
- Single household with children
- Multiple household with children

Country	Single household without children	Multiple household without children	Single household with children	Multiple household with children
ESTONIA	64%	73%	81%	94%
GERMANY	68%	64%	77%	84%
HUNGARY	46%	50%	46%	61%
ITALY	72%	52%	49%	77%
SPAIN	66%	57%	57%	81%
UK	74%	75%	87%	91%

COUNTRY

Figure 10: Impact of household composition on sufficiency of digital skill (2019)

PERCENTAGE OF PARTICIPANTS BY HOUSEHOLD COMPOSITION AGREEING WITH THE STATEMENT 'I HAVE SUFFICIENT DIGITAL SKILLS WITHIN MY DAILY LIFE' (2019 503 DATA)

- Single Household without children
- Multiple Household without children
- Single Household with children
- Multiple Household with children

Country	Single Household without children	Multiple Household without children	Single Household with children	Multiple Household with children
ESTONIA	59%	75%	60%	90%
GERMANY	74%	78%	81%	87%
HUNGARY	59%	68%	53%	72%
ITALY	64%	43%	31%	62%
SPAIN	64%	55%	46%	71%
UK	71%	75%	82%	87%

COUNTRY

This data suggests a linkage between digital competence and the role of collaboration and family learning between adults and young people in the home (Helsper and Eynon, 2010: 516).

This analysis of Eurobarometer 460 (2017) and 503 (2019) has shown how attitudes towards digital competences vary between countries and according to different social demographic characteristics. Respondents were asked about the difficulties they faced in improving their digital skills. Overall responses to Eurobarometer 503 (2019) found the most common barriers as follows:

- A lack of time to improve their skills (27%)
- Not knowing what specific skills they should improve (24%)
- A lack of appropriate training opportunities (22%)

In terms of how to allay their self-reported digital skill gaps, respondents also reflected on what technological solutions may assist:

- A secure single digital ID (63%) for all online services (both public and private)
- Greater security for online services (63%)
- If more public services were online (57%)

In sum, this analysis indicates that while a majority of Europeans feel they have the appropriate levels of skills to navigate their digital daily and working lives, significant minorities do not. These differences are related not only to the difference in national levels of digitalisation, but also vary within countries along an intersectional level of inequality and inaccessibility. Bearing these findings in mind, we now turn to compare evidence for the extent and use of online public services in Europe.

6. Usability of services and the eGovernment Benchmark Survey 2021

The eGovernment Benchmark survey provides an analysis of digital government through the eyes of EU citizens. It "*corresponds with the key policy priorities in the e-government Action Plan and the Tallinn Declaration and brings insights on the state-of play of e-government in Europe.*" (European Commission, 2021).

Our analysis draws on eGovernment Benchmark data from 2013-2019 to explore the maturity of online public services.[7] This survey is used to compare the public social services dimension on the DESI and examines the extent to which government public services are available online (O'Reilly and Verdin, 2021).

The eGovernment Benchmark establishes measures to compare the provision of public services for key life events. These key life events in the 2013-2019 data include: owning and driving a car, moving house, starting and losing a job, having a child, studying, and starting a small claims procedure. The indicators used in the survey include: user centricity, transparency, cross border mobility and key enablers. We focus now on the 'user centricity' dimension to help us understand the Eurobarometer findings. This indicator examines the

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[7] To ensure consistency with the Eurobarometer analysis eGovernment data from 2019 has been used. This dataset also includes both Norway and the UK.

extent of service provision online, the ease of use in terms of the support and help available on the website, and mobile friendliness. The 'user centricity' of service provision associated with these life events is assessed by citizens respondents in the eGovernment Benchmark data. In each country respondents report on their experience of government service provision for each of the key life events described.

This analysis is intended to explore the extent to which the attitudes presented in the Eurobarometer surveys may be influenced by the usability of service provisions. Firstly, we can see how overall user centricity reported by eGovernment Benchmark data has changed over time (Figure 11).

Figure 11: User centricity of services to support key life events online (2019)
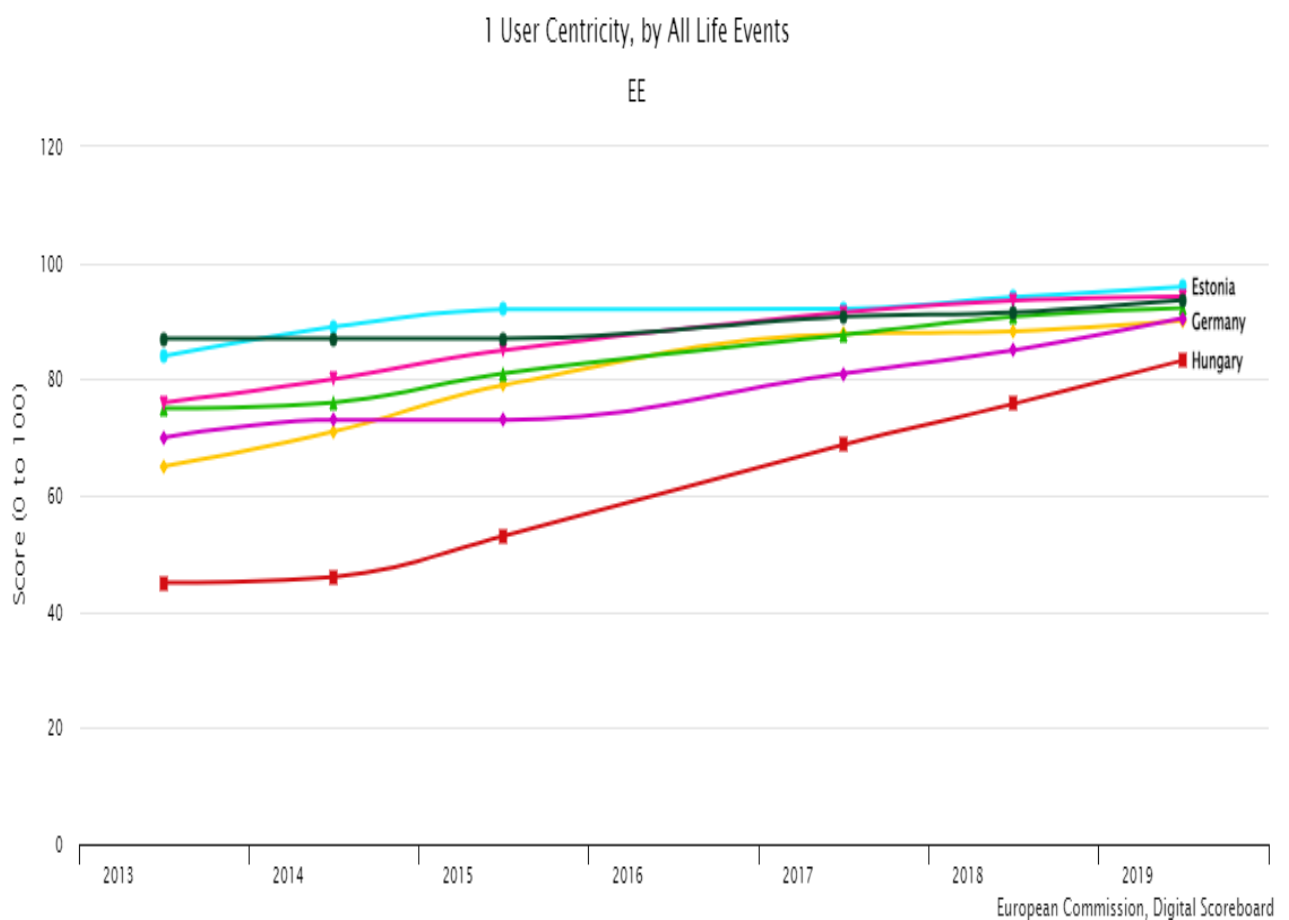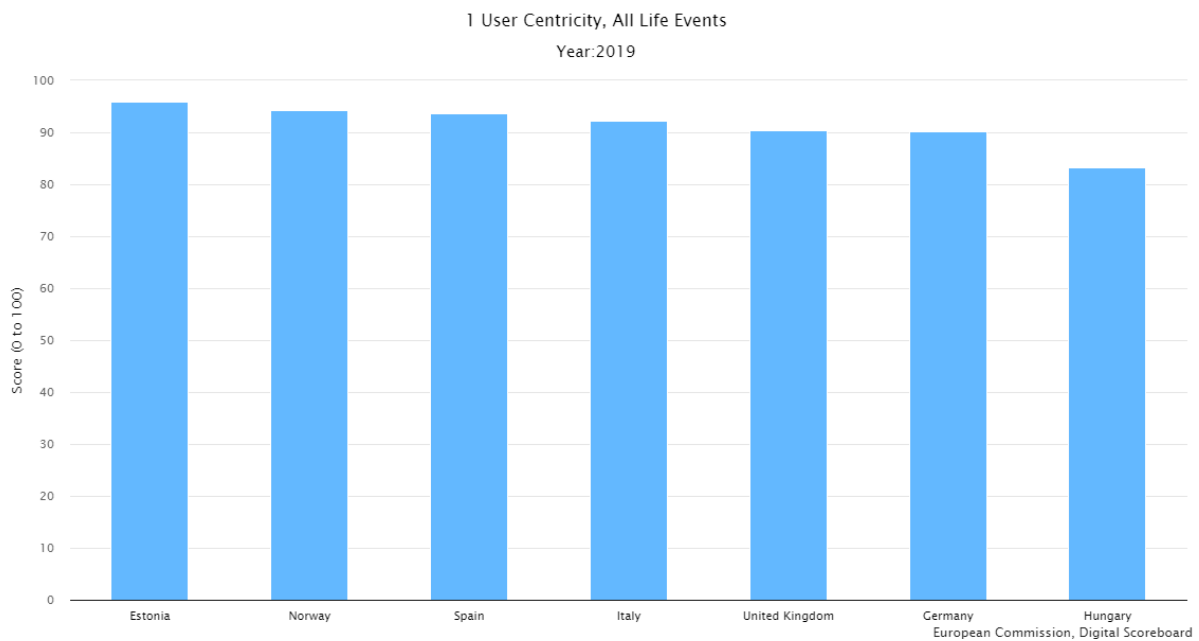

Source: eGovernment Benchmark

Legend: Red – Hungary; Yellow – Germany; Lilac – UK; Green – Italy; Pink – Norway; Dark Green – Spain; Turquoise - Estonia

The graph shows marked improvements for Hungary and Italy, alongside consistently strong performances for Estonia and Spain. This broadly reflects the DESI data and digital advancements discussed in O'Reilly and Verdin (2021). While the pace of improvement varies, there is an overall upward trend over time. These improvements in usability show that

online provision of services, citizens experiences of the interface, and mobile friendliness of access are progressing. However, there was no such clear trend in terms of the attitudes reported in Eurobarometer 460 (2017) and 503 (2019). If the digital confidence of citizens cannot keep pace, these advancements may add to the risks of digital exclusion.

Figure 12 provides a snapshot of how EUROSHIP countries compared in 2019, with reference to user centricity.

Figure 12: Cross country comparison of user centricity (2019)

1 User Centricity, All Life Events
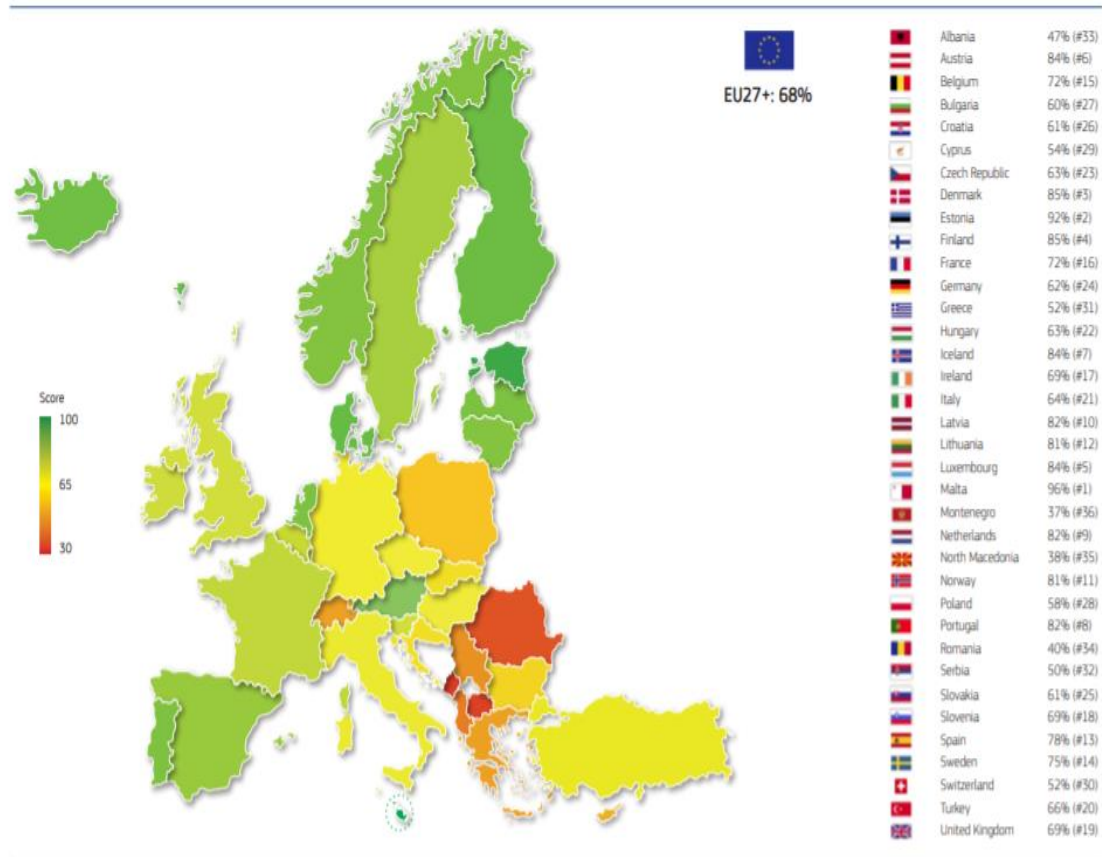Year:2019

Source: eGovernment Benchmark

Scores of over 90 in Estonia, Norway, Spain and Italy show that online services are almost universally available and usable. Nevertheless, the potential to access the services needed for daily life, alongside an easy to use and mobile-friendly interface, is not sufficient to address the confidence gaps reported in Eurobarometer 460 (2017) and 503 (2019).

The eGovernment Benchmark 2021 report provides a useful reflection on how the Covid pandemic has enhanced the speed of technological development.[8] Digitalisation has been implemented at pace as progress towards the 100% target for online provision of public services has continued (European Commission, 2021: 7). That said, the evidence shows that business services (91%) are more digitalised than citizens services (77%) (European Commission, 2021: 26). The higher levels of self-reported confidence in the digital skills required for work as opposed to daily life, shown in Figures 4 and 6, may reflect this development (Eurobarometer 460, 2017: 26 and 28).

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[8] The research for the eGovernment Benchmark 2021 was carried out between August and September 2020.

Figure 13 shows a broad assessment of performance across Europe according to all indicators in the eGovernment Benchmark data.[9]

Figure 13: eGovernment maturity in Europe (2021)

	Albania	47% (#33)
	Austria	84% (#6)
	Belgium	72% (#15)
	Bulgaria	60% (#27)
	Croatia	61% (#26)
	Cyprus	54% (#29)
	Czech Republic	63% (#23)
	Denmark	85% (#3)
	Estonia	92% (#2)
	Finland	85% (#4)
	France	72% (#16)
	Germany	62% (#24)
	Greece	52% (#31)
	Hungary	63% (#22)
	Iceland	84% (#7)
	Ireland	69% (#17)
	Italy	64% (#21)
	Latvia	82% (#10)
	Lithuania	81% (#12)
	Luxembourg	84% (#5)
	Malta	96% (#1)
	Montenegro	37% (#36)
	Netherlands	82% (#9)
	North Macedonia	38% (#35)
	Norway	81% (#11)
	Poland	58% (#28)
	Portugal	82% (#8)
	Romania	40% (#34)
	Serbia	50% (#32)
	Slovakia	61% (#25)
	Slovenia	69% (#18)
	Spain	78% (#13)
	Sweden	75% (#14)
	Switzerland	52% (#30)
	Turkey	66% (#20)
	United Kingdom	69% (#19)

EU27+: 68%

Source: European Commission, 2021: 9

The performance of EUROSHIP countries is as follows: Estonia (92% #2); Norway (81% #11); Spain (78% #13); UK (69% #19); Italy (64% #21); Hungary (63% #22); and Germany (62% #24). While the performance of Estonia, Norway and Hungary accords with the levels of digital advancement reported in the DESI, Germany's position is perhaps more surprising. D8.4 will provide an opportunity to look at how services are being rolled out and how some of these more unexpected gaps, alongside the social demographic differences reflected in the Eurobarometer analysis, are being targeted.

We have seen how the rollout of digital services has increased yet there is still notable variation between countries. It will be interesting to see if the development of online service provision and the upscaling of digitalisation prompted by the pandemic has been accompanied by a comparable improvement in digital skills and confidence of European citizens. Covid has necessitated an escalation of technological development, but may also

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[9] Indicators (and their respective combined scores) are: User centricity (81%); transparency (61%); key enablers (64%); cross-border mobility (43%) (European Commission, 2021: 8).

have shifted attitudes and the motivation to address some of the digital skills gaps identified in the data reported here.

7. Conclusions

This report has explored how the rapid development of digital technologies is perceived by citizens in terms of their digital skill capacity, revealing notable similarities and differences between and within countries. This analysis has shown how intersectional differences, such as gender, age, education and household composition, are pertinent to understand gaps relating to digital skill capacity, contributing to factors such as motivation, access, and usage (Van Dijk 2020). Citizens' perceptions of their own digital confidence are also seemingly affected by the national digital infrastructure and ease of use of the technology itself. The speed and escalation of technological change, as a result of the Covid pandemic, makes the challenge of addressing these self-reported digital skill gaps all the most pressing.

This report has demonstrated that attitudes to digital technology are quite contradictory, with both positive and negative perceptions of its expected outcomes. These perspectives may help explain the resilience of digital skill gaps for some citizens, as shown in the Eurobarometer surveys (2017 and 2019). Exploration of survey data has sought to understand whether attitudes and confidence in the digital skills needed for daily life and work reflect intersectional inequalities and how this may have changed over time. A rich understanding of these perceptions has been presented, demonstrating where perceptions of consistent skills gaps across EUROSHIP countries remain divisive. This has shown where a lack of confidence in the digital skills needed for work and daily life may affect the capacity of individuals to exercise social citizenship in intersecting ways.

Analysis of perceptions of digital skill levels has shown some expected differences in the gaps between different communities. The social demographic factors of gender, age, education and household composition remain broadly divisive. For example, the data shows that men, those who are younger, better educated, and living in multiple households with children are more likely to have a more positive evaluation of their digital skill set. While this is similar across all countries (more or less), the extent of these differences varies significantly.

Broad trends in the data have been identified alongside interesting country differences. Citizens in Italy and Hungary have much lower levels of confidence in their digital skill set than those in countries like Estonia, Spain and the UK. The findings resonate with some of the material in O'Reilly and Verdin (2021) about national differences, as informed by the DESI (Commission, 2019). This underlines the importance of national levels of digitalisation and highlights an unintended consequence of the gaps we observe between countries. Assessment of the eGovernment Benchmark (2021) suggests that these gaps are not easily offset by provision and ease of use of online services.

This report has also shown how countries, such as Hungary, have begun to address the gaps with some evidence of rapid progress. Nevertheless, while citizens remain less digitally confident overall, their progress is in stark contrast to the experience of others. For instance, in Italy, despite their usability of online service provision, they are struggling to maintain levels of confidence amongst citizens. Research from the UK suggests the effect of gender,

age, education and household composition remain divisive as we navigate through the enhanced speed of technological change prompted by Covid (Lloyds, 2021). This report has highlighted the need to address how citizens with different social demographic characteristics acquire the necessary skills to use new technologies, but also where the digital divide looks set to widen. The levels of confidence reported in the Eurobarometer surveys draw attention to the challenge policymakers face and will be used to inform the analysis in Task 8.4.

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