

IS THE DIGITAL TRANSITION A LEVER FOR STRUCTURAL REFORMS OR DOES IT REINFORCE THE DIVIDE?

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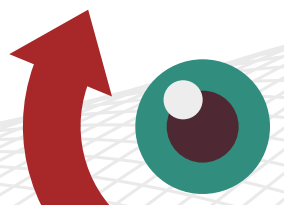
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RECOVERY WATCH



RECOVERY WATCH

WHAT IS THIS PROJECT ABOUT?

The National Recovery and Resilience Plans represent the new framework in which European member states identify their development strategies and allocate European and national resources – with the objective of relaunching socio-economic conditions following the coronavirus pandemic.

This process, initiated as part of the European response to the global health crisis, follows the construction of NextGenerationEU. It combines national and European efforts to relaunch and reshape the economy, steering the digital and climate transitions.

For European progressives, it is worth assessing the potential of these national plans for curbing inequalities and delivering wellbeing for all, as well as investigating how to create a European economic governance that supports social, regional, digital and climate justice.

The Foundation for European Progressive Studies (FEPS), the Friedrich Ebert Stiftung (FES) and the Institut Emile Vandervelde (IEV), in partnership with first-rate knowledge organisations, have built a structured network of experts to monitor the implementation of National Recovery and Resilience Plans and assess their impact on key social outcomes. Fact- and data-based evidence will sharpen the implementation of national plans and instruct progressive policymaking from the local to the European level.

The Recovery Watch will deliver over 15 policy studies dedicated to cross-country analysis of the National Recovery and Resilience Plans and NextGenerationEU. Monitoring the distributive effects of EU spending via NextGenerationEU, and the strategies and policies composing the national plans, the project will focus on four areas: climate action, digital investment, welfare measures and EU governance.



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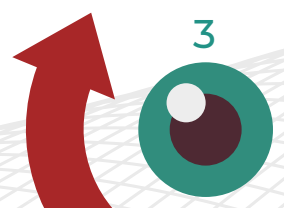


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EXECUTIVE SUMMARY

This policy study analyses how the Recovery and Resilience Facility (RRF) and the National Recovery and Resilience Plans (NRRPs) of different EU member states address issues regarding access to healthcare and education. This is done by evaluating key metrics that show the coverage of these public services before and during the COVID-19 pandemic.

For education, the number of students dropping out without a diploma and the number of days that schools were closed during the pandemic are evaluated. The unmet health needs and excess mortality rates during the COVID-19 pandemic are assessed for healthcare. We address how digitalisation plays a role in different member states for both sectors.

This is followed by an analysis of the NRRPs when it comes to investments in both health and education, plus the way the plans invest in the digitalisation of these public services.

The findings of the study point to a strong correlation between unmet health needs and student dropout rates, and where member states with the worst results invested most, the opposite was true for digitalisation. The member states, with already more digitalised education and health systems, tended to invest more funding from their NRRPs in digitalising these sectors than those who needed to catch up.

This leads us to conclude that the countries which already were on a path to use digital tools in the provision of these public services used the opportunity of the RRF to scale up their efforts. At the same time, the countries with the most significant challenges and lowest degree of digitalisation did not use the potential of digitalisation to close the gap in education and healthcare coverage.

Our preliminary conclusion is that the RRF did not lead to more fundamental reforms, at least not regarding investment in e-health or digital education.



1. INTRODUCTION

In May 2020, the European Commission's unprecedented decision to borrow money directly on behalf of its 27 member states¹ to finance €750 billion of the Next Generation EU (NGEU) was welcomed as a "Hamiltonian" moment² in the history of the EU.³

These historical references may be exaggerated, but the NGEU has undoubtedly been the block's recent, most significant, move towards greater integration. In addition, the NGEU also had the ambitious objective to upgrade the long-term growth potential of the EU and to make it structurally more resilient.⁴ Such a goal made the so-called green and digital transitions priorities, which resulted in member states spending at least 36% of their NGEU-financed National Recovery and Resilience Plans (NRRPs) on sustainability-related investments and at least 20% on digital ones.⁵

The digital transition that the EU envisages is also a qualified one: in President von Der Leyen's words,⁶ it is a transformation that puts the "human person at the centre" and "ensures that people's fundamental rights are protected"; "the internet is for all"; and "nobody is left behind". It is an approach that appears to be different from the American and Chinese ones currently dominating the battle for global digital leadership. The "internet for all" is a potential "third way" between a US market-dominated approach and a Chinese one, which is bent to the will of the state and may lead the EU to find a European approach to digitalisation.

The European Pillar of Social Rights defines "digital communications" as an essential service, access to which should be guaranteed "for those in need" (Chapter III, point 20, 2018),⁷ and the European Commission has defined "e-inclusion" as the situation where "everyone in society can participate in the information society".⁸ This happens when specific conditions exist, such as affordable access to technologies and the ability to use them.⁹ Given Europe's ageing society, overcoming these digital divides is even more necessary.

This is the context of this study. Its objective is to understand whether the NGEU and, more specifically, the NRRPs are taking on board this idea of investing the money dedicated to digitalisation as a lever to improve cohesion. More specifically, we focus on whether the countries that appear to have more problems making sure that nobody is left without access to healthcare and education are the ones that show a higher propensity to spend on digital technologies, which may bring these public services to everybody.

The thesis is that the experience with COVID-19 restrictions may have allowed EU governments (indeed, everybody) to overcome a cognitive bias. This policy study aims to measure signals, or more precisely "revealed preferences", in the actions taken, which may indicate that member states are acknowledging the importance of digital technologies as a lever to reduce inequalities by improving access to public services.

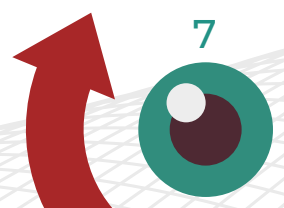
Remote learning for all students for more than one year, as well as monitoring, at a distance, the health conditions of people infected with the virus or who could not access hospitals, did provide a gigantic social experiment which could have changed the old stereotype that digital technologies are a luxury only developed economies can afford – a perception that appeared to be taken for granted by other EU development policies.¹⁰

Such a finding would be relevant to measure the success of the NGEU because this instrument is explicitly meant to be a response to the pandemic and because good results of a program can be prevented by cognitive biases of a society that is still to complete its transition from the 20th to 21st century, in terms of approaches to policy design.

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Are the NRRPs taking on board the idea of investing the money dedicated to digitalisation as a lever to improve cohesion?

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2. THE CONTEXT OF DIGITALISATION IN PUBLIC SERVICES

"The European Union is the welfare superpower."¹¹ Angela Merkel often reminded audiences that the EU accounted for 7% of the world population, 25% of global GDP and 50% of the world's expenditure on social protection. This was both an element of pride and attractive to new potential applicants to the EU and a potential weakness casting doubts on the financial sustainability of such a welfare system.

Then the COVID-19 pandemic put a strain on everything. If we consider the numbers of excess mortality during the last two and half years, the EU seemed to have fared worse than much less well-funded health systems, notwithstanding that the EU includes some of the best systems, according to rankings based on numbers from the World Health Organization (WHO).¹² Likewise, when we look at the numbers on school closures, the students of some EU countries have lost more days than their peers in Asia.¹³

More importantly, some segments of the population seem to have suffered more: citizens aged over 80, as far as healthcare is concerned; children aged below 10, when it comes to education; and families living in rural areas, which can be cut off from both physical and digital access to public services.

In the meantime, digitalisation has shown that it can be both hugely important and a double-edged sword in light of this health crisis. Global platforms allowed the world to continue to operate. Remote learning allowed 65 million EU students to continue studying and millions of people to be "traced, tracked and, eventually, treated" at a distance. The same thing applied to many EU citizens who could not physically access hospitals and used telemedicine for the first time.

The vast social experiment that the restrictions triggered can, indeed, be considered a unique event that can generate entirely new innovation waves: since COVID-19, education has become the most promising area where experiments with applications of the metaverse happened;¹⁴ and many have started considering the case for healthcare and medical research being the new frontier of big data¹⁵ and the internet.¹⁶

However, the health emergency left many European countries, regions and citizens unprepared: some were "left behind" because they could not afford computers or lacked sufficiently capable broadband or software; others suffered a lack of digital skills. Finally, we all

used a very limited number of web conference tools for a very differentiated set of activities (from remote diagnosis to studying mathematics); this resulted in minimal adaptability to the vulnerabilities of some disadvantaged groups and flexibility regarding different "products" when it came to other pathologies and various school subjects. The dependency on a few applications could generate even greater inequalities and further deteriorate the EU's competitiveness.

In a rapidly digitalising world, inequalities may become more significant between countries that seem readier to have their public services accessed online and others which are lagging. Figure 1 shows that differences are substantial, with the percentage of citizens accessing public services online in Sweden or the Netherlands being almost four times those in Italy or Germany.

The differences are, however, even more considerable within countries. Table 1 shows how different factors of possible disadvantage (age, unemployment, low education achievement, gender, immigration or living in rural areas) drive the "digital divide".

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In a rapidly digitalising world, inequalities may become more significant between countries that seem readier to have their public services accessed online and others which are lagging.

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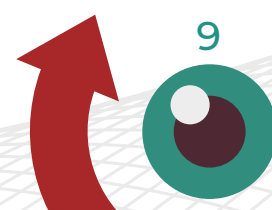
TABLE 1. Individuals (%) declaring that they accessed the internet at least once a day (in 2021).

	All	16 to 24 y.o.	25 to 64 y.o.	65 to 74 y.o.	75 y.o. or more	25 to 64 y.o. with low formal education	25 to 64 y.o. who are unemployed	Females 25 to 64 y.o.	Who are born in non-EU country	Living in rural areas
EUROPEAN UNION - 27	80	95	84	50	:	68	77	85	81	74
SPAIN	86	97	89	56	21	78	85	91	97	81
ITALY	79	94	83	48	14	67	76	83	74	75
LATVIA	84	99	87	54	49	73	79	89	69	79
NORWAY	95	98	97	85	70	92	94	97	:	94

Source: Vision on Eurostat data – Use of Internet

Figure 1 shows how frequently different groups of people use the internet. Eurostat only collects numbers for those over 75 years old in some European countries. However, it does collect data for the two countries – Italy and Spain – that are the largest beneficiaries of the NGEU. These two member states receive half of the total NGEU funds and are the countries with the highest population percentage aged over 75. It is very evident from these findings that age is by far the most influential factor on exclusion: there is a drop in internet usage at age 65 and an even sharper fall at age 75. However, we also need to mention two countries – Latvia in the EU and Norway in the European Free Trade Association (EFTA) – which seem to show that this exclusion is not unavoidable.

The effect of digitalisation can be paradoxical. Technology meant to avoid the need to physically go into offices, and, for example, to visit a physical bank branch, risk leaving an entire (and growing) segment of society in isolation;¹⁷ this risk became even more acute during the COVID-19 pandemic. However, one other potential side effect of digitalisation during COVID-19 was that European policymakers were confronted with the fact that teachers, students, doctors and patients provided a few non-European firms¹⁸ with a torrent of personal data from which they would extract economic and political value. This enormous legal "leak" of relevant or even personal data¹⁹ showed that it was the EU as a whole that risked being left behind in a global battle for global digital leadership, which is being dominated mainly by the USA and China.²⁰



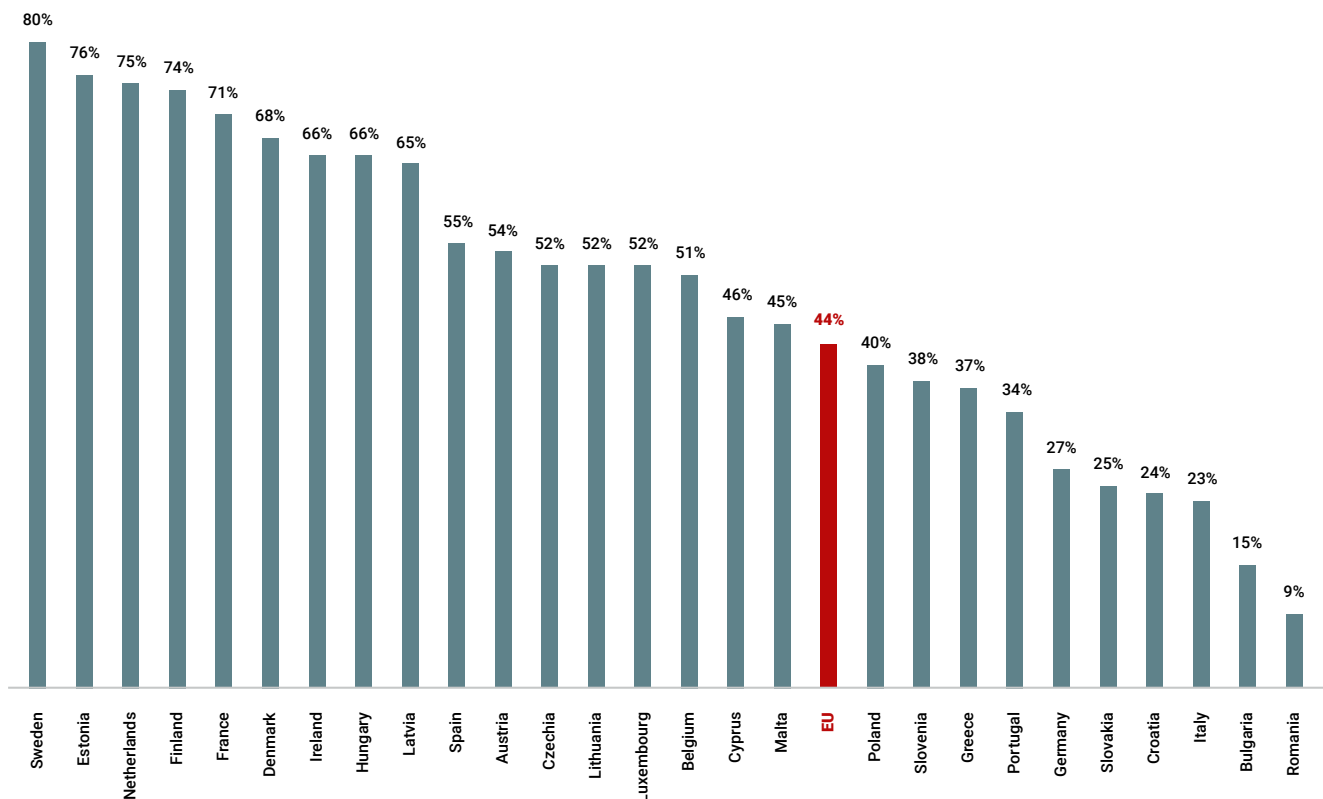
2. THE CONTEXT OF DIGITALISATION IN PUBLIC SERVICES

This policy study started from the view that a policy conceived as a response to the COVID-19 pandemic should have tried to develop an overall strategy such that:

- 1) the opportunities provided by digital technologies could be maximised, so that they could even become a lever to approach universal coverage of education and healthcare more rapidly; and
- 2) the risks of further reinforcing inequalities that digitalisation implies could be effectively tackled and digital divides could be reduced.

The study also attempts to understand whether the EU is turning a problem into an opportunity. Using technologies to improve access to education and healthcare can unveil a market failure. Global digital platforms primarily respond to the demand from relatively young, affluent enough, urban segments, not the whole of society. The EU may have the chance to develop an approach – "internet for all" – that responds to its values and could make business sense.

FIGURE 1. Number of citizens (%) who have completed at least one application with public administration entirely through an online channel (EU 2021).



Source: Figures elaborated by Vision on Eurostat data [E-government activities of individuals via websites]

3. THE METHODOLOGY

Before proceeding, we mostly refer to the RRF and the 27 NRRPs the RRF has financed. However, the RRF is, indeed, only one of the financial instruments activated by the NGEU. Yet, with its endowment of €672 billion, it represents almost 90% of the NGEU's €750 billion. In addition to investments, the RRF also considers the reforms needed to allow countries to achieve a structural improvement in their productivity and competitiveness.

We therefore refer to the RRF to provide the general and regulatory framework²¹ for the functioning of the overall NGEU. It also has to be mentioned that the focus on the RRF has three consequences for the content of this study:

- 1) the RRF resources are being concentrated on a few countries. If we consider just the two largest beneficiaries, Italy and Spain, they make around half of the total RRF, and we dedicate more analytical space to the largest beneficiaries (which also include France, Germany and Poland) because the results of their national plans will impact on the NGEU's overall performance;²²
- 2) Hungary's national plan is still to be approved, and the Dutch one has only recently been submitted; and
- 3) some countries have specific "missions" (sections of their national plans) dedicated to healthcare and education, others do not; this requires some reconciliation.

As mentioned, this policy study will try to test the hypothesis that the NRRPs are taking on board the "internet for all" paradigm by focusing on two specific fields. We try to understand whether the EU countries that are suffering from worst access to highly relevant public services, healthcare and education, are the ones spending more on digital technologies to improve such parameters.

The reasons to focus on healthcare and education as the two areas of this study are as follows:

- 1) They are sectors that define the welfare system of European countries, and they were undoubtedly on the "frontline" during COVID-19. Hospitals were where most battles "between life and death" were fought during the pandemic and the ones that risked being overwhelmed. As we articulate shortly, school closures were one of the most significant sources of damage that the restrictions produced, and every government struggled to limit this toll.

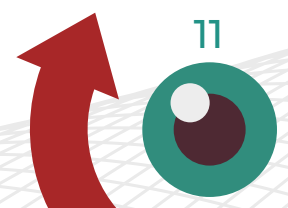
- 2) Education and healthcare are also among the public services that made more use of technologies to guarantee the continuation of services. This applies to distance learning, which involved – to different extents – all 65 million EU students and their teachers, but also to the various instruments used to monitor the health of people infected by the virus (which was traced through applications), as well as those used by elderly and less-elderly patients to consult hospitals and physicians, which they could not physically reach.

The pandemic restrictions triggered a vast, unprecedented social experiment where technologies entered all households. This was potentially a game-changer because healthcare and education had been considered for decades as two of the few areas still relatively alien to widespread automation experienced by other industries.

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Are the EU countries that are suffering from worst access to highly relevant public services, healthcare and education, spending more on digital technologies to improve such parameters?

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4. MEASURING ACCESS TO EDUCATION AND HEALTHCARE

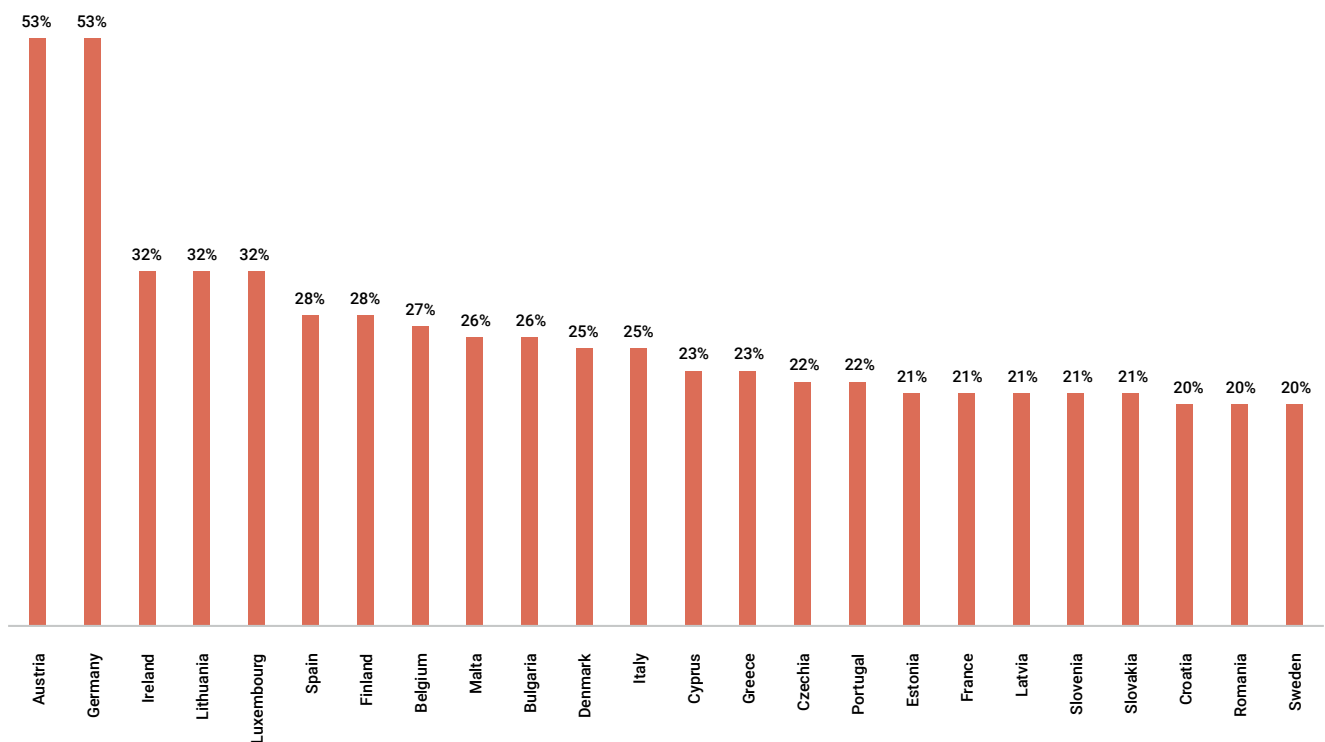
As mentioned, the digital transition was one of the two priorities of NGEU. The RRF regulation required that member states spent at least 20% of their NRRP resources on digitalisation. All respected the threshold, yet some countries spent much more than the minimum (Figure 2).

The five countries spending more than 30% are already advanced in digitalisation. According to Eurostat's digital economy and society index (DESI), Austria, Ireland, Luxembourg, Germany and Lithuania all do better than the EU average. This may already be seen as evidence that countries which invest more in digital objectives are the ones that are already more digitalised.

In our analysis, however, we also focus on how different countries are faring regarding access to healthcare and education. We consider two specific indicators for each area: one to measure how accessible the service was before the COVID-19 pandemic (which is a proxy of a more long-term performance); and one to assess how well countries managed to enable public services to remain accessible during the health crisis, which is a proxy for so-called resilience.

In the last section, we calculate a composite indicator for each area, which will average both indicators, pre- and during COVID-19, and measure how much this correlates with the propensity of different countries to spend on digital technologies as a lever to make education and healthcare more accessible.

FIGURE 2. Share of RRP expenditure (%) on digital objectives in 2021.



Source: Figure elaborated by Vision data from the European Commission.²³

4.1 MEASURING ACCESS TO EDUCATION

The closing of schools is probably the worst legacy of the COVID-19 pandemic. The pandemic exposed the vulnerabilities of what has been referred to as the place where the future is built and, thus, the most important public good for making societies capable of sustaining themselves long term.

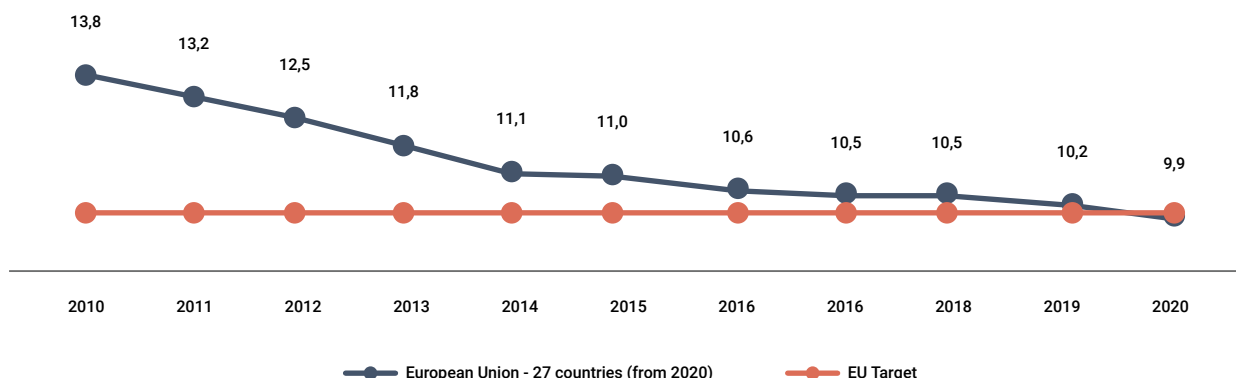
Some research institutes tried to calculate the cost of closing schools during the pandemic, and the potential losses (due to a reduction in skills of the future workforce) could even be higher than the cost of the decrease in GDP that statistics detected in 2020.

According to the Official Office for Statistics in Norway,²⁴ the cost per student per day of school closure was \$173;²⁵ according to the World Bank,²⁶ instead, the closure of schools in an Organisation for Economic Co-operation and Development (OECD) country for two months – March and April 2020 – was enough to reduce the net present value of future salaries per student of \$37,987 and to produce a drop in future GDP with a sum equivalent to 16% of the GDP of one year.

The COVID-19 pandemic, however, only made the damage that poor access to schools produces more visible. In 2016, the EU did acknowledge, even before the pandemic, that "there are more than 4 million early school leavers across Europe and only around 45% of them"²⁷ were employed. The same year, the European Commission issued the "New Skills Agenda for Future", a strategy that "set the goal of reducing the proportion of 18-to-24-year-olds leaving education early below 10%"²⁸ by 2030 through the adoption of several measures at the national level.

As seen in Figure 3, after ten years, although relevant gaps among Northern and Southern European countries persist (even within the countries themselves), the situation has improved all over the EU. The overall share of early leavers from education and training fell in the EU by 3.9 percentage points between 2010 and 2020, overcoming the target set a decade before. And yet, one out of ten young EU citizens still needs to use their right to education fully.

FIGURE 3. Number of early school leavers (aged 18-24) from 2010 to 2020 with the European target (2020).



Source: Figure elaborated by Vision on Eurostat data - Early School Leavers

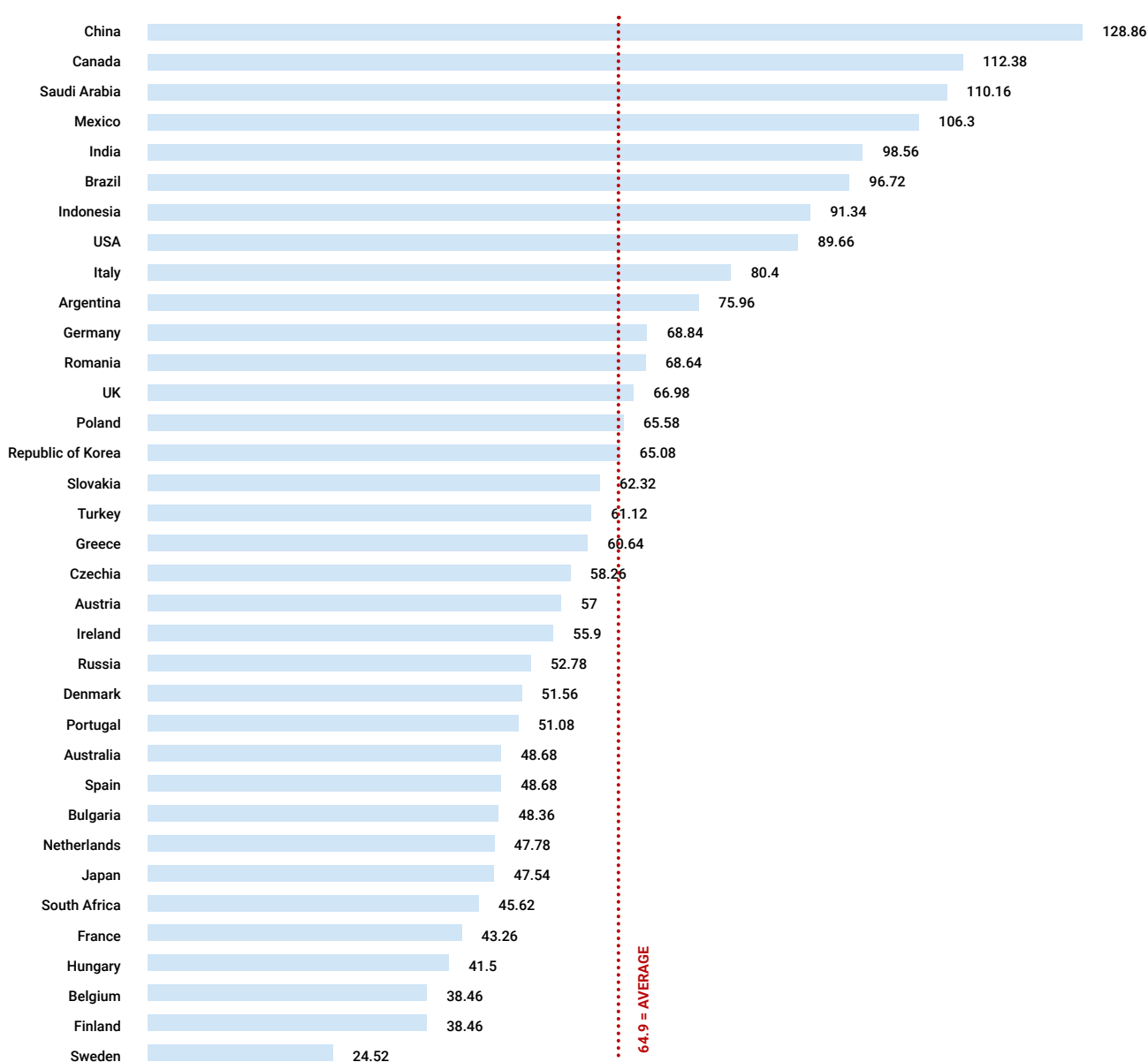
4. MEASURING ACCESS TO EDUCATION AND HEALTHCARE

This takes a toll on the long-term GDP potential growth, which weighs differently on different EU countries. The system's long-standing weaknesses were not fully accounted for before the pandemic.

We tried to account for the number of days of school closure in the major world economies (we considered

the G20, which represents more than two thirds of the world population and 80% of the global GDP, and includes Germany, France and Italy) to which we also added EU countries with more than five million inhabitants (Figure 4).

FIGURE 4. Estimation of school closures²⁹ (G20 + EU countries with more than 5 million inhabitants) as FTE of a day of closure per year (data from January 2020 to June 2022).



Source: Figures elaborated by Vision on Oxford University (Our World in Data) data.³⁰

The results are relatively clear:

- 1) There are some European countries whose schools appear to be very resilient, for instance, Finland, France and Belgium. Whereas, the cases of Sweden and Hungary are more controversial because they may have paid for it with higher infections.
- 2) Some did worse. Italy, Romania, Germany and Poland closed their schools for longer than the average of their peers. This may have resulted in long-term damage that the RRFs could have been expected to consider regarding the effect of closing schools on GDP.³¹

One possible weakness of the data on closures is that it

may simply reflect more infections. A sign that this may not be the case is that China tops the table and Sweden is last, whereas China recorded fewer cases than anybody else – 1.2 per million and Sweden was much worse at 249.³² Another possibility is that school closures were used more heavily by some countries as a lever to contain infections.

It is important to remind ourselves that these differences reflect structural vulnerabilities that COVID-19 has only magnified. Table 2 refers to the days of effective lockdown during the COVID-19 pandemic per region in Italy, and these are compared with two possible explanatory variables: the spread of infection – where closure is used to lessen health risks; and the pre-COVID-19 rates of dropouts – schools tend to be closed where they are already weaker.

TABLE 2. School days lost to COVID-19, dropouts and COVID-19 cases per region in Italy (2020).

ITALIAN REGION	DAYS OF EFFECTIVE LOCKDOWN ³³ (Sep 20-Feb 21)	EARLY SCHOOL LEAVERS % ³⁴ 2019	COVID-19 CASES ³⁵ / POPULATION 2020
CAMPANIA	71	17.2	31
BASILICATA	39	11.7	33
CALABRIA	38	18.9	30
MOLISE	37	10.7	46
PIEDMONT	36	10.7	42
APULIA	36	17.8	24
SICILY	34	22.3	33
UMBRIA	34	9.3	30
LOMBARDY	33	11.3	81
ABRUZZO	33	9.9	37
AOSTA VALLEY	33	14.1	57
TUSCANY	31	10.1	31
EMILIA-ROMAGNA	26	11.1	55
LAZIO	26	11.6	26
LIGURIA	26	9.7	59
FRIULI-VENEZIA GIULIA	26	8.7	25
MARCHES	26	8.5	39
SARDINIA	26	17.7	30
VENETO	25	8.3	59
PROVINCE OF TRENTO	23	6.7	50

Source: Figures elaborated by Vision on Bank of Italy/Istituto Superiore di Sanità (Italian National Institute of Health) data.

4. MEASURING ACCESS TO EDUCATION AND HEALTHCARE

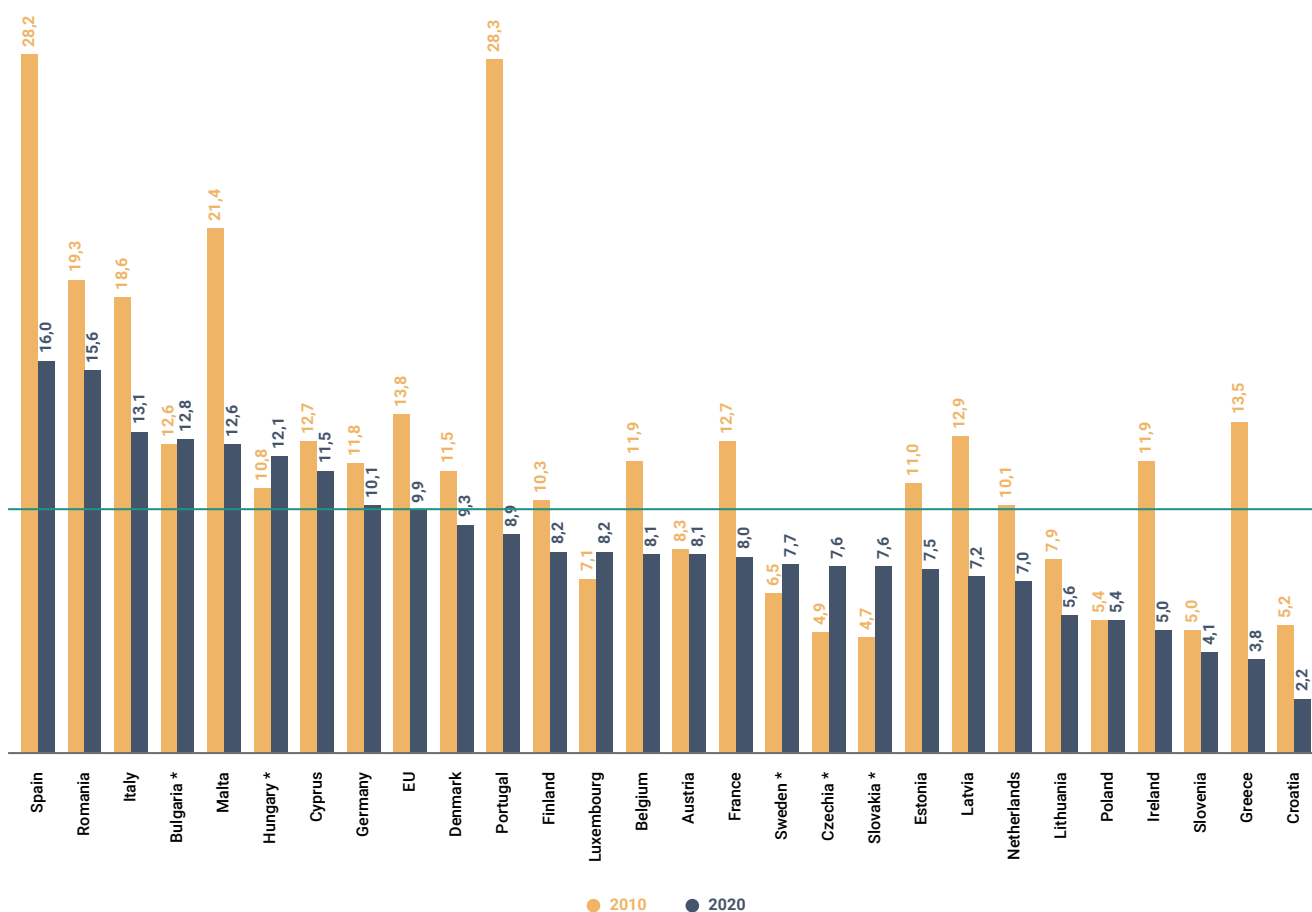
Table 2 provides evidence of two things:

- 1) in a country with problems of education coverage, the averages may result from more significant regional gaps: in the same country there are regions like Trento, in which the "early school leavers" are significantly lower than the EU average (9.9%) and others (like Sicily) where they are almost four times as high; and
- 2) regions that closed schools for longer (the less advanced ones from the south: Campania; Basilicata; Calabria; Apulia; and Sicily) were not amongst those with more exposure to the highest number of COVID-19 infections; yet they are the ones with higher structural vulnerabilities when it comes to "early school leavers".

The resilience of the education system to COVID-19 and pre-existing strength (or vulnerability) tend to be correlated.

This leads us to the second indicator, describing how different education systems fared in covering their target population before the pandemic. As a key performance indicator, we considered early leavers.³⁶ Although some exceptions persist, over the last decade, the EU has made considerable improvements in tackling the early school leaving phenomenon, recording a decisive decrease, as shown in Figure 5. However, there are still substantial differences between countries.

FIGURE 5. Early school leavers (aged 18-24) in relation to national and European targets.



Source: Figure elaborated by Vision on Eurostat data.

Figure 5 does yield some results that are not immediately apparent.

In absolute terms, Croatia (2.2), Greece (3.8), Slovenia (4.1) and Ireland (5 percentage points) are the countries with the best performances, recording the lowest rates in the early school leaving phenomenon at the European level. At the other end, even though in relative terms they registered the most considerable reduction of the phenomenon, Spain (12.80), Romania (13.1), Italy (13.1) and Bulgaria (12.8 percentage points in 2020) remain the EU countries with the highest percentage of early school leavers, far above the European target of 10 percentage points.³⁷

Overall, we can identify three groups of countries:

- 1) Hungary and Bulgaria display a percentage of early school leavers above the EU targets, further worsening their performance.
- 2) Spain, Italy, Malta, Cyprus and Romania are still above the EU target but improving rapidly.
- 3) Luxembourg, Sweden, Czechia and Slovakia have an absolute number of dropouts that is still relatively low, yet their capacity to guarantee a universal service is deteriorating.

In Section 5, we try to understand how the RRF digital investments and reforms are trying to address these situations.

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The resilience of the EU was not as good as expected, and the performance becomes even worse if we consider that some of the EU countries enjoy the best-funded national healthcare systems in the world.

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4.2 MEASURING ACCESS TO HEALTHCARE

As stated in the "opinion of experts" commissioned by DG Health at the European Commission:³⁸

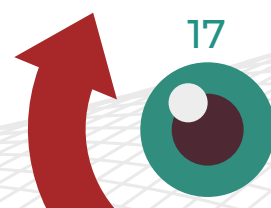
The COVID-19 pandemic has put national health systems in Europe and beyond under immense pressure, whereas health systems were largely unprepared for an outbreak of this magnitude. The crisis tested their resilience which is the capacity to absorb shocks while sustaining day-to-day operations.

Thus, our analysis of the health systems' adequacy goes beyond what we knew before the crisis.

Over the last two years, healthcare has been bearing a significant burden of the pandemic, which resulted in the infection of 150 million EU citizens (about one third of the total) and slightly more than one million deaths that were officially considered to be due to COVID-19, which was around 0.67% of cases.³⁹ Although the capability to treat the illness has increased month after month, due to the learning experience and the vaccination campaign's positive effects on limiting the virus's circulation and its virulence, the COVID-19 pandemic's legacy will last for years. Therefore, like education, healthcare was an obvious priority for RRFs to consider. We turn to the evidence to check for the significant weaknesses that need to be repaired.

The pandemic overwhelmed some countries, primarily those located in the Balkans and in Southern and Eastern Europe. Others have done much better. The ranking given in Table 3 provides an overall picture of how the EU fared by comparing the 27 EU countries with the G20's largest economies.

The somewhat surprising result is that, notwithstanding the advantage that the EU should have regarding the quality of its healthcare systems, eight out of ten of the most badly hit countries in the world are from the EU. The resilience of the EU was not as good as expected, and the performance becomes even worse if we consider that some of the EU countries enjoy the best-funded national healthcare systems in the world. Figure 6 does, indeed, show that spending more money on healthcare systems does not automatically translate into better performance.



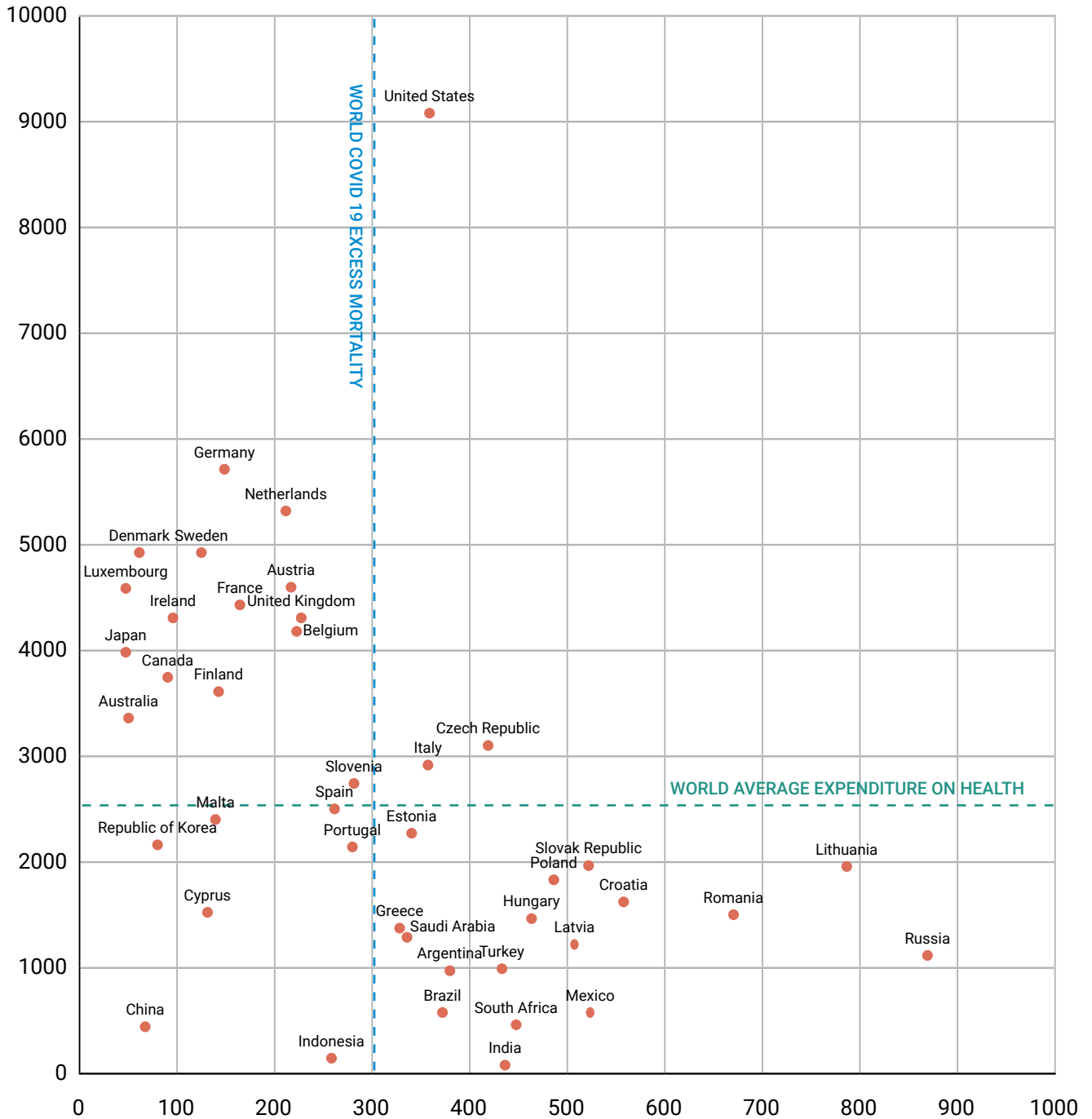
4. MEASURING ACCESS TO EDUCATION AND HEALTHCARE

TABLE 3. EU excess mortality rates per 100,000 people during COVID-19 (cumulative: January 2020-June 2022) compared with the G20 largest economies.

RANK	COUNTRY	EXCESS MORTALITY RATE	RANK	COUNTRY	EXCESS MORTALITY RATE
1	Russia	869	22	Slovenia	281
2	Lithuania	787	23	Spain	264
3	Romania	670	24	Indonesia	259
4	Croatia	558	25	United Kingdom	226
5	Mexico	524	26	Belgium	223
6	Slovak Republic	523	27	Austria	217
7	Latvia	508	28	Netherlands	212
8	Poland	487	29	France	166
9	Hungary	463	30	Germany	150
10	South Africa	447	31	Finland	144
11	India	437	32	Malta	141
12	Turkey	433	33	Cyprus	133
13	Czechia	419	34	Sweden	126
14	Argentina	380	35	Ireland	97
15	Brazil	373	36	Canada	92
16	USA	359	37	South Korea	82
17	Italy	357	38	China	68
18	Estonia	342	39	Denmark	63
19	Saudi Arabia	334	40	Australia	52
20	Greece	327	41	Luxembourg	49
21	Portugal	281	42	Japan	48

Source: Figures elaborated by Vision on data from The Economist, 2 July 2022.

FIGURE 6. Healthcare resilience based on excess mortality
 (horizontal axis; deaths per 100,000 people from January 2020 to June 2022)
 and healthcare expenditure (vertical axis, per person, in USD).



Source: Figure elaborated by Vision on OECD and WHO data.

4. MEASURING ACCESS TO EDUCATION AND HEALTHCARE

As mentioned, our analysis is also about measuring how well different countries were doing before the pandemic in terms of access to healthcare.

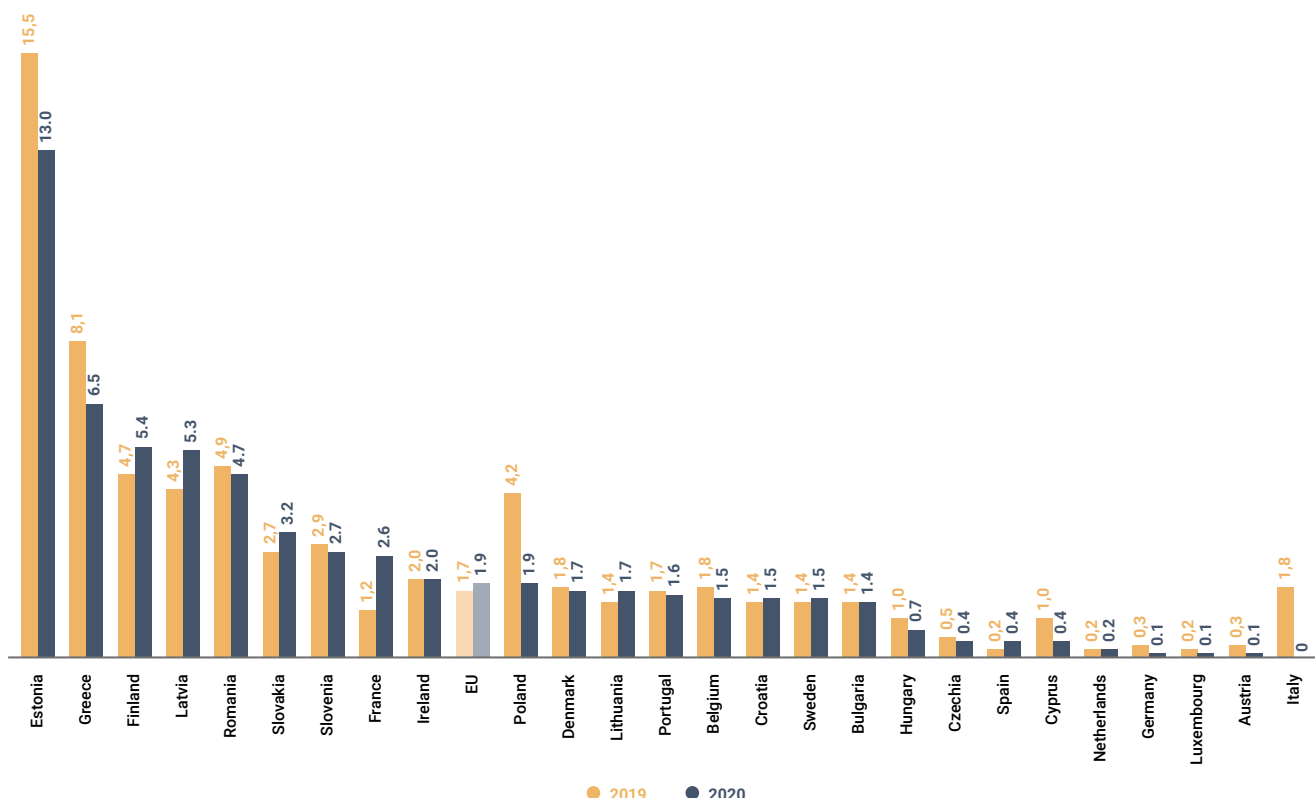
As the OECD states, *unmet health needs* are defined as reasons that prevent individuals from reaching healthcare providers. The leading causes listed are the expense of treatments, long waiting times and long physical distances from healthcare facilities. These are the principal barriers that policymakers should investigate to improve quality and, especially, access to the healthcare system. A comparison among EU countries reveals a surprising picture (Figure 7).

Combining the evidence from Table 3 and Figures 6 and 7 appears to indicate that:

- 1) Estonia, Greece, Latvia, Romania and Slovakia appear to show structural problems and lower resilience against COVID-19, in parallel with a lower expenditure per capita;
- 2) Finland, Slovenia, France and Ireland appear to have issues with delivery, but their well-funded healthcare systems seem to have reacted well to the pandemic; and
- 3) Italy appeared to do worse than the EU average in 2019 and paid a high price for COVID-19-triggered mortality rates due to insufficient funding and lack of optimal organisation.

We now consider how far the overall design of the RRF appears to be consistent with this evidence.

FIGURE 7. Unmet health needs 2019-2020.



Note: data are expressed as percentages within the population aged 16 years old and above living in private households. Self-reported unmet needs for medical care concern a person's assessment of whether they needed examination or treatment for a specific type of health concern but did not have it or did not seek it due to the following three reasons: financial reasons; waiting lists; and too far to travel. Data are collected from the European Statistics of Income and Living Conditions survey, referring to such needs during the previous 12 months.

Source: Figure elaborated by Vision on Eurostat data.⁴⁰

5. ARE THE NATIONAL PLANS COHERENT WITH THE GAPS IN DIGITALISATION AND ACCESS TO EDUCATION AND HEALTHCARE?

This last section of our study provides a preliminary assessment of how the member states considered the resilience of their education and healthcare systems in drafting their National Resilience and Recovery Plans and, more specifically, their strategy for the digital transition. The analysis is based on how much of the plan's fund is allocated to improving access and quality of education and healthcare. It also provides the first assessment of how much the reforms appear to take on board the experience of the COVID-19 pandemic.

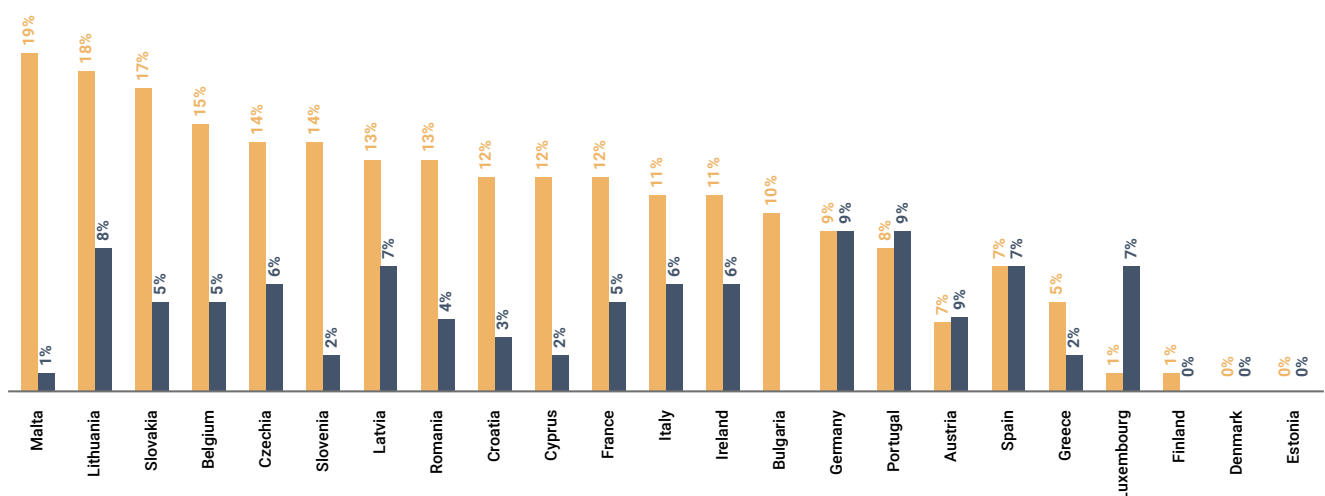
5.1 INVESTMENT IN EDUCATION

As analysed in Section 4.1, there are some countries that show weaknesses, which either were evident before the pandemic or became even more apparent during the crisis:

- 1) Italy, Romania and, surprisingly, Germany appear to have both a higher percentage of dropouts than the average and suffered from exceptionally high school closures during the pandemic;
- 2) Spain, Bulgaria, Malta, Hungary and Cyprus show high percentages of early school leavers but appear to be more resilient;
- 3) Sweden, Luxembourg, Czechia and Slovakia have low but rising rates of early school leavers; and
- 4) Polish students have suffered from extended school closures, but dropouts are relatively low.

Regarding this situation, our analysis starts by considering the share of RRP funds allocated to education and then to digital technologies for education (Figure 8). This may be an indicator of priority.

FIGURE 8. Share of RRP expenditure on general initial vocational and higher education, on early childhood education and care, and on digital technologies and skills (% in 2021; in orange, investments in specific targets dedicated to education; in blue, investments in digital technologies and skills).



Source: Figures elaborated by Vision from European Commission data.⁴¹

5. ARE THE RECOVERY AND RESILIENCE PLANS COHERENT WITH THE GAPS IN DIGITALISATION AND ACCESS TO EDUCATION AND HEALTHCARE?

The analysis needs to start with two initial clarifications:

- 1) beyond the cases of Hungary (with no plan approved) and the Netherlands (with a plan submitted late), Estonia, Sweden and Denmark do not have a specific component/mission of their plan dedicated to education (so our analysis can only be of 22 member states); and
- 2) we also account for investments in digital skills, which can be outside the dedicated component/mission; this explains why four countries (Portugal, Austria, Spain and Luxembourg) are spending even more on digital to increase access to education than the amount allocated to the specific component.

The evidence does, however, show that:

- 1) Malta is the only vulnerable country amongst the top six spenders on education;
- 2) Bulgaria, Romania, Cyprus, Italy, Germany and Spain spend less than the EU average; and
- 3) Czechia and Slovakia appear to assign relevance to the recent increase in the rate of early school leavers. They are allocating a more significant part of their investments to education than Sweden and Luxembourg.

When we, however, focus just on investments in digital technologies, we discover that:

- 1) the average weight of digital technologies on investments in education averages to slightly above one quarter (26.1%);
- 2) Luxembourg, Germany, Portugal and Austria appear to spend a higher share of their RRF portfolios on digital technologies; and
- 3) Malta, Slovenia and Greece have a much lower propensity to do so.

More telling are the results shown in Figure 9, where we try to compare the extent of the problem of coverage for citizens of different EU countries and their propensity to spend their NGEU allocation on education.

Figure 9 compares the coverage problem, which is calculated as an average of the pre-COVID-19 problem of "early school leavers" and the days lost during the COVID-19 period, with the share of RRP that different countries spent on education.

The results position the EU countries in four quadrants:

- 1) in the upper right, we have countries like Italy, which seem to be relatively problematic compared with other EU countries that appeared to treat education as a priority;
- 2) others in the lower-left quadrant appear to spend less but also face relatively more minor problems; this is the case for Finland, Estonia and Denmark, which do not have a section of their recovery plans dedicated to education;
- 3) in the upper left, we, instead, have member states like France that did decide to make education a high priority, notwithstanding that they do not appear to have suffered big problems; and
- 4) the lower right includes member states like Spain, which could have spent more of their NGEU allowance on education.

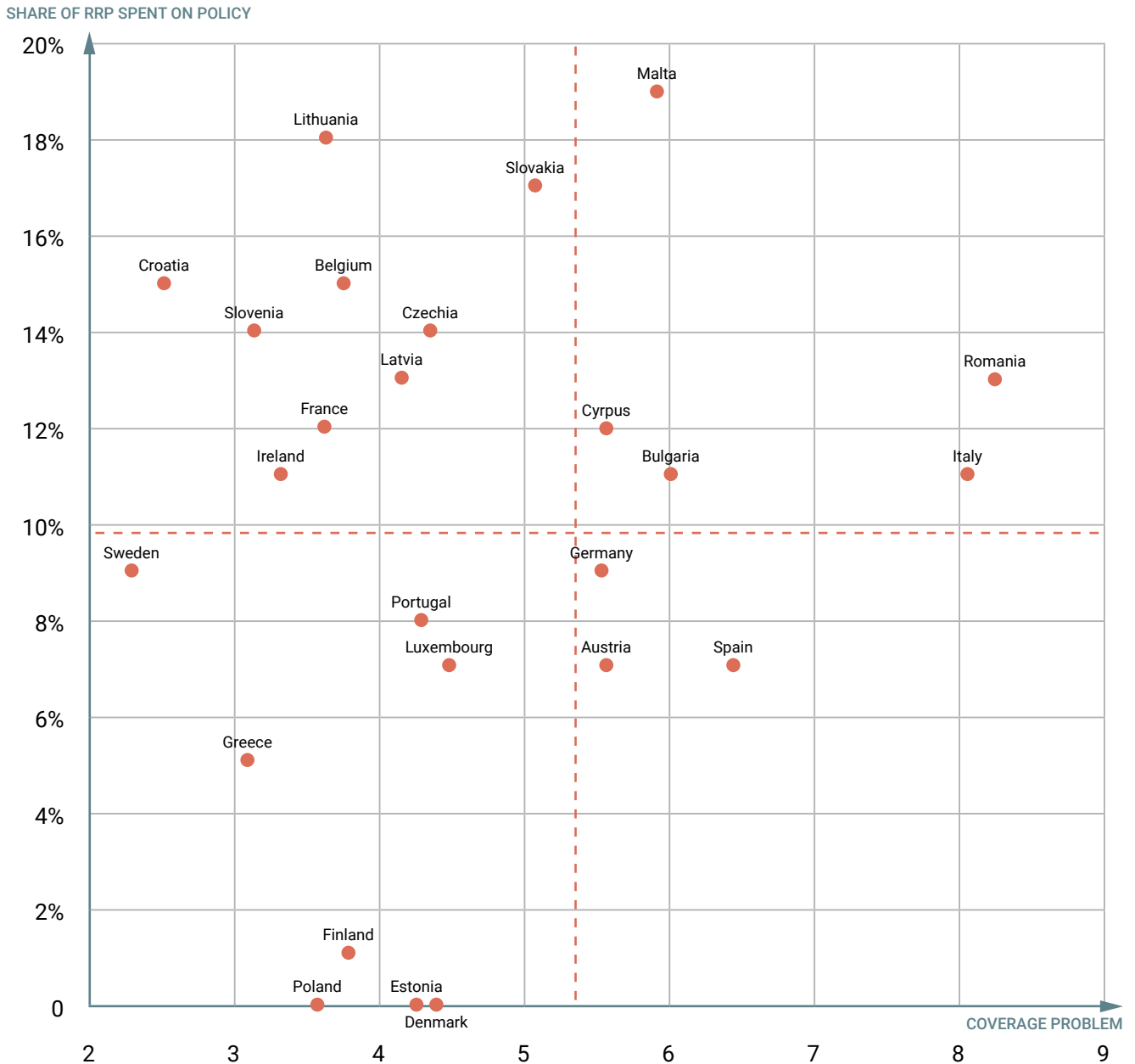
Considering the countries mentioned above, we decided to take a closer look at the biggest recipient countries, in terms of GDP,⁴² of the RRF, with a focus on their investments that appear to use technologies as a lever to improve accessibility to education.

“

On average, member states spent about a quarter of their investments in education on digital technologies.

”

FIGURE 9. Comparison of coverage problems in education systems, based on measured dropout rates and days of school closure, with the share of RRP expenditure on general initial vocational and higher education and early childhood education and care (% , in 2021).



Source: Figure elaborated by Vision on data from Eurostat and UNESCO.⁴³



5.1.1 SPAIN

Spain is going to spend 7% of its RRF funds on general education. The Spanish plan provides specific investments to reduce early school leaver numbers. The first noticeable investment is PROA+. It will use the funds to reduce dropout rates by creating institutionalised support systems within schools, at least 2,700 institutes nationwide, and those located in rural areas, which include a significant percentage of vulnerable students. Another investment is directed to support vulnerable students and families by creating at least 1,000 units of psycho-pedagogical service guidance systems at the local level. The measure is expected to affect the number of Spanish early school leavers.

The Spanish plan envisages implementing a progressive digital transformation, from youth education to older people, to improve the quality of and access to education. Most EU countries will intervene in schools' infrastructure to improve access and quality of education; in several cases, this improvement is made by technological progress, for example, by providing digital devices or creating a better connectivity service. Spain foresees this enhancement by updating classroom equipment, such as interactive whiteboards and instruments for distance learning. Digital capabilities must be strengthened to give the population enough tools to be more self-sufficient in today's society. This is why the Spanish recovery plan invests in training programs, especially for vulnerable children but also for older people and adults.

5.1.2 ITALY

Another case that must be cited in detail is that of Italy. Italy is third for the number of early school leavers, and the plan addresses this fragility within the educational system. The country will spend 11% of its RRP share on education. The government, aware of its position in the dropout rankings, has invested in reducing the number of early school leavers. The related investment delivers both preventive and subsequent interventions in the phenomenon through mentoring and training for these pupils with the support of an online platform. As in this case, the use of technologies is underlined in several measures; the principal investment is "School 4.0", which aims to improve school infrastructure first (as in many other countries) with, for example, improved connectivity, and then to facilitate students' work orientation through the implementation of courses to expand their digital literacy.

This kind of intervention is imagined for both primary/secondary and university levels. In the case of higher education, the plan provides for the creation of three digital education hubs to enhance the ability of the education system to offer better digital education to both students and working students.

To understand if these measures could be effective at reducing the gap between two of the biggest countries in the EU and others who register, for example, lower levels of "early school leavers", it could be helpful to analyse the kind of action that other countries, such as France or even Germany, are going to implement to improve access to and the quality of their educational systems.

5.1.3 FRANCE

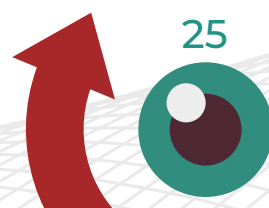
France spends 12% of its National Recovery Plan (NRP) on investments in education. Although France has a less vulnerable school system, the French plans include measures to further reduce the number of early school leavers. Some of the interventions differ from what other countries have been doing. For example, to increase the number of admissions to boarding schools of excellence, according to the NRP, they need to be modernised to be more attractive to those from disadvantaged backgrounds. The NRP also provides investments to fund scholarships for students under 28 years old. Another different approach to fighting "early school leaver" numbers is the investment in customised programmes for NEET (not in education, employment or training) young people: 15 days of immersive programs directed to school dropouts.

This plan aims to increase youth employment by implementing curricula and study methods through technology. Distance-learning courses will offer better access to education to those who have been excluded, for example, due to mobility issues.

Using digital platforms will contribute to the acquisition and development of debased digital skills. The NRP will finance the creation of 30,000 distance-learning courses by the national employment agency, *Pôle Emploi*, and this will include remuneration over eight months for 42% of the participants. The French government places distance learning as a concrete alternative to physical attendance after COVID-19 and lockdowns. There is also a reference to "immersive courses" as learning through virtual reality. France will spend a little more than Italy (12% vs 11%), but it seems that France will ensure more specific reforms to target its weaknesses.

5.1.4 GERMANY

Germany invests a share of 9% of the plan's funds in education. The plan deals with this component in different ways. The third component, "digitalisation of education", aims to improve the quality of and access to digital learning at all levels of education. The pandemic and the various lockdowns have exposed the digital divide, and the German plan seems to remove some obstacles to digital and interactive learning. Measures include providing all teachers with digital mobile devices on a loan basis and supplying schools with the appropriate tools. With 96%⁴⁴ of households having access to the internet (in 2020), the government focuses on the tools missing in schools.



5. ARE THE RECOVERY AND RESILIENCE PLANS COHERENT WITH THE GAPS IN DIGITALISATION AND ACCESS TO EDUCATION AND HEALTHCARE?

5.2 INVESTMENT IN HEALTHCARE

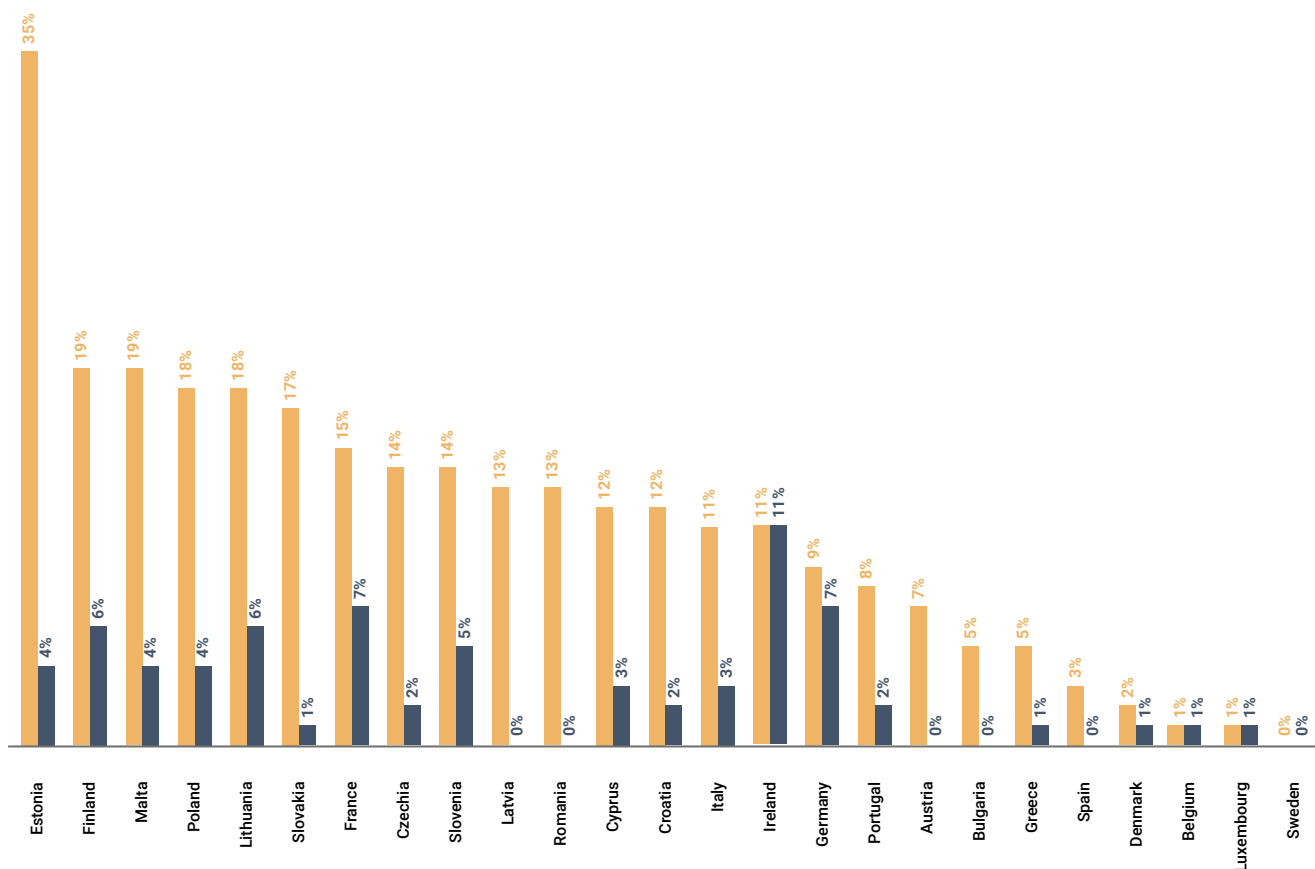
The analysis in Section 4.2 showed vulnerabilities that could be summarised as follows; some countries had vulnerabilities that were either evident before the pandemic or became even more apparent during the crisis:

- 1) Estonia, Greece, Latvia, Romania, Poland, Italy and Slovakia seemed to suffer both from high excess mortality rates during the pandemic and significant "unmet health needs";
- 2) Croatia and Portugal appeared not to be resilient against COVID-19, and yet their healthcare systems appeared to be responsive enough to citizens' needs; and

- 3) Finland, Slovenia and Ireland have some long-term problems, yet their systems appeared resilient enough regarding the pandemic.

As for education, the section on healthcare starts with a graph (Figure 10) that shows the propensity of member states to invest in this public service, which was considered the frontline in the COVID-19 pandemic. The columns in blue account for total investments in healthcare as a percentage of the national plans, and the red columns are the portion of the same NRRPs dedicated to digital technologies to improve healthcare access.

FIGURE 10. Share of RRP expenditure on healthcare (% , 2021) (in orange, total investment; in blue, investment in digital technologies).



Source: Figure elaborated by Vision on data from the European Commission.⁴⁵

First of all, all countries except two (Belgium and Sweden) have a specific mission/component of their plans dedicated to healthcare.

Comparing the data in Figure 10 to known vulnerabilities, it seems that:

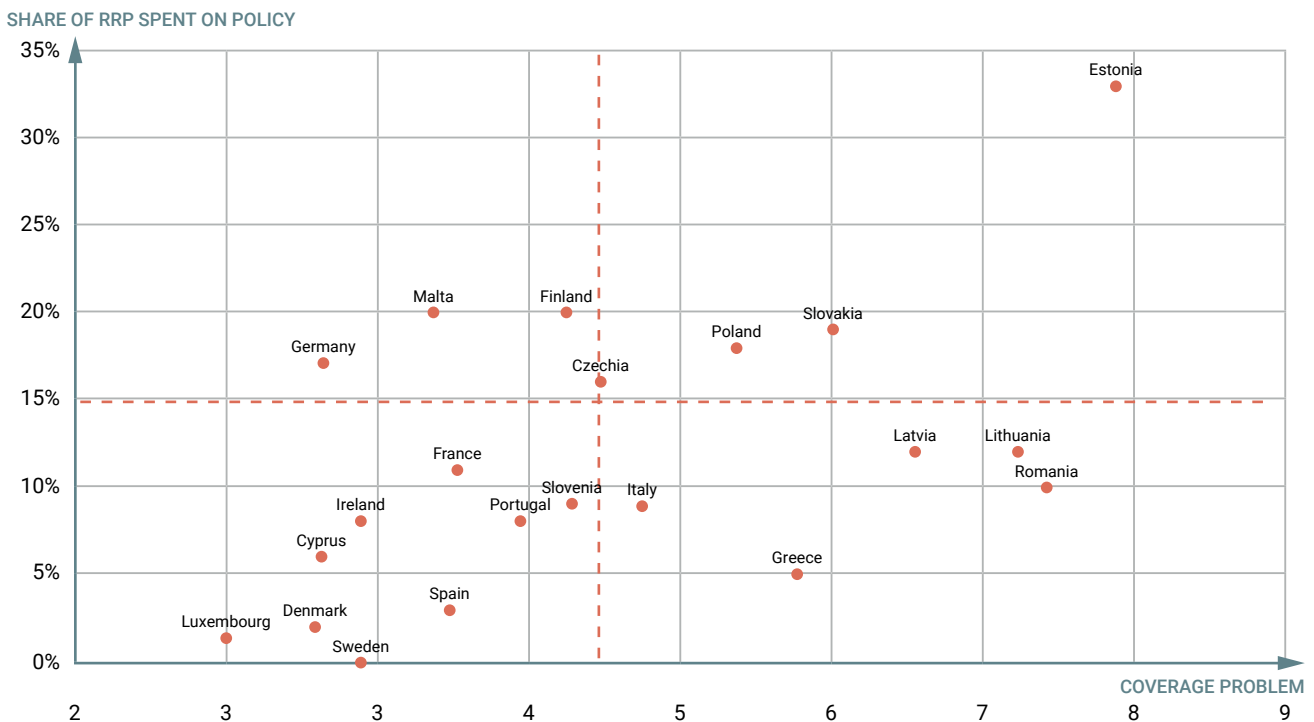
- 1) Estonia and Slovakia are rightly responding to what appears to be a priority;
- 2) Latvia, Romania and Italy are also doing so but to a lesser extent;
- 3) Greece and, more remarkably, Poland do not seem to have made healthcare systems a priority;
- 4) Finland appears to have taken the opportunity of the COVID-triggered NGEU to realign its national system to its citizens' demands; and
- 5) to a lesser extent, Slovenia, Portugal, Ireland and Croatia are doing the same as Finland.

When we, however, focused just on investments in digital technologies, we discovered that:

- 1) investments became much smaller (the weight of digital technologies on investments in healthcare averages to 15.9% amongst the 27 member states);
- 2) Germany and Ireland were spending almost their entire investments dedicated to healthcare on technological upgrades; and
- 3) countries like Slovakia, Latvia and Romania, which prioritised healthcare spending, were not doing so by trusting in digitalisation.

Figure 11 gives a more systematic measurement of the coherence of the NGEU regarding country-specific problems.

FIGURE 11. Comparison of coverage problems of healthcare systems with share of RRP expenditure on healthcare (% in 2021).



Source: Figure elaborated by Vision on data from Eurostat and University of Oxford, WHO.⁴⁶

5. ARE THE RECOVERY AND RESILIENCE PLANS COHERENT WITH THE GAPS IN DIGITALISATION AND ACCESS TO EDUCATION AND HEALTHCARE?

Figure 11 compares the coverage problem (calculated as an average of the pre-COVID problem that the "unmet healthcare needs" may indicate and excess mortality during the COVID period, as for section 3) with the share of RRP that different countries spent on healthcare.

The picture positions the EU countries in four quadrants:

- 1) in the upper right, we have countries like Estonia, which seem relatively problematic in relation to other EU countries, that give healthcare sufficiently high priority;
- 2) others in the lower-left quadrant appear to spend less but also face relatively more minor problems; it is the case for Luxembourg, Sweden and Denmark, which plan to spend almost nothing of their RRP on healthcare;
- 3) in the upper left, we, instead, have member states like Germany that did decide to make healthcare a high priority, notwithstanding that they do not appear to have suffered significantly compared with their peers; and
- 4) the lower right includes member states like Italy and Greece that should have spent more of their NGEU allowance on healthcare.

5.2.1 ROMANIA AND POLAND

In general, countries overwhelmed by the pandemic and whose healthcare systems are underfunded, such as Romania and Poland, are trying to overcome their vulnerabilities with the RRP funds. What emerges from the healthcare component analysis is that their government's objective is to improve the management of health-related finances. The majority of the fund is destined for the modernisation of existing infrastructure and the creation of new sanitary facilities. There is also a significant share of the funds that will be directed at boosting the resilience of healthcare: €36 million in Bulgaria and €1 billion in Poland to implement sanitary digital transformation.

Romania is implementing a telemedicine system to facilitate integration between healthcare institutions and to permit much more efficient data sharing. Poland, on the other hand, promotes digital acceleration to support all medical staff and patients. These measures are

incredibly vague, and it's unclear if there is consistency between the extent of vulnerabilities these two countries face and the measures that should be implemented through digitalisation.

5.2.2 ITALY

Italy has a much better funded healthcare system, but its excess mortality rates were high. Italy planned to spend a 9% share on healthcare. The primary investment that envisages greater use of technologies is "home as the first place of care and telemedicine", which will promote remote doctor-patient interactions and improve diagnosis and monitoring of chronic diseases, according to the Italian plan. However, not much was said about providing skills to older people or their caregivers or innovating the interfaces they use; this may be a missed opportunity to promote a domestic supply. Like all other countries, Italy foresees investments in infrastructure, new digital devices and training for healthcare officers to improve digital and technical skills.

5.2.3 GREECE AND ESTONIA

As shown in Section 4, Greece and Estonia are the two countries with the highest unmet health needs in Europe, underlining difficulties related to access to their healthcare systems. Estonia is trying to address the poor responsiveness of its system through investments in new and improved infrastructure. There are references to changing the level of health governance and making it more digitalised; this is foreseen as a general structural intervention. Greece only commits itself to "rationalise governance".

5.3 ENABLING REFORMS OF EDUCATION AND HEALTHCARE

Examining the reforms adopted by the NRRPs needs a methodological premise: the reforms are required by the RRF regulation⁴⁷ to follow the indications of the so-called "European Semester".⁴⁸

However, we argue that, as we mention in this last section, even the European Semester may not sufficiently reflect the radical impact digital technologies have on private and public organisations and their very nature.

The relationship between the internet and governments needs to be explored in two different directions:

- 1) technologies provide opportunities to improve services radically; and
- 2) the same technological revolution changes the nature and organisation of the public administrations providing them.⁴⁹

The COVID-19 pandemic seemed to have demonstrated⁵⁰ that such reorganisation required that:

- 1) the delivery of services needs to become much closer to the individual citizen/customer (client-centric) with much less need for intermediation; whereas in the 20th century demands and services tended to be identified and designed from the centre, today, the entire organisation seems to be shaped around the "user experience"; this is true both for education⁵¹ and healthcare;⁵² and
- 2) despite data gathering, analysis and transmission need to become much more coordinated, especially when introducing technologies like blockchains;⁵³ for instance, it was fundamental to standardise the protocol by which data on COVID-19 cases were generated and classified.⁵⁴

User experience and economies of data may push public administrations towards a paradigm where they adopt some of the features of the so-called "digital platforms".⁵⁵ This has, theoretically, an immediate impact on the kind of reforms we need to realise to unfold the transformative potential of technologies. How much were the NRRPs able to reflect an evaluation of how the COVID-19-triggered experience accelerated the reorganisation of schools and healthcare systems?

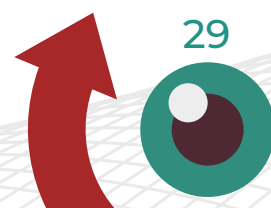
Reading of the reforms appears to indicate that:

- 1) For education, Italy's plan envisages a renewal of school curricula with the introduction, at all levels, of courses aimed at improving STEM skills and introducing mandatory coding courses. Yet, at a more fundamental level, the plan does not provide an assessment of "distance learning", so that it can become a structural complement to existing curricula; even more importantly, it does not appear to consider a priority the long-debated issue of providing individual schools (and their heads) the "autonomy" to adapt their institution to the needs of the territory they serve (which is a prerequisite of higher adaptation of the service to different local contexts).

As mentioned, however, this may also be a consequence of an analysis of the European Semester itself that appears to be concentrated more on the resources spent than on the organisation or, even less so, on the use of technologies as a lever for achieving higher efficiency.⁵⁶

The primary reform of the Italian plan is about creating a more efficient and modern organisational model of territorial healthcare assistance networks. However, the plan does not envisage a systematic evaluation of the pathologies/segments to which telemedicine can be more readily applied. Therefore, little is said about which technologies may be used or experimented with. More importantly, it does not acknowledge that a healthcare system fragmented into 21 regional ones implies no centralisation of patient records, which becomes both an economic burden and an obstacle to easier access for everyone. Again, the European Semester does not seem to account for such problems of institutional organisation and better use of technologies.⁵⁷

- 2) Romania and Bulgaria have conceived a plan for the *digitalisation of education*, by which they want to increase the level of digital skills of segments that are suffering digital divides, including "pupils", unemployed and people without internet access, and one on *digitalisation of healthcare*, with the adoption of telemedicine, telediagnosics and telemonitoring.
- 3) Estonia is another country with the need for more alignment between the provision of study courses and the labour market.⁵⁸ However, its RRP lacks concrete educational reforms to modify this trend. Regarding healthcare, Estonia is spending the least in Europe on health relative to GDP, and with the



5. ARE THE RECOVERY AND RESILIENCE PLANS COHERENT WITH THE GAPS IN DIGITALISATION AND ACCESS TO EDUCATION AND HEALTHCARE?

reforms from the plan, the system should have an overall reorganisation. In the Estonian plan, these two sectors do not see strong interventions with digitisation.

- 4) France starts its digital transformation reforms with a robust upskilling of teachers and health workers: two reforms foresee training classes for both these categories to improve the use of the already present digital divide. Also, Austria, Slovakia and Germany are among the few to consider integrating digital learning into the student's curriculum.

A scattered picture around the EU seems to confirm that there is no strategic approach to education and healthcare and even less on technologies to improve accessibility.

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There does not seem to be a strategic approach to reform education and healthcare and even less on the use of technology to improve accessibility.

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6. CONCLUSIONS BASED ON PRELIMINARY FINDINGS

The policy study focused on two specific research questions:

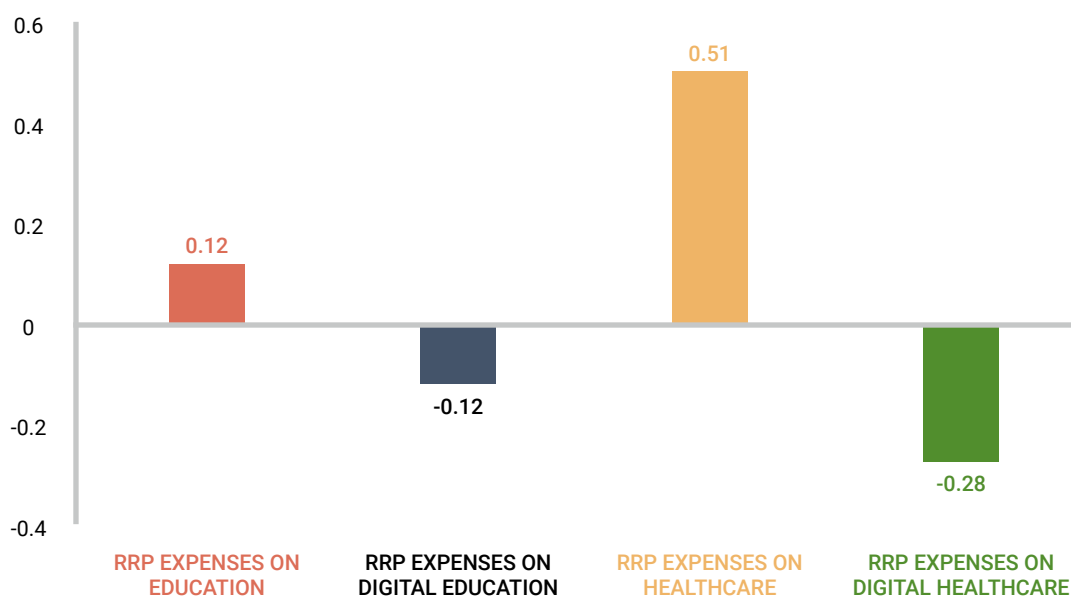
- Did the NGEU, as a "portfolio" of national plans, appear to express a European strategy for using digital technologies to make education and healthcare more accessible?
- Did the NRRPs seem to reflect an evaluation of the COVID-19 pandemic, which led to the massive use of digital means to access these public services?

To respond to such questions, the researchers used a specific "signal" that could reveal member states' attitudes. We measured whether the member states that showed more significant gaps in universal coverage of education and healthcare were the ones using more of the money allocated to digital transition to improve access.

In Sections 4 and 5:

- 1) we assessed how significant the gaps were regarding a benchmark of universal coverage in education and healthcare, considering both long-term indicators and vulnerabilities exposed by the pandemic;
- 2) we accounted for the percentage of each NRRP being dedicated to education and healthcare (in some plans, these two policy areas make separate "missions", as policy areas are called); and
- 3) we measured how much of this could refer to using technologies to increase coverage. Figure 12 summarises an assessment of coherence.

FIGURE 12. Correlation of RRP expenditure in different countries by types of investment and coverage problems in education and healthcare of different member states (from -1 to +1, in 2021).



Source: Vision data from the European Commission.⁵⁹

6. CONCLUSIONS BASED ON PRELIMINARY FINDINGS

The data indicate that overall:

- 1) countries with more significant problems with healthcare appear to spend more;
- 2) the coherence is smaller for education;
- 3) if we focus investments on digital tools to make education more accessible, however, the correlation becomes negative (although with low statistical significance); and
- 4) this is even more true for healthcare.

It is, therefore, relatively straightforward that the higher the cost of COVID-19 (and human suffering) to education and healthcare, the higher the propensity to spend on those two policy areas. And yet, notwithstanding the leap experienced in using digital media to access essential public services during the pandemic, digital technologies still need to be considered a strategic lever to improve access in countries with more problems.

The same applies to the excursus of "reforms" we found in the national plans. Whereas the lessons from the COVID-19 pandemic highlighted the importance of more centralisation and standardisation of data gathering and analysis, which appeared to be crucial for evidence regarding COVID-19 infections. Conversely, with more decentralisation in service delivery, health monitoring and education were demonstrated to be at least partially accessible from home. Only some reorganisations of this kind were found in the national plans.

For instance, in Italy, which was the country investing most RRF money on healthcare, by far, the health system continues to be fragmented into 21 regional ones, with the consequence that data are collected according to 21 different standards, with consequences for the capability to react efficiently to a health emergency. Actual healthcare continues to be centred around brick-and-mortar hospitals. Likewise, we found very little evidence on how distance learning could be integrated into school curricula in Italy, nor of evaluations of differences in how it impacted on school subjects or segments of students and age groups.

This may result in the NGEU needing more opportunities to build a different approach to technologies, where the chance to promote a different EU-specific approach to digital transformation can be part of the outcome.

However, this situation may reflect a broader problem for the entire NGEU. The priority was to issue joint debt to achieve a massive fiscal response.⁶⁰ Speed seems to have been the priority, although, theoretically, the NGEU was about moving the entire European economy onto a different productivity curve. At the same time, the tool of national plans might not be the right approach to achieve structural reforms, as proven for the country-specific recommendations of the European Semester that have not yielded the reforms prescribed.⁶¹ The approach may have yielded reforms that have not been strategic enough.

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Notwithstanding the leap experienced in using digital media to access essential public services during the pandemic, digital technologies still need to be considered a strategic lever to improve access in countries with more problems.

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7. LIMITS OF THE ANALYSIS AND THE NEED FOR FURTHER EVALUATION

The approach chosen for the RRF may have consequences for evaluating the facility as a whole and of the NRRPs. Our research, for instance, did encounter some limits:

- 1) it was not easy to reconstruct similar semantics for different recovery and resilience facilities; and
- 2) common data on implementation is not enough, and it is still early in the expenditure process.

The RRF regulation envisages less evaluation scope than similar programs financed by the European Commission budget. If we compare the RRF regulation with other EU programs (like the regional development ones), there are at least three characteristics that appear to limit the scope of the evaluation:

- 1) The evaluation is technically meant (article 32) to provide only recommendations in terms of modification of the RRF regulation (and not of the policy choices). As a consequence, there are no explicit expectations in terms of evaluations of NRRPs/country-specific assessments.
- 2) Amendment of the national plan is possible – by article 21 – only where the recovery and resilience plan, including relevant milestones and targets, is no longer achievable.
- 3) The above-mentioned innovative method of paying member states for the fulfilment of procedural requirements ("milestones") and the achievements of final results ("targets") has got the side effect of reducing, with respect to similar programs (like the "structural funds", which are paid upon certification of expenses to be reimbursed), the possibility to control how quickly the money reaches the final beneficiaries (this concern is expressed by the European Parliament⁶² as a response to the June 2022 European Commission mid-term assessment of the RRF).

In addition, a proper EU-wide evaluation is made difficult because:

- 1) The NRRPs are all very different. Article 3 of the regulation enumerates six policy areas/pillars that should structure the national plans. Yet, some of these areas have blurred perimeters (like the one on "smart, sustainable and inclusive growth", which is more an overarching inspiration than a policy). In contrast, countries may even use other criteria to identify a "green transition".
- 2) The overall objective of the RRF itself is extensive,⁶³ and we appear to be in a situation where Tinbergen's condition for evaluability may be violated.⁶⁴
- 3) The NGEU is a new instrument for the European Commission and the individual member states; they are still developing a suitable capability to monitor and steer the policy.

It is a fact that the NGEU is a leap forward in the history of EU integration which makes the case for a much stronger evaluation (and even for a change of the RRF regulation). We think that a comprehensive or per policy *in itinere* evaluation may be very useful to identify margins of improvements and strengthen the debate on the possibility of developing a permanent fiscal capacity of the EU. This is particularly the case for the evaluation of how the NGEU may promote an EU approach to the digital transition, which we consider essential both for empowering all EU citizens and for finding a role in the battle for global digital leadership, which may decide the very viability of the EU project in the 21st century.



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EXPLANATORY TABLE

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY	Reforms that aim at the improvement of access – quality of education for each segment.	Reforms that aim at the improvement of acces – quality of healthcare for each segment.	Reforms that aim at the improvement of connectivity and internet access for each segment.
UNDERAGE			
RURAL			
GENERAL			

The reforms/measures are from the EU COMMISSION STAFF WORKING DOCUMENTs / RRFs / EU PARLIAMENT BRIEFINGS.

HERE ARE LISTED THE MAIN TRACEABLE REFORMS ON DIGITALIZATION of EDUCATION-HEALTHCARE.

In some cases there are no specific plans to improve healthcare / education throughout digital.

There are some reforms that do not consider all the different population segments necessities while some others are more specific.

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AUSTRIA⁶⁵

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	<p>Fair and equal access to basic digital skills for all lower secondary students: provide access to digital education and to digital equipment for students and support the digitalisation of teaching practices of lower secondary schools. The measures are complemented by training for educators, development of basic IT infrastructure for schools, the establishment of a quality label for learning apps, and the development of a 'Digital School Portal' and a portal for digital teaching/ learning resources (Eduthek).</p>		<p>Internet Infrastructure Austria 2030 Platform to simplify procedures for broadband deployment.</p>
RURAL	<p>Improving access to education</p>		=
GENERAL	=	<p>Making primary care more attractive (Sub 4.A)</p> <p>Digitalization of Health care: The electronic mother-child passport aims to improve health opportunities for pregnant and breastfeeding women and their children and to increase social cohesion, by reaching out particularly to those women who do not necessarily take up these services. These investments contribute to the digitalisation of the health services for mothers.</p>	=

BELGIUM

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY	<p>Stratégie de (re)qualification des compétences: The project aims to remove obstacles to employment especially for low skilled people and elderly people through the improvement of performances and of the inclusiveness of the training systems.</p>	<p>eHealth Services and Health Data of the Federal State: The project aims at increasing the quality, speed and agility of healthcare through the digitalization of healthcare processes; it promotes the extension of electronic prescription capabilities and other digital instrument to facilitate and innovate the healthcare assistance.</p>	
UNDERAGE	<p>Education 2.0: this reform aims to improve the quality and inclusiveness of education systems. Emphasis is placed on the acquisition of skills – including digital STEM skills. It also aims to fight early school leaving.</p> <p>Digisprong: the main objective of the reform is the digital inclusion through the implementation of school curricula and plans to improve students and teachers' digital skills.</p> <p>Fonds pour l'avancement de l'enseignement supérieur: the reform aims to support the implementation of new digital forms of education.</p> <p>Virage numérique des écoles bruxelloises: the program focuses on giving students modern and quality teaching and on reducing school inequalities.</p>		=
RURAL			<p>Digital Transformation → 'Optic fibre, 5G and new technologies' aims to resorb delays in 5G deployment and providing universal and affordable access to connectivity in all urban and rural areas. It includes structural reforms to remove regulatory bottlenecks for the deployment of 5G.</p>
GENERAL			=



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BULGARIA⁶⁶

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	Digitalisation of Education: reforms that wants to increase the level of digital skills for everyone, pupils, unemployed, people without internet access. (Provision of digital skills trainings and set-up of a platform for adult learning).		
RURAL	=	Digitalization of Healthcare: the reforms will be implemented to update the legal framework in the country for e-Health (e.g. telemedicine, tele-diagnostics and tele-monitoring) and the adoption of the National Strategy for e-Health and Digitalisation of the Health System 2021-2030, which are expected to increase the efficiency and coverage of eHealth.	Digital Connectivity: to increase the coverage of very high-capacity networks across the country , including in rural and sparsely populated areas.
GENERAL	=		Digital Connectivity: try to reduce administrative burden and streamline procedures and fees associated with 5G deployment.

CROATIA

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	Digital transformation of higher education: based on infrastructure investments to increase participation in early childhood education and care and enable an increase in mandatory education time at primary and lower secondary education levels.		
RURAL			Digital Transition of Society: digital transformation of Croatia's economy and society, with various measures to support the digitalisation of public administration and the provision of digital public services. Investments in digital connectivity are also included for digital infrastructures in remote rural areas, which are lagging in terms of digital inclusion.
GENERAL		Strengthening the resilience of the health system: The healthcare component dedicates a majority of measures to health services digital shift.	

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REPUBLIC OF CYPRUS⁶⁷

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY	<p>"E-Skills Action Plan Implementation of specific actions": the program is targeting the elderly to create a culture of lifelong learning. The reform is aimed at designing targeted programs for ICT professionals and developing custom-made measures to improve digital skills.</p>		
UNDERAGE	<p>"Digital transformation of school units with the aim of enhancing digital skills and skills related to STEM education": the program is aimed at upgrading classrooms by developing e-classes by equipping schools with laptops, projectors and peripherals, equipping students with laptops and tablets, producing educational material towards enhancing students' digital skills, training in-service teachers.</p>		
RURAL			<p>Component 4.1 - Upgrade infrastructure for connectivity: The aims of these reforms package is to ensure 5G and finer coverage for all and to enable affordable access to Gigabit connectivity in all urban and rural areas.</p>
GENERAL		<p>"Design of an electronic platform for the surveillance of Nosocomial Antibiotic Consumption and Healthcare Associated Infections" reform: the program is aimed at collecting data from hospital pharmacies, microbiology department and Hospital Infection Control Committees in order to create a digital dataset regarding antibiotic consumption, antimicrobial resistance and Healthcare Associated Infections.</p>	=

CZECH REPUBLIC

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	<p>Digital skills for the digital age: revamping the digital curricula in education, providing digital equipment and training to schools, new university programmes in fast-growing digital fields, upskilling and reskilling in digital skills.</p> <p>- Revising the curricula for primary and secondary education in order to reinforce IT education, adapt it to the latest trends and foster digital skills across the educational areas, promote digital skills of teachers and invest in digital equipment in schools. The plan also aims at addressing the digital divide, exacerbated by the prolonged school lockdown, by setting up a fund for mobile digital devices at the disposal of disadvantaged pupils and students.</p>		
RURAL	<p>- In education, the attention is given to supply of quality education and inclusiveness of the system, in view of pending health and social inequalities. The acquisition of digital equipment for schools across Czechia is expected to open the opportunities for pupils from poorer regions and disadvantaged socio-economic backgrounds.</p>		
GENERAL		<p>eHealth : increase digitalization of the health care system through telemedicine, improve already existed tools, linking leading healthcare providers.</p>	<p>Institutional reform of the coordination and support system for digital transformation of economy (0,35M)</p>



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DENMARK⁶⁸

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	<p>“Denmark fit for a digital future” reform: the program is aimed at increasing the awareness on the necessity of improving digital skill at every level. For the education system the reform proposes to continue focusing on the promotion of teaching digital skills in school and of promoting the students’ enrollment in high specialized IT education.</p>		
RURAL			
GENERAL		<p>“Digital solutions in the healthcare sector” reform: the program is aimed at wide spreading the use of digital solutions throughout the Danish healthcare system, at expanding the use of video consultations, at guarantee an ongoing communication between patients and health workers and at spreading the use of telemedicine</p>	

ESTONIA

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY		=	
UNDERAGE		=	
RURAL		=	
GENERAL		<p>Re-organisation of the Estonian health system with investments (no invest in digital to improve access)</p> <p>Improving HC access: Construction of the construction of the Northern Estonia Medical Campus; modernizing e-health governance; strengthening of primary care; addressing health workforce shortages; purchasing multipurpose helicopters for emergencies and constructing landing sites at medical centers.</p>	<ul style="list-style-type: none"> - Creation and development of a center of excellence for data management and open data - Development of event services and proactive digital public services for individuals - Development of event services and digital gateway for entrepreneurs - Enhancing the strategic analysis of money laundering and terrorist financing in Estonia

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FINLAND

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY	=		
UNDERAGE	=		
RURAL		=	=
GENERAL	<p>Reform of continuous learning: A service centre for continuous learning and employment; Medium-term foresight capacity to anticipate labour and competence needs.</p>	<p>Promoting compliance with the care guarantee as part of the preparation for the health and social services reform, and reducing the care, rehabilitation and service deficit in health and social services caused by the coronavirus pandemic with also e-service and digital instruments</p>	<p>Finland aims to invest in fixed high-speed broadband networks in areas where access would not be provided on commercial basis, i.e. in particular in sparsely populated regions</p>

FRANCE

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY		<p>Training class for healthcare workers to acquire digital skills.</p> <p>Ensuring software's interoperability and security.</p>	
UNDERAGE	<p>Law establishing a framework for research and higher education for 2021-2030 ('loi de programmation de la recherche pour les années 2021 à 2030 et portant diverses dispositions relatives à la recherche et à l'enseignement supérieur')</p> <p>Training class for teachers to learn how to use digital devices and to find new methods for online education</p> <p>Developing digital services and resources for elementary school students.</p>		
RURAL			<p>The ultrafast broadband plan ('France Très Haut Débit') will improve connectivity in rural areas. The ultrafast broadband plan invests in infrastructures with the aim of accelerating the rollout of next generation access internet, including based on optic fiber, across the territory of France.</p>
GENERAL	<p>Training class for teachers and researchers by hiring specialists i.e. educational engineers (every university might receive 100 thousand euros to implement this measure)</p> <p>Assignment of projects aimed at developing ad hoc services for students</p> <p>Assignment of 19 projects to 19 consortiums to develop digital tools to enhance hybrid teaching</p> <p>Creation of new national digital platforms for webinar, online class, online examination, and so on.</p>	<p>National strategy for the transformation of the health system</p>	=



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GERMANY

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	<p>"Special equipment program for digital devices": the plan includes equipping teachers with digital devices to enhance digital teaching, learning and communication facilities in schools.</p> <p>Developing education platforms (in conjunction with the digital teaching space).</p>		
RURAL			
GENERAL	<p>"Digital in-service teacher training": the plan considers the creation of centers of excellence for digital and digitally supported teaching aimed at strengthening digital teaching and learning.</p>	<p>Strengthening of the digital and technical resources of the public health sector.</p> <p>"Program to future-proof hospitals": the plan includes the expansion of the German Electronic Reporting and Information System for Infection Control.</p> <p>Deploying of e-Health services: the program is aimed at supporting digital expansion through the use of electronic services, particularly in the area of infection control.</p>	

GREECE⁶⁹

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	<p>“Education, vocational education, training, and skills” reform: the program is aimed at mark a digital renovation of the education system by assigning €200 vouchers for pupils and students from low-income families to purchase IT equipment, installing 36 000 interactive learning systems (primary and secondary school) and training students on digital.</p>	=	
RURAL		=	
GENERAL		<p>Reform and acceleration of investment in the healthcare sector – clawback reduction and rationalisation of healthcare expenditure: renovation of infrastructure and medical equipment of at least 50% of health center.</p>	<p>Towards ‘customer- oriented’ public services through simplification and improvement of processes – interconnection and interoperability of registries, systems and services: Transition to 5G technology.</p>

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HUNGARY

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE			
RURAL			
GENERAL			

IRELAND

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY		=	"10 Year Adult Literacy, Numeracy and Digital Literacy Strategy" : the reform is aimed at developing basic digital skills among adults and elderly to enable greater access to digital services.
UNDERAGE	Addressing the digital divide and enhancing digital skills: this reform encompasses four measures designed to support the digital transformation of education in Ireland at all levels (school, tertiary, lifelong learning). The measures complement each another, mainstreaming essential digital skills and addressing the digital divide in the education system.	=	
RURAL	=	=	
GENERAL	+ "Ireland's Third ICT Skills Action Plan" : the program is aimed at increasing the number of learners graduating with high-level ICT skills by over 65% or an additional 5000 graduates, apprentices and trainees by the end of 2022.	Healthcare reform. This project comprises three separate measures to address the related CSRs, particularly as regards improving access to healthcare and increasing the cost-efficiency of the healthcare system.	Address digital divide and enhancing digital skills (with D/Education and Skills).

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ITALY

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY		<p>Casa come primo luogo di cura e telemedicina: this program aims at the identification of a shared model for the provision of homecare that could benefit from all the new technologies possibilities such as telemedicine, home automation and digitalization. In addition, the program wants to create within the ASL (Aziende Sanitarie Locali) an information system able to detect clinical data in real time.</p>	
UNDERAGE	<p>Nuove competenze, nuovi linguaggi: This policy promotes within the curricula of all school grades the integration of activities, methodologies and content aimed at developing STEM skills.</p> <p>Didattica digitale integrata e formazione sulla transizione digitale del personale scolastico: the measure provides for the creation of a multidimensional system for the continuing education of teachers and school staff for the digital transition, articulated in a coordination pole on digital education promoted by the Ministry of Education.</p> <p>Nuove competenze, nuovi linguaggi: The main provision of this policy is the introduction of a mandatory coding course for all students during their education cycle.</p>		

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
RURAL			<p>Digitalisation, innovation and competitiveness of the production system: to bring gigabit connectivity to grey areas and scattered households in black areas; to ensure connectivity at Gigabit speed to public schools, hospitals and remote islands and to boost coverage of 5G networks.</p>
GENERAL	<p>Sviluppo del sistema di formazione professionale terziaria: the objectives are: the increase of technical schools and the enhancement of laboratories with 4.0 technologies; improvement of highly specialized training courses connected to the Energy 4.0 and Environment 4.0 sectors, functional to the adaptation of 4.0 skills to strategic development sectors; reduction of youth unemployment by addressing the skill mismatch between job supply and demand; training of teachers, so that they are able to adapt training programs to the needs of local companies; the development of a national digital platform for job vacancies for students with professional qualifications.</p>	<p>Infrastruttura tecnologica e strumenti di raccolta, elaborazione, analisi dei dati e simulazione:</p> <p>This policy wants to strengthen and upgrade the Italian health information systems such as the FSE (Electronic Health Record) and the NSIS (New Health Information System) to facilitate the collection and distribution of medical data.</p>	

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LATVIA

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY		Modernising hospitals and secondary ambulatory care (€ 158 million).	
UNDERAGE	Improve the quality of regional schools by coupling investment with the optimization of school network: Upgrade infrastructure and equipment of 20 schools -15 low emission school buses -26 620 digital equipment available for schools.		
RURAL			
GENERAL	Sustainable and socially responsible support for adult learning	Comprehensive and integrated healthcare system Human resources and upskilling Sustainable health care	Modern and digital national processes and services National ICT resources Digital skills Broadband infrastructure development

LITHUANIA

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY		Provision of long-term care services	
UNDERAGE	Modern general education – background to competitive competences.		
RURAL			
GENERAL	Access to the development of competences and recognition of qualifications for adult. Competences for green and digital transformation acquired in vocational education and training.	Improving the quality and accessibility of health services and promoting innovation. Systemic improvement of the health system's resilience to deal with emergencies.	

LUXEMBOURG⁷⁰

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY	Skillsdësch: launch of the vocational training 'skills bridges': to foster lifelong learning and improve the adequacy of training to the needs of the labour market, which should make the labour market more resilient.		
UNDERAGE			
RURAL			
GENERAL		Gezondheetsdësch: strengthening health system resilience - It contains measures expected to address the shortage of health professionals and skills, better governance and digitalisation of the health sector (e.g. the development of telemedicine).	Fostering the establishment of a new technological ecosystem in Luxembourg

MALTA⁷¹

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE			
RURAL			
GENERAL	Promoting digital competence through insuring proper instruments (internet connection and PC) to low-income families to incentivize digital alphabetization. e-College institution to improve adults/workers skills: online courses.	Developing and implementing a health policy framework aimed at making the health system more sustainable and resilient: it aims at the strengthen of the outpatient and operation management, to report the tissue analysis workflow into a digital platform and to improve radiotherapy delivery to reduce the volumes of treatments.	Deepening the digital transformation through policy reform, with a focus on reducing the digital divide and promoting digital skills

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THE NETHERLANDS

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE			
RURAL			
GENERAL			

POLAND

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	Digital skills for the digital age: support for ICT equipment for schools and teachers, investing in large-scale digital upskilling.		
RURAL			Ensuring universal high-speed internet access: including white areas where there are no broadband infrastructures
GENERAL		Improving accessibility and quality of healthcare services: reform of the hospital sector and related investments, measures in the fields of e-health, medical studies and research, and long-term care.	

PORTUGAL⁷²

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	<p>"Reforma para a educação digital" the reform is aimed at strengthening students' digital skills by modernizing the pedagogical and education environments and creating conditions to better ensure academic success and to avoid early school leaving.</p> <p>Transição digital na Educação (500 M€) investment: the allocation is aimed at equipping schools with internet (300 Gbps), Creating 1.300 laboratories for digital teaching, equipping schools with 40.000 projectors in class, providing resources and educational digital contents for 330 subjects and equipping both students and teachers with 600.000 PC for personal use.</p>		
RURAL	<p>"Educação Digital (Açores) (38 M€)": The investment is aimed at implementing the "Azores Digital Education" project whose objective is to modernize the Azores' education system through technology and digital tools. The program will take into account: the purchase of 200.000 mobile digital equipment, the purchase of interactive screens to equip 330 school classes in the region and the creation and development of 10 Massive Open Online Courses both for teachers and parents.</p>		
GENERAL		<p>Primary Healthcare Reform: to strengthen the core role of primary health services within the overall architecture of the National Health Service, upscale long-term and mental health services, and increase efficiency by completing the reform of the governance model of public hospitals and bringing forward the digitalisation of health services.</p>	

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ROMANIA

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY		Development of an integrated e-Health and telemedicine system. ⁷³	
UNDERAGE	Digitalisation of education: Updating the curriculum and developing digital teaching materials and linking teacher's competences profile and the curriculum for initial vocational training, continuing vocational training and the one for skills training.		
RURAL	Programs for the development of thematic training courses, for digital literacy and digital pedagogy competences, for teachers in rural and disadvantaged areas, grants for computer science laboratories and smart hubs, development of open educational resources and schemes for digitalisation of universities.		
GENERAL			

SLOVAKIA

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY	<p>National digital skill strategy: direct to adult learning opportunities to ensure their continued inclusion into the society. It includes plans to improve elderly digital skills and vulnerable persons, combining training in digital skills with the provision of accessible digital equipment.</p>	<p>Modern and accessible healthcare: the reform is aimed at digitally transforming the sector by promoting, for instance, telemedicine services.</p>	
UNDERAGE	<p>Education for the 21st century: the reform aims at equipping schools with digital tools, internet access, textbooks and equipment for distance learning taking into consideration the change of the education curricula and textbooks & the preparation for teachers for the new curricula and teaching methods.</p> <p>Improvement of the universities' performance: as described in the national plan, the reform is aimed at digitally renovating and modernizing schools and dormitory building, at including new teaching facilities to support the strategic development of universities.</p>		
RURAL			
GENERAL			<p>Digital Slovakia: comprehensive investments and reforms to usher in a shift towards e-government services, suitably secured and accompanied by better tools and skills for providers and users. Digital upskilling of vulnerable groups.</p>

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SLOVENIA

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE	Renovating the education system for the green and digital transitions.		
RURAL			
GENERAL	Reform of higher education	Healthcare system reform in digitalisation	

SPAIN

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY		<p>“Plan de Inversión en equipos de alta tecnología en el Sistema Nacional de Salud”: the program includes the enhancement of the existent online healthcare services.</p> <p>“Data Lake sanitario”: the reform is aimed at creating a data centre to gather information to allow a high-quality diagnosis and more incisive treatments.</p> <p>Creation of a “Secretaría General de salud Digital, Información e Innovación del SNS”.</p>	
UNDERAGE	“Plan de Digitalización y Competencias Digitales del Sistema Educativo” (C19.R1): the program mentions the use of artificial intelligence to promote a custom-made education in order to guarantee an efficient learning path.		
RURAL			
GENERAL	“Plan Nacional de Competencias Digitales” : (C19.R1) – National Digital Competences Plan: it provides digital skills training for the population in general.		C15.R2: “Digital Spain 2025” : to ensure the security of 5G electronic communications networks and services; to improve level of digital connectivity through investments in the digital infrastructure network, with a particular focus on rural or less populated areas.

SWEDEN

CATEGORIES	EDUCATION	HEALTHCARE	INTERNET ACCESS
ELDERLY			
UNDERAGE			
RURAL			Digital connectivity: accelerating broadband network roll-out in sparsely populated areas.
GENERAL	Increasing digital skills at universities and other higher education institutions.		

ANNEX 2

MEMBER STATES' RRF INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

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EXPLANATORY TABLE

		GRANTS Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		Funds invested in ED - total	Funds invested in HC - total	Funds invested in improving connectivity and internet access - total
CATEGORIES		DIGITALIZATION OF EDUCATION	DIGITALIZATION OF HEALTHCARE	
	ELDERLY	Funds invested in improving access and quality of education using digital tools	Funds invested in improving access and quality of healthcare using digital tools	
	UNDERAGE			
	RURAL			
	POORER QUARTILE			
	GENERAL			

The numbers are from the **EU COMMISSION STAFF WORKING DOCUMENT / RRFs / EU PARLIAMENT BRIEFINGS**.

HERE ARE LISTED THE MAIN TRACEABLE INVESTMENTS ON DIGITALIZATION IN EDUCATION-HEALTHCARE, therefore the investments consider the total of fund allocated to improve access and quality through education-healthcare.

In some cases it isn't clear the difference between investments in education and investments in digitalisation of education, meanwhile in some cases there are no specific plans to improve healthcare / education throughout digital or there are no connectivity improvements.

ANNEX 2 MEMBER STATES' RRF INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

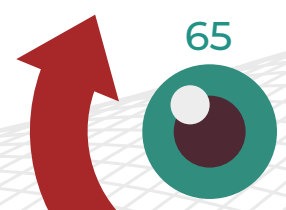
AUSTRIA

		GRANTS 3.46 billion 52.8% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		7,3%	7%	891 million
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 385 million	DIGITALIZATION OF HEALTHCARE TOT: 26.5 million	<p>Gigabit networks reaching half of Austrian households: the investment sustains the Creation of the Internet Infrastructure Austria 2030 Platform (PIA 2030) reform.</p> <p>The aim is to facilitate broadband deployment, by ensuring coordination between all stakeholders and reducing red tape. This reform and investment hope is to contribute to ensuring equal opportunities between urban and rural areas.</p>
	ELDERLY			
	UNDERAGE	Provision of digital end-user devices to pupils: provide school with digital tools, and to give every year digital devices to 80.000 pupils .		
	RURAL			
	POORER QUARTILE			
	GENERAL		Development of the electronic mother-child passport platform including the interfaces to the early aid networks: improve health opportunities for pregnant and breastfeeding women and their children and to promote accessibility of health services with user-friendly software.	

BELGIUM

			GRANTS 5.8 billion 27% Digital transition		
			EDUCATION	HEALTHCARE	INTERNET ACCESS
			15,4%	1%	115.3 million
				** There is no specific "healthcare component" in the Belgian plan; the healthcare related improvements are within other general reforms and investment for example on "public administration", "renovations of buildings"... etc	
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 292 million	DIGITALIZATION OF HEALTHCARE TOT: 40 million			
ELDERLY					
UNDERAGE	<p>Education 2.0: the investment-reform includes upgrades of digital connectivity and equipment in schools in all three language communities to increase the effective use of technology and digital learning tools in schools, which is comparatively low in Belgium.</p> <p>Virage numérique des écoles bruxelloises: the investment is used to strengthen schools' internet connection and to ensure the provision of digital equipment such as interactive whiteboards and tablets.</p>				
RURAL					
POORER QUARTILE					
GENERAL	<p>Digisprong: the program foresees the supply of digital devices for all students to support their education.</p> <p>Fonds pour l'avancement de l'enseignement supérieur: the investment is directed to the provision of computer equipment such as hardware and software and to adapt school facilities.</p>	<p>eHealth Services and Health Data of the Federal State.</p>	<p>Optic fibre, 5G and new technologies: it aims to resorb delays in 5G deployment and providing universal and affordable access to connectivity in all urban and rural areas. The hoped result is increasing the fibre readiness of Belgium and in certain business parks in areas in the Wallon regions where there is no easy adequate access to connectivity equipments.</p> <p>Social Infrastructure: the plan foresees the equipment of social housing in Wallonia with assistive technologies to support the independent living of persons with disabilities and elderly people. The plan will also allow about 9.450 vulnerable households to receive refurbished computers and to equip 285 digital spaces open to the public.</p>		

IS THE DIGITAL TRANSITION A LEVER FOR STRUCTURAL REFORMS OR DOES IT REINFORCE THE DIVIDE?



ANNEX 2 MEMBER STATES' RRF INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

BULGARIA

		GRANTS 6.27 billion 25.8% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		10%	5%	385 million
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 319 million	DIGITALIZATION OF HEALTHCARE TOT: 36.47 million	Digital Connectivity (C.7): the investments related to this component aims to the development of a more extent coverage of the State network to all municipal centers and provide coverage with VHCNs in the "white areas".
ELDERLY				
UNDERAGE		STEM centers and laboratories in schools: this investment's objective is to increase digital literacy and promote interest and skills in subjects related to natural and engineering sciences, artificial intelligence, robotics, IT.		
RURAL				
POORER QUARTILE				
GENERAL		National online platform for adult learning	Implementation of the National Health Information System and platform for medical diagnostics to collect and exchange medical information; the aim of the investment is to create a pilot project for telemedicine services in the offices of the Bulgarian Post in rural and remote areas	

CROATIA

		GRANTS 6.3 billion 20.4% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		12%	12%	130 million
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 168 million	DIGITALIZATION OF HEALTHCARE TOT: 44.1 million	<p>Increasing national broadband coverage with gigabit connectivity in rural areas and construction of electronic communications infrastructure for 5G network thereby increasing the digital connectivity of rural areas.</p> <p>Investments for the construction of passive electronic communications infrastructure (such as the construction of stand-alone antenna poles, provision of fiber or microwave transmission capacity to connect mobile electronic communications network to base stations), especially in rural areas.</p>
	ELDERLY			
	UNDERAGE			
	RURAL			
	POORER QUARTILE			
	GENERAL	<p>Digital equipment for higher education: the aim is to facilitate e-learning through investment in digital infrastructure and digital devices.</p>	<p>Digital image diagnostics</p> <p>Establishment of the National Oncological Network and National Oncological Database</p> <p>Digital integration of operating halls and robotic surgery in KBC Split</p> <p>Tele transfusion.</p>	

ANNEX 2 MEMBER STATES' RRFs INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

REPUBLIC OF CYPRUS

		GRANTS 1.006 billion LOANS 0,2 billion 23% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		11.8%	12%	53 million
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 24 million	DIGITALIZATION OF HEALTHCARE TOT: 15 million	Expansion of Very High-Capacity Networks in underserved areas Enhance building cabling to be "Gigabit-ready" and promote connectivity take-up.
	ELDERLY			
	UNDERAGE			
	RURAL			
	POORER QUARTILE			
	GENERAL	Skilling, reskilling and upskilling - digital skills.	<p>Cyprus Innovative Public Health ICT System: the allocation of funds is aimed at determining a decisive step towards the digitalization of the healthcare system in order to guarantee better quality and quicker public services. Its main objectives are: enrich evidence-informed health policymaking, adopt and implement policies that promote health, prevent illness and facilitate access to quality health services by ensuring an inclusive approach across the life course of the population, build capacity for data innovation, promote emergency preparedness and response and so on.</p> <p>"Deployment of generic cross border e-health services in Cyprus": this reform is aimed at creating a bond with other EU member states in the healthcare system that will lead to cross-border care and secure access to patient health information between European healthcare systems. It takes into consideration, for example, the deployment of generic cross border eHealth services in Cyprus (i.e. patient summary and ePrescription / eDispensing).</p>	

CZECH REPUBLIC

		GRANTS billion 22% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		14%	14%	112 million total
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 446 million	DIGITALIZATION OF HEALTHCARE TOT: 6.865 million	Digital service for end users Supporting the development and further development of the 5G ecosystem Coverage of the 5G corridors and support for the development of 5G networks Coverage of "white" municipalities in the investment-difficult places in rural areas by the 5G signals
ELDERLY				
UNDERAGE		Digital Equipment for Schools Implementation of the curricula reform and the DigCompEdu Framework		
RURAL				
POORER QUARTILE				
GENERAL			eHealth: facilitate digitalization of healthcare.	

ANNEX 2 MEMBER STATES' RRF INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

DENMARK

		GRANTS 1.5 billion 22% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		0%	2%	65 million
CATEGORIES		DIGITALIZATION OF EDUCATION TOT:	DIGITALIZATION OF HEALTHCARE TOT: 14 million	Investment to support the digitalisation of SMEs and to extend rural ultrafast internet broadband coverage where such networks are still not available. This will help close the digital divide by improving connectivity also in remote regions.
ELDERLY				
UNDERAGE				
RURAL				
POORER QUARTILE				
GENERAL			Digital solution in health care system: new technologies and digital solutions developed during the COVID-19 pandemic are used to create a more resilient and sustainable healthcare system.	

ESTONIA

GRANTS 969 million 21.5% Digital transition			
EDUCATION		HEALTHCARE	INTERNET ACCESS
%		35%	24.29 million
CATEGORIES	DIGITALIZATION OF EDUCATION TOT:	DIGITALIZATION OF HEALTHCARE TOT: 14 million	Construction of very high-capacity broadband networks: Give all households access to very high-capacity network (at least 100 Megabit/second).
ELDERLY			
UNDERAGE			
RURAL			
POORER QUARTILE			
GENERAL			

ANNEX 2 MEMBER STATES' RRF INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

FINLAND

GRANTS 969 million 21.5% Digital transition			
EDUCATION		HEALTHCARE	INTERNET ACCESS
0.80%		19%	50 million
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 7 million	DIGITALIZATION OF HEALTHCARE TOT: 144.8 million	Development of quality and availability of communications networks
ELDERLY			
UNDERAGE			
RURAL			
POORER QUARTILE			
GENERAL	Digitalisation programme for continuous learning: two are the element of this investment, such as the creation of digital service packages to promote continuous learning and the implementing digitalization and flexible learning in schools.	Introducing digital innovations for social welfare and health care services.	

FRANCE

GRANTS 39.4 billion 21% Digital transition			
EDUCATION		HEALTHCARE	INTERNET ACCESS
11.8%		15%	500 million
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 1948 million	DIGITALIZATION OF HEALTHCARE TOT: 2 billion	<p>Digital upgrade of the State and territories: the ultrafast broadband plan, ('France Très Haut Débit'): The ultrafast broadband plan invests in infrastructures with the aim of accelerating the rollout of next generation access internet, including based on optic fiber, across the territory of France.</p> <p>Digital inclusion investment: it consists in the training of 4000 digital consultants to be relocated in local authorities which will organize training sessions to people to complete any public service online and other crucial activities that can be completed digitally.</p>
ELDERLY			
UNDERAGE	Educational continuity: digital transformation of the school: Equipping schools with basic tools i.e., mobile phones, projectors, internet connection (that can be borrowed by students) - with a specific focus on high schools to ensure asynchronous or synchronous hybrid teaching.		
RURAL	Developing access to higher education throughout the country thanks to digital.		
POORER QUARTILE			
GENERAL	<p>Distant Learning Courses:</p> <p>To reduce early school leavers, to improve access to training courses and to improve digital skills both of students and workers.</p> <p>Digital Learning Content: digital platforms which include immersive courses based on virtual reality.</p>	Investing on new national digital platforms to ease the access to online healthcare services i.e., the Shared Medical File (Dossier Médical Partagé), the Digital Space of Healthcare (Espace Numérique de Santé).	

ANNEX 2 MEMBER STATES' RRFs INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

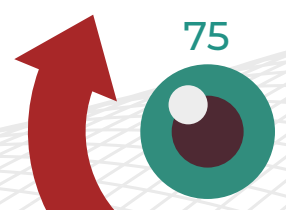
GERMANY⁷⁴

		GRANTS 39.4 billion 21% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		8.6%	9%	<p>Connectivity is the only area for which no measure is proposed under the recovery and resilience plan. However, it is to be noted that actions are planned with national funding to address this priority. To tackle the digital divide between regions, the government notably launched a federal funding programme for broadband expansion.</p>
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 1948 million	DIGITALIZATION OF HEALTHCARE TOT: 2 billion	
ELDERLY				
UNDERAGE				
RURAL				
POORER QUARTILE				
GENERAL		<p>Education platform: Equip all teachers with mobile digital devices on a lending basis</p> <p>Investment program for teacher devices: equipping teachers with digital devices to enhance digital teaching, learning and communication facilities in schools.</p>	<p>Programme to future-proof hospitals: Enable hospitals to invest in their modernisation within a short timeframe, e.g. to improve digital infrastructure, telemedicine, robotics or IT, and cybersecurity.</p> <p>Strengthening of the digital and technical resources of the public health service.</p>	

GREECE

GRANTS 30.5 billion 23.3% Digital transition			
EDUCATION		HEALTHCARE	INTERNET ACCESS
	5.10%	5%	2.2 billion
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 754 million	DIGITALIZATION OF HEALTHCARE TOT: 277 billion	5G Corridors – Develop 5G networks that will provide coverage of all Greek motorways that are part of the Trans-European Submarine fibre cables Fibre optic infrastructure in buildings
ELDERLY			
UNDERAGE	Modernising and upgrading Greece's upskilling and reskilling system: Installation of at least 36 000 interactive learning systems (primary and secondary).		
RURAL			
POORER QUARTILE	Modernising and upgrading Greece's upskilling and reskilling system: €200 vouchers for pupils and students from low- income families to purchase IT equipment		
GENERAL	Modernising and upgrading Greece's upskilling and reskilling system: Training on digital, green and financial literacy skills for at least 500 000 participants.	Modernisation of the logistical infrastructure of hospitals throughout Greece.	

IS THE DIGITAL TRANSITION A LEVER FOR STRUCTURAL REFORMS OR DOES IT REINFORCE THE DIVIDE?



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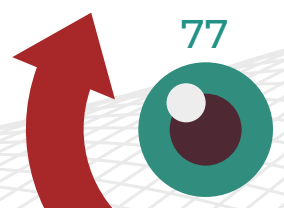
ANNEX 2 MEMBER STATES' RRFs INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

HUNGARY

		GRANTS 7.2 billion % Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		/	354 million	/
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 754 million	DIGITALIZATION OF HEALTHCARE TOT: 277 billion	
	ELDERLY			
	UNDERAGE			
	RURAL			
	POORER QUARTILE			
	GENERAL			

IRELAND

GRANTS 989 million 31,6% Digital transition			
	EDUCATION	HEALTHCARE	INTERNET ACCESS
	10.50%	11%	± 64 million
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 64 million	DIGITALIZATION OF HEALTHCARE TOT: 75 billion	Programme to provide digital infrastructure and funding to schools: Provision of high-speed broadband.
ELDERLY			
UNDERAGE	<p>"Laptops for Disadvantaged Students in Further and Higher Education": it implies the distribution of laptops to disadvantaged students (20.000 laptops will be given to students).</p> <p>Digital Strategy for Schools: it is a programme to provide digital infrastructure and funding to schools. It establishes the provision of high-speed broadband connectivity to up to 1,100 for primary school (3.240 primary school) (Schools Broadband Programme and it supplies schools with essential tools/infrastructures to support digital learning (devices and software) in support of most vulnerable learners.</p>		
RURAL			
POORER QUARTILE			
GENERAL	Technological universities (TU) transformation fund.	<p>Suite of eHealth projects: Development of national drug files and delivery of e-Prescribing solutions for the community.</p> <p>Delivery of ICR communications and technical infrastructure to support the work of a mobile clinical workforce.</p>	



ANNEX 2 MEMBER STATES' RRFs INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

ITALY

		GRANTS 68.9 billion LOANS 122.6 billion 25.1% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		11.40%	11%	3,8 billion
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 11252 million	DIGITALIZATION OF HEALTHCARE TOT: 4.403 million	<p>Investment 3: Digitalisation, innovation and competitiveness of the production system. The objective is to bring gigabit connectivity to grey areas and scattered households in black areas; to ensure connectivity at Gigabit speed to public schools, hospitals and remote islands and to boost coverage of 5G networks.</p> <p>"Servizio Civile Digitale": a Digital civil service, that consists in the creation of digital facilitation centres where young volunteers will help user who are at risk of digital exclusion to improve their digital competences (1.7.2)</p> <p>Investment 1.4.2 : to improve citizens inclusion this investment aims at the improving of digital services accessibility.</p>
ELDERLY				
UNDERAGE		Scuola 4.0: the aim is to make school spaces connected learning environments, with the creations of laboratories for digital professions during the II cycle of education; the digitalization of school administration and the internal wiring of about 40,000 school buildings and related devices.		
RURAL				
POORER QUARTILE				
GENERAL		Didattica e competenze universitarie avanzate: Creation of 3 Digital Education Hubs (DEH) to enhance the ability of the higher education system to offer digital education to students and university workers.	<p>Ammodernamento del parco tecnologico e digitale ospedaliero: this policy stipulates the purchase of 3.133 new equipment with high technological content and it provides operations to increase the digitalization level of 280 health facilities which have Emergency and Acceptance Departments.</p> <p>Sviluppo delle competenze tecniche, professionali, digitali e manageriali del personale del sistema sanitario: The investment aims at upgrading and developing of digital skills of national health care staff.</p>	

LATVIA

GRANTS 1.8 billion 21% Digital transition			
	EDUCATION	HEALTHCARE	INTERNET ACCESS
	13%	13%	255 million
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 124 million	DIGITALIZATION OF HEALTHCARE TOT:	Broadband or very high-capacity network "last mile" infrastructure development; Construction of the Passive Infrastructure on the Via Baltica Corridor for 5G coverage; Digital skills for citizens, including young people.
ELDERLY			
UNDERAGE			
RURAL			
POORER QUARTILE			
GENERAL	Develop and improve digital skills. Closing the digital divide for socially vulnerable students and educational institutions.		

ANNEX 2 MEMBER STATES' RRFs INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

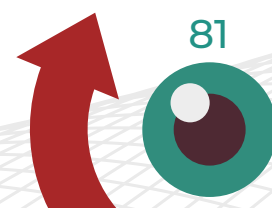
LITHUANIA

		GRANTS 2.2 billion 31.5% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		18%	18%	63,5 million
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 184 million	DIGITALIZATION OF HEALTHCARE TOT: 85.7 million	Step towards 5G – Delivering on Connectivity Innovation + Infrastructure: Very High-Capacity broadband network (access/local loop with a performance equivalent to an optical fibre installation up to the base station for advanced wireless communication)
	ELDERLY			
	UNDERAGE			
	RURAL			
	POORER QUARTILE			
	GENERAL	Modernize general education / Competences for green and digital transformation acquired in vocational education and training: IT services and applications for digital skills and digital inclusion.	Improving the quality and accessibility of services and promoting innovation - Developing the digitalisation of the health sector.	

LUXEMBOURG

		GRANTS 93 million 32% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		1%	1%	10 million
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 7 million	DIGITALIZATION OF HEALTHCARE TOT: 1.17 million	Development and deployment of testing infrastructure and ultra-secure connectivity solutions: Establishing a LuxQCI lab jointly with the SnT research institute to provide the scientific community and consortium partners with expertise to develop and operate a quantum communication infrastructure , with two demonstrations planned in 2023 and 2024 to gain experience.
ELDERLY				
UNDERAGE				
RURAL				
POORER QUARTILE				
GENERAL		<p>"Future skills" program: the investment is aimed at proposing a 3-months training to 5000/7000 unemployed people (>45 years old) to develop their digital skills (the courses will be focused on cybersecurity, data analysis, digital tendencies and so on).</p> <p>"Digital skills" program: the investment is aimed at training employees and partial layoffs to guarantee them a basic knowledge of digital tools.</p>	<p>Telemedicine solution for remote medical follow-up of patients / "Solution de télémédecine pour le suivi médical à distance de patients" reform: the investment is aimed at adopting telemedicine solution in order to minimize people movement and the consequent spreading of the virus, but also to enhance the coordination and integration of therapies to make them more accessible and safer</p> <p>+ Single Digital Register of healthcare professionals that allows for managing data on health professionals, forecasting profession and skill needs, and mobilisation of staff during crises.</p> <p>Building on Maela, a platform for remote medical monitoring used during the pandemic, developing a more advanced telemedicine solution for remote medical follow-up of patients ('IdeoPHM') and integrating it into the e-health services to improve healthcare accessibility.</p>	

IS THE DIGITAL TRANSITION A LEVER FOR STRUCTURAL REFORMS OR DOES IT REINFORCE THE DIVIDE?



ANNEX 2 MEMBER STATES' RRF INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

MALTA

		GRANTS 316.4 million 26% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		19.20%	19%	The investments aim at fast-tracking the digital transformation by strengthening the national policy framework and facilitating the further digitalisation of services in both the <u>public sphere</u> and <u>the business environment</u> .
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 3 million	DIGITALIZATION OF HEALTHCARE TOT: 15.5 million	
ELDERLY				
UNDERAGE				
RURAL				
POORER QUARTILE				
GENERAL			Enhancing the resilience of the health system through digitalisation and new technologies: Speed up the digital transition of Malta's health care system. Investment C4-12	

THE NETHERLANDS

		GRANTS billion Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
CATEGORIES		DIGITALIZATION OF EDUCATION TOT:	DIGITALIZATION OF HEALTHCARE TOT:	
ELDERLY				
UNDERAGE				
RURAL				
POORER QUARTILE				
GENERAL				

POLAND

GRANTS 23.9 billion LOANS 11.5 billion 21.3% Digital transition			
EDUCATION		HEALTHCARE	INTERNET ACCESS
%		18%	1.2 billion
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 550 million	DIGITALIZATION OF HEALTHCARE TOT: 1 billion	Providing access to very fast internet in the areas of white spots.
ELDERLY			
UNDERAGE	Level playing field for schools with mobile multimedia devices – investments related to the fulfilment of minimum equipment standards.		
RURAL			
POORER QUARTILE			
GENERAL	Electronic skills: improve at least 380 000 people digital skills among public officials, citizens with low level of digital skills, teachers, people at risk of exclusion.	Accelerating the digital transformation of healthcare by further developing digital healthcare services	

ANNEX 2 MEMBER STATES' RRFs INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

PORTUGAL

GRANTS 13.9 billion LOANS 2.7 billion 22% Digital transition			
EDUCATION		HEALTHCARE	INTERNET ACCESS
8%		8%	10 million ⁷⁵
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 1412 million	DIGITALIZATION OF HEALTHCARE TOT: 336 million	Business Reception Areas – Strengthening coverage with 5G.
ELDERLY			
UNDERAGE	Transição digital na Educação, Educação Digital and Programa de Aceleração da Digitalização da Educação (Madeira): Scaling-up of schools' connectivity by expanding the extended network of education's internet connectivity from 40 to 300 gigabytes per second (Gbps)		
RURAL		Hospital Digital da Região Autónoma dos Açores: the investment is aimed at creating an Electronic Health File/ Record for every citizen in the Azores to enable the sharing of patients' data in the archipelago. The main objective of the reform is to guarantee the access to healthcare among people living in isolated areas, without a proper health system.	
POORER QUARTILE			
GENERAL	Programa de Aceleração da Digitalização da Educação (Madeira): the investment is aimed at equipping schools with digital tools in order to create Innovative Education Centre and with a "strong" internet connection, training teachers in the use of digital devices, spreading the use of the Cloud through the education system.	Primary health care services with more answers – Tele-medicine/tele- healthcare Transição digital da Saúde (300 M€): the investment is aimed at adopting digital tools to ease the communication between patients and health workers, creating "National books/registers" to guarantee a full monitoring of the "Sistema de Saude" and to detect the critical data. Digitalização na área da Saúde na Madeira: the investment is aimed at creating in Madeira new digital solutions to support health system to manages patients i.e. by developing a digital platform to register relevant data (Consulta Multidisciplinar de Decisão Terapêutica), intensifying the use of telemedicine, strengthening the artificial intelligence technologies to the epidemic monitoring, enhancing the interoperability of the information system of Madeira healthcare and finally at training citizens and stakeholders to use health digital tools.	

ROMANIA

GRANTS 14.2 billion LOANS 14.9 billion 21% Digital transition			
EDUCATION		HEALTHCARE	INTERNET ACCESS
12.5%		13%	1.817 million ⁷⁶
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 1267 million	DIGITALIZATION OF HEALTHCARE TOT: 70 million	Implementation of a scheme to support the use of communication services through different types of instruments for beneficiaries, with a focus on white areas.
ELDERLY			
UNDERAGE	Supporting educational establishments with high risk of drop-outs – part of digitalisation: the aim is to boost the availability of services for children education and to reduce the dropout rate from compulsory education.		
RURAL			
POORER QUARTILE			
GENERAL	<p>In service training programme for teaching staff + Ensuring digital technology equipment and resources for schools: to accelerate the digitalisation of higher education and to facilitate advanced skills development which can turn in support of the digital transition.</p> <p>Online School: Assessment platform and content development</p> <p>Digitisation of universities and their preparation for the digital professions of the future.</p>	<p>Development of eHealth and telemedicine system:</p> <p>Development of public hospital infrastructure – equipment and facilities, new-born ATI, reduction of the risk of hospital infections.</p>	

ANNEX 2 MEMBER STATES' RRFs INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

SLOVAKIA

		GRANTS 6.3 billion 21% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		17.4%	17%	615 million
CATEGORIES		DIGITALIZATION OF EDUCATION TOT: 298 million	DIGITALIZATION OF HEALTHCARE TOT: 43 million	Digital Slovakia: this component aims at the digitalization of public service and government. No connectivity.
ELDERLY		Improving digital skills of the elderly and the distribution of "senior tablet": a targeted program on digital skills for at least 172,800 elderly and disadvantaged people. The measure talks want to create a pilot project to train these segments on using digital device especially.		
UNDERAGE				
RURAL				
POORER QUARTILE				
GENERAL		Digital infrastructure in schools: this investment aims at increasing digital access in schools trough better connectivity and better instruments.	Digitalization in Health Coordinated inter-ministerial cooperation and regulation – IT part	

SLOVENIA

GRANTS 1.8 billion LOANS 0.7 billion 21% Digital transition			
EDUCATION		HEALTHCARE	INTERNET ACCESS
13.9%		14%	56.5 million
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 60 million	DIGITALIZATION OF HEALTHCARE TOT: 83 million	Construction of very high-capacity broadband networks for at least 8500 households in white spot areas. Gigabit infrastructure
ELDERLY			
UNDERAGE			
RURAL			
POORER QUARTILE			
GENERAL	Strengthening competences: foster digital literacy in the education system.	Digitalization in Health Coordinated inter-ministerial cooperation and regulation – IT part	

ANNEX 2 MEMBER STATES' RRFs INVESTMENTS ON EDUCATION, HEALTH CARE AND INTERNET ACCESS

SPAIN

		GRANTS 69.5 billion 28% Digital transition		
		EDUCATION	HEALTHCARE	INTERNET ACCESS
		6.6%	3%	4 billion
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 4752 million	DIGITALIZATION OF HEALTHCARE TOT: 100 million		
ELDERLY	Transversal digital skills (C19.I1): investment to strengthen digital skills: digital training centers to empower older people to become more autonomous and to facilitate vulnerable children digital skills learning.		<p>Digital Connectivity: to ensure the security of 5G electronic communications networks and services; to improve level of digital connectivity through investments in the digital infrastructure network, with a particular focus on rural or less populated areas.</p> <p>+ Ultrafast broadband extension high digital connectivity: Fostering territorial cohesion through network deployment.</p> <p>+ Deployment of 5G networks and 5G innovations</p> <p>Transversal digital skills (C19.I1): investments to improve the level of digital skills of the population. The goal of this investments is to reach 2.6 billion people in Spain.</p> <p>Connectivity vouchers for SMEs and vulnerable groups (C15.I3): At least 125 000 connectivity vouchers for individuals or families identified as 'vulnerable'.</p>	
UNDERAGE	Transversal digital skills (C19.I1).			
RURAL				
POORER QUARTILE	"Educa en Digital" (C19.I2): the plan involves equipping schools with basic tools and internet connection (especially for students from low-income families), training class for teachers and students.			
GENERAL	Improving university digital infrastructure, equipment, technologies, teaching and evaluation (C21.I5): it includes measures aimed at improving the technological and digital capacities and skills of universities such as investment in school infrastructures and providing technologies for online courses.	"Plan de Inversió en equips de alta tecnologia en el Sistema Nacional de Salud" (C18.I1): Renewal of obsolete medical devices, also the program includes the enhancement of the existent online healthcare services.		
		Digital transformation of the National Health System: eHealth services, teleassistance for long term care and support Creation of a "Data Lake" for the Health sector 100m		

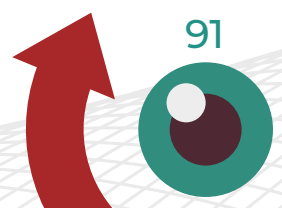
SWEDEN

GRANTS 3.3 billion 20.5% Digital transition			
	EDUCATION	HEALTHCARE	INTERNET ACCESS
CATEGORIES	DIGITALIZATION OF EDUCATION TOT: 60 million	DIGITALIZATION OF HEALTHCARE TOT: 83 million	Broadband expansion: this investment finances the expansion of connectivity where the private market can't expand on commercial basis.
ELDERLY			
UNDERAGE			
RURAL			
POORER QUARTILE			
GENERAL			

END NOTES

- 1 In fact, this was not exactly the first time. The European Commission did borrow to finance the European Financial Stabilisation Mechanism previously. However, the scope of NGEU is on a different scale.
- 2 "Europe's Hamiltonian moment". Barron's, 21 July 2020.
- 3 The comparison seems far too stretched: a few years after the revolution that gave birth to the USA, Alexander Hamilton managed to merge the entire public debt of the founding colonies, whereas here we only had the decision to borrow common money for a limited amount of additional debt. Some others (for instance, Regling, K. (2020) "The EU recovery plan is the new Marshall plan". Future Europe – Sustainable Europe video conference, 1 July) greeted the plan as the equivalent to the Marshall Plan with which the USA helped their Atlantic allies to recover from the devastation of the Second World War. This parallel is exaggerated for two main reasons: the first is that the post-war American aid was not due to be repaid; the second is that the US administration had a much stronger role in the selection and execution of the individual projects financed by the Marshall Fund than the European Commission has within the RRF.
- 4 As per article 4 of the RRF regulation: "the general objective of the Facility shall be to promote the Union's economic, social and territorial cohesion by improving the resilience, crisis preparedness, adjustment capacity and growth potential of the member states [...] by supporting the green transition [...] of the digital transition, thereby contributing to the upward economic and social convergence, restoring and promoting sustainable growth and the integration of the economies of the Union, fostering high-quality employment creation, and contributing to the strategic autonomy of the Union alongside an open economy and generating European added value".
- 5 As per article 16 of the RRF regulation.
- 6 President von der Leyen's speech at the high-level opening session of the 2021 Digital Assembly, "Leading the Digital Decade".
- 7 European Pillar of Social Rights (https://commission.europa.eu/publications/european-pillar-social-rights-booklet_en)
- 8 "Glossary:E-inclusion". Eurostat website.
- 9 "Digital inclusion". European Commission website.
- 10 For instance, "cohesion policies" do use a method similar to the NGEU to make sure that enough priority is given to the regional programs investing "structural funds" for development. A certain percentage of the total money needs to be spent on thematic "objectives" fostering modernisation (which includes digital as well as R&D and green technologies); however, the minimum threshold is lower in less-developed regions (50%) than in developed ones (80%). As per article 4 of Regulation No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund.
- 11 Peel, Q. (2012) "Merkel warns on cost of welfare". *Financial Times*, 16 December.
- 12 The WHO does not rank countries. However, its numbers are analysed by organisations like *CEO Magazine* (*CEO World Magazine*, Healthcare index, 2021), which shows that five out of the ten best healthcare systems in the world are in the EU: Denmark (third place); Austria (fourth place); France (seventh); Spain (eighth); and Belgium (ninth).
- 13 As demonstrated by data from UNESCO and the University of Oxford (Our World in Data) to which we refer in Section 4.1.
- 14 Salman, J. (2022) "What does the 'metaverse' mean for education?" *The Hechinger Report*, 27 October.
- 15 "The dawn of digital medicine". *The Economist*, 2 December 2020.
- 16 "The pandemic as the great 'BIG DATA' failure and the internet of beings as the next frontier". *Vision*, 19 May 2021.
- 17 Tims, A. (2022) "Left in isolation: how the online revolution failed our elderly people". *The Guardian*. 31 October.
- 18 Such as American Microsoft Teams, Google Meetup and Meta's WhatsApp; Chinese WeChat and American-Chinese Zoom.
- 19 As per the definition of the EU 2022 Digital Services Act.
- 20 In a recent paper ("Siena third conference on the future of Europe, time for Europe's man on the moon moment". *Vision*, 20 May 2022), the think tank considered several innovation waves where there were almost no EU firms competing: a suite of PCs, tablets and mobiles (dominated by Microsoft and Kingsoft); search engines (like Google, Baidu and Yandex); mobile makers and designers (Apple, Samsung, Huawei, Xiaomi); online payment platforms (We Chat and Alipay); e-commerce platforms (Amazon and Alibaba); social media (Facebook, We Chat, Weibo, V Kontakte); chipset makers and designers (Intel, Nvidia, IBM, Qualcomm, Huawei, ARM, TSMC, although here there is still the Dutch firm ASML); self-driving car manufacturers (Tesla Autopilot, Google and Baidu Apollo, Yandex OS); turbo jet engine manufacturers (French Safran is in partnership with GE, but the UK, USA, China and Russians have independent factories); electric cars; and lithium batteries.
- 21 Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February 2021 establishing the RRF.
- 22 The overall package became smaller due to some member states' reluctance to ask for loans (which was probably crowded out by support from the European Central Banks, making it cheaper for EU states to issue public debt in the markets). According to the June 2022 European Commission report on the RRF, out of 27 member states, only Poland, Greece, Portugal, Cyprus, Slovenia and Italy have so far decided to take loans, and this shrunk the overall package from €750 to about €555 billion (€195 of the €360 billion in loans made available by the NGEU, have not been used). This also led to the NGEU being concentrated in a few countries.
- 23 "Recovery and resilience scoreboard". European Commission website.
- 24 Andresen M., S. Bensnes and S. Looken (2020) "What does it cost to close the education sector? Calculation of costs of infection prevention measures against COVID-19 for human capital, study progression and productivity". Statics Norway.
- 25 This estimation had to be adjusted considering that GDP per income in Norway is higher and fine-tuned up, accounting for the number of people who regularly use the internet is also higher than that in other OECD countries.
- 26 Psacharopoulos, G., V. Collis, H. A. Patrinos et al. (2020) "Lost wages: The COVID-19 cost of school closures". Working Paper 9246. World Bank.
- 27 European semester thematic fact sheet. Early school leavers - 2017
- 28 28 A NEW SKILLS AGENDA FOR EUROPE (Brussels, 10.6.2016 COM(2016) 381 final) - Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions.
- 29 The closure per year in days during the pandemic period (January 2020-June 2022) is calculated by considering how long three types of school lockdowns were implemented: "measures required at all levels" (levels mean primary, secondary and tertiary; and different regions/provinces); "measured required at some levels"; "measures recommended but not required". We then assigned three different conversion factors (45%, 15% and 10%) to transform the days into full-time equivalent (FTE) days (considering that a number of days of closures also applied to the period when students were not asked to attend institutions like during holidays and examination breaks).
- 30 Hale, T., N. Angrist, R. Goldszmidt et al. (2021) "A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)". *Nature Human Behaviour*, 4(5): 529-538. DOI: 10.1038/s41562-021-01079-8
- 31 Using a methodology similar to that employed by the World Bank, *Vision* estimates that the loss value for each student in Italy is currently €31,430 and that the discounted value of the GDP loss is 15.1%, which is more than the actual GDP drop recorded for the year 2020. "Progettare una Scuola da Ventunesimo Secolo". December 2020.
- 32 According to "Our World in Data" at the University of Oxford.
- 33 Bovini, G. and M. De Philippis (2021) "Alcune evidenze sulla modalità di svolgimento della didattica a distanza e sugli effetti per le famiglie italiane". Bank of Italy, 21 May.
- 34 Istat data on young people (18-24 year olds) leaving vocational education and training early (in 2019).
- 35 "Epidemia COVID-19". Istituto Superiore di Sanità, 29 December 2020.
- 36 As the Eurostat glossary describes, "early leaver from education and training refers to a person aged 18 to 24 who has completed the mandatory curricula (up to the end of the secondary cycle) and is not involved in further education or training".
- 37 To keep tackling the early school leaver phenomenon and to strengthen the positive results achieved in 2020, the European Council has adopted a new resolution (Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030) that sets a new objective for EU countries: "the share of early leavers from education and training should be less than 9% by 2030".
- 38 The Organisation of Resilient Health and Social Care following the COVID-19 pandemic Opinion of the Expert Panel on effective ways of investing in Health; Directorate General for Health and Food Safety.
- 39 Data extracted on 7 July 2022 from the WHO.
- 40 "Self-reported unmet need for medical care by sex". Eurostat website.
- 41 "Recovery and resilience scoreboard: Thematic analysis: Education". European Commission, December 2021.

- 42 2021 data from "Gross domestic product at current market prices of selected European countries in 2021". Statistica website.
- 43 "Recovery and resilience scoreboard: Thematic analysis: Education". European Commission.
- 44 Eurostat - Households - level of internet access in 2020 (data code: ISOC_CL_IN_H)
- 45 "Recovery and resilience scoreboard: Thematic analysis: Education". European Commission, December 2021.
- 46 "Recovery and resilience scoreboard: Thematic analysis: Education". European Commission.
- 47 Article 17 explicitly states that "the recovery and resilience plans shall be consistent with the relevant country-specific challenges and priorities identified in the context of the European semester [...] and shall also be consistent with the information included by the member states in the National Reform Programs under the European Semester".
- 48 "European Semester" is the process set out in Article 2a of Council Regulation (EC) No. 1466/97.
- 49 Kesavan, S., A. Uppal and B. Pandey (2022) "ICT and administrative reforms: A literature review", in S. Fong, N. Dey and A. Joshi (eds) *ICT Analysis and Applications* (Singapore: Springer Nature), pp. 107-119.
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- 51 Mazzara, M., P. Zhdanov, M. R. Bahrami et al. (2022) "Education after COVID-19", in R. J. Howlett, L. C. Jain, J. R. Littlewood et al. (eds) *Smart and Sustainable Technology for Resilient Cities and Communities* (Singapore: Springer), pp. 193-207.
- 52 Wong, B. L. H., L. Maaß, A. Vodden et al. (2022) "The dawn of digital public health in Europe: Implications for public health policy and practice". *The Lancet Regional Health-Europe*, March(14): 100316. DOI: 10.1016/j.lanepe.2022.100316
- 53 Tan, E., S. Mahula and J. Cromptvoets (2022) "Blockchain governance in the public sector: A conceptual framework for public management". *Government Information Quarterly*, 1(39): 101625. DOI: 10.1016/j.giq.2021.101625
- 54 Trischler, J. and J. Westman Trischler (2022) "Design for experience—a public service design approach in the age of
- 55 Kim, S., K. N. Andersen and J. Lee (2022) "Platform government in the era of smart technology". *Public Administration Review*, 2(82): 362-368. DOI: 10.1111/puar.13422
- 56 This is, for instance, the approach to education of the "country report for Italy" issued within the European Semester on 26 Feb 2020 (the last before the pandemic and the NGEU): "Education is a key challenge, especially in southern Italy, hindering the quality of skills. Italy has a much higher rate of early school leavers and low achievers compared to the EU average, especially in the south. Shortages of secondary education teachers remain a challenge, as does attracting, selecting and motivating them. Compared to the EU average, the percentage of people having completed higher education remains low and the number of scientific/technical graduates is still insufficient. Higher education is underfinanced and understaffed. Despite better employability rates, vocational-oriented higher education is limited in scope. Shortages in basic and advanced digital skills are a serious concern. Measures to enhance vocational training are slowly being implemented. A comprehensive approach to upskilling, reskilling and adult learning is lacking".
- 57 Like for education, the "country report for Italy" issued within the European Semester on 26 Feb 2020 (the last before the pandemic and the NGEU) appears to be mostly concentrated on resources (or the lack of them): "The access to and quality of health services are overall good despite below-average spending. Public expenditure on healthcare stood at 6.3% of GDP in 2016 (EU average: 6.8%) and universal and largely free health coverage contributes to good health outcomes. Long-term care spending in terms of GDP is slightly above the EU average (1.7% compared with 1.6%). Life expectancy is among the highest in the EU, but life expectancy in good health at the age of 65 is slightly below the EU average. Cancer care following diagnosis is effective and timely for patients (survival rates above the EU average). Potential challenges for public health include the impact of socioeconomic and educational disparities on health outcomes, the rising obesity rates for children and the risks related to antimicrobial resistance".
- A partial exception is when the country report mentions that "An ageing health workforce is likely to create skills shortages in the future, which are further exacerbated by admission restrictions to medical schools and by the emigration of an increasing number of medical school graduates. The number of nurses remains limited and the range of their professional tasks and responsibilities could be widened. Investment in medical infrastructure has decreased in the last decade and medical equipment is on average relatively old and unevenly distributed across hospitals and regions".
- 58 As reported in a recommendation for a Council Recommendation on the 2022 National Reform Program of Estonia and delivering a Council opinion on the 2022 Stability Program of Estonia.
- 59 "Recovery and resilience scoreboard". European Commission website.
- 60 Schramm, L., U. Krotz and B. De Witte (2022) "Building 'next generation' after the pandemic: The implementation and implications of the EU COVID recovery plan". *Journal of Common Market Studies*, S1(60): 114-124.
- 61 Konstantinos, E. and G. B. Wolff (2018) "Is the European Semester effective and useful?" Policy Contribution, issue no. 09, Bruegel.
- 62 In its response to the European Commission's report on the RRF (point 72 under the heading "Transparency, monitoring and control mechanisms"), the European Parliament "reiterates its regret that the Council refused the creation, supported by Parliament and the Commission, of an online platform where final beneficiaries would be publicised; observes that by the nature of the instruments used, the control focuses on the achievement of results and outputs rather than the verification of costs; notes that this approach can simplify implementation and contribute to the achievement of the desired outcome; warns that, without the proper monitoring, it could make the detection of abuse of EU funds more difficult".
- 63 As per article 4 of the RRF regulation: "the general objective of the Facility shall be to promote the Union's economic, social and territorial cohesion by improving the resilience, crisis preparedness, adjustment capacity and growth potential of the member states, by mitigating the social and economic impact of that crisis, in particular on women, by contributing to the implementation of the European Pillar of Social Rights, by supporting the green transition, by contributing to the achievement of the Union's 2030 climate targets set out in point (11) of Article 2 of Regulation (EU) 2018/1999 and by complying with the objective of EU climate neutrality by 2050 and of the digital transition, thereby contributing to the upward economic and social convergence, restoring and promoting sustainable growth and the integration of the economies of the Union, fostering high quality employment creation, and contributing to the strategic autonomy of the Union alongside an open economy and generating European added value".
- 64 The first Economics Nobel Prize Winner, Jan Tinbergen, recommended that each policy objective should be specific enough (to be reduced to one or a few quantified targets) and should be pursued by a limited number of instruments.
- 65 Austria spends 52.8% of the RRF's funds on digital reforms.
- 66 Bulgaria spends 25.8% of the RRF's funds on digital reforms.
- 67 [http://www.cyprus-tomorrow.gov.cy/cypresidency/kyprostoavrio.nsf/all/B37B4D3AC1DB73B6C22586DA00421E05/\\$file/Cyprus%20RRP%20For%20Upload%2020052021.pdf?openelement](http://www.cyprus-tomorrow.gov.cy/cypresidency/kyprostoavrio.nsf/all/B37B4D3AC1DB73B6C22586DA00421E05/$file/Cyprus%20RRP%20For%20Upload%2020052021.pdf?openelement)
- 68 https://fm.dk/media/18771/denmarks-recovery-and-resilience-plan-accelerating-the-green-transition_web.pdf
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- 72 <https://recuperarportugal.gov.pt/wp-content/uploads/2021/10/PRR.pdf>
- 73 The Digital transformation partially contributed to the health pillar.
- 74 Germany is more concentrated to improve the integration of digital technology by enterprises and digital public services in which is below the EU average. In 2020, 96 percent of households in Germany had access to the internet.
- 75 The Portuguese plan includes only minor investments in 5G deployment. These are limited to local 5G networks in business parks and a local project to deploy about 90 km of the 5G network for the public administration in the Autonomous Region of Madeira. The plan also includes investments in school connectivity and in digital capacities for the public administration (cloud, data centres). (EU Commission Staff Working Document).
- 76 Romania: The connectivity improvements are within the Digital Transformation component (n.7) and throughout other components.



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RECOVERY WATCH

During the pandemic, digitalisation has shown that it can be a double-edged sword in light of this health crisis. Remote learning allowed 65 million EU students to continue studying and millions of citizens to be "traced, tracked and, eventually, treated" at a distance.

This policy study analyses the contribution of the Recovery and Resilience Facility to use technologies as a lever to improve access to public services, especially in healthcare and education. This is done by evaluating key metrics that show the coverage of these public services before and during the COVID-19 pandemic.

For education, the number of students dropping out without a diploma and the number of days that schools were closed during the pandemic are evaluated. The unmet health needs and excess mortality rates during the COVID-19 pandemic are assessed for healthcare. Therefore, we address how digitalisation plays a role in different member states for both sectors.

The findings of the study point to a strong correlation between the member states that invested the most in health and education vis-a-vis the unmet health needs and student dropout rates. At the same time, the study finds a negative correlation between the investment in the digitalisation of health and education, with the already digitalised member states investing more than the ones lagging behind.

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