FOCUS PAPER NO. 2

February 2025

EUROPE'S DIGITAL TRANSITION: ASSESSING THE EFFECTIVENESS OF THE 2030 DIGITAL DECADE POLICY PROGRAMME

Giulia Torchio

European Policy Centre

REGROUP

REBUILDING GOVERNANCE AND RESILIENCE OUT OF THE PANDEMIC

FUNDED BY THE EUROPEAN UNION
HORIZON EUROPE - RESEARCH AND INNOVATION ACTIONS
GRANT NO. 101060825

REGROUP

REBUILDING GOVERNANCE AND
RESILIENCE OUT OF THE PANDEMIC

Culminating more than a decade of crisis in Europe, the Covid-19 pandemic has opened an important window of opportunity for institutional and policy change, not only at the "reactive" level of emergency responses, but also to tackle more broadly the many socio-political challenges caused or exacerbated by Covid-19. Building on this premise, the Horizon Europe project REGROUP (*Rebuilding governance and resilience out of the pandemic*) aims to: 1) provide the European Union with a body of actionable advice on how to rebuild post-pandemic governance and public policies in an effective and democratic way; anchored to 2) a map of the socio-political dynamics and consequences of Covid-19; and 3) an empirically-informed normative evaluation of the pandemic.

www.regroup-horizon.eu

info@regroup-horizon.eu

@regroup-horizon.bsky.social

@regroup-horizon

@regroup_horizon

FUNDED BY THE EUROPEAN UNION
HORIZON EUROPE - RESEARCH AND INNOVATION ACTIONS
GRANT NO. 101060825

FOCUS PAPER NO. 2

Executive summary

This research evaluates the effectiveness of the European Union's (EU) 2030 Digital Decade Policy Programme (DDPP), highlighting its current shortcomings and providing recommendations for improvement. The DDPP aims to enhance the EU's global competitiveness and align digital transformation with European values, focusing on digital skills, infrastructure, business digitalisation, and public services. However, the 2023 and 2024 reports indicate that the EU is off track to meet its 2030 goals, with slow progress on all targets. Potential challenges stemming from a failure of the DDPP include a loss of technological competitiveness, a widening digital divide, skills polarisation, and the creation of new vulnerable groups. Reckoning with the critical state of the DDPP, President von der Leyen has tasked Henna Virkkunen, Executive Vice-President (EVP) for Tech, Sovereignty, Security and Democracy, with a review of the strategy to be carried out in 2026. Ahead of it, this research aims to kickstart a conversation on the need to substantially and comprehensively revisit the DDPP targets. It combines desk research with expert discussions to assess the effectiveness of the Digital Compass and reveals significant delays, funding issues, and an overall lack of coherence in the strategy.

To this end, the research recommends:

- **Addressing** Europe's investment gap to accelerate progress on the triple green, digital, and economic security transition. To do so, the Commission should encourage public-private partnerships, strengthen the single market, and create favourable conditions for European companies to scale up.

- **Revising** the DDPP's *objectives* along with its implementation. The Commission should address unrealistic goals, poor implementation, and the overall lack of alignment with Europe's quest for technological sovereignty. To do so, it should prioritise realistic targets and enhance accountability mechanisms.

- **Integrating** the DDPP with other EU instruments. The Commission should work closely with fellow EVPs for cohesion and reform and for social rights and skills, quality jobs, and preparedness to coordinate the EU's response to challenges that promise to affect the cohesiveness and resilience of the European project.

- **Prioritising** digital skills development over unrealistic targets. The Commission should focus on re-skilling and up-skilling through high-quality, freely available vocational education training (VET) modules, promote credential harmonisation, and facilitate the sharing of best practices among member states.

- Further **institutionalising** the practice of strategic foresight in EU policy-making to strengthen societal resilience.

Keywords: EU's digital transition; 2030 Digital Decade Policy Programme; Digital Compas; and societal resilience.

Introduction

Technology, as a catalyst for societal and economic change, presents unprecedented opportunities and complex challenges for Europe's future. Over the last decades, EU institutions have developed successive digital strategies to harness the former and mitigate the latter. These strategies aim to enhance the EU's global competitiveness and ensure that digital transformation aligns with European values and interests.

In light of recent geopolitical and geoeconomic tensions, the von der Leyen Commissions have also intensified efforts to enhance Europe's economic security and technological sovereignty while adhering to European values of inclusion, fairness, and justice.

As a new EU institutional cycle begins, this paper evaluates the Union's current headline strategy for promoting digital development and enhancing societal resilience – the 2030 DDPP – ahead of its mandated revision scheduled for 2026 (von der Leyen 2024).

This paper aims to answer two questions related to the DDPP and its mechanisms. First, based on the 2023 and 2024 reports, how effectively is Europe progressing towards its 2030 targets? Second, is the Digital Compass, with its four strategic targets, the most effective approach to guide Europe's digital transformation and foster our societal resilience ambitions?

Preliminary findings describe a lack of significant progress on all fronts, signalling that Europe is not on track to meet its digital ambitions for the current decade (European Commission 2024). This is attributed to several challenges, such as low and ineffective research and development (R&D) spending, lack of talent, low labour mobility, poorly performing education systems, insufficient funds, and underdeveloped financing mechanisms (Draghi 2024). As for the effectiveness of the digital strategy, the research identifies discrepancies between the broader political ambitions of the EU, its targets, and the means to deliver on them (Codagnone 2021).

To address these issues, the paper recommends revising the DDPP to reform digital targets and address funding gaps. With a new institutional cycle and digital commissioner, it is an ideal time for these changes. Additionally, the upcoming negotiations of the next Multi-annual Financial Framework (MFF) represent an opportunity to align the financing with Europe's digital goals.

The analysis presented here combines desk research with the results of discussions with experts in Brussels. The literature includes primary sources, like official EU communications and reports, and secondary sources, such as academic writings on digital transformation and governance for societal resilience.

The paper is divided into four sections. The first provides an overview of the 2030 Digital Decade strategy, including related initiatives such as the 'Path to the Digital Decade' and the European Digital Rights and Principles (EDRP). The second section examines the findings of the 2023 and 2024 State of the Digital Decade reports and evaluates their effectiveness. The third section discusses potential challenges if Europe's digital transition falters. The final section summarises key findings and suggests actions to strengthen societal and institutional resilience through the Digital Compass mechanism.

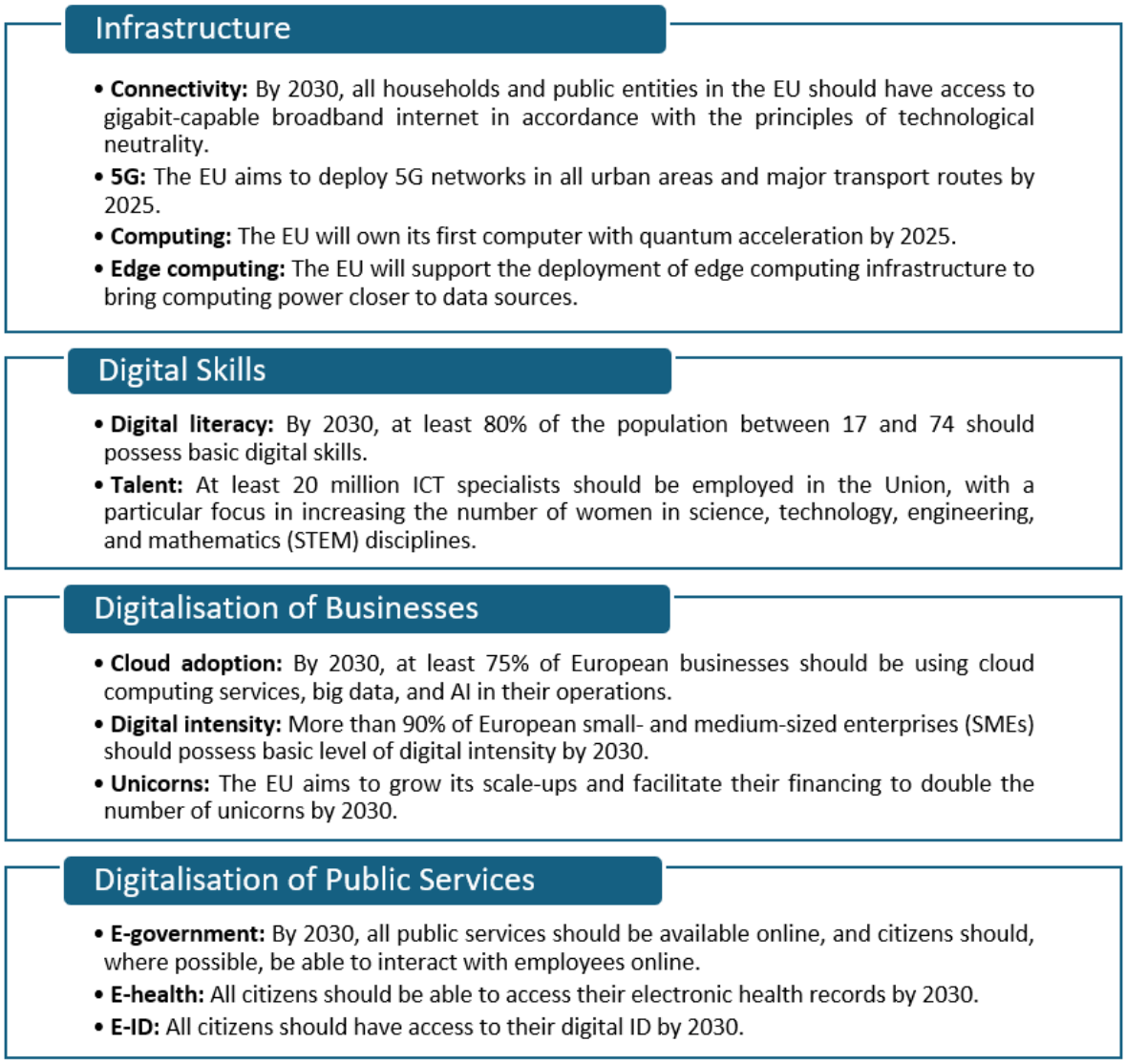
Europe's Digital Decade

The digital transition presents Europe with an unprecedented opportunity to transform its economy, society, and way of life. By embracing technological advancements, the EU can foster more innovation, create new jobs, enhance security and resilience, and improve the quality of life for its citizens. At the same time, achieving this vision requires both proactive efforts to seize opportunities and preventive measures to address new and related challenges.

In January 2020, the von der Leyen Commission launched its flagship digital strategy, 'Europe fit for a digital age', casting the EU's policy goals for the next term in terms of developing a human-centric digital transition (von der Leyen 2019; European Commission 2020). Then, the priority was complemented by the communications 'Shaping Europe's Digital Future' and '2030 Digital Compass: The European Way for the Digital Decade', which outlined technical targets in four strategic areas, namely: (i) digital skills, (ii) digital infrastructure, (iii) the digitalisation of businesses, and (iv) of public services (European Commission 2021). To measure progress on these targets, the EC then reformed an existing composite index, the Digital Economy and Society Index (DESI), to fit a yearly revision mechanism.

Lastly, the Commission established a European Digital Infrastructure Consortium (EDIC) to assist member states with multi-country projects. It also introduced EDRPs to ensure fair and inclusive progress, aligning with European values and promoting digital rights and human-centred digital transformation (European Commission 2024).

Figure 1: The 2030 Digital Decade targets



The state of Digital Decade: A reality check

At the decade's midpoint, the EU faces a critical juncture in its digital transition. The 2024–2029 term will determine whether Europe meets its digital objectives or not. To prevent failure, President von der Leyen has assigned EVP for Tech Sovereignty, Security and Democracy, Henna Virkkunen, to review the DDPP in 2026.

Ahead of the scheduled revision, this paper reviews progress on targets and evaluates the policy programme's effectiveness in facilitating the digital transition. The objective is to spark expert discussion on alternative approaches or solutions to targets performing poorly or presenting logical inconsistencies.

Progress on the 2030 Digital Decade targets

Tracking yearly progress is key to the EU's digital strategy. Two years after introducing the 2030 DDPP, the Commission issued its first report on digital progress in the EU.

The 2023 State of the Digital Decade report shows slow progress, with Europe not on track to meet any 2030 objectives. In particular, the report revealed that Europe was far from its goal of 100% coverage in digital infrastructure, with only 56% fibre networks and 41% 5G coverage in the 3.4–3.8 GHz band. For digital skills, projections showed that just 59% of the population will have basic skills by 2030, falling short of the 80% target. Additionally, there may be only 12 million information and communication technology (ICT) specialists instead of the desired 20 million (European Commission 2023). Adding to these concerning numbers, 30% of Europeans felt their skills were inadequate for the digital transition, with older generations and rural populations at exceptionally high risk of falling behind and progress on digitalising businesses and public services, particularly in AI and Big Data, being too slow (ibid.).

The 2024 report confirms the findings of the 2023 report: the EU is not on track to achieve its objectives by 2030. While some progress has been made on certain targets, such as connectivity coverage and the creation of the first quantum-accelerated computer, overall progress remains insufficient. For example, current skill levels are estimated to be almost a factor of three below what is needed to achieve the strategic targets by 2030 (European Commission 2024).

Regarding critical digital infrastructure, the 2024 report shows low fibre connectivity, gigabit connections, and high-quality 5G coverage, with rural areas also remaining particularly underserved. Additionally, the aggregate data shows that only 55.6% of the European population possesses basic digital skills and that there is no effective and inclusive strategy for skills development to support the digital transition (ibid.). Similarly, advancements in digitalising businesses and public services show slow progress.

This lack of substantial progress, along with limited funding mechanisms for the DDPP, affects the population's ability to thrive in an increasingly digitalised society and creates an unequal distribution of benefits along wealth and gender lines. Therefore, the EU must intensify its efforts and increase funding to address all four strategic targets and close the digital divide gap, ensuring that all individuals can succeed in a rapidly evolving digital world.

However, intensifying current efforts and scaling up funding mechanisms alone may not resolve the DDPP's challenges.

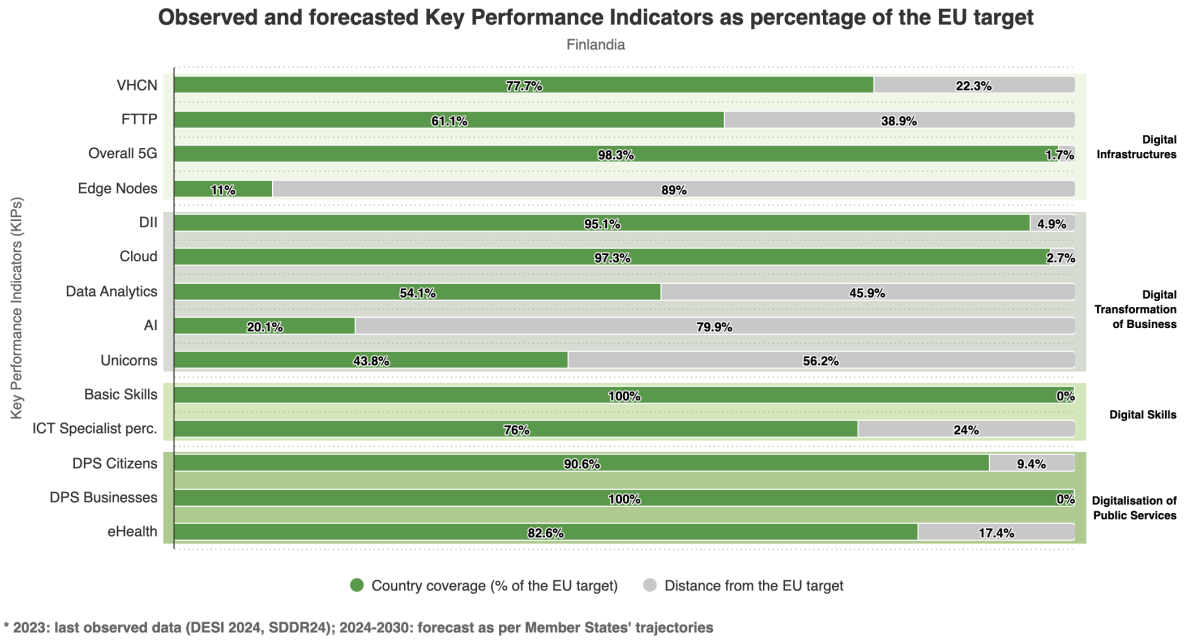
The DDPP and national implementation: The Digital Decade Country Reports

A granular analysis of the progress and usefulness of the DDPP also warrants looking into the effective implementation of digitalisation plans at the national level. Going beyond the four strategic targets, this section presents the most recent findings of the 2024 Digital Decade Country Reports, focusing on four countries in different regions of Europe: Finland, Belgium, Italy, and Bulgaria. This section aims to present insights into the real-world opportunities and challenges the member states face, highlight areas where additional support is required, as well as foreshadow some of the criticism of the DDPP that is outlined in the following section.

Finland

Finland's national digital roadmap is mainly aligned with the DDPP instruments, sharing 11 targets out of 14. It allocates an estimated (public) budget of **EUR 497 million** (0.2% of the country's GDP) to the digital transition (European Commission 2024). The country is a leader in digital skills, with 82% of its population having at least basic digital skills, and in digital intensity, with 79.5% of its enterprises using cloud, artificial intelligence, or data analytics (against the EU average of 54.6%). However, Finland performs slightly below the EU's average for connectivity infrastructure, with 77.7% of deployment of gigabit networks across its territory, and only slightly above average in access to e-health records. The country has yet to produce an e-ID scheme (ibid.). According to the Commission's projections, Finland is likely to meet all targets by 2030.

Figure 2: Finland's key performance indicators



Source: European Commission 2024

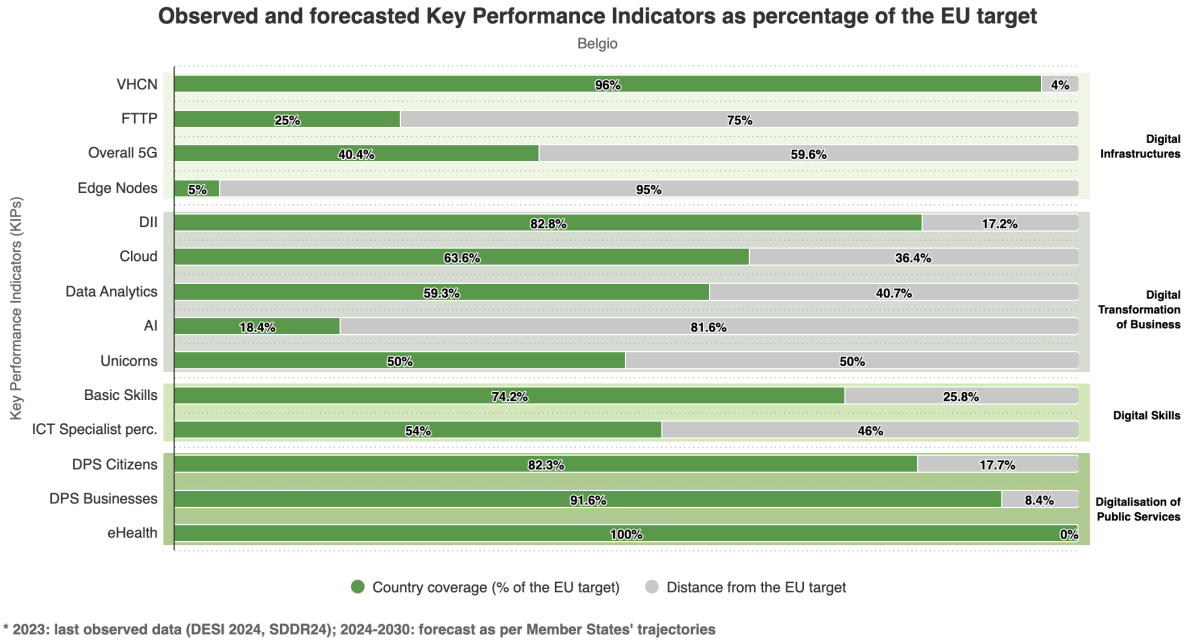
Strengths: Basic digital skills, digitalisation of SMEs.

Weaknesses: Connectivity infrastructure, e-Health, and e-ID.

Belgium

Similar to Finland, Belgium's digital roadmap is mostly aligned with the DDPP, sharing 12 out of 14 targets and allocating an estimated (public) budget of EUR 892 million (0.2% of the country's GDP) to the digital transition (European Commission 2024). The country leads in the digitalisation of SMEs, with 74.5% of Belgian SMEs having at least a basic level of digital intensity compared to the EU average of 57.7%, in the adoption of advanced digital technologies by enterprises, and the overall digitalisation of public services. However, Belgian infrastructure leaves much to be desired, with staggeringly low estimates for fibre to the premises (FTTP) coverage and 5G. The country also has a below-average level of ICT specialists, compounded by labour shortages in technical occupations, and the lowest rate of women in STEM programmes of the EU (ibid.). According to the Commission's projections, Belgium is likely to meet all targets by 2030.

Figure 3: Belgium's key performance indicators



Source: European Commission 2024

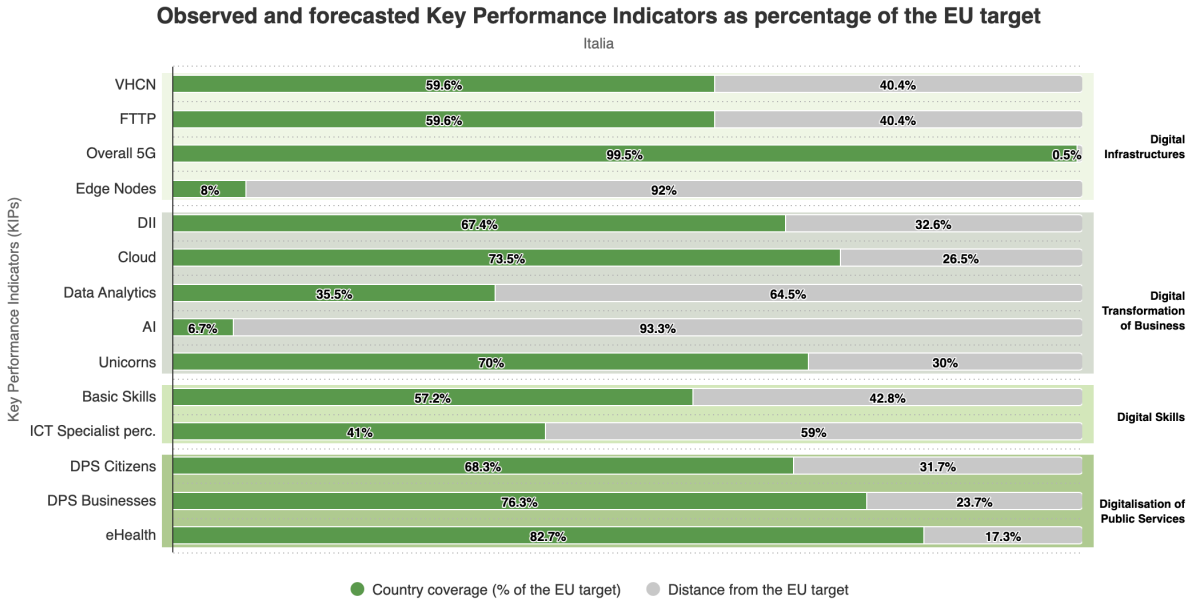
Strengths: Digitalisation of SMEs, adoption of advanced digital technologies by enterprises, and the digitalisation of public services.

Weaknesses: Connectivity infrastructure, ICT specialists.

Italy

Italy's digital roadmap fully aligns with the DDPP, sharing all 14 targets, and it allocates an estimated (public) budget of EUR 32.5 billion (1.6% GDP) (European Commission 2024). The country's strengths are its digital infrastructures, which are still below-average but evolving, and the national access levels for e-health records (82.7% compared to the EU average of 79.1%). Despite these promising statistics, Italy shows an underwhelming adoption of AI technologies and difficulties in scaling up businesses. Most concerningly, the struggles with low levels of digital literacy, with only 45.8% of the population possessing basic digital skills compared to the EU average of 55.6%. According to the Commission's projections, Italy is unlikely to meet all targets by 2030, especially those on the digital transformation of business and digital skills.

Figure 4: Italy's key performance indicators



* 2023: last observed data (DESI 2024, SDDR24); 2024-2030: forecast as per Member States' trajectories

Source: European Commission 2024

Strengths: e-Health, digital infrastructures.

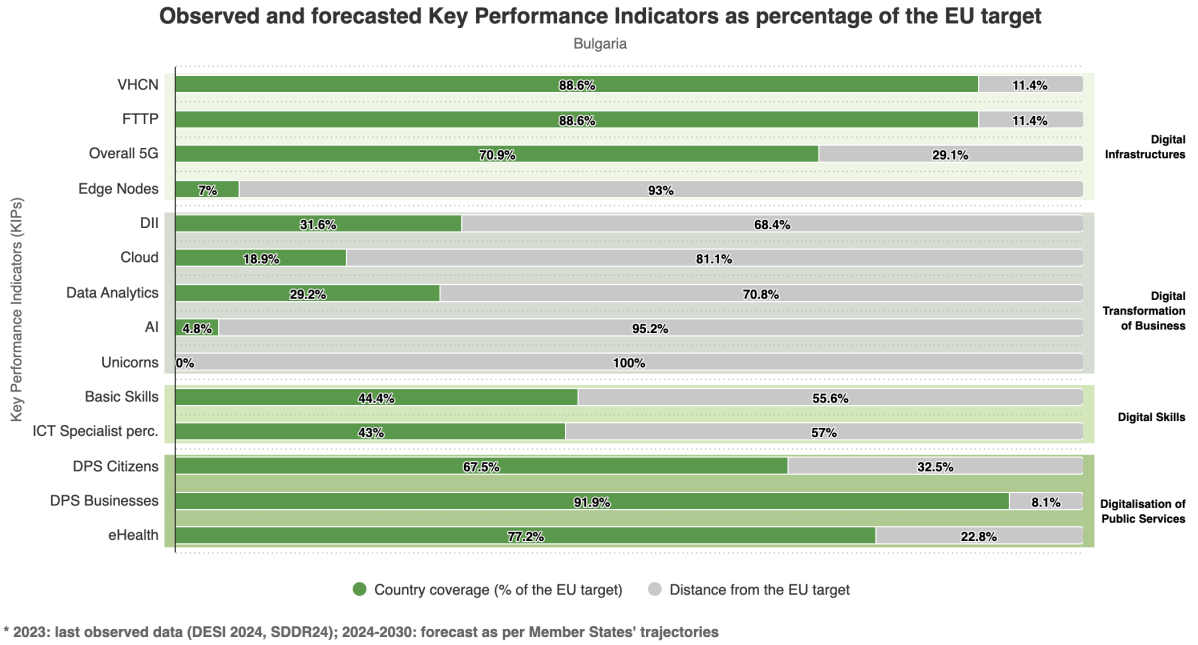
Weaknesses: Adoption of cloud by enterprises and unicorns, basic digital skills.

Bulgaria

Bulgaria's digital transformation roadmap is mostly aligned with the DDPP, sharing 13 out of 14 targets. The country receives an estimated (public) budget of **EUR 2.2 billion** (2.3% GDP) (European Commission 2024). Bulgaria is leading in the online delivery of public services for businesses and has a competing edge in the production of semiconductors. The country also hosts one of the EU's eight supercomputers, Discoverer. As

for its weaknesses, Bulgaria lags behind the EU average in basic digital skills, with only 35.5% of its population possessing basic digital literacy, and in the adoption of advanced technology by businesses, ranking last among the EU27. According to the Commission's projections, Bulgaria is unlikely to meet all targets by 2030. Instead, it will continue to severely underperform in the digital transformation of business and digital skills, reaching an estimated maximum of 65% of its population with basic digital skills.

Figure 5: Bulgaria's key performance indicator



Source: European Commission 2024

Strengths: Delivery of online services to businesses, semiconductors, and quantum.

Weaknesses: Adoption of advanced digital technologies by enterprises, basic digital skills.

Effectiveness of the Digital Decade Policy Programme

Given the poor progress, when revising the DDPP implementation in 2026, the Commission should also revise the DDPP's overall vision and targets. To effectively do so, targets and the EU's capacity to implement them should be reviewed.

To this end, this section critically examines the DDPP implementation and the specific digital targets to assess the strategy's effectiveness as a tool for supporting societal and institutional resilience.

The digital infrastructure target

The COVID-19 pandemic has simultaneously accelerated digitalisation efforts in Europe (Rodriguez Contreras 2021) and highlighted the importance of connectivity for societal resilience (Beaunoyer et al. 2020). However, it also exposed connectivity gaps across Europe, indicating low connectivity-related issues in regions with poor digital infrastructure (Eurostat 2020). It is, therefore, a surprise that for such an underlying objective, the DDPP's digital infrastructure target was not given higher priority and more substantial funding.

The total budget allocated to support Europe's digital transformation through the DDPP amounts to around EUR 205 billion, with the most substantial part (70%) coming from the Resilience and Recovery Facility (RRF) (Papazoglou et al. 2023). Digital infrastructure received 18.2% of this budget. In contrast, business digital transformation received 35.1%, and public service digitalisation got 30.3%. Interestingly, despite the limited funding, digital infrastructure performs marginally better than the other targets (ibid.).

The insufficient allocation of funds to the development of an independent digital ecosystem contradicts the necessity of widespread connectivity across Europe to achieve other goals and, as such, also hinders progress on the digitalisation of public services target. A first lesson of the DDPP review is, therefore, to allocate – and reallocate if need be – sufficient funding towards strategic 'backbone' objectives like digital infrastructure, which are essential for progress on all other fronts.

The digital skills target

Although the DDPP envisions a fair digital transition that supports an inclusive society, there is a significant and growing gap between this vision and current trends surrounding digital skills. Additionally, the strategy presents issues of misaligned competencies and indexes within the Commission.

First, the skills targets are the least funded out of all priorities of the Digital Compass, receiving a meagre 16.4% of the total funds (Papazoglou et al. 2023). As a result, current progress on both the basic digital skills (69%) and the ICT specialists (9.8 million) targets is a far cry from the desired numbers for 2030. However, it is also important to note that it is a notoriously complex area to support. High technological skills require sustained investments in scientific knowledge, talent, and high-performing institutions, which cannot be achieved simply through short-term or ad hoc measures. Moreover, skills-related policies must be developed while respecting national competencies, such as in education.

Nevertheless, low digital literacy and a shortage of skilled ICT workers will continue to hinder Europe's digital transition and quest for technological sovereignty by feeding into inequalities, increasing our vulnerability to cyber threats, hindering technological competitiveness, and slowing economic growth. To this end, the Commission should resize the budget allocated to the skills targets and adopt targeted efforts to address the skills gap in Europe, such as possibly cooperating with the private sector to develop education programmes and public-private partnerships.

Second, progress on the first skills target is measured through the Digital Skills Indicator (DSI) (European Commission Joint Research Centre 2022), which is subject to periodical revisions to incorporate the needs and requirements outlined in the Commission's Digital Competence Framework (DigComp). In this context, it is noteworthy that the Commission is using as reference a DigiComp version (2.0) that does not take into account recent advancements in general-purpose artificial intelligence (GPAI) and the widespread ability of citizens to use such tools, as recognised in later versions (2.2) (European Commission Joint Research Centre 2016, 2022). This points to a lack of alignment of the Commission's digital tools and the need for more dynamic monitoring in the area of skills.

The digitalisation of business target

The business digitalisation target reveals the disjointed approach that the EU adopted to implement the DDPP strategy. This misalignment between long-term goals and ensuing policy responses supports the hypothesis of this research that the Commission's strategic vision and DDPP plan lack overall coherence.

In the recent mandate, the Commission proposed and negotiated 23 legislative files to address recent crises and advance Europe's dual green and digital transitions. While this legislation includes crucial policies that play an essential role in regulating increasingly digitalised societies, the extensive effort has not been without consequences for business digitalisation. Research and, more recently, the Draghi report suggest that Europe's regulatory advancements have come at the expense of competitiveness with European businesses having experienced high compliance costs and cumulative regulatory burden (Lausberg et al. 2024; Draghi 2024). In simple words, Europe's well-established role as a regulatory powerhouse often clashes with its ambitious aspirations for business digitalisation.

The research suggests that the DDPP priority of digitalising businesses, which is underperforming despite receiving the most funding, should be revised to set more achievable targets but must also be approached and re-examined in the context of the Commission's Better Regulation agenda.

The digitalisation of public services target

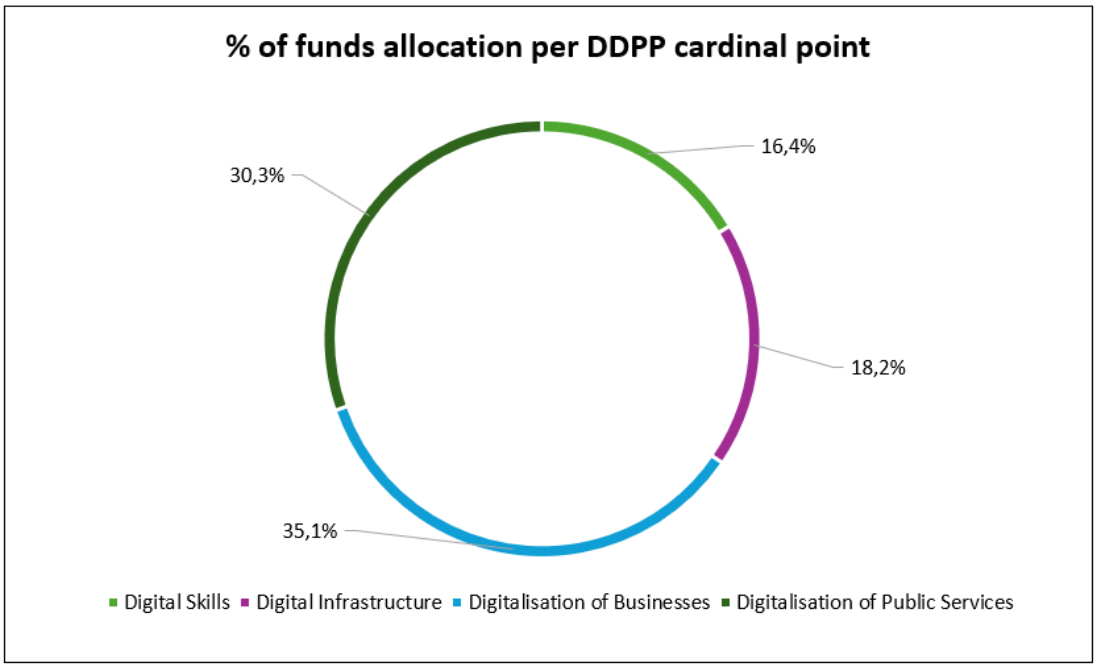
The main criticism of the digitalisation of public services target is that it reveals tensions between its implementation and the EU's broader strategic quest for technological sovereignty (Codagnone 2021).

Technology, with its potential to act as a catalyst for innovation, could greatly benefit Europe's public sector. It could make for better delivery of services and public goods, as well as reduced costs, and increased support for businesses. However, the ultimate precondition for the rolling out of e-administration, e-governance, and e-democracy services throughout EUrope is widespread state-of-the-art digital infrastructure across the region. This is where things become more complicated.

Aiming to reduce some of Europe's most critical dependencies on foreign powers amid rising global tensions, the new Commission has pledged to focus on achieving technological sovereignty. However, this is impossible as Europe does not own its tech stack. Instead, it imports over 80% of its digital services and products from foreign competitors, which leaves our strategic assets open to foreign interference and subjected to foreign law (Bria 2024). A clear example of this vulnerability is Europe's dependence on Big Tech to provide cloud services – one of five critical elements of digital infrastructure – leaving a combined 70% of market share in the hands of three hyperscalers (Google, Amazon, and Microsoft) (Ferreira Gomez and Okano-Heijmans 2024).

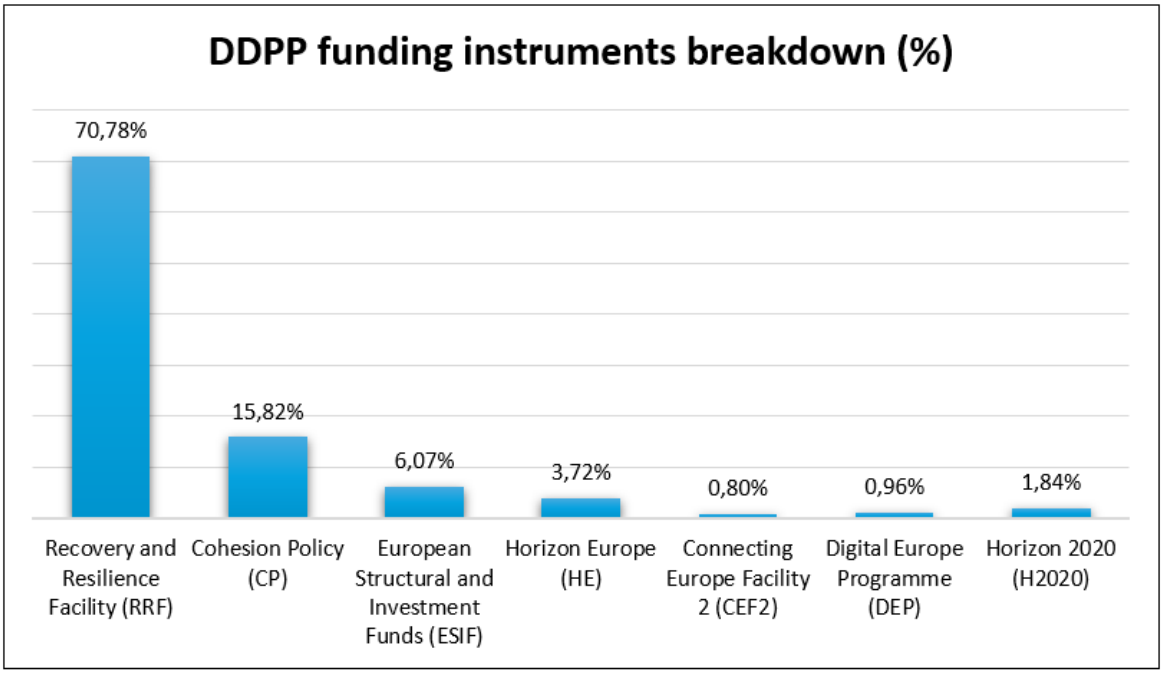
This dependence, compounded with all other sectors in which the EU depends on foreign imports, is incompatible with our technological sovereignty and societal resilience aspirations. It reduces our agency and capacity to deliver critical services, as well as results in struggles to ensure control over our data. Therefore, during the review of the DDPP, the Commission should better integrate security concerns into the scope of the strategy, align this target with the digital infrastructure one, and redistribute funding more homogeneously between the two.

Figure 6: Allocation of funds (%) per cardinal objective of the DDPP



Source: Papazoglou et al. 2023

Figure 7: Breakdown (%) of the DDPP's funding instruments



Source: Papazoglou et al. 2023

Horizontal challenges

In addition to these criticalities, progress on the DDPP targets is also hindered by further horizontal obstacles such as unclear methodologies, insufficient funds and financing, low implementation from member states, and a lack of bold political leadership at the EU level.

First, the Commission is using a potentially outdated progress-tracking methodology. The current tool, the DESI, is a composite index that was first introduced in 2014 to evaluate the state of development of a country or an economic entity, as well as the efficiency of their digital transition (Stavyytskyy et al. 2019). Proponents of this index point to its capacity to compare diverse data collected across Europe and to generate Europe's bigger picture. On the other hand, its critics refer to the same characteristics as shortfalls, highlighting that the comparison of data collected by regional actors often using different methodologies and with different capacities is unsuitable for monitoring cross-country progress on the DDPP (Banhidi et al. 2020). Therefore, to dispel doubts and ensure its tracking methodology is still fit for purpose, as part of the DDPP revision, the Commission should also look into the DESI.

Second, the Commission's vision does not align with EUrope's current economic realities and institutional capacities for implementation. Since public funds allocated to the DDPP are insufficient to simultaneously ensure progress on all targets, further investments in private infrastructure and initiatives are needed to support the digital transition. However, as Draghi (2024) emphasises in his report, EU-level private sector financing is underdeveloped in all key areas, weighing Europe down against competitors like China and the US and hindering innovation. To achieve its digital objectives and reduce its 'competitive disadvantage', the EU needs an estimated additional EUR 750–800 billion in investments (4.4%–4.7% of total EU GDP) for the 2025–2031 period (ibid.). This scale of private investments requires multifaceted actions, such as strengthening private and public research funding, angel investing, public development investment, private venture and growth capital, debt funding, and long-term institutional and pensions investors (ibid.).

Third, there is significant fragmentation across the EU27. Other than showing insufficient progress on all targets, the State of the Digital Decade and the country reports also highlight that national advancements are particularly fragmented, especially in public administration, health, and education. Member states have exclusive competencies in these areas, highlighting a major obstacle: the EU lacks the authority to achieve its Digital Decade vision without relying heavily on member states. As such, further reflection is needed on the DDPP's implementation tools regarding objectives where the EU has only partial competence or no competence at all. As part of avenues of future action, this could point to better integration of the DDPP into Europe's economic governance processes such as the European Semester.

Last, while the lack of significant progress on the DDPP targets is partially caused by outdated mechanisms, insufficient funding, and poor enforcement, it also indicates a broader issue: EUrope's lack of bold political leadership and strategic vision. Disagreements between the EU27, low-level political action, and bureaucrats' tendency to think in terms of limited periods are hindering the digital transition and exposing EU citizens to significant risks (Böck and Kettemann 2024). Short-term solutions can only reduce these risks so much. Instead, reflecting on current and future challenges, the Commission should develop long-term solutions and mechanisms to deal with crises and uncertainties (ibid.). This could be achieved through a more substantial integration of strategic foresight into policy-making processes at the EU level.

Under the current Commission, strategic foresight is the responsibility of the Commissioner for Intergenerational Fairness, Youth, Culture and Sport, and is practised at the level of the Strategic Foresight Network and of the European Strategy and Policy Analysis System (ESPAS). Despite these initiatives and the yearly publication of a foresight report, the exercise often remains abstract, with limited practical application in concrete policy decisions (Borges de Castro 2024).

Unless these challenges are proactively and comprehensively addressed, the EU risks becoming increasingly embroiled in crisis scenarios, potentially undermining its long-term stability and prosperity.

Future scenarios

If the Commission's (2024) assertion that 'the success of the Digital Decade is paramount to Europe's prosperity and competitiveness' is accurate, Europe's current failures to meet its targets are alarming. At this halfway crossroads, it is essential to review and update the DDPP's targets and our implementation capacity, as well as to consider what could be the long-term implications of our failing digital strategies.

In her mission letter, the President of the Commission entrusted EVP Henna Virkkunen with 'oversee[ing] our path towards reaching Europe's 2030 Digital Decade targets', as well as with a 'review of the implementation strategy and digital targets in 2026, looking at where updates are needed in light of technological developments, cybersecurity concerns and our wider productivity and sustainability goals' (von der Leyen 2024). This research aims to provide some pointers for this coming review and course correction. Accordingly, this section identifies four potential challenges related to shortcomings in the DDPP.

A continuing loss of technological competitiveness

Europe is falling behind in the global tech race. The Australian Strategic Policy Institute's (ASPI) (2024) Critical Technology Tracker projects the EU block as a leader in only 2 out of 64 critical technologies, which pales next to China's leadership in 57 technologies. Therefore, while the tracker describes the EU as an overall competitive player, we are effectively cast out of the global 'race' for tech domination. This is also the picture Mario Draghi described in his recent report on competitiveness.

According to Draghi (2024), Europe suffers from fading technological competitiveness, a lack of innovation across many sectors, and stagnant productivity growth. Pointing out the nexus between pervasive digitalisation and increased competitiveness, Draghi suggests that the EU's new digital industrial strategy should be supported by more significant public and private investments and be focused on advancing R&D in three key areas: (1) connectivity, (2) computing and AI, and (3) semiconductors (ibid.). If Europe fails to do so, its gap with tech leaders like China and the US will only continue to increase, bringing about security concerns in times of rising geopolitical and geoeconomic tensions.

However, enhanced technological competitiveness is not an end in itself. While Europe's recent focus on reversing dependencies through a return to industrial policy and an increased interest in trade policy is welcomed, the EU should also prioritise developing a public-interest vision for its digital transition. A digital industrial policy developed in a vacuum will only promote further misalignment between EU strategies and its long-term priorities, such as a fair twin green and digital transition.

Hence, besides increasing private-public procurement and boosting sovereignty, competitiveness, and productivity, the new Commission should also reflect on 'which public and whose interest' its digital industrial policy will serve (Kaltheuner et al. 2024). This comes back to the criticism of the DDPP's digitalisation of the public services target, which is arguably not coherent with the EU's objective to become digitally autonomous. Other potential unwanted outcomes of a misalignment between digital industrial, competition, and trade policies are increased service costs, widening digital inequalities, and reduced societal resilience.

A widening digital divide

Digital transitions do not follow a linear progression and are significantly impacted by socio-economic factors such as connectivity, educational attainment, and availability of opportunities (Rizza 2023). Regions with lower levels of these factors are likelier to experience the 'digital divide' and fall behind their more digitally advanced neighbours.

While early studies of this phenomenon focused on a binary understanding ('has vs. has not') of access to ICTs, contemporary research points to more complex dynamics in promoting digital inclusion (Cruz-Jesus et al. 2012). According to this vision, the digital divide intervenes at three levels – access, use, and outcomes – and relates principally to availability, skills, and benefits from technology adoption (Picatoste et al. 2022).

Given its heterogeneous socio-economic landscape, Europe is characterised by a digital gap, which generally follows a North-West vs. South-East axis. Additionally, divides within countries often see urban centres contrasting with rural areas (Eurostat 2024). These patterns can reinforce existing advantages and territorial inequalities, which may contribute to skills polarisation and generate new vulnerable populations.

While the DDPP was designed to more broadly support the digital transition, progress on infrastructure and skills targets is directly linked with efforts to close the digital gap in Europe. Should Europe fail in these ambitions, it is also a concern for the cohesiveness and political viability of the European project. In turn, this suggests that the DDPP should, as a policy planning and resource allocation process, be much closer integrated with the EU's cohesion policies.

Skills polarisation

Similar to the digital divide, a failure of the DDPP could negatively affect Europe's labour markets by feeding into ongoing polarisation dynamics and economic inequalities.

The task-polarisation model, or skill-biased technological change (SBTC) hypothesis, conceptualises work as a series of tasks, some of which can be automated by machines and others that must be performed by human workers (Autor 2022). The last is usually based on areas in which machines have not yet made significant advancements, such as non-routine abstract reasoning, interpersonal communication, and other complex tasks often requiring expertise in leadership. Given that these skills are often characteristic of highly skilled workers, experts (Autor 2022; Acemoglu and Autor 2011; Acemoglu and Restrepo 2019) posit that rapid technological advancements have decreased the demand for routine task workers. Redundancy in middle-skill jobs puts pressure on lower-skilled jobs – where insufficient progress in robotics has not yet led to replacements – resulting in job and wage polarisation (ibid.).

Therefore, while producing a relative increase in productivity, technological change also drives job polarisation dynamics, exposing mid-level education workers in low-paying jobs to the perils of digitalisation and income inequality (Lund Jelsen et al. 2019). Considering that the unskilled workforce constitutes an overwhelming majority of workers, the SBTC is a worrying dynamic that reveals the urgent need for up-skilling and re-skilling programmes across Europe. To this end, future EU policy interventions might be explored in the area of VET to upskill and reskill Europe's working class.

Creation of new groups of vulnerable individuals

In addition to increasing the digital divide between regions and contributing to job and wage polarisation, a failure of the DDPP may also lead to the emergence of new groups of vulnerable individuals. This is particularly pertinent in the workplace, where the digitalisation of value creation can lead to changes in workforce structures and the formation of new categories of vulnerable workers.

A perfect example of this dynamic is the rise of new forms of flexible work using AI technologies to match the supply and demand of paid labour. As a novel form of employment, platform work – also known as the 'gig economy' – heavily relies on practices of algorithmic management to maximise employee productivity (Hossein Jarrahi et al. 2021). Invasive data collection methods can enable employers to monitor employees, altering the power dynamics between platforms and workers in favour of the former and creating potential vulnerabilities for companies to exploit (De Stefano and Taes 2021).

In addition to supporting the gig economy, AI has also emerged as a 'new competitor' for human labour, which has contributed to significantly reducing workers' bargaining power and creating new vulnerable workers. These include those in unstable employment, self-employed individuals, or those facing discrimination. An example of this phenomenon is the many 'invisible' AI workers who train large language models (LLMs), usually carrying out repetitive tasks, sometimes while exposed to graphic and potentially damaging content.

While these are some of the most pressing challenges that might arise from failing to progress on the DDPP targets, they will not be the only ones. The interlinkages between the digital, green, and economic security transitions are such that the list of future challenges will be much longer and more complex than this. Mitigating them demands anticipation and, as such, warrants immediate and bold political intervention from EUrope.

Conclusion and suggested actions

In his memoirs, Jean Monnet (1978) famously wrote that 'Europe will be forged in crises and will be the sum of the solutions adopted for those crises'. Half a century later, however, Europe is stuck in an age of permacrisis, marked by the failure to deal with the compounding effects of many complex crises (Zuleeg et al. 2021).

Contrary to popular belief, being in a crisis-fighting mode and dealing with individual problems as they arise only heightens them. Instead, given the nexuses between all challenges presented in this research, the Commission should look for holistic answers and develop resilient and stronger mechanisms to counter the current political and institutional inertia in the EU.

This concluding section suggests concrete actions to correct the DDPP's failures so that Europe can position itself as a global leader in shaping a sustainable, inclusive, and resilient digital future. The new Commission should:

1. **Address Europe's massive investment gap and boost the region's technological competitiveness.**

More EU public money is, by itself, insufficient to address EUrope's massive investment gap. Instead, to bridge the gap and accelerate the triple digital, green, and economic security transition, the Commission should adopt a comprehensive strategy that combines public investment with private sector mobilisation. This strategy should prioritise key areas like AI, cybersecurity, and digital infrastructure while creating a favourable investment environment through tax incentives, streamlined regulations, and financing mechanisms such as joint borrowing. While this would require significant coordination at the EU level, a strengthened single market, investment-friendly fiscal rules, and joint debt issuance, it is effectively the only way to deliver the scale of change needed to close the gap with foreign competitors (Bouabdallah et al. 2024).

2. **Thoroughly revise the DDPP instrument, not only its implementation strategy.**

President von der Leyen has asked EVP Virkkunen to review the DDPP's implementation strategy and digital targets in 2026. If the EU is committed to achieving the targets by 2030, the upcoming revision should go much further than that. It should touch on three dimensions of the DDPP: its unrealistic objectives, poor implementation, and overall incoherent goals.

a. **Strategic vision.** The Commission should work on better aligning the DDPP's objectives with the more recent focus on enhancing Europe's technological sovereignty. This would require addressing our critical technological dependencies and better imbuing security considerations across the entire tech agenda.

b. **Realism.** There is a fine line between setting ambitious targets, spurring positive change, and setting out unrealistic targets, spelling an early failure of the strategy. Reckoning that the DDPP is too ambitious to the point of being unrealistic, the Commission should review the whole strategy. In doing so, it should reflect on realistic scenarios for 2030 and then reassign funds by prioritising areas in which progress is already advanced, as well as where inertia would challenge societal resilience. This approach should result in a higher prioritisation of the skills and digital infrastructure targets.

c. **Implementation.** While unrealistic targets have translated into low ambition among member states from the start, the strategy's lack of accountability mechanisms has certainly not helped. To fix this issue, the Commission should comple-

ment the yearly revisions with new mechanisms to monitor the implementation of the recommendations provided in the national roadmaps. Additionally, it should consider the possibility of better integrating the DDPP into the European Semester framework to tackle member states' inertia.

3. **Better integrate the DDPP with other instruments.**

As we have already seen, a potential failure of the DDPP would also affect the cohesiveness and resilience of the European project by feeding into phenomena like the digital divide. Therefore, building on the suggestion to develop a more strategic vision, EVP Virkkunen should also closely cooperate with her fellow EVPs for cohesion and reform and for social rights and skills, quality jobs, and preparedness to better align the objectives of different policy mechanisms.

4. **Reprioritise the DDPP's skills targets and promote further action to advance them.**

While strengthening digital skills and tackling the skills gap is a complex objective, the Commission needs to step up its efforts and be more proactive where it does have the competence to promote positive change. Specifically, it should work on two fronts: promoting re-skilling and up-skilling through VET modules and incentivising the sharing of best practices among member states.

Regarding the first suggestion, the Commission should support the development and ensure the availability of high-quality free VET modules to citizens across the EU. This should also be supported by further action such as the harmonisation of credentials recognition across member states, which could favour labour mobility, and public-private partnerships to boost participation in VET modules.

On the second point, the Commission should create ad hoc spaces to share best practices across the EU, promoting initiatives such as the Applied AI Network at the Technical University of Munich or the University of Helsinki's courses on elements and ethics of AI.

5. **Better integrate strategic foresight into EU policy-making dynamics.**

While enforcement and reprioritisation of the DDPP are urgently needed, targeted policy adjustments are insufficient for meaningful reform. Fast-paced progress warrants constant monitoring, future-oriented thinking, and systemic reforms to effectively curb risks that might arise. Therefore, strategic foresight should be further institutionalised at the EU level, and the insights produced by already existing groups such as the Strategic Foresight Network and the ESPAS should be better integrated into the EU's legislative processes to create forward-looking laws. It is only by embracing this long-term perspective that the EU can proactively mitigate current and future challenges and ensure a sustainable and prosperous future for all its citizens.

References

Acemoglu, D., and D. Autor. 2011. 'Skills, Tasks and Technologies: Implications for Employment and Earnings'. In *Handbook of Labor Economics* 4: 1043–1171. Elsevier. https://doi.org/10.1016/S0169-7218(11)02410-5

Acemoglu, D., and P. Restrepo. 2019. 'Automation and New Tasks: How Technology Displaces and Reinstates Labor'. *Journal of Economic Perspectives* 33, no. 2: 3–30. https://doi.org/10.1257/jep.33.2.3

Autor, D. (2022). *The Labor Market Impacts of Technological Change: From Unbridled Enthusiasm to Qualified Optimism to Vast Uncertainty* (w30074; p. w30074). National Bureau of Economic Research. https://doi.org/10.3386/w30074

Bánhidi, Z., I. Dobos, and A. Nemeslaki. 2020. 'What the Overall Digital Economy and Society Index Reveals: A Statistical Analysis of the DESI EU28 Dimensions'. *Regional Statistics* 10, no. 2: 42–62. https://doi.org/10.15196/RS100209

Beaunoyer, E., S. Dupéré, and M. J. Guitton. 2020. 'COVID-19 and Digital Inequalities: Reciprocal Impacts and Mitigation Strategies'. *Computers in Human Behavior* 111: 106424. https://doi.org/10.1016/j.chb.2020.106424

Borges de Castro, R. 2024. 'The New Commission Needs Better Mechanisms to Anticipate the Crises to Come'. *European Policy Centre*, September 17, 2024. https://www.epc.eu/en/publications/~5d5c64

Bouabdallah, O., E. Dorrucci, L. Hoendervangers, and C. Nerlich. 2024. 'Mind the Gap: Europe's Strategic Investment Needs and How to Support Them'. *European Central Bank*, June 27, 2024. https://www.ecb.europa.eu/press/blog/date/2024/html/ecb.blog240627~2e939aa430.en.html

Böck, C., and M. Kettemann, M. 2024. 'Mapping the Future of Technological Innovations'. *Rebuilding Governance and Resilience out of the Pandemic (REGROUP)*. https://regroup-horizon.eu/publications/future-technological-innovations/

Bria, F. 2024. 'European Digital Independence: Building the Euro Stack'. *AI NOW, Redirecting Europe's AI Industrial Policy: From Competitiveness to Public Interest*. https://ainowinstitute.org/wp-content/uploads/2024/10/AI-Now_EU-AI-Industrial-Policy_Oct.-2024.pdf

Codagnone, C., G. Liva, L. Gunderson, E. Rebesco, O. Evidence, G. Misuraca, and I. Futures. 2021. 'Europe's Digital Decade and Autonomy (PE 695.465-)'. https://www.europarl.europa.eu/RegData/etudes/STUD/2021/695465/IPOL_STU(2021)695465_EN.pdf

Cruz-Jesus, F., T. Oliveira, and F. Bacao. (2012). 'Digital Divide Across the European Union'. *Information & Management* 49, no. 6: 278–291. https://doi.org/10.1016/j.

im.2012.09.003

De Stefano, V., and S. Taes, S. 2021. 'Algorithmic management and collective bargaining [Foresight Brief]'. European Trade Union Institute. https://www.etui.org/sites/default/files/2021-05/Algorithmic%20management%20and%20collective%20bargaining-web-2021.pdf

Draghi, M. 2024. 'The Future of European Competitiveness'. https://commission.europa.eu/document/download/ec1409c1-d4b4-4882-8bdd-3519f86bbb92_en?filename=The%20future%20of%20European%20competitiveness_%20In-depth%20analysis%20and%20recommendations_0.pdf

European Commission. 2021. 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 2030 Digital Compass: The European Way for the Digital Decade'. https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52021DC0118

European Commission. 2022. 'European Digital Rights and Principles'. https://digital-strategy.ec.europa.eu/en/policies/digital-principles

European Commission. '2024 State of the Digital Decade Package | Shaping Europe's Digital Future'. Accessed January 21, 2025. https://digital-strategy.ec.europa.eu/en/policies/2024-state-digital-decade-package

European Commission. 2024. 'Belgium 2024 Digital Decade Country Report'. https://digital-strategy.ec.europa.eu/en/factpages/belgium-2024-digital-decade-country-report

European Commission. 2024. 'Bulgaria 2024 Digital Decade Country Report'. https://digital-strategy.ec.europa.eu/en/factpages/bulgaria-2024-digital-decade-country-report

European Commission. 2024. 'Finland 2024 Digital Decade Country Report'. https://digital-strategy.ec.europa.eu/en/factpages/finland-2024-digital-decade-country-report

European Commission. 2024. 'Italy 2024 Digital Decade Country Report'. https://digital-strategy.ec.europa.eu/en/factpages/italy-2024-digital-decade-country-report

European Commission. 2024. 'State of the Digital Decade 2024 Report'. https://digital-strategy.ec.europa.eu/en/factpages/state-digital-decade-2024-report

European Commission Directorate General for Communications Networks, Content and Technology. 2020. 'Shaping Europe's Digital Future'. Publications Office. https://data.europa.eu/doi/10.2759/091014

European Commission Joint Research Centre. 2016. 'DigComp 2.0: The Digital Competence Framework for Citizens'. Publications Office. https://data.europa.eu/

doi/10.2791/11517

European Commission Joint Research Centre. 2022. 'DigComp 2.2: The Digital Competence Framework for Citizens: With New Examples of Knowledge, Skills and Attitudes'. Publications Office. https://data.europa.eu/doi/10.2760/115376

Eurostat. 2024. 'Digital Economy and Society Statistics—Households and Individuals'. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Digital_economy_and_society_statistics_-_households_and_individuals#Use_of_internet

Eurostat. 2024. 'Urban-Rural Europe—Digital Society'. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Urban-rural_Europe_-_digital_society

Ferreira Gomes, A., and M. Okano-Heijmans. 2024. 'Too Late to Act? Europe's Quest for Cloud Sovereignty'. https://www.clingendael.org/publication/too-late-act-europes-quest-cloud-sovereignty

Jarrahi, M. H., G. Newlands, M. K. Lee, C. T. Wolf, E. Kinder, and W. Sutherland. 2021. 'Algorithmic Management in a Work Context'. Big Data & Society 8, no.2: 20539517211020332. https://doi.org/10.1177/20539517211020332

Kalthenuer, F., L. Saari, A. Kak, and S. Myers West. 2024. 'AI NOW, Redirecting Europe's AI Industrial Policy: From Competitiveness to Public Interest'. *AI Now Institute*. https://ainowinstitute.org/wp-content/uploads/2024/10/AI-Now_EU-AI-Industrial-Policy_Oct.-2024.pdf

Lausberg, P., M. Otero-Iglesias, G. Riekeles, and A. González-Agote. n.d. 'Towards a Competitive Edge: Reforming the EU Regulatory Framework'. *European Policy Centre*. https://epc.eu/content/Regulatory_DP_v3.pdf

Lund Jensen, T., J. Nielsen, and A. Gorud Christiansen, A. 2019. 'Job Polarisation Has Increased Inequality Across Western Europe'. *Foundation for European Progressive Studies*. https://feps-europe.eu/wp-content/uploads/downloads/publications/feps_eclm_job%20polarisation%20has%20increased%20inequality%20across%20western%20europe.pdf

Misheva, G. 2022. 'Digital Skills Indicator 2.0 Methodology'. *Digital Skills & Jobs Platform*. https://digital-skills-jobs.europa.eu/en/inspiration/resources/digital-skills-indicator-20-measuring-digital-skills-across-eu

Monnet, J. 1978. *Memoirs* (1st ed). Doubleday. https://archive.org/details/Monnet-JeanMemoirs/page/n1/mode/2up

Papazoglou, M., J. Torrecillas Jódar, M. Cardona, E. Calza, M. Vázquez-Prada Baillet, and R. Righi (with Europäische Kommission). 2023. 'Mapping EU Level Funding Instruments to Digital Decade Targets: Application to Main Digital Instruments in 2014–2027' (M.

López Cobo & G. De Prato, Eds.). *Publications Office of the European Union*. https://doi.org/10.2760/986930

Picatoste, X., A. Mesquita, and F. González-Laxe. 2023. 'Gender Wage Gap, Quality of Earnings and Gender Digital Divide in the European Context'. *Empirica* 50, no. 2: 301–321. https://doi.org/10.1007/s10663-022-09555-8

Rizza, C. 2023. 'Digital Divide'. In *Encyclopedia of Quality of Life and Well-Being Research*, edited by F. Maggino. Springer International Publishing: 1790–1793. https://doi.org/10.1007/978-3-031-17299-1_732

Rodriguez Contreras, R. 2021. 'COVID-19 and Digitalisation'. *European Foundation for the Improvement of Living and Working Conditions*. https://www.eurofound.europa.eu/en/covid-19-and-digitalisation

Stavytskyy, A., G. Kharlamova, and E. A. Stoica. 2019. 'The Analysis of the Digital Economy and Society Index in the EU'. *Baltic Journal of European Studies* 9, no. 3: 245–261. https://doi.org/10.1515/bjes-2019-0032

von der Leyen, U. 2019. 'A Union That Strives for More—My agenda for Europe'. https://commission.europa.eu/document/download/063d44e9-04ed-4033-acf9-639ecb187e87_en?filename=political-guidelines-next-commission_en.pdf

von der Leyen, U. 2024. 'Mission Letter to Executive Vice-President-designate for Tech Sovereignty, Security and Democracy'. https://commission.europa.eu/document/download/3b537594-9264-4249-a912-5b102b7b49a3_en?filename=Mission%20letter%20-%20VIRKKUNEN.pdf

Wong Leung, J., S. Robin, and D. Cave. 2024. 'ASPI's Two-Decade Critical Technology Tracker: The Rewards of Long-Term Research Investment'. *Australian Strategic Policy Institute*. https://ad-aspi.s3.ap-southeast-2.amazonaws.com/2024-08/ASPIs%20two-decade%20Critical%20Technology%20Tracker_1.pdf?VersionId=1p.Rx9MIuZyK5A5w1SDKIpE2EGNB_H8r

Zuleeg, F., J. Emmanouilidis, and R. Borges de Castro. 2021. 'Europe in the Age of Permacrisis'. *European Policy Centre*. https://www.epc.eu/en/publications/Europe-in-the-age-of-permacrisis~3c8a0c