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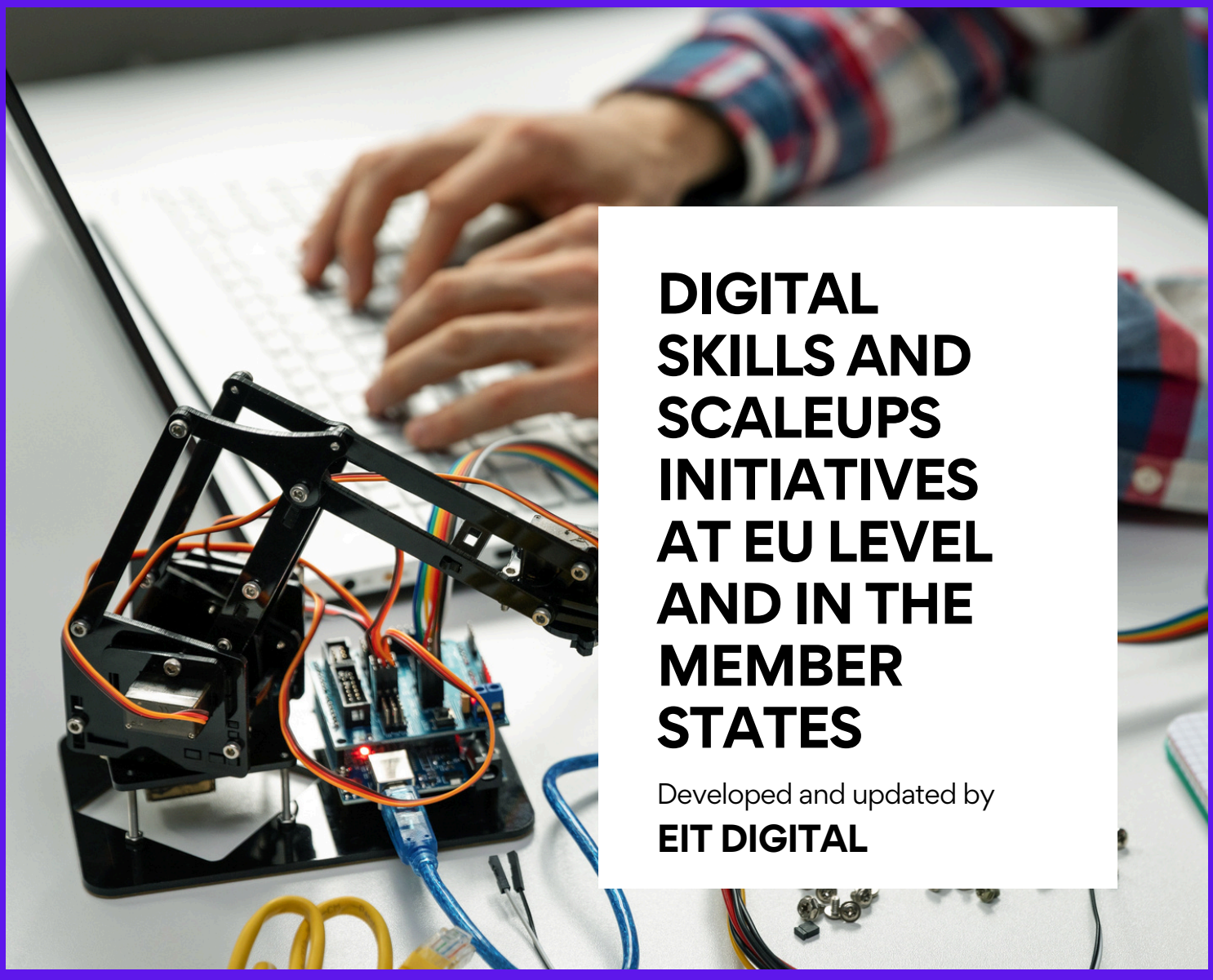
DIGITAL SKILLS & SCALEUPS



DIGITAL SKILLS AND SCALEUPS INITIATIVES AT EU LEVEL AND IN THE MEMBER STATES

Developed and updated by

EIT DIGITAL

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THIS REPORT WILL BE UPDATED REGULARLY, INNOVATION IS FAST, SO ARE WE

MESSAGE FROM THE CEO

FEDERICO MENNA
CEO EIT Digital

To every policymaker, entrepreneur, investor, and innovator contributing to European innovation - your vision and determination shape the future! Together, we have an extraordinary opportunity to position **Europe at the forefront of global innovation**.
This report delves into two critical areas: mapping the initiatives and support mechanisms at both EU and Member State levels while identifying gaps and opportunities for enhanced collaboration.

Digital skills are no longer optional—they are fundamental to economic growth, social inclusion, and global competitiveness. As digitalisation permeates every sector, ensuring that all citizens possess basic digital literacy is as crucial as equipping businesses with highly skilled ICT professionals.

Without a workforce proficient in digital capabilities, Europe risks lagging behind in innovation and productivity. At the same time, Europe must become a powerhouse for scaleups—nurturing the potential unicorns that drive economic resilience and technological leadership. Scaleups are more than just high-growth enterprises; they are engines of innovation, investment, and job creation. Yet, they continue to face barriers in accessing funding, scaling beyond national borders, and navigating fragmented regulatory landscapes.
Addressing these challenges is imperative for Europe's digital and economic future.
This report not only highlights the strides made but also reveals the systemic hurdles that remain.
By aligning policy frameworks, fostering cross-border collaboration, and streamlining funding mechanisms, we can unlock the full potential of Europe's digital skills and scaleup ecosystem. The path ahead requires ambition, coordination, and unwavering commitment. Together, we can build a Europe where digital inclusion and innovation thrive, creating lasting impact for businesses, workers, and society as a whole. Let's build the future, together!

INTRODUCTION

This report focuses on digital skills and on digital scaleups (potential unicorns) with the aim of producing a selective mapping of support programmes and initiatives on these two areas at EU level and in a selected number of Member States and provide some final considerations on gaps and need for better collaboration/coordination. These two areas are of great importance and both figure among the objectives and targets of the Digital Decadė and of the Digital Decade Policy Programme 2030.[2]

The digital transformation, accelerated by the Covid-19 induced digital surge, requires a skills revolution in Europe. It is a challenge and opportunity where matters of inclusion and growth converge with one another. It is a two-sided challenge, concerning both basic digital skills, as part of today's understanding of literacy and digital citizenship, and the specialised skills needed for European firms and organisations to innovate. With many public services and most commercial ones fully digital, giving basic digital skills to all European and especially to vulnerable groups it is a matter of inclusion and social cohesion. On the other hand, a digital skilled workforce is fundamental today. Improving digital skills is also important for those employees, who may not be required to be digital specialists, nevertheless, must perform many administrative and operational activities online. It has long been shown by economists that productivity and innovation depend not only on capital and technology, but also on labour productivity.

SKILLS

Europe needs educational systems fit for the digital age, alongside supplementary programs to train and retrain that part of the adult population which has long left their studies behind. In an era characterised by rapid technological advancements, the shortage of ICT specialists is a systemic challenge. It is strategic to build up a sufficient talent pool of highly skilled professionals.

INTRODUCTION

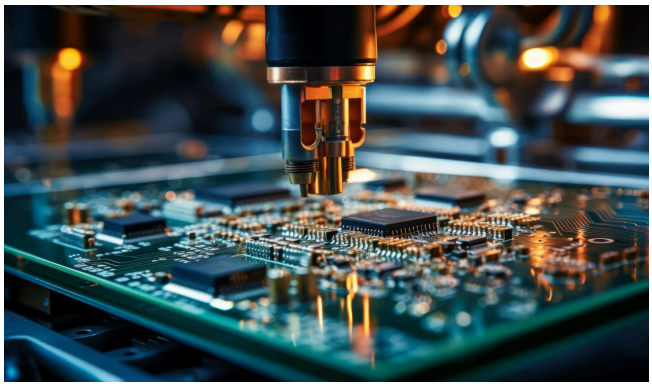
Scale-ups, innovative businesses and unicorns play a pivotal role in increasing the EU's competitiveness. These ventures promote economic growth by introducing disruptive technologies, creating new job opportunities, promoting innovation, and attracting investment. They embody agility, creativity, and adaptability, driving traditional industries to evolve and remain relevant in a rapidly changing market landscape. Furthermore, startups serve as a breeding ground for entrepreneurship, nurturing a culture of risk-taking and innovation essential for long-term economic sustainability.

A very recent and in-depth review of the scaleup gap by the European Investment Bank (EIB), shows that scaleups are much more productive of the average EU firm: with a value added per employee of about 120.000 EUR for the former as compared to about 60.000 EUR for the latter.[3]

Our overview of funding programmes and policies initiatives in these two domains is two-fold:
First, in Section 1, we consider digital skills and scaleups (unicorns) within the Digital Decade targets and policy programme.

We show where Europe stands today with respect to the 2030 targets and we consider in aggregate and based on programming documentation (analysed by the JRC, see infra) how EU and national level programmes have focused on improving digital skills and increasing the number unicorns.

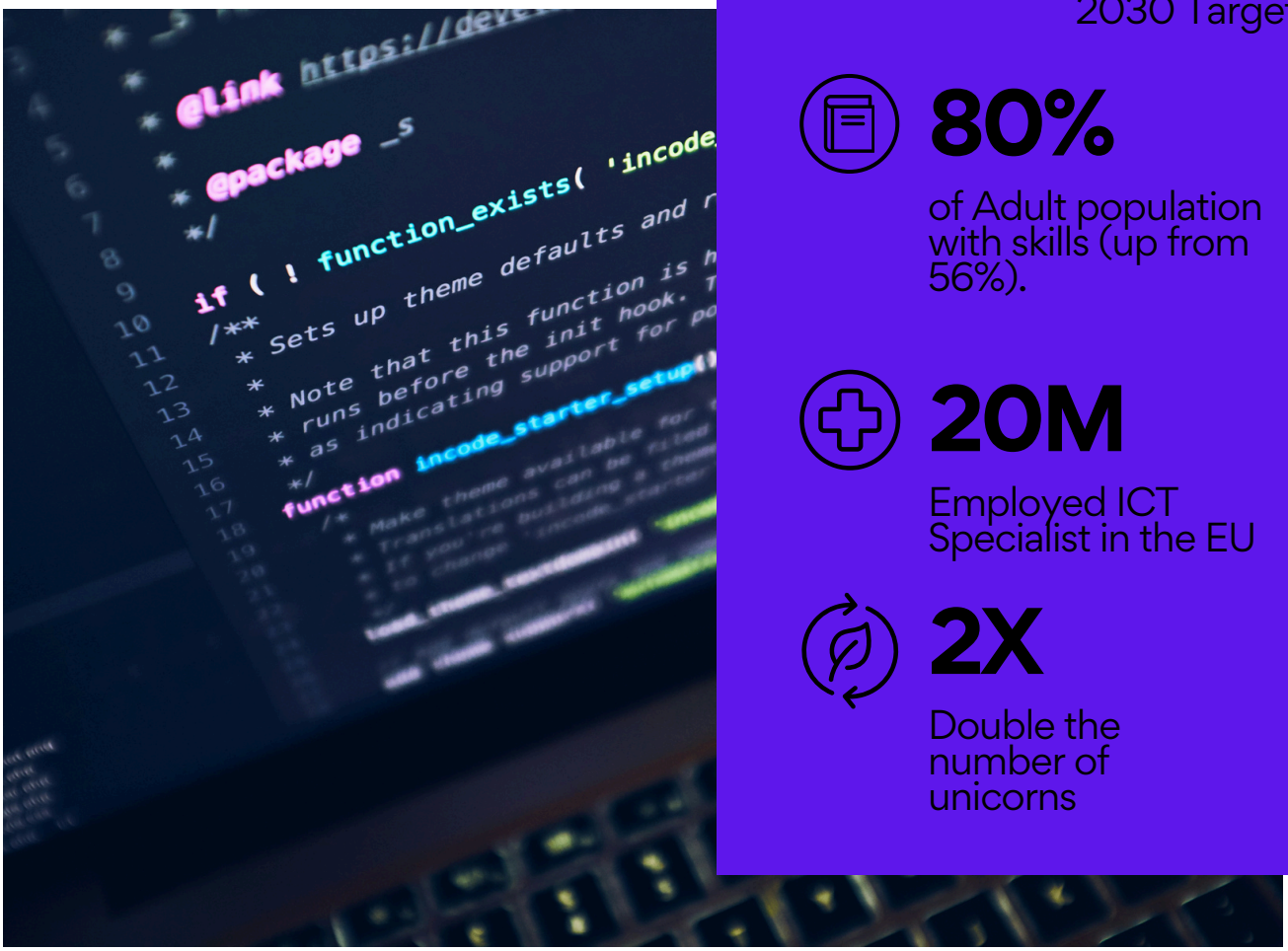
Second, we have performed our own survey of programmes and initiatives at EU level and in a selected number of Member States.



METHODOLOGY

We have studied surveys in total 120 between programmes and initiatives, all of which are reported in full in Annex (see Section 4) and selectively reviewed and commented in Section 2. The conclusive considerations drawn from the sources consulted and retrieved are presented in Section 3. We must anticipate that in our survey was extremely challenging to find for all entries information on duration and budget in one single point of access. The information is fragmented and in several cases budget figures were not available anywhere. This difficulty in finding concentrated and exhaustive sources is already a preliminary indication of the fragmentation of the various existing programmes and initiatives.

DIGITAL SKILLS AND SCALEUPS IN THE DIGITAL DECADE



THE ALIGNMENT BETWEEN EU LEVEL AND MEMBER STATE LEVEL SOURCE ALLOCATION TOWARDS THE 2030 GOALS

In this Section we present three kinds of analysis based on secondary sources. First, we look at where we stand with respect to the targets fixed for 2030 using the data reported in the 2024 Communication on the state of the Digital Decade. Second, we use a mapping exercise produced by the JRC to present how funds have been allocated to targets (based on planning documents). Third, we analyse the Digital Decade Roadmaps produced by the Member States.

DIGITAL SKILLS AND SCALEUPS IN THE DIGITAL DECADE

In 2021 the Communication on the Digital Compass[4] fixed the following targets in the area of skills and scaleups to be reached by 2030:

- 80% of adult population with basic digital skills (2021 it was about 56%).[1]
- 20 million employed ICT specialists in the EU with convergence between men and women (2021 there were only about 8 million ICT specialists employed, clearly skewed toward men)
- Grow scaleups and finance them to double the number of European unicorns (2021 there were about 100 of them).

A modelling Montecarlo Simulation, produced the same year as the publication of the Digital Compass Communication, concluded that without an exogenous shock (new supporting policies and funding) none of these three targets could be achieved by 2030. Taking current historical trends and projecting them into the future this simulation indicated that by 2030 only 64% of European will possess basic digital skills, that at most 13.3 millions of ICT specialist would be employed, that the gap between men and women would increase rather than decrease, and that the unicorns target would not be reached.[5]

On July 2, 2024, the Commission released the Communication on the state of the Digital Decade in 2024, with two annexes reporting analyses and data.[6] From these sources we can obtain an updated picture on the targets relevant for this report, both based on actual data and on projections.

BASIC DIGITAL SKILLS

In 2023, slightly more than 55.6% of individuals reported having at least basic digital skills, with variations across Member States from 82.7% to about 27.7%. The Communication stresses that a lot of work remains to be done to reach the Digital Decade target and that the level in 2023 falls between 2.5 and 3 times less than the rate needed to reach the targets by 2030.[7]

DIGITAL SKILLS AND SCALEUPS IN THE DIGITAL DECADE

The more technical analysis in Annex II to the Communication concludes that "the target will not be met without new policy interventions and associated investments as the 2030 forecast projected along the baseline trajectory is that 59.8% of people aged 16-74 would have at least basic digital skills, falling short by more than 20 points from the target".[8] In this respect Annex I to the Communication comments that "increased, and focused efforts by the European institutions as well as the Member States are necessary to facilitate the acquisition of digital skills. In the context of an ageing population and an increasingly technology-driven society, there is a crucial need to follow a multi-faceted approach targeting digital skills in primary, secondary and higher education, Vocational Education and Training and lifelong learning, as well as focusing on priority or 'hard-to-reach' groups".[9]

ICT SPECIALISTS AND CONVERGENCE

The Communication anticipates that at the current pace by 2030 there will be only 12 million ICT specialists employed in Europe, which is 8 million short of the 2030 target.[10] The gender gap is still substantial and persisting. In 2023, just 19.4% of ICT specialists employed in the EU were women.[11] In 2023, the EU employed just under 10 million ICT specialists, accounting for merely 4.8% of total employment. This already created a shortfall of 900 000 specialists compared to the value predicted in 2023 along the Digital Decade trajectory, with an expected deficit of 7.8 million by 2030 if no further investments are made.[12]

DIGITAL SKILLS AND SCALEUPS IN THE DIGITAL DECADE

SCALEUPS AND UNICORNS

For unicorns, instead of starting from the original baseline, the 2024 Communication takes their number in 2022 (i.e. 249) and makes 500 the 2030 target. New data show that much less unicorns were created in the EU in 2023 than in any previous here since 2017.[13] In 2023 there was a net increase of 14 start-ups with a valuation above USD 1 billion across the whole EU, down 82% from 2021's high-water mark of plus 79.[14] This notwithstanding, the projection show that 500 unicorns will be reached by 2030. It must be noted, however, the EU is currently home only to approximately 13% of the world's unicorns, and the difference in absolute numbers of EU headquartered unicorns compared to other key countries remains stark, with 263 unicorns in the EU, 387 in China, and 1,539 in the USA by the end of 2023.[15] The implication is that, besides reaching the 500 2030 target, the need for action at both EU and national level, to sustain growth and match the performance of other parts of the world.

In 2023 and 2024 the JRC published a mapping exercise on EU level funding instruments for the period 2021-2027 supporting the Digital Decade targets.[16]
This mapping exercise has its limitation for it is based on official EU and Member States programmatic documents and, as well-known, there are always gaps and lag time between strategic planning and execution. Having stressed this limitation, the JRC exercise is the only kind of aggregated analysis at EU and Member States level that is currently available. The funding instruments considered by the JRC are: Recovery and Resilience (RFF); Digital Europe Programme (DIGITAL); Horizon Europe; and the Connecting Europe Facility (CEF), and Cohesion Policy. The table[17] in next page provides the overview of EU funding of Europe as a whole. Considering the four blocks of the Digital Decade targets, the allocation of funds in percentage from the JRC estimation looks as follows:

14,8%
Digital skills

21,5%
Digital infrastructure

36,4%
Digitalisation of businesses:

27,3%
Digitalisation of public services

In relative terms, while the digital transformation of businesses (especially in the areas of late adopters and unicorns), and the digitalisation of the public sector are expected to jointly receive more than 63,7% of the funds, digital infrastructures and digital skills receive 21.5% and 14.8% respectively of the total funding relevant to Digital Decade. As can be seen from table 1 at aggregate EU level:

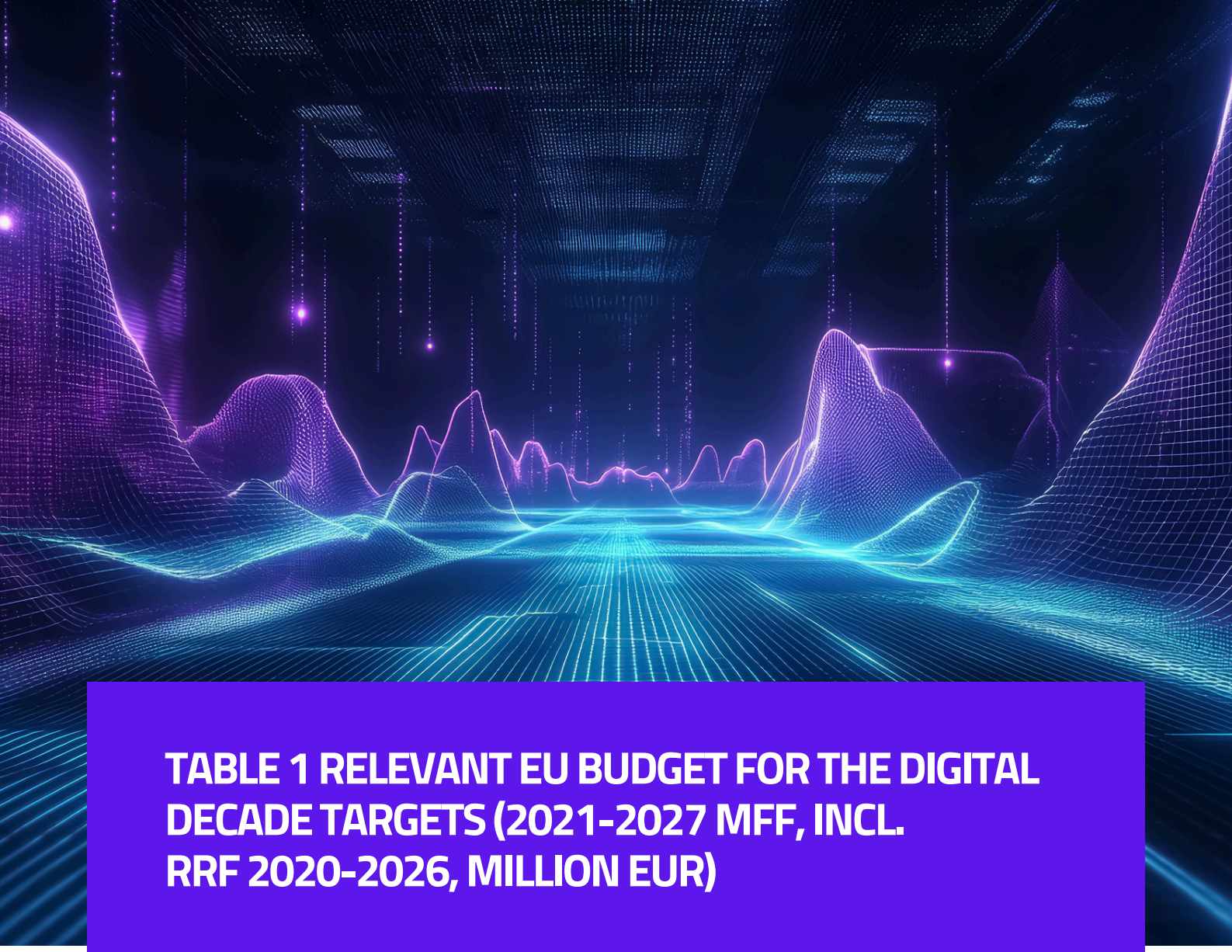


TABLE 1 RELEVANT EU BUDGET FOR THE DIGITAL DECADE TARGETS (2021-2027 MFF, INCL. RRF 2020-2026, MILLION EUR)

Fund		Total	Recovery and Resilience Facility (2020-2026)	Cohesion Policy (2021-2027)	Digital Europe Programme (2021-2027)	Horizon Europe (2021-2024)	Connecting Europe Facility – Digital (2021-2027)
Total funding		**957,422**	651,670	260,896	7,948	35,199	1,709
Digital funding		**204,583**	150,037	31,063	7,948	13,826	1,709
Digital funding %		21%	23%	12%	100%	39%	100%
Funding DD general objectives		27,488	14,129	4,392	1,275	7,320	373
Funding Digital Decade targets	**Total target budget**	177,096	135,909	26,672	6,673	6,506	1,336
	Basic digital skills	15,405	14,294	950	128	34	0
	ICT specialists	10,881	9,506	633	661	73	8
	Gigabit network coverage	14,003	11,628	2,164	4	0	206
	5G coverage	3,362	1,967	115	4	396	879
	Semiconductors	18,200	14,801	0	1,396	2,004	0
	Edge nodes	609	0	0	220	335	35
	Quantum computing	1,918	866	0	293	669	90
	Cloud computing services	8,373	6,019	1,584	370	337	63
	Data analytics	7,552	4,718	1,584	546	678	26
	Artificial intelligence	9,386	5,278	1,584	1,227	1,266	30
	Digital late adopters	19,885	14,154	4,753	674	304	0
	Unicorns	19,257	14,158	4,753	159	187	0
	Digital public services	32,343	24,449	7,271	616	6	0
	Electronic health records	15,233	13,604	1,280	163	187	0
	e-ID	688	466	0	212	9	0

Source: Signorelli et al (2024, p. 39)

The following two tables provide a break down by Member States and the three Digital Decade targets relevant for this report.

Country		Total DD-targets relevant	Basic digital skills	ICT specialists	Unicorns
EU	**European Union**	**135,909**	**14,294**	**9,506**	**14,158**
BE	Belgium	1,105	132	88	128
BG	Bulgaria	903	180	121	18
CZ	Czechia	1,814	222	148	251
DK	Denmark	285			67
DE	Germany	11,995	1,081	721	426
EE	Estonia	208	6	4	25
IE	Ireland	312	38	25	49
EL	Greece	6,851	453	302	744
ES	Spain	39,378	2,692	1,799	4,640
FR	France	7,732	995	615	735
HR	Croatia	906	121	100	78
IT	Italy	41,793	4,314	2,876	5,711
CY	Cyprus	254	14	10	24
LV	Latvia	384	64	43	46
LT	Lithuania	684	85	57	40
LU	Luxembourg	24	0	[1] 0	3
HU	Hungary	1,219	331	221	42
MT	Malta	62	2	[2] 1	5
NL	Netherlands	834	171	114	15
AT	Austria	1,326	224	149	49
PL	Poland	6,028	1,156	771	211
PT	Portugal	4,416	939	626	350
RO	Romania	4,792	752	501	363
SI	Slovenia	439	36	24	34
SK	Slovakia	1,123	164	109	87
FI	Finland	391	23	16	17
SE	Sweden	650	99	66	

Table 2

Recovery and Resilience Facility 2020-2026 DD-targets relevant budget by Member State and DD target (million €)
Source: Elaboration on Signorelli et al (2024, p. 40)

Country		Total DD-targets relevant	Basic digital skills	ICT specialists	Unicorns
EU	**European Union**	**26,672**	**950**	**633**	**4,753**
BE	Belgium	150	12	8	32
BG	Bulgaria	691	4	3	172
CZ	Czechia	1,339	54	36	161
DK	Denmark	37			7
DE	Germany	1,150	26	17	335
EE	Estonia	333	6	4	41
IE	Ireland	35			12
EL	Greece	1,703	37	24	326
ES	Spain	4,209	227	151	594
FR	France	1,233	88	58	225
HR	Croatia	463	14	9	104
IT	Italy	3,551	184	123	686
CY	Cyprus	66			9
LV	Latvia	364	13	9	50
LT	Lithuania	309	11	7	68
LU	Luxembourg	4	1	0	0
HU	Hungary	1,569	11	8	364
MT	Malta	58	1	0	10
NL	Netherlands	58	2	1	17
AT	Austria	68			23
PL	Poland	3,934	34	23	477
PT	Portugal	1,674	20	14	451
RO	Romania	1,873	14	10	291
SI	Slovenia	197	19	13	34
SK	Slovakia	670	52	35	75
FI	Finland	175	15	10	47
SE	Sweden	208	20	14	44
Interreg (sev. countries)		550	85	57	100

Table 3
Cohesion Policy 2021-2027 DD-targets relevant budget by Member State and DD target (million €)

Source: Elaboration on Signorelli et al (2024, p. 41)

As per the break-down for Member States a very fragmented and diversified picture emerges.
Some countries seem to have allocated more than others into supporting the achievement of the three targets. For instance, it appears that Italy and Spain invested substantially more in support to digital skills than, for instance, Germany and France. And the same applies for ICT specialists and unicorns.
As a third step we have analysed the Member States National Digital Decade Roadmaps,[18] using an AI tool,[19] and have obtained a general characterisation that we briefly report here.
The roadmaps typically include sections on the current state of digital transformation in the country, national trajectories and targets, and specific strategies, measures, and actions to achieve digital goals. They align with the EU's Digital Decade Policy Programme, which sets targets across four areas: digital skills, digital infrastructure, digitalization of businesses, and digital public services. The roadmaps are generally closely aligned with the EU's Digital Decade targets and often reference EU-wide initiatives and funding programs. Many roadmaps emphasize improving basic digital skills for the general population, with targets often aligned with the EU goal of 80% of adults having basic digital skills by 2030.
Measures include establishing digital competence offices, developing national strategies for digital skills, and implementing educational programs from primary to higher education levels. Countries seem to be focusing on increasing the number of ICT specialists to meet growing demand. Strategies include supporting capacity building, conducting studies on skilled labour needs, and developing specialized education programs.
Most countries report implementing programs to support SMEs in their digital transformation. This includes providing digital advisory services, financial support for technology adoption, and promoting the use of advanced technologies like AI and cloud computing. While specific funding details vary, many roadmaps mention using a combination of national funds, EU funds (such as the Recovery and Resilience Facility), and private investments. The roadmaps also report that Implementation often involves collaboration between multiple government ministries, agencies, and private sector partners.
Going into more details with respect to funding and implementation, in terms of EU funding schemes Roadmaps cites the following: a) Recovery and Resilience Facility (RRF): many countries are leveraging this fund for digital transformation projects.

MANY ROADMAPS USE A COMBINATION OF THE BELOW INSTRUMENTS

EU FUNDS

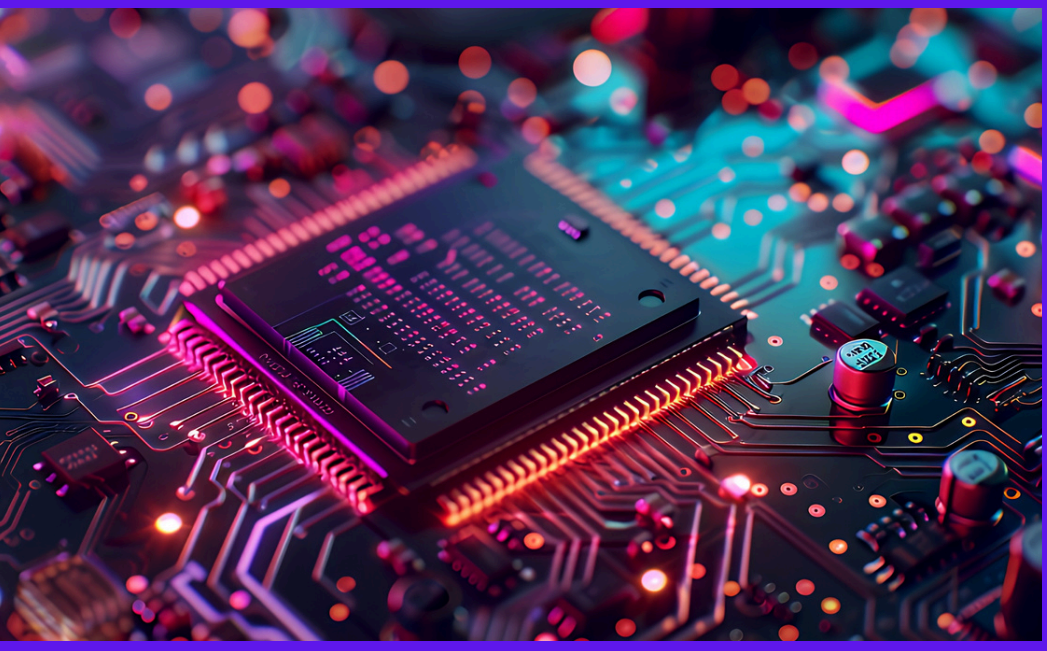
NATIONAL FUNDS

PRIVATE INVESTMENTS

For example, Spain plans to invest €20 billion from its RRF allocation into its digital agenda; b) the European Regional Development Fund (ERDF) is used by several countries to support digital infrastructure and innovation in businesses; c) European Social Fund Plus (ESF+) is mentioned in multiple roadmaps for funding digital skills training programs; d) the Digital Europe Programme is cited as a source for advanced digital skills development and deployment of digital technologies; and e) Horizon Europe is referenced for funding research and innovation in digital technologies. Many countries have established specific national funds for digital transformation. For instance, France's "France 2030" plan includes €30 billion for digital and industrial innovation. Some countries have created dedicated digital transformation agencies with their own budgets, like Denmark's Agency for Digital Government. Many countries have established inter-ministerial committees or task forces to coordinate digital initiatives across government departments. Some have created specific roles, like Chief Digital Officers at national or regional levels to oversee implementation. In countries with federal structures, there's often a mix of national and regional funding. For example, Spain's roadmap discusses coordination between national digital initiatives and those of autonomous communities.

Several countries have outlined multi-year budgets for their digital strategies, aligning with the 2030 timeframe of the Digital Decade goals.

Having reported at aggregate level what emerges from the national roadmaps presented by the Member States, we must repeat the same disclaimer applied to the JRC mapping exercise.
The roadmaps are programming documents, most of which might not have been fully implemented yet.



THE EU IS HOME TO CCA 13% OF THE WORLD'S UNICORNS

TO REACH THE 500 TARGET BY 2030 WE NEED ACTION ON BOTH EU AND NATIONAL LEVELS

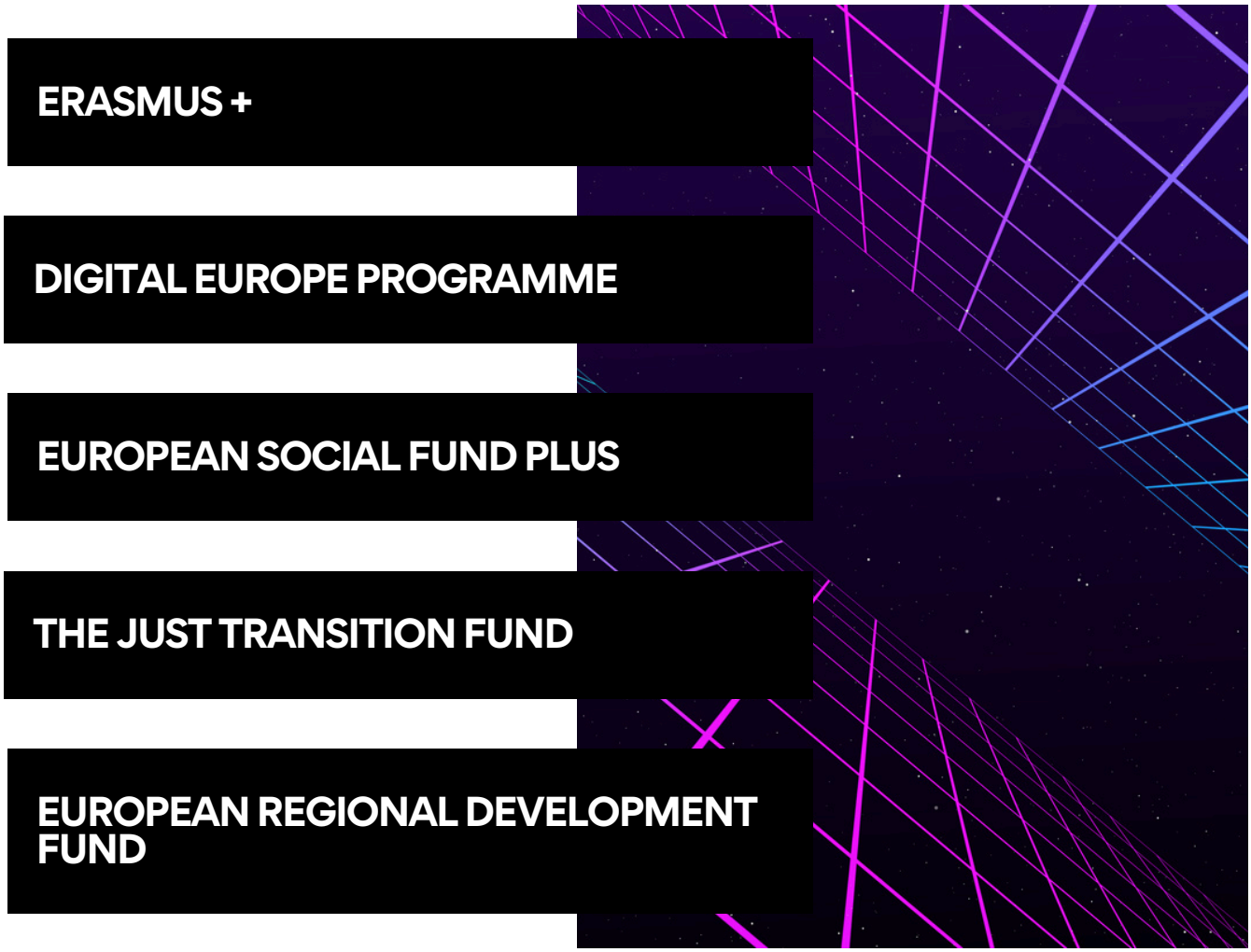
SUPPORT TO DIGITAL SKILLS AND UNICORNS AT EU AND MEMBER STATES LEVEL

DIGITAL SKILLS (AND ICT SPECIALISTS)

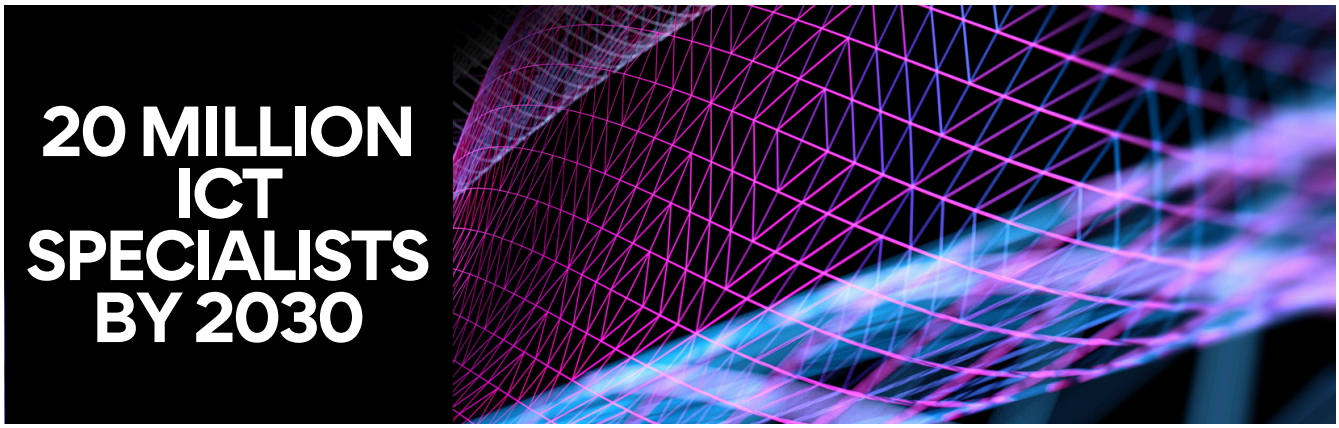
DIGITAL SKILLS (AND ICT SPECIALISTS)

During its 2019-2024 mandate, the European Commission has adopted various initiatives to foster digital skills such as the European Pillar of Social Rights Action Plan[20] and the Digital Education Action Plan[21] 2021-2027, advocating for EU-level support to strengthen education and training systems, in particular through the Structured Dialogue on digital education and skills. 2023 was the year of European Year of Skills, during which the Commission adopted a digital education and skills package on 18 April 2023[22], related to a digital skills certificate and a digital education action plan, the proposals fit in the context of the European Year of Skills. The aim is to support European Union Member States and the education and training sector in providing high-quality, inclusive and accessible digital education and training to develop the digital skills of European citizens. The package included also two proposals (both adopted on 23 November 2023) for Council Recommendations: one on the key enabling factors for successful digital education and training[23]; another on improving the provision of digital skills and competences in education and training[24].

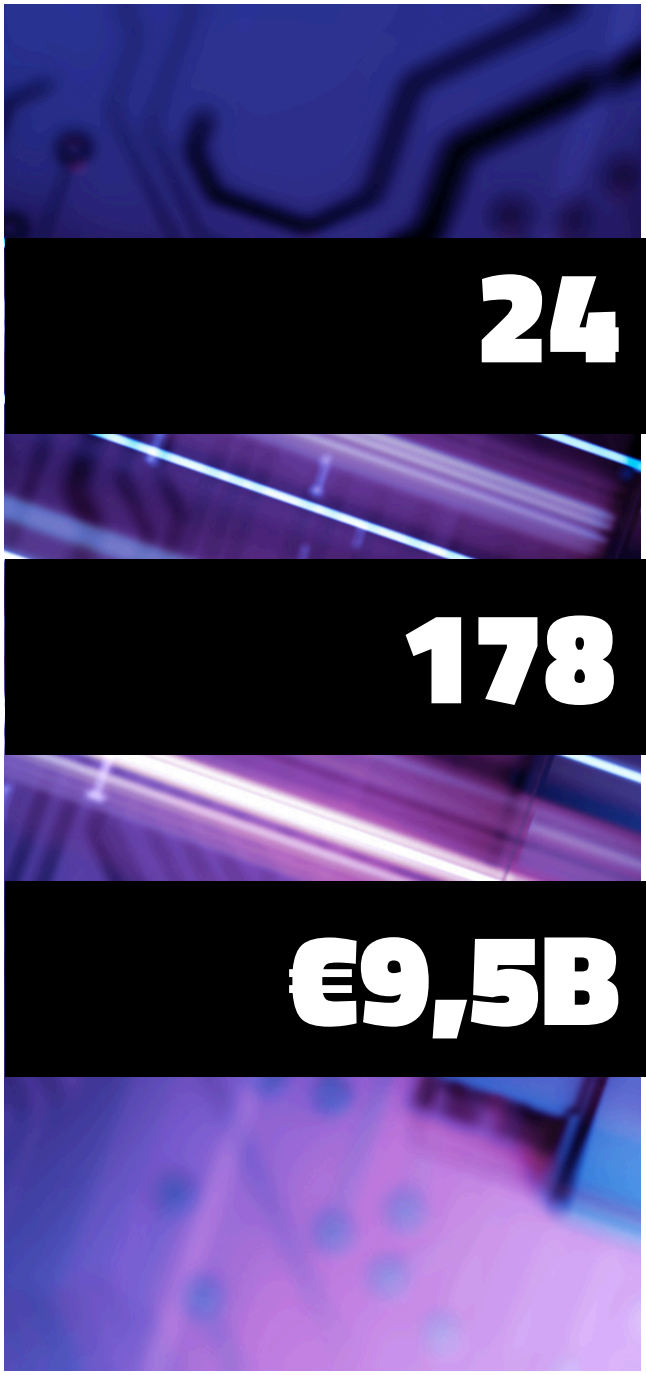
The Commission and other EU institutions have supported digital skills through as many as 10 funding schemes and several policy initiatives. The most noteworthy funding schemes at Commission level include:



Erasmus+, for instance, supports priorities and activities set out in the European Education Area, Digital Education Action Plan and the European Skills Agenda. It supports the development of digital skills through initiatives like the Centres of Vocational Excellence, with €400 million allocated for the period 2021-2027. Within the Digital Europe Programme digital skills are just one component within a larger portfolio of intervention in various areas pertaining to the digital transformation. Within this programme, DG CONNECT in collaboration with HaDEA launched a call for Specialised Education Programmes in Key Capacity Areas. The call aims at contributing to the target of reaching 20 million ICT specialists in the EU by 2030, while promoting gender convergence. Two of the targets of the Just Transition Fund are the reskilling and upskilling of workers and the support for SMEs and startups. European Social Fund+ (ESF) supports the digital transition through investments in digital skills, but this is part of its broader mission to invest in people's employment, education, skills, and social inclusion. For 2022, the ESF+ allocated €1.134 billion as a "digital contribution", which represents 7% of the total 2021-2027 implementation budget. This amount corresponds to investments earmarked for "Developing digital skills and jobs" under the ESF+ programs.



In their National Digital Decade[25] strategic roadmaps, 26 Member States provided a trajectory for the target on basic digital skills that, in most cases, is in line with the EU target value of 80%. Member States have reported a total of 292 measures that contribute to this target, with a total budget of EUR 24.8 billion. They cover a number of aspects, from digital skills in formal education and upskilling and reskilling programmes for people currently in employment, to actions addressed at vulnerable groups. In the same national roadmap for ICT specialists 24 Member States collectively reported 178 measures, amounting to a budget of EUR 9.5 billion and covering several aspects of skills development[26]: from advanced digital skills in formal and higher education, to measures supporting the upskilling of the workforce and other support initiatives, emphasising for instance gender balance or the retention and attraction of ICT specialists globally[27]. It is our assumption that the vast majority of these measure and expenditure are still just planned, as we did not find evidence of them in the selective overview of programmes/initiatives in a selected number of Member States that we conducted. Also in our survey we found fragmentation and little evidence of cross-institutional collaboration.



24 **EU member states:**
Driving national strategies for digital excellence

178 **Measures reported:**
Covering education, workforce upskilling & gender inclusion

€9,5B **Combined Buget:**
Covering education, workforce upskilling & gender inclusion

Most of the funding programmes we identified at national level are, with few exceptions, small in their budget and short in duration and fragmented in a plethora of local level initiatives often not aligned to national and EU level targets and objectives. Two exceptions in terms of scale can be found in France and in Germany. In France, the Compétences et Métiers d'Avenir (CMA, skills and jobs of the future) programme is has a budget of 700 million EUR, aiming to train train 400,000 people per year by 2030 and 1 million new graduates by 2030, at the levels of operators, technicians, assistant engineers, engineers, masters, doctorates, and mainly in the field of STEM (Science, technology, engineering, mathematics). So, digital technology and skills are only one component. In Germany, The Federal Ministry of Education and Research is responsible for this programme launched in 2022 with a budget of EUR 2.2 billion.[28] Part of Germany's Recovery and Resilience Plan, it setup a digitized learning platform by linking existing and creating new platforms, forming a nationwide system. The focus is on digital skills.

SCALEUPS (UNICORNS)

At the EU level (Commission and other European Institutions) several programme support startups and scaleups in the domain of digital technologies. The most noteworthy include:

- DIGITAL EUROPE PROGRAMME
- EIC ACCELEREATOR, TRANSITION AND PATHFINDER
- HORIZON EUROPE EIE. "EUROPEAN INNOVATION ECOSYSTEMS"
- DIGITAL INNOVATION AND SCALEUP INITIATIVE (DISC)
- AI INNOVATION PACKAGE TO SUPPORT ARTIFICIAL INTELLIGENCE STARTUPS AND SMES
- EUROPEAN DIGITAL INFRASTRUCTURE CONSORTIUM (EDIC)

Digital Europe Programme, managed by **DG CNECT** running from 2021 until 2027 with a total budget of 7.6 billion EUR, supports projects in key capacity areas such as: supercomputing, artificial intelligence, cybersecurity, advanced digital skills, and ensuring a wide use of digital technologies across the economy and society.

It supports industry, small and medium-sized enterprises (SMEs), and public administration in their digital transformation with a reinforced network of European Digital Innovation Hubs (EDIH).

The **EIC accelerator**, managed by the European Innovation Council, is established under Horizon Europe programme with a budget of 10.1 billion EUR for the period 2021-2027. It is an accelerator with strong focus on digital (half of the areas supported) with a budget in 2023 of 1.13 billion EUR and in 2024 of 675 million EUR. Support is provided in the form of grants, direct investment, funding challenges, funding projects.

"**European Innovation Ecosystems**" (EIE), part of **Horizon Europe** running for 2021-2027 (budget for 2023-2024 of 107 million EUR), acts in synergy with the European Innovation Council (EIC), European Institute of Innovation and Technology (EIT) and innovative activities across Horizon Europe and other EU funding programmes to improve the overall ecosystem for innovation in Europe. It aims aims to create more connected and efficient innovation ecosystems to support the scaling up of companies, encourage innovation and stimulate cooperation among national, regional and local innovation actors.

Digital startups in the central, eastern and south-eastern Europe (CESEE) regions face an investment gap compared to innovators in other European regions. To address this gap in a geographically targeted way the **digital innovation and scaleup initiative (DISC)** was launched in 2019 by the European Commission in cooperation with several other international institutions such as the European Investment Bank, the European Investment Fund, the European Bank for Reconstruction and Development, and the World Bank Group. Managed in coordination by Digital Europe, DG Connect, and DG RTD, the AI innovation package runs for the period 2024-2027 with a budget of 4 billion EUR. It supports European startups and SMEs in the development of trustworthy Artificial Intelligence (AI) that respects EU values and rules. It is not organised as single programme, but as a number of actions/initiatives. One of the precursor actions is the Large AI Grand Challenge (now closed) providing 1 million EUR for access to HPC computing for AI.

European Digital Infrastructure Consortium (EDIC) is an instrument made available to Member States under the Digital Decade Policy Programme 2030 to speed up and simplify the setup and implementation of multi-country projects. EDICs will enable the achievement of the Digital Decade general objectives and targets. Implementation programmes of the consortia created so far are not on digital skills or scaleups. The only funding initative focussing exclusively on scaleups is the European Tech Champion Initiative (ETCI). ETCI is the first of its kind growth stage fund-of-funds in Europe, whose main goal is to tackle the European scale- up gap. ETCI is a fund of funds with €3.85 billion of capital that will in large-scale venture capital funds, which are expected in turn to provide growth financing to European tech champions in in their late-stage growth phase.

In the earlier mentioned National Digital Decade strategic roadmaps[29], 15 Member States provided a trajectory for the unicorns and innovative scale-ups target[30]. Member States reported in total 100 measures that contribute to this target with a total budget of **EUR 26.4 billion**.
Most of the measures focus on:

ACCESS TO FINANCE

INCUBATION

SPIN-OFFS AND SPIN-OUTS

STARTUP ECOSYSTEMS

FOSTERING TECHNOLOGY TRANSFER

SUPPORTING FRAMEWORK AND REGULATION FOR STARTUPS

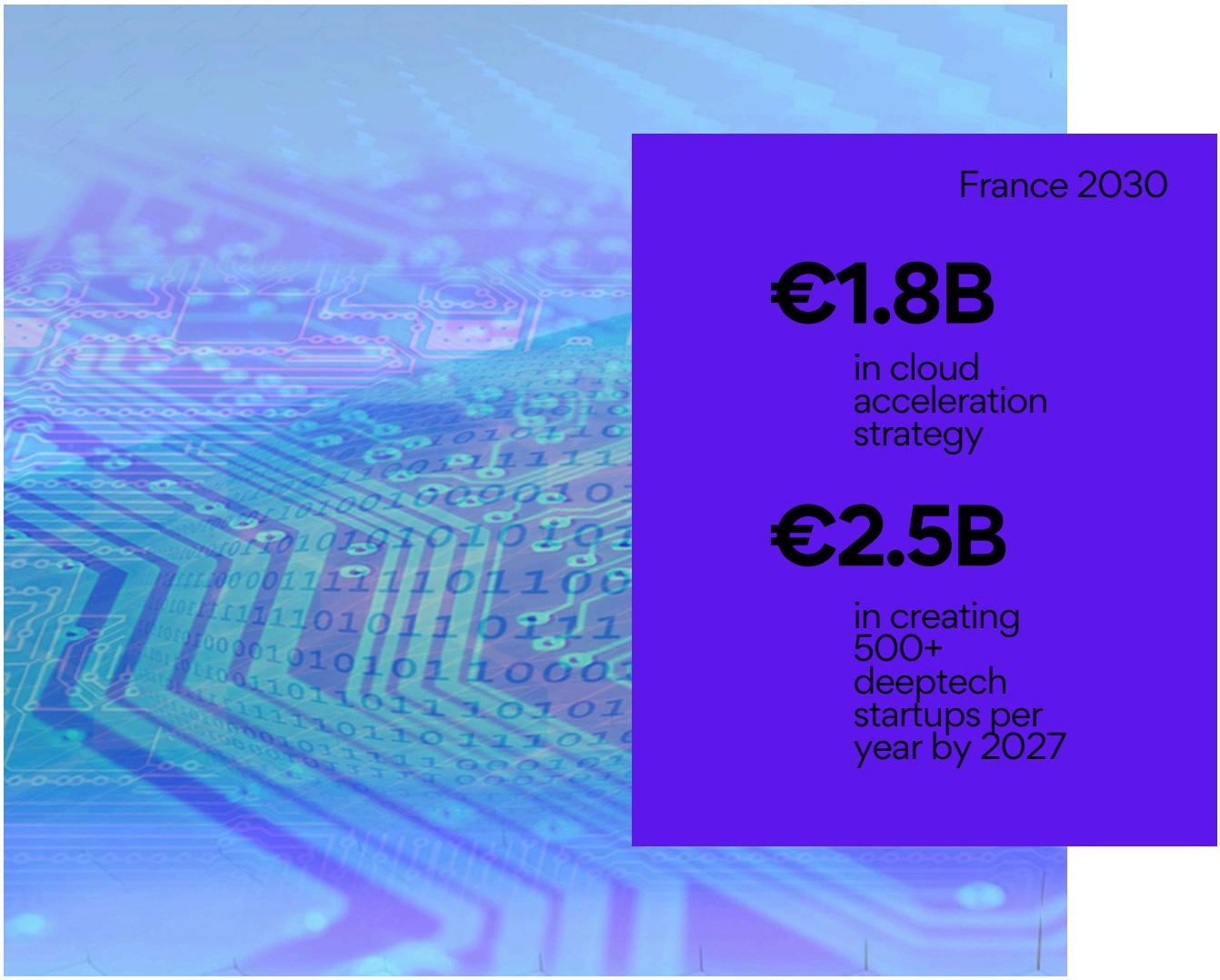
It is our assumption that the vast majority of these measure and expenditure are still just planned, as we did not find evidence of them our survey, which shows fragmentation and little evidence of cross-institutional collaboration.

Most of the funding programmes we identified at national level are, with few exceptions, small in their budget and short in duration. In all countries there is a plethora of accelerators/incubators (especially at local and regional level) providing mentoring, advisory services, work spaces and very little funding. The readers can read the annex to see this aspect. Here we limit ourselves to a few noteworthy exceptions of programmes with a larger scale.

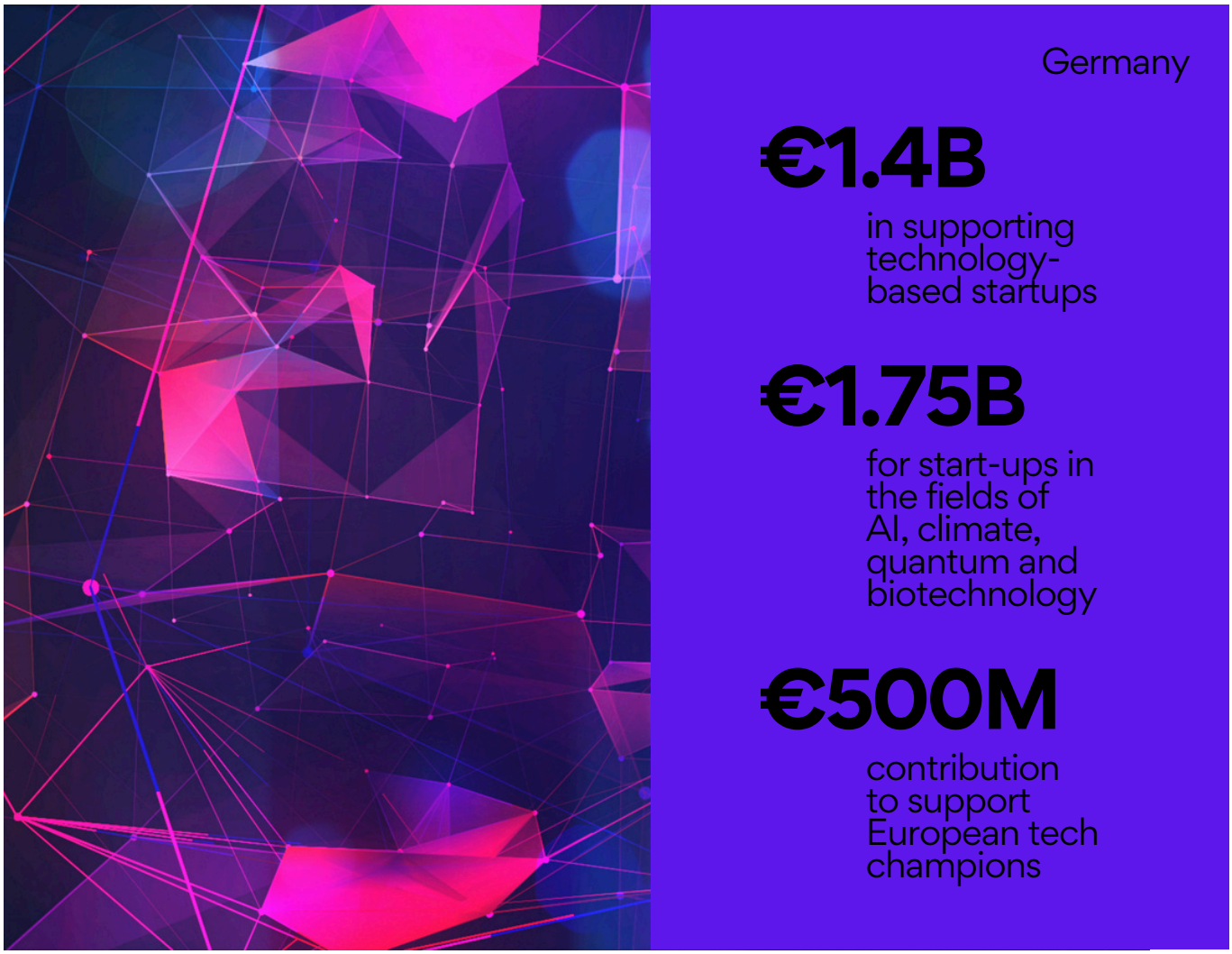
Larger scale programmes can be found in France and Germany.

France 2030, with a budget of 54 billion EUR for the period 2021-2030, is the investment plan of the French government. France 2030 is not focused only on digital initiatives, as they are one element alongside other strategic sectors (energy, automotive, aeronautics and even space). Under France 2030 umbrella the French government also launched its cloud acceleration strategy, with funding of 1.8 billion, including €667 million in public funding, €680 million in private co-financing and €444 million in European funding.

Additionally, Plan Deeptech is a programme of the French government implemented by Bpifrance running from 2019 until 2027 with a budget of 2.5 billion EUR (part of France 2030 budget) . The Plan aims to position France as a major player in disruptive innovation and aims to create more than 500 deeptech start-ups per year by 2027.

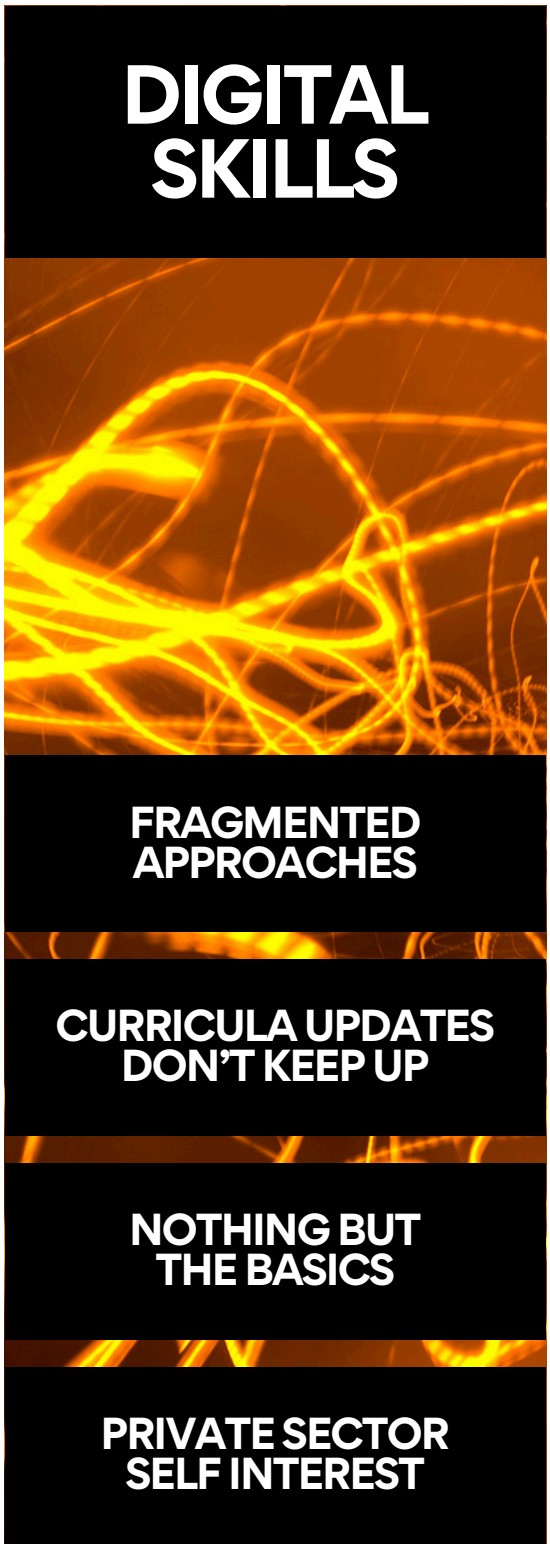


In Germany, High-Tech Gründerfonds (High-Tech Start Up Fund) is a programme managed by the Federal Ministry of Economy and Climate. This fund supports capital-intensive, technology-based startups, including those in digital technologies. It aims to close the financing gap in the early-phase segment for innovative and technology-based startups. The budget is 1.4 billion EUR comprising a combination of public and private capital. Zukunftfonds (Future Fund) is managed by the Federal Ministry of Economy and Climate with a total budget of 12.7 billion EUR. Venture capital fund supporting forward-looking technologies, aiming to provide significant financial backing to innovative startups. Supported by the European Recovery Programme consists of various modules, e.g. the "Wachstumsfond Deutschland", a VC umbrella fund co-funded by private institutional investors (1 billion EUR) for Digital: European Tech Champions Initiative (ETCI): part of the EIF, German contribution; Deep Tech & Climate Fonds (1 billion EUR); Venture Tech Growth Financing (1.3 billion EUR). In 2024 ND additional 1.75 billion EUR was announced for start-ups in the fields of artificial intelligence as well as climate, quantum and biotechnology to strengthen German high-tech companies. The focus with an investment volume of €850 million on AI as well as climate, quantum and biotechnology. A further €500 million has been earmarked as German contribution to support European tech champions. The aim is to prevent successful German and European start-ups from moving to non-European markets.



CRITICAL APPRAISAL

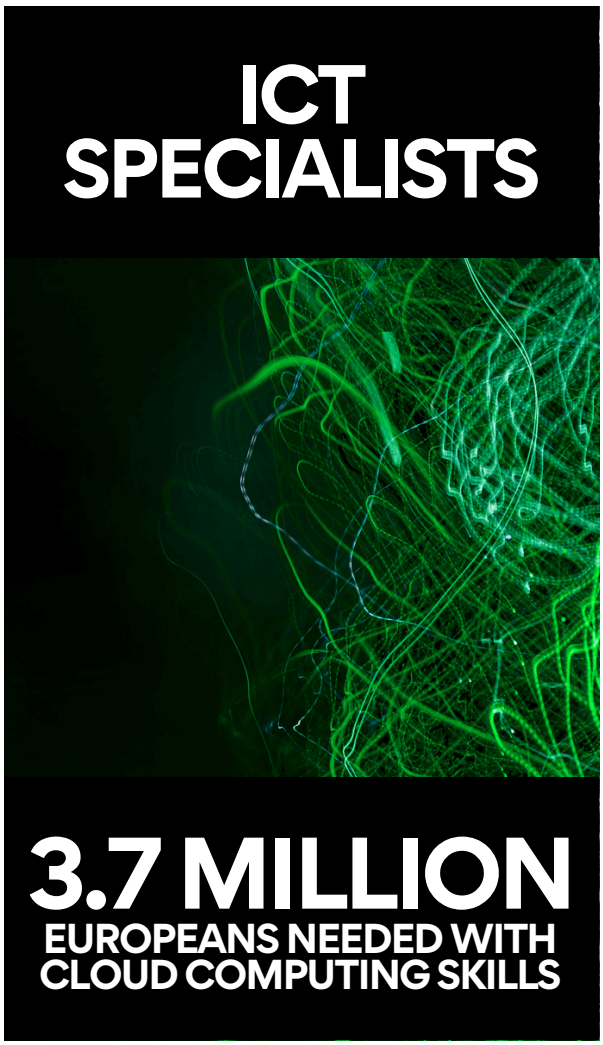
That of digital skills is a multi-faceted challenge that call for an equally multi-faceted approach targeting digital skills in primary, secondary and higher education, vocational Education and training and lifelong learning, as well as focusing on priority or 'hard-to-reach' groups. A number of gaps exist, that neither EU level programme/initiatives nor Member States alone seem to tackle effectively.



First, there is a clear fragmentation across Europe in the approach towards digital competences at primary and secondary level educational systems. Second, on average European institutions at the university educational level for specialised digital skills are slow to change their curricula. When they do, the approach remains very traditional and not adapted to the dynamism of the labour market needs. Third, there is a lack of private sector supply addressing the middle of the digital skills scale. The NGOs initiatives, in fact, mostly target the lower end of very underprivileged groups provided with short crash courses that give them the minimum set of skills to get by in their daily lives. Fourth, the offerings of the tech giants and of other specialised private sector establishments tend to focus more narrowly on their own labour market needs and to be exclusive as attendees need to pay for themselves or be funded. At the EU level there is a plethora of programmes and initiatives that do not seem to be strategically coordinated and coherent. Few programme as just specialised on digital skills, and there is need of more coordination with the educational systems at all level. Member States, on their side, should prioritise investment in digital education and skills in line with the European Council recommendation on improving the provision of digital skills and competences in education and training, including targeted policies for groups most in need including vulnerable groups, the older population, people with little or no formal education, people living in rural areas and people with disabilities

European companies already face increased competition for digitally skilled talent, with more than 60% of EU enterprises that recruited or tried to recruit ICT specialists reporting difficulties in doing so in 2022[31] and significant advanced digital skills gaps in more traditional non-ICT professions. These issues are projected to increase and be exacerbated by the global race for digital talents. For example, the demand for professionals working in AI development and deployment has increased by 33% from 2019 to 2022 in selected OECD countries.[32]

Estimates suggest that, to meet future industry demand of AI skills alone, between 0.5 and 2.8 million Europeans will need to acquire these skills over the next five years, while approximately 1.2 to 3.7 million individuals will be required to gain proficiency in cloud computing skills.[33] There are many and complex drivers behind these shortcomings, including the low number of young people entering science, technology, engineering and mathematics (STEM) or ICT studies, with only 4.2% of all graduates in the EU pursuing degrees in ICT;[34] a shortage of specialised training programmes, misalignment with industry needs and the lack of flexibility of existing learning pathways. Furthermore, the challenges in attracting and keeping women in tech impede the needed increase of EU's workforce in ICT. More diverse teams lead to better decision-making and more innovative products and services, positively impacting the usability of technology for diverse users, including women.

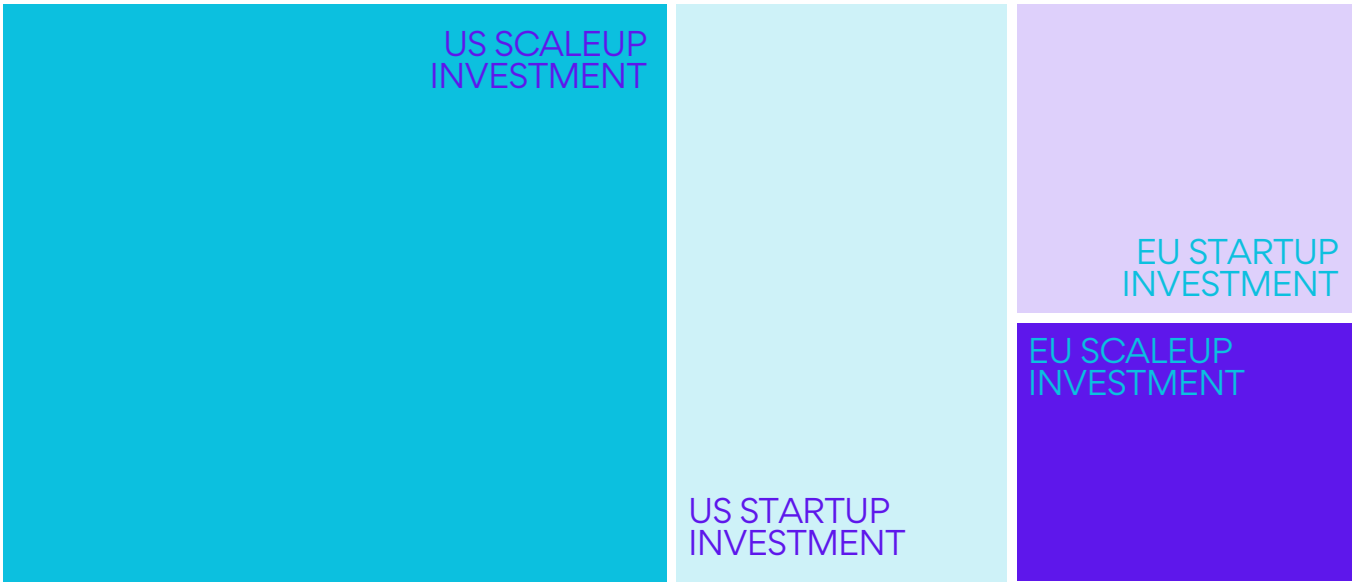


Both at the EU level and at Member States level more efforts should go in the direction of aligning the educational system and also other forms of training with industry needs. Member States should swiftly develop initiatives, strengthen their policy and prioritise action in line with the specific recommendations for addressing the shortage of ICT professionals in the Council Recommendation on improving the provision of digital skills and competences in education and training. They should in particular support early exposure of young people, particularly girls, to STEM, promote VET and lifelong learning in the domain of ICT, increase the academic offer in advanced digital skills, facilitate collaboration among higher education institutions, boost industry integration and foster diversity and inclusion, particularly of women.

In Europe there are examples of good ideas becoming unicorns, such as WeTransfer, Transferwise (Wise), Skyscanner, Klarna, Skype to name just a few. While many startups perish, there is a second valley of death: the scale-up gap. The European market for scale-up financing, however, remains underdeveloped compared to other developed economies, most notably the United States. The volume of scale-up investments has been consistently higher in the US than in the EU over the last decade. In 2023 (year to date, as of mid-September 2023), scale-up investments stood at €108bn in the US but just €25bn in the EU, according to PitchBook data.[35]

US INVESTMENT IN SCALEUPS IS 4.3X THAT OF THE EU

The data is overwhelming: There are, quite simply, at least 7x more large-size (>€600m) VC funds in the US than in Europe. At the level of investee companies, the average VC-backed company in the US receives 5x more backing than its European peers. And looking at the financing in terms of the stage of development, we see that in the US about 2/3 of all VC goes to scale-ups, compared with less than half in Europe.[36] When European companies seek substantial support to scale up and cannot find a partner in Europe, it's hardly surprising that they turn elsewhere, and what we are seeing is a very large number of European companies being bought up by non-European investors, often even re-locating outside of Europe. By the time they reach ten years in operation, European scale-ups raise 50% less capital than their San Francisco peers.[37] This capital accumulation gap persists regardless of industry, year of establishment or business cycle. The scarcity of EU investors that can provide financing at the scale-up phase pushes many EU companies to seek funding abroad and, at exit, look for a foreign buyer or get listed on a foreign stock exchange.[38]



>50% OF US VC FLOWS TO SCALUEPS; EU VC DOES NOT

Closing the gap in finance for scale-up companies is essential for the European Union to maintain its edge in technology and thrive amid the green and digital transitions. European innovators grapple with significant constraints when seeking investment, particularly as they transition from startups to growth-stage ompanies. This often compels promising firms to seek financing abroad, or even relocate their operations overseas. Removing investment barriers and implementing targeted public interventions can generate a virtuous cycle, redirecting investments from institutional investors to this strategic market segment. The public sector can catalyse private investment in innovative firms, particularly at early stages of technological development, and provide diversified funding sources where patient capital is needed. To enhance European competitiveness, EU and national policies should be coordinated within a broader industrial strategy.

Regulatory and legal intervention is needed to deepen capital markets, mobilise private institutional investors towards this strategic segment of innovative firms, and develop a robust ecosystem. Finally, addressing other obstacles to growth – such as updating the EU single market, investing in enabling infrastructure, and tackling skilled labour shortages in innovative sectors – will increase returns on the investments.[39] The lack of take-up of established best policy practices across Member States leads to fewer opportunities for startups to attract and retain talent, access finance or have their innovations procured in public procurement. Also the EU level programmes and fundings is to some extent fragmented and not coordinated as to provide more funding resources. The only exception that we identified is European Technology Champions Initiative (ETCI) provided opportunities to support firms in their crucial scale-up phase. The European Investment Bank (EIB) Group, known for its success in backing innovative companies and scaling up new technologies, can play a catalytic role, contributing to Europe's global competitiveness. The challenging picture for delivering conditions that are conducive to unicorn creation is completed by the suboptimal linkages between EU and national research programmes and programmes (which are critical to support the emergence of national champions from EU-funded innovation programmes), and the insufficient support to stimulate the creation of more spin-offs from universities. Member States should mobilise public policies – especially in the area of tech transfer and the use of the public procurement budget to procure innovations from startups – to foster the scaling up of start-ups and facilitate the creation of spin-offs from universities and research centres. Progress in these areas should be monitored. Member States should introduce or improve policy initiatives that aim to increase the amount and diversity of private capital (for example from national pension funds) available for co-investing in high-growth startups.

CONCLUSIVE CONSIDERATIONS AND RECOMMENDATIONS

First, as shown at the beginning of Section 1, at the current pace the digital skills and ICT specialists Digital Decade targets will not be reached by 2030. Only 59.8% of people aged 16-74 will have at least basic digital skills by 2030, falling short by more than 20 points from the target. And by 2030 there will be only 12 million ICT specialists employed in Europe, which is 8 million short of the target. While the target of 500 unicorns by 2030 may be reached, difference in absolute numbers of EU headquartered unicorns compared to other key countries remains stark, with 263 unicorns in the EU , 387 in China, and 1,539 in the USA by the end of 2023. Despite the efforts made so far, Europe has a still growing digital talent gap and EU unicorn numbers are still far behind those in the US and Asia. So, something more fundamental needs to change. Second, the results of our survey contrast with the analysis of planning documents that we have presented in the second part of Section 1. We have not found implemented yet many of the measures indicated in national roadmaps for digital skills, ICT specialists, and scaleups (unicorns). Neither we have found the planned increased cross-sectorial coordination.

Most interventions are still limited in scale and implemented vertically by silos. On the basis of our analysis we can present the following general conclusions that point out six main problems.

1. First of all **there is far too much fragmentation of tools.** Already at EU level, but also at country level and even more at regional and local level. This leads to relatively small instruments with no critical mass that, thus, achieve limited results.

2. A Second problem is the **lack of alignment between the various levels:** EU, country, region. As a result instruments overlap, or even worse are going in different directions.

3. The Third problem is the **role of governments versus the role of private actors.** This leads to competition, ineffective public instruments, opportunistic use of public instruments, etc.

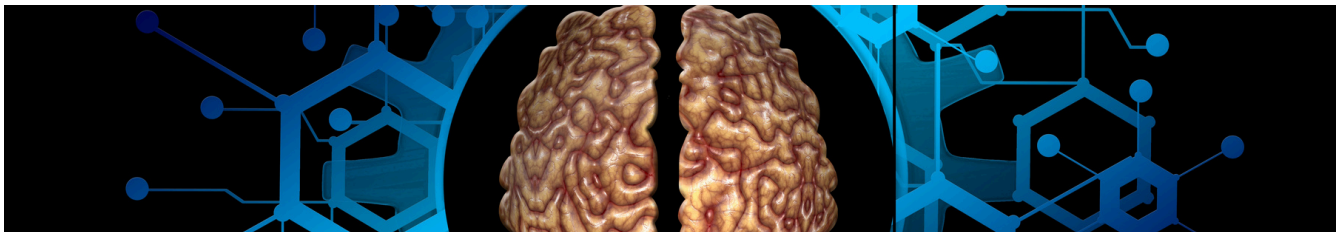
4. Fourth problem is that **government interventions and instruments are policy driven**. They set objectives/targets, without addressing the root causes, which often leads to ineffective instruments.

5. Fifth problem is the **level of expertise in the execution of the public instruments.** It often starts already with their design, done by people that have no real deep domain knowledge other a deep understanding of the dynamics of the sector in which the instruments are supposed to intervene.

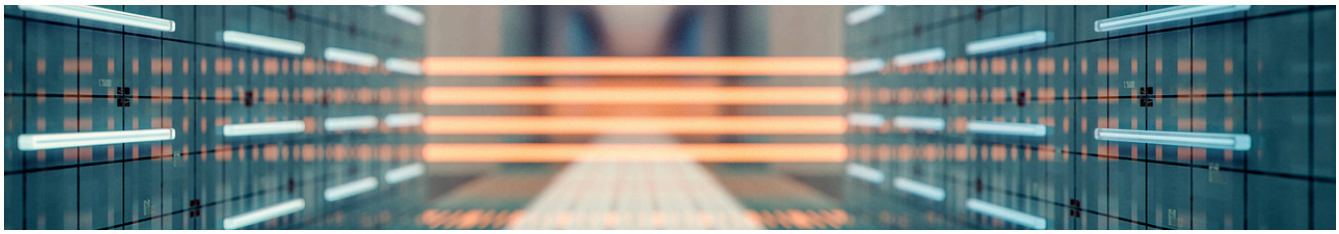
But also the level of expertise in the execution of the instruments. Too often organizations charged with the coordination and partial execution of the implementation of the instruments have much broader objectives (such as RTOs of universities) which diffuses the instruments.

6

The Sixth problem is the **role of private actors in public private partnerships.** Although there are examples of instruments with appropriate coordination partners, unfortunately one often sees the coordination in the hands of public organizations and the the private parties trailing. Partly this is due to state aid rules which make governmental agencies extremely careful in this respect. Unfortunately this of comes with the price of ineffective deployment of the instrument, and consequently underachievement and poor results. Based on analysis presented throughout this report and on the above conclusions two main recommendationds can be formulated with respect to, respectively, digital skills and digital scaleups (unicorns).



With regard to digital skills the recommendation is to mainly focus on alignment of public and private initiatives as well as on alignment of regional, national, and EU instruments. To properly address the shortcomings described above, private industry and public education institutions need to work together in the development and deployment of actions to increase the digital skills levels in industry with the aim to increase productivity. When it comes to the development of actions, this is preferably done at national or even EU level not only to achieve critical mass in development expertise but also to provide harmonized certification and learning outcomes. When it comes to deployment of the actions this is typically done at national or regional level, the latter especially when targeting SMEs. Actions should move away from the more traditional education programs towards more practice oriented education tools like learning communities and training on the job. In addition actions should be sector specific recognizing the fact that different sectors, for example healthcare versus industrial production, require different digital skills. The realization of this could take the form of a new Important Project of Common European Interest on Digital Skills (IPCEI DigiSkills) that relies on pan-EU actions development combined with member states and regional deployment activities. Setting up such a IPCEI DigiSkills enables a wide and inclusive deployment which in needed for a transitional theme like digital skills. Although at a much smaller scale, the portfolio of digital education offerings from EIT Digital, can serve as an initial partial blueprint for such a IPCEI especially when it concerns harmonized certification (EIT Label) and pan-EU digital master programs.



With regards to government support for growing EU startups to global players the focus should be on creating a well-aligned set of successive support instruments that accompany successful EU startups on their growth path both in terms of hands-on support and advice on managing growth as well as investment support. There is an urgent need to simplify and streamline the wide array of support instruments at regional, national, and EU level, since most of these instruments lack critical mass of expertise and finance to create global players. Also simplified access to these instruments is needed to allow a larger number of high potential start-ups to scale up to global players. European technological sovereignty also requires a good balance between public support and private investments in order to assure that EU's and member states' public support and investments in scale-ups leads to strengthening EU economies. Such a balance also requires public support being able to step up in later stages of the growth with more advanced financial support instruments that at the same time avoid issues related to state aid. Given the amounts needed in the later stages of the growth focus on areas strategic for Europe is an absolute must.

ANNEX

5.1 Digital skills: Member States' programmes and initiatives: elected overview

5.2.1 FINLAND

Jatkuvan oppimisen digitalisaatio –ohjelman jatkuvan oppimisen digitaalinen palvelukokonaisuus (Digital Service Framework for Continuous Learning in the Digitalization of the Continuous Learning Program, Ministry of Education). The goal of the comprehensive digital services for continuous learning is to develop services that support individuals in making educational and career choices, maintaining and enhancing their skills throughout their working lives and beyond, as well as to improve the matching of labor market demand and supply with education and training opportunities.[51] Budget 32 Million EUR. Digituen valtakunnallinen vakiinnuttaminen (National establishment of digital skills, Ministry of Finance). The Ministry of Finance has granted the Digital and Population Information Agency 1.8 million euros for the development and piloting of a national digital support operating model for the year 2022. The funding was granted from the program for the promotion of digitalization, one of the goals of which is to expand digital support's national operating model to also cover the development of digital supports engaged in business activities.[52]

5.2.2 FRANCE

Compétences et Métiers d'Avenir (CMA, skills and jobs of the future). This programme is managed by the Agence Nationale de la Recherche (National Research Agency) with a budget of 700 million EUR.[53] In addition to having to support the transition of professions, with millions of workers to be trained by 2030, the program aims to ambition to help train 400,000 people per year by 2030 and 1 million new graduates by 2030, at the levels of operators, technicians, assistant engineers, engineers, masters, doctorates, and mainly in the field of STIM (Science, technology, engineering, mathematics). So, digital technology and skills are only one component.

Le Programme Avenir. This programme is managed by the Office National d'Information sur les Enseignements et les Professions (ONISEP, National Information Office on teaching and professions).[54] It runs from 2023 until 2025, and in 2023 it had a budget of 23 million EUR. The programme aims provide each pupil and student (in primary and secondary education) with a portfolio of skills and diplomas, making it easier to pursue lifelong learning and move around Europe. It is not focussed only on digital skills, which are one of the subjects included.

Territoires Numériques Éducatifs (TNE - Digital Educational Territories). The national strategy to accelerate the integration of education and digital technology is one of the cornerstones of the 4th Programme d'Investissement d'Avenir (PIA4). Part of this strategy has resulted in the launch of an innovative and pragmatic project: the Territoires Numériques Éducatifs (TNE - Digital Educational Territories)[55]

ANNEX

5.2.3 GERMANY

Digitaler Bildungsraum – Nationale Bildungsplattform (Digital Education Space – National Education Platform). The Federal Ministry of Education and Research is responsible for this programme launched in 2022 with a budget of 2.2 billion EUR. Part of Germany's Recovery and Resilience Plan, it setup a digitized learning platform by linking existing and creating new platforms, forming a nationwide system. The focus is on digital skills. Similar programmes are run in the federal states of Lower Saxony and Thuringia.[56]

Digital Bonus Bayern (Digital Bonus Bavaria). Run by the Bavarian Ministry of Economy, it has a budget of 105 million EUR for the period 2024-2027. It supports digitalisation and IT security of SMEs (< 50 employees), also by training courses for employees.[57]

Förderung der digitalen Ausstattung in überbetrieblichen Berufsbildungsstätten (ÜBS) und Kompetenzzentren (Promotion of digital equipment in inter-company vocational training centres and competence centres). Managed by the Federal Ministry of Education and Research (BMBF) for the period 2018-2025 with a budget of €224 million, it supports the digital skills of companies employees through inter-company vocational training centres and also through competence centres. The programme enabled over 200 ÜBS locations to acquire approximately 61,000 digital items, including robots, VR glasses, and simulators, to modernize their workshops and learning environments[58]

Berufsbildung 4.0: InnoVET - Innovationen für eine exzellente berufliche Bildung (Vocational training 4.0: InnoVET - Innovation competitions for excellent vocational trainings). Managed by Federal Ministry of Education and Research for the period 2020-2028 with a budget of 74 million EUR. InnoVET (2020-2024) and InnoVET PLUS (2024-2028) create new structural concepts that make vocational training future-proof and underline the equivalence of dual and academic education. The 17 InnoVET alliances launched in autumn 2020 are developing and testing attractive qualification offers for vocational training that create incentives for young people to start training or further education. The qualification offers are based on the needs of companies and help to train highly qualified specialists. InnoVET (2020-2024): Relevant actors in vocational training have joined forces in 17 projects with a total of 89 partners: vocational schools, companies, inter-company vocational training centres (ÜBS), education centres, advisory institutions, research institutions and universities are represented. After the funding period has ended, the project results should be able to be established in the vocational training system. The transfer of knowledge and results is therefore of particular importance. Example: KI B³ - Bringing artificial intelligence into vocational training (https://www.inno-vet.de/innovet/de/die-projekte/alle-projekte-von-a-bis-z/ki-b): The project develops three new educational qualifications as additional qualifications (ZQ) and at DQR levels 5 and 6, which integrate the topic of artificial intelligence into vocational training and further education.[59]

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Berufsbildung 4.0: INVITE - Wettbewerb für einen innovativen digitalen Weiterbildungsraum (Vocational training 4.0: INVITE - Competition for an innovative digital education space). Managed by Federal Ministry of Education and Research for the period 2021-2025 with a budget of 88 million EUR.[60] 35 winning projects (including meta projects) innovative developments that make it possible for everyone to find the digital training that suits them and their situation as quickly and easily as possible.

Nationale Weiterbildungsstrategie (National Continuing Education Strategy). Main responsible/coordinating body is the "Bundesministerium für Digitales und Verkehr (BMDV) "(the Federal Ministry for digital and traffic).[61] This is a comprehensive initiative in Germany aimed at strengthening continuing education and lifelong learning. One of its goals is to enable more people to participate professionally in the digital transformation Its key partners are Federal government (led by the Federal Ministry of Education and Research and the Federal Ministry of Labour and Social Affairs), state governments, Business associations, trade unions, and the federal employment agency.

Digitalstrategie 2025 (Digital Strategy 2025). Adopted in 2016, this strategy outlines Germany's priorities for digital transformation, including: Ensuring every school pupil has basic knowledge in information science, algorithms, and programming by 2025; Providing fast internet connections and efficient digital learning infrastructure to around 43,000 schools; Supporting universities, companies, and adult education institutions in offering digital training and ensuring educators are well-qualified.

Digital Jetzt (Digital Now). This grant-funding program, managed by Federal Ministry of Economy and Climate,[62] supports medium-sized companies, including craft businesses and freelancers, in investing in digital technologies and enhancing the digital skills of their employees. It aims to make it easier for these companies to implement digitization projects.

5.2.4 ITALY

Sicilia Digitale (Digital Sicily). This project is part of the programme Fondo Per la Repubblica Digitale (Fund for the Digital Republic, managed by the Ministry of technological innovation and by the Ministry of finance. The project runs for the period 2022-2026 with a budget of 350 million EUR.[63] The objective is to support initiatives, selected through calls for tenders, aimed at digital training and inclusion, to increase digital skills and develop the country's digital transition and improve the corresponding indicators of the Digital Economy and Society Index (DESI).

Alfabetizzazione mediatica (Media literacy). The strategic objective of the intervention is to select, finance and promote digital and media literacy projects of a communicative and educational nature in favour of minors, also of an innovative nature, which focus on at least one of the following lines of intervention: prevention of cyberbullying, support for parenting, protection of minors on the web, development of digital knowledge.[64] The initiative was launched by the Ministry of Enterprise and Made in Italy with a budget of 1,7 million EUR.

ANNEX

Digital Transformation. Digital Transformation is the incentive that encourages the technological and digital transformation of the production processes of micro, small and medium-sized enterprises, through the application of advanced technologies envisaged under Impresa 4.0 and those related to digital technological solutions in the supply chain.[65] The facilities are aimed at micro, small and medium-sized enterprises, even in aggregate form, in which a DIH (Digital Innovation Hub) or an EDI (Digital Ecosystem for Innovation), as referred to in the Impresa 4.0 national plan, is the lead promoter. The programme is administered through call for tenders (budget 100 million EUR) by Invitalia (the National Agency for Inward Investment and Economic Development. It is owned by the Italian Ministry of Economy).

Bando Digitale Sociale (Digital Social Tender). Part of the earlier cited Fund for the Digital Republic, managed by the Ministry of technological innovation and by the Ministry of finance, these call for tenders aims at empowering citizens with digital skills (15 million EUR of budget).[66]

Voucher consulenza innovazione (Innovation Consulting Voucher). Managed by the Ministry of Enterprise and Made in Italy with a budget of 75 million EUR.[67] It supports the processes of technological and digital transformation of SMEs and business networks throughout the country through the introduction of managerial figures capable of implementing the enabling technologies envisaged in the Impresa 4.0 National Plan.

5.2.5 THE NETHERLANDS

Development of digital skills is an integral part of the charter of the following ministries: OCW (https://www.rijksoverheid.nl/ministeries/ministerie-van-onderwijs-cultuur-en-wetenschap), SZW (https://www.rijksoverheid.nl/ministeries/ministerie-van-sociale-zaken-en-werkgelegenheid), BZK (https://www.rijksoverheid.nl/ministeries/ministerie-van-binnenlandse-zaken-en-koninkrijksrelaties), and
EZ (https://www.rijksoverheid.nl/ministeries/ministerie-van-economische-zaken).
In addition, the following two programmes could be identified:

HCA ICT. In the national human capital agenda ICT education institutions, government and industry work together with the aim to have 1 million ICT professionals by 2030.[68]

Project Beethoven. Under the name 'Project Beethoven', the national government and the region have worked on an extensive package of measures to support the Dutch semiconductors industry. One of the support areas is talent development: The earmarked investment for this is €450 million up to and including 2030 and then €80 million structurally per year to make sure sufficient talent is available for the sector.

5.2.6 POLAND

Knowledge Education Development Programme - Poland. Programme managed by the Ministry of Development Funds and Regional Policy for the period 2014-2024 with a total cumulated budget of 1.2 billion EUR. The programme aimed at enhancing digital competences in higher education.

ANNEX

5.2.7 ROMANIA

Planul Național de Cercetare Dezvoltare și Inovare 2022-2027 (PNCDI IV) (National Research Development and Innovation Plan 2022-2027 (PNCDI IV) - Romania). Managed by the Ministry of Research, Innovation and Digitization for the period 2022-2027.[69] PNCDI IV aims to create the premises for ensuring the framework for investments in RDI, encouraging partnerships between public and private actors in order to transfer research results to the market, stimulating institutional performance and international collaborations.

5.2.8 SLOVAKIA

Slovakia's Recovery and Resilience Program. The Slovakian government for the period 2021-2026 will invest 102 million EUR for digitalisation. An investment from the Recovery Fund for Slovakia will help businesses with their digitalisation through a network of digital innovation hubs to assist them in digitalising business processes and provide trainings in digital skills.

5.2.9 SPAIN

Educa en Digital (Digital Education). The programme is part of Spain Agenda 2025, funded through the European Regional Development Fund (ERDF). "Educa en Digital" is a Spanish initiative supporting the digital transformation of the education system[70], launched in response to the challenges faced during the COVID-19 pandemic. It provides vulnerable students with devices and connectivity, improves digital resources, enhances teachers' digital skills, and integrates AI for personalized education. The program focuses on pre-university students in publicly funded schools and aims to improve access to online education and technology. It run from 2020 to 2024 with a budget of 263 million EUR.

Plan Nacional de Competencias Digitales (National Plan for Digital Skills). It is part of the Recovery and Resilience Plan, managed by the Spanish Government. National program aimed at closing the digital skills gap, offering educational initiatives across different levels.[71] It run from 2021 until 2023 with a budget of 3.7 million EUR.

5.2.10 SWEDEN

ändrades högskolelagen (Higher Education Act). The implementation of the Act is the responsibility of the Ministry of Education. The Higher Education Act has been amended to include a requirement for institutions to promote lifelong learning.[72] Funds have been allocated to higher education institutions to develop training programmes for lifelong learning. The provisional timetable for these actions is from 2022 to 2024. The state budget has allocated approximately €21.8 million per year in 2022 and 2023, with estimated resources for 2024. Overall, these actions aim to increase opportunities for continuous training and retraining to meet the demands of the labour market with a special focus on digital skills.

Cybercampus Sverige (Cybercampus Sweden). Also the responsibility of the Ministry of Education, a Cybercampus Sweden is established to strengthen both skills supply and research in cybersecurity.[73] It has a yearly budget of 3 million EUR.

KK-stiftelsen (The Knowledge fundations)[74]. Since 1994 KKS is primarily funded by an initial endowment provided by the Swedish government. This endowment was established when KKS. The foundation operates independently and uses the returns generated from this endowment to fund its activities. It supports eight programmes. The universities can use the programmes strategically to develop their operations in the long term and build strong research and educational environments that create value for academia as well as business and society. Digital skills are one of the programme.

Utbildningsdepartementet (Ministry of Education and Research). This ministry allocates significant portions of its budget to universities for education and research in STEM areas. These funds are intended to support both undergraduate and graduate programs, ensuring that institutions can maintain high standards of education and research.[75]

5.3 Scaleups and unicorns: EU level programmes/initiatives

Digital Europe Programme. Managed by DG CONNECT, runs from 2021 until 2027 with a total funding of 7.6 billion EUR [76]. The Digital Europe provides strategic funding to answer challenges of digital transformation and innovation, supporting projects in key capacity areas such as: supercomputing, artificial intelligence, cybersecurity, advanced digital skills, and ensuring a wide use of digital technologies across the economy and society. It supports industry, small and medium-sized enterprises (SMEs), and public administration in their digital transformation with a reinforced network of European Digital Innovation Hubs (EDIH).

EIC Accelerator, Transition and Pathfinder. Managed by the European Innovation Council (EIC), runs from 2021 until 2027 with a total funding of 10.1 billion EUR [77]. The European Innovation Council (EIC) has been established under the EU Horizon Europe programme. It has a budget of €10.1 billion to support game changing innovations throughout the lifecycle from early-stage research to proof of concept, technology transfer, and the financing and scale up of start-ups and SMEs. It is an accelerator with strong focus on digital (half of the areas supported) with a budget in 2023 of 1.13 billion EUR and in 2024 of 675 million EUR. Support is provided in the form of grants, direct investment, funding challenges, funding projects.

Single Market Programme. Managed by DG GROW, runs from 2021 until 2027 with a total funding of 4.2 billion EUR [78]. "The Single Market Programme (SMP) is the EU funding programme to help the single market reach its full potential and ensure Europe's recovery from the COVID-19 pandemic. With €4.2 billion over the period of 2021-2027, it provides an integrated package to support and strengthen the governance of the single market. The Single Market Programme (SMP) will provide various forms of support to businesses, in particular SMEs. We aim to boost their competitiveness and sustainability, including in the tourism sector. In particular it aims to: facilitate access to markets; promote entrepreneurship and the acquisition of entrepreneurial skills; promote the modernisation of industry and address global and societal challenges. Digital technologies are included but are only one component among other areas of investments.

Horizon Europe EIE. "European Innovation Ecosystems" (EIE), part of Horizon Europe running for 2021-2027 (budget for 2023-2024 of 107 million EUR), acts in synergy with the European Innovation Council (EIC)[151], European Institute of Innovation and Technology (EIT) and innovative activities across Horizon Europe and other EU funding programmes to improve the overall ecosystem for innovation in Europe79. The EU aims to create more connected and efficient innovation ecosystems to support the scaling up of companies, encourage innovation and stimulate cooperation among national, regional and local innovation actors. The areas of intervention includes: builds interconnected, inclusive innovation[152] ecosystems across Europe by drawing on the existing strengths of national, regional and local ecosystems and pulling in new, less well-represented actors and territories to set, undertake, and achieve collective ambitions towards challenges for the benefit of society, including the green, digital, and social transitions; reinforces network connectivity within and between innovation ecosystems to accelerate sustainable business growth with high societal value[153]; supports the European Partnership for Innovative SMEs (Eurostars 3); complements the European Regional Development Fund support for innovation ecosystems and interregional partnerships around smart specialisation topics. It contributes to all 3 key strategic orientations of the Horizon Europe strategic plan. It also supports the New European Innovation agenda, particularly flagships 2 (Enabling innovation through experimentation spaces and public procurement to facilitate innovation through improved framework conditions including experimental approaches to regulation such regulatory sandboxes, test beds, living labs and innovation procurement). and 3 (Accelerating and strengthening innovation in European Innovation Ecosystems across[154] the EU and addressing the innovation divide to support the creation of regional innovation valleys and help Member States and regions direct at least €10 billion to concrete interregional innovation projects, including in deep-tech innovation for key EU priorities. It will also support Member States to foster innovation in all regions through the integrated use of cohesion policy and Horizon Europe instruments).

Digital innovation and scaleup initiative (DISC). Digital startups in the central, eastern and south-eastern Europe (CESEE) regions face an investment gap compared to innovators in other European regions. To address this gap in a geographically targeted way the digital innovation and scaleup initiative (DISC) was launched in 2019 by the European Commission in cooperation with several other international institutions such as the European Investment Bank, the European Investment Fund, the European Bank for Reconstruction and Development, and the World Bank Group80. 46% of startups incubated in the Central, Eastern and South Eastern Europe (CESEE) region raise financing from investors outside of Europe and move their base, most often leaving to the US and China. This highlights the substantial investment gap faced by digital innovations, a major bottleneck for startups, and the digital economy, in reaching full potential. The DISC initiative is setting up the first regional investment facility that specifically targets digital innovations and the scale-up of digital startups in the region. DISC's targeted financing tools are tailored to both the early stage and the scale-up phase of digital startups, which require riskier financing and are underserved by the traditional finance sector. DISC also offers a technical assistance programme with the goal to strengthen the institutional capacity of public agencies to design, develop and implement digital innovation programmes. Finally, DISC will boost investment in the enabling environment for innovation and entrepreneurship, with a focus on cross border digital infrastructure and digital skills projects.

AI innovation package to support Artificial Intelligence startups and SMEs. Managed in coordination by Digital Europe, DG Connect, and DG RTD, it runs for the period 2024-2027 with a budget of 4 billion EUR81. It supports European startups and SMEs in the development of trustworthy Artificial Intelligence (AI) that respects EU values and rules. It is not organised as single programme, but as a number of actions/initiatives. One of the precursor actions is the Large AI Grand Challenge (now closed) providing 1 million EUR for access to HPC computing for AI82.

European Digital Infrastructure Consortium (EDIC). EDIC is an instrument made available to Member States under the Digital Decade Policy Programme 2030 to speed up and simplify the setup and implementation of multi-country projects. EDICs will enable the achievement of the Digital Decade general objectives and targets. Implementation programmes of the consortia created so far are not on digital skills or scaleups.

European Tech Champions Initiatives (ETCI). ETCI has been launched on 13 February 2023 with European Investment Bank (EIB) Group resources alongside contributions from Germany, France, Spain, Italy, Belgium,[151] the Netherlands83. It builds on the European Investment Fund (EIF)'s extensive work in the venture capital markets in Europe, which has been made possible using EIB resources and it is This is the first of its kind growth stage fund-of-funds in Europe. ETCI is a fund of funds with €3.85 billion of capital to tackle the European scale-up gap. It invests in large-scale venture capital funds, which are expected in turn to provide growth financing to European tech champions in in their late-stage growth phase. ETCI plans to to[152] make 10-15 investments in large VC funds of approx. € 1 billion. In doing so, ETCI seeks to mobilise more than € 10 billion of investments in innovative companies in their growth stage. Boosting funding for promising high-tech companies that to raise amounts of over €50 million to compete on a global scale whilst staying in Europe.

EIT Digital Business Creation Programme. Managed by EIT Digital in the period 2021-2024 with a budget of 17 million EUR.

5.4 Scaleups and unicorns: Member States programmes/initiatives

5.4.1 ESTONIA

Ajujaht (Brain Hunt). Managed by Civitta, ERR, and Optimist, it is being run in 2024 with a budget of 0,3 million EUR84. "Ajujaht is the best-known startup accelerator in Estonia. Teams participating in the Ajujaht competition have the opportunity to make their product or service ready for scaling and investment. The accelerator programme is based on 15 years of experience and focuses on the elements that startups need most in their initial phase. The Ajujaht competition involves a TV show consisting of eight episodes, which monitors the development of the teams during the accelerator programme and introduces the startups to the Estonian public, so it's also run a great platform for raising awareness about products.

Prototron. It is run in collaboration by Swedbank Estonia, TalTech, Technopol and the city of Tallinn85. The Prototron acceleration programme was created to help turn smart and innovative ideas into tangible prototypes to grow into major businesses. Equally important to the €35,000 funding is the mentoring, training, and useful contacts made during the Prototron programme. Applicants may be individuals as well as businesses with ideas from all the technical verticals. Selected teams learn about financing, intellectual property, prototyping, communication and sales. Teams get mentoring sessions with field experts and investors, followed by a pitch-training and invest-readiness programme.

Startup accelerator. Managed by Technopol, it offers the best and highest-quality program in the region, along with expert advice for growing your startup. Ten carefully selected companies are admitted to the 6-month accelerator funding86.

5.4.2 FINLAND

DEEP TECH ACCELERATOR. Managed by Business Finland87, Deep Tech Accelerator funding is targeted at startups less than five years old that have already launched their operations and have been founded to commercialise the latest research results and know-how.
Kasvun kiihdyttämisohjelma yritysten kansainvälistymisvalmiuksien kehittämiseen (Growth acceleration program for developing companies' internationalization capabilities). Managed by ELY-keskus88, The aim of the funding call is to promote the growth and internationalization capabilities of micro and small enterprises (companies with fewer than 50 employees). The funded projects specifically focus on advancing the use of digital technology and methodologies in the business operations and internationalization efforts of small companies. Yearly budget 4.6 million EUR.
Matkailualan kestävä ja digitaalinen kasvu (Sustainable and digital growth in the tourism industry). Managed by Business Finland with a budget of about 11 million EUR for the period 2021-202489, the goal of the investment is to develop Finland's tourism businesses and regions by promoting sustainability in operations and enhancing the monitoring and evaluation of tourism development, as well as the sales of tourism services, particularly in a digital environment.
AI Business Program. Managed by Business Finland with a budget of about 100 million EUR for the period 2018-202190, AI Business was targeted at startup, SME, Midcap and large companies registered in Finland, and Finnish research organizations. Companies could apply for funding for their own development project or joint-project with other companies and research organizations.
Data economy. Managed by Business Finland with a budget of about 135 million EUR for the period 2024-2027, the goal of the Data Economy program is to encourage Finnish companies to develop international business based on the utilization and sharing of data. The program will continue until the end of 2027 and its goal is to accelerate challenging development projects related to the data economy with up to 135 million EUR.
European Digital Innovation Hub (EDIH) Finnish AI Region. A project funded/managed by EU, Business Finland, City of Helsinki with a budget of about 3.2 million EUR for the period 2022-202591, The Finnish AI Region, or FAIR, offers businesses low-threshold expertise in artificial intelligence, augmented reality, high-performance computing, and cyber security. Most of our services are free of charge.
European Digital Innovation Hub (EDIH) Robocoast. A project funded/managed by EU, Business Finland, City of Helsinki with a budget of about 3 million EUR for the period 2023-2025, European Digital Innovation Hub (EDIH Finnish AI) Region. A project funded/managed by EU, Business Finland, City of Helsinki with a budget of about 3.2 million EUR for the period 2022-2025.
AI Finland. A project by Teknologiateollisuus with a budget of about 13 million EUR for the period 2025-2027. Technology Industries of Finland decided in November 2023 to invest ten million euros in accelerating the utilisation of AI in Finland. This investment aims to increase the uptake and development of AI at Finnish technology companies, bolster applied research and attract AI experts to Finland.

5.4.3 FRANCE

France 2030. With a budget of 54 billion EUR for the period 2021-2030, This is the investment plan of the French government92. France 2030 investment plan aims to sustainably transform key sectors of the national economy through technological innovation. 54 billion euros will be invested to ensure the transition of strategic sectors (energy, automotive, aeronautics and even space) and enable them to respond to technological and environmental challenges in a competitive manner. So, it is not focussed only on digital technologies. Piloted by the Secrétariat général pour l'investissement on behalf of the Prime Minister and operated by l'Agence de la transition écologique (ADEME), l'Agence nationale de la recherche (ANR), Bpifrance and Banque des Territoires.
Stratégie d'accélération cloud France 2030 (Cloud Acceleration Strategy)93. On 2 November 2021, the French government unveiled its cloud acceleration strategy, with funding of 1.8 billion, including €667 million in public funding, €680 million in private co-financing and €444 million in European funding. The strategy is part of the France 2030 framework.

Plan Deeptech. It is a programme of the French government implemented by Bpifrance running from 2019 until 2027 with a budget of 2.5 billion EUR (part of France 2030 budget). The Plan aims to position France as a major player in disruptive innovation and aims to create more than 500 deeptech start-ups per year by 2027.
Paris&Co. Run by the city of Paris, Paris&Co is the economic development and innovation agency of Paris. It is also a network of European incubators and startups which offers 12 sectoral incubators (circular economy, real estate, logistics & mobility, tourism, sport, export, agri-food, health & well-being, cultural and creative digital industries, publishing, finance, HR, e-sport)95.
ParisTech entrepreneurs. Run by Telecom Paris Tech, ParisTech entrepreneurs is the incubator of the engineering school specializing in digital technology Télécom ParisTech. The incubator has structured and supported innovative digital projects in France since 1999 and offers project leaders a rich incubation service. This personalized support takes place over 18 months, provides easy access to support organizations, innovation, financing as well as the ParisTech network (researchers and laboratories, former students and young graduates).
Incubateur Agoranov (Agoranov Incubator). Managed by Ministère de l'Enseignement supérieur et de la Recherche (Research and higher education Ministry), Agoravnov is a public incubator, expert in Deeptech, which supports innovative projects in the fields of Industries/Greentechs, Digital and Health97. In addition to complete accommodation (open space, laboratories, convivial spaces, etc.), entrepreneurs benefit from tailor-made support with a dedicated business manager and participate in an acceleration program led by a network of experts. Project leaders benefit from Agoranov's rich ecosystem, whether through its community of alumni (Doctolib, Critéo, etc.) or through its close links with investors and public research institutions. Agoranov has incubated more than 400 projects, which have created more than 7,500 jobs and raised a total of more than a billion euros in private funds. 5 companies from Agoranov are today listed on the stock exchange (1 NASDAQ and 4 Euronext).

LeHub. Managed by Bpifrance, LeHub through a hands-on approach (Pre-Revenue, Seed and Series A) and on-demand expertise (Late Series B and Large Enterprise), aims to bring impactful, lasting improvements to businesses and help them achieve their next milestones relevant operational requirements, whether it's organic growth or an upcoming round of financing.

Clermont Auvergne Innovation. This is the innovation programme of the Région Auvergne Rhône Alpes99. As a valorisation subsidiary of Clermont Auvergne University and INRAe, CAI's mission is to ensure the interface between the university's research laboratories and the economic world by simplifying and accelerating collaborations and their added value. It allows companies to have agile access to the assets and skills of the scientific community, ensures the detection and maturation of innovative solutions resulting from research work, up to the creation and acceleration of Deeptech start-ups.

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EuraTechnologies. This is the innovation programme of the Région Hauts de France100. Created in 2009 by the European Metropolis of Lille, the Hauts-de-France Region and the City of Lille, EuraTechnologies is one of the largest startup incubators in Europe. A precursor of French Tech, EuraTechnologies welcomes 200 startups each year in 7 verticals: PropTech, Retail/Ecommerce, FinTech/InsurTech, Cybersecurity, AgTech/GreenTech, EdTech/HRTech, Industries/Robotics/SpaceTech.

Incuballiance. This is the incubator programme of Paris Saclay. Paris-Saclay deeptech incubator createdin 2000 by higher education schools, research institutions and corporate industries present on the territory. Major incubator on the plateau de Saclay cornerstone area for deepthech in the Région Île de France. Major on Health, Energy, Enterprise Software, Semiconductors, Transportation, Robotics, and Security.

Normandie Incubation. This is the incubator of Région Normandie. Free program funded by the Normandy Region, the Ministry of Higher Education, Research and Innovation. Main areas: Health, Enterprise Software, Food and Home Living.

Incubateur Provence Côte dPACA-EST. This is the incubator managed by Université Côte d'Azur, l'Université de Toulon, Inria. the Provence-Côte d'Azur Incubator advises innovative entrepreneurs in the Maritime Alps and the Var. It detects, selects, advises, supports and finances entrepreneurs in the emergence of their business, from the project to registration, the signing of the first clients and the constitution of an entrepreneurial team and, if necessary, the preparation of a fundraiser. It does not take any shares in the capital of the companies supported. Founded by Université Côte d'Azur, the
University of Toulon and Inria, the association is a public research incubator supported by the Ministry of
Higher Education and Research which brings together most of the research players , innovation and economic development. It has a main focus on deeptech.

Paris Biotech Santé. It is an incubator created in 2000 by PARIS CITE University, ESSEC, CENTRAL SUPELEC and INSERM, selects and supports ten new innovative projects and companies per year, in the exclusive field of human health: medicines, medical devices, e-health, AI104. Since 2022, the incubator is supported by the Ministry of Higher Education, Research and Innovation, the City of Paris and the Ile de France Region.

Scal'E-nov. Scal'E-Nov is the start-up accelerator in the Grand Est Region, created at the initiative of the Grand Est Region, with the support of the CCI Grand Est and Bpifrance, and in collaboration with its private partners105. It is supported by Grand E-nov+, the Regional Innovation and International Prospecting Agency of the Region Grand Est. Main areas: Health, Wellbeing & beauty, job recruitment, food, transportation and enterprise software.

BIC Montpellier (Montpellier business and innovation centre). The Business and Innovation Centre - BIC - in Montpellier is an incubator dedicated to supporting innovative projects.

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Dedicated to young start-ups with high growth potential, since 1987 it has offered high-level expertise which allows their managers to benefit from support which maximizes their chances of success106. Awarded numerous times for its tools and support programs, including internationally, it actively contributes to the birth of tech champions in the Montpellier metropolitan area, in the fields of digital, health, environment, ENR or even sustainable agronomy. It is in In the top 5 of public incubators worldwide with 90% startups still in business after 3 years.

Incubateur Belle de Mai. It is the incubator of the Région Sud Investissement. Created in 1999, the Belle de Mai Incubator is a thematic incubator with a team fully invested alongside project leaders, entrepreneurs, future startuppers. Leading them towards the creation of their innovative business and supporting them towards growth is the incubator's mission. Main areas: Media, Transportation, Education, Fintech, Sports and Enterprise Software.

Pulsalys. This is incubator and accelerator of deeptech innovations in Lyon & Saint-Etienne, builds the innovative products and services of tomorrow, by transforming scientific discoveries from the laboratories of the University of Lyon into economic opportunities for companies and startups108. Created in December 2013 as part of the Future Investment Program (PIA) under the status of Technology Transfer Acceleration Company (SATT), PULSALYS has become in a few years a key player in attractiveness and development economy of the territory of Lyon / Saint-Etienne. Main areas: Health, Energy and Enterprise Software.

7 Technopoles Bretagne. This is an association of technopoles of the Région Bretagne. "The 7 Technopoles Bretagne association was created in October 2014 by all the regional technopoles: Technopole Brest Iroise, Technopole Anticipa (Lannion), Lorient Technopole, Technopole Quimper-Cornouaille, Le Poool (Rennes), Technopole Saint-Brieuc Armor and VIPE Vannes. This network represents a key operator of innovation in Brittany, based on a network of local actors, certified by the national RETIS network (incubators, technopoles, CEEI), experts in supporting innovative companies, covering the entire Breton territory. Driving the entrepreneurial dynamic in Brittany, the teams from the 7 Breton technology parks support the creation of around 80 new innovative companies per year, generating jobs for Brittany. They also support innovative companies in their development.

Incubateur X Up. This is the incubator of the Institut Polytechnique de Paris. Since 1794, the École Polytechnique has been training engineers to the highest level. The scientific and technological dimension combined with a unique ecosystem allow the school to support and incubate some of the most innovative technological start-ups in the country. With the X-Up programs, X-Fab and support services, the objective is to meet all the needs of innovation players through the accelerator and incubator, as well as financing tools, coworking and prototyping spaces to encourage creativity and the emergence of high-potential entrepreneurial projects. Deeptech focus with 80% of startup created still in business after 5 years.

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Incubateur Télécom Paris. A precursor of incubation since 1999, the Télécom Paris incubator, central element of the Télécom Paris Novation Centre, is today a reference in the digital world in Paris111. Thus, some of the best FrenchTech startups have been able to benefit from the support of the incubator to accelerate the development of their technology-focused product or service! In addition, the links with the entire academic ecosystem at the Institut Polytechnique de Paris and the network of financiers give the incubator a unique position and vision in terms of entrepreneurship in key areas of digital Deeptech.

IMT Starter (Telecom Sud Paris). The IMT Starter incubator is a structure that promotes the emergence young digital companies with strong potential for innovation, development and job creation112. Through this support structure for business creation projects (in terms of hosting, advice, technical support), Télécom SudParis provides support to the entrepreneurship of tomorrow. To carry out its action and establish a lasting relationship with value-creating start-ups, IMT Starter relies on multiple skills. Those of its founding Grandes Ecoles, Télécom SudParis, Institut Mines-Télécom Business School and ENSIIE, and their teacher-researchers.

Le soutien à des projets d'innovation et de première industrialisation (Support for innovation and first industrialisation projects). This measure (with a budget of 1.3 billion EUR) concerns the work of companies and partners in the Microelectronics and Connectivity and Connectivity programme for which the decision was made in June 2023. Support of 12 lead partners and around a hundred academic and industrial indirect partners. Content of the measure: aid in the form of grants (€1.3bn) notified to the European Commission or in accordance with the R&D&I aid framework Development of industrial production lines based on innovative technologies.113

L'IA Booster (The AI Booster). "IA Booster helps SMEs in all business sectors to get their AI projects off the ground. It is a 4-stage support programme that starts by raising awareness among SMEs of the value of their data and the potential use cases for AI tailored to each company's business operations, providing them with a range of tools and resources to self-assess their digital maturity and train themselves114. In the subsequent stages, companies are supported by expert consultants to assess their data assets and potentially, carry out a feasibility study, plan a proof of concept and carry out an initial implementation to demonstrate the benefits. The measure is open to SMEs and SMIs at different stages of their digital process. It aims to improve their understanding of AI technologies and to promote adoption based on their specific business needs and expected return on investment. The dissemination of successful deployments of AI technologies in SMEs should stimulate the interest of other companies to start their own AI journey. Target: 500 SMEs.

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La Mission French Tech (Mission French Tech). Since 2022, the Mission French Tech will provide priority support to Next 40 companies on the legal front, with the support of public administrations and a member of the Council of State115. Mission French Tech provides legal support to Next 40 companies by putting them in touch with the right contacts in the public administrations and, secondly by assessing proposals that have a positive consequences for the ecosystem with the support of a member of the Council of State. Start-ups are consulted when the drafting of legislation.

5.4.4 GERMANY

Digital Jetzt – Investitionsförderung für KMU (Digital Now - Investment Funding for SMEs). A programme managed by the Federal Ministry of Economy and Climate116. Financial grants to encourage investments in digital technologies and the digital skills qualification of employees in small and medium-sized companies, including craft businesses and freelancers.

High-Tech Gründerfonds (High-Tech Start Up Fund). A programme managed by the Federal Ministry of Economy and Climate117. This fund supports capital-intensive, technology-based startups, including those in digital technologies. It aims to close the financing gap in the early-phase segment for innovative and technology-based startups. The budget is 1.4 billion EUR comprising a combination of public and private capital.

Gründungszuschuss (Founding boost). A variant of unemployment support for start-ups founders managed by the National Employment Agency118. It is a long-term programme. No investment but living
expenses support for up to 12 months.

EXIST-Gründungsstipendium (EXIST - founding stipend). Managed by Federal Ministry of Economy and Climate, EXIST promotes entrepreneurship at higher education and research establishments119. It includes three pillars: "EXIST Start-Up Culture," "EXIST Research Transfer," and "EXIST Start-up Grant," providing initial funding for the seed or start-up phase. The support is for up to 1 year for living expenses, plus equipment.

Start-ups im Bereich der Kommunikationssysteme (StartUpConnect) (Start-ups in the area of communication systems (StartUpConnect)). Support of technology transfer into marketable products in the area of 6G / communications funded by Federal Ministry of Education and Research120.

Zukunftfonds (Future Fund). A fund managed by the Federal Ministry of Economy and Climate with a total budget of 12.7 billion EUR121. Venture capital fund supporting forward-looking technologies, aiming to provide significant financial backing to innovative startups. Supported by the European Recovery Programme.

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Consists of various modules, e.g. the ""Wachstumsfond Deutschland"", a VC umbrella fund co-funded by private institutional investors (1 billion EUR) for Digital: European Tech Champions Initiative (ETCI): part of the EIF, German contribution; Deep Tech & Climate Fonds (1 billion EUR); Venture Tech Growth Financing (1.3 billion EUR). In 2024 ND additional 1.75 billion EUR was announced for start-ups in the fields of artificial intelligence as well as climate, quantum and biotechnology to strengthen German high-tech companies. The focus with an investment volume of €850 million on AI as well as climate, quantum and biotechnology. A further €500 million has been earmarked as German contribution to support European tech champions. The aim is to prevent successful German and European start-ups from moving to non-European markets. INVEST- Zuschuss für Wagniskapital (INVEST – Grant for Venture Capital). Managed by the Federal Ministry of Economy and Climate, this program incentivizes business angels to invest in young, innovative companies by reimbursing 25of their investment, thus reducing the risk associated with investing in startups
.Mikromezzaninfonds-Deutschland (Micro-Mezzanine Fund Germany). Managed by the Federal Ministry of Economy and Climate and co-funded by European Social Fund (ESF). this fund provides venture capital to small and new companies, offering up to €50,000 for a ten-year period, or up to €150,000 for special target groups. Various programmes at federal level. There are a number of smaller scale programmes to support SMEs in the areas of Cybersecurity and resilience, or access to capital. None are specifically targeted at Digital (apart from support the gaming industry in two federal states).

5.4.5 HUNGARY

Startup Factory. Start-up factory, managed by the National Research, Development and Innovation Office, is a fund of funds supporting various kind of start-ups and SME in various domain including digitalisation124. It runs from 2024 until 2026 with a budget of 14 million EUR.
HSUP (Hungarian Startup University Program). HSUP, the National Research, Development and Innovation Office, is a pre-Venture incubator programme supporting various kind of start-ups and SME in various domain including digitalisation125. It has been running since 2020 with a budget of 20 million EUR.

5.4.6 ITALY

Smart & Start Italia 2024. Managed by Invitalia (Invitalia is the National Agency for Inward Investment and Economic Development. It is owned by the Italian Ministry of Economy) with a budget of 200 million EUR126. Smart&Start Italy supports the creation and growth of innovative startups all over Italy. It funds projects costing up to 1.5 million euro. Smart&Start Italy funds the creation and growth of innovative startups that: have a strong technological dimension; operate in the digital economy; enhance search results (spin-offs from research); are fundable projects costing between 100,000 EUR and 1.5 million EUR.

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It funds projects costing up to 1.5 million euro. Smart&Start Italy funds the creation and growth of innovative startups that: have a strong technological dimension; operate in the digital economy; enhance search results (spin-offs from research); are fundable projects costing between 100,000 EUR and 1.5 million EUR.

Resto al Sud (I remain in the South). Managed by Invitalia with a budget of 1.25 billion EUR127. Resto al Sud supports the establishment and development of new entrepreneurial and freelance activities: in Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia, Sardinia, and Sicily in the earthquake crater areas of central Italy (Lazio, Marche, Umbria) in the minor marine, lagoon and lake islands of central and northern Italy. The incentive is intended for those between 18 and 55 years of age.

Smart Money. Managed by Invitalia with a budget of 9.5 million EUR128. Smart Money is the incentive that supports young innovative startups in the development of new business ideas and accelerates their ability to enter the market through meetings with incubators, accelerators, innovation hubs, research organizations and other innovation players.

NITO-ON. Managed by Invitalia with a budget of 100 million EUR129. This “New zero-rate businesses” measure aims to support, throughout the country, the creation and development of micro and small businesses with a prevalent or total participation of young people or women.

Fondo impresa femminile (Female enterprise fund). Funded by the Ministry of Enterprise and Made in Italy for a budget of 400 million EUR130 . Innovative startups, in the initial phase of their activity, can request a non-repayable contribution of up to 10,000 euros to purchase services from authorized entities, such as incubators, accelerators, research organizations and innovation hubs. The aim is to facilitate access to specialized services to develop and test solutions, create a prototype (Minimum Viable Product) or do the first industrial test of the product/service.

Scoperta Imprenditoriale (Entrepreneurial Discovery). Funded by the Ministry of Enterprise and Made in Italy for a budget of 300 million EUR131. After completing the business plan admitted to the incentives, startups can request a second non-repayable contribution, if they present development plans that include equity financing from authorized entities, business angels and qualified investors.

Poli Innovazione digitale (Digital Innovation Competence Centers). Funded by the Ministry of Enterprise and Made in Italy for a budget of 43 million EUR132. The new hubs will represent the access points for companies to the technology transfer system, composed of the Competence Centers and the European Digital Innovation Hubs, and will provide digital first assessment and orientation services to support the digital transition of companies.

ANNEX

Fondo per la transizione digitale (Digital Transition Fund). Investment 3.2 “Start-up financing”, with a financial endowment of 300 million euros in loans, aims to strengthen the National Innovation Fund through the creation of a Digital Transition Fund, managed by CDP Venture Capital SGR S.p.A., to promote the digital transition of supply chains and small and medium-sized enterprises that implement innovative projects in the areas of, in particular, artificial intelligence, cloud, healthcare, industry 4.0, cybersecurity, fintech and blockchain or other areas of digital transition. The project is aimed at stimulating the growth of the Italian innovation ecosystem through direct and indirect venture capital investments.

Pre-seed Plus. Managed by Lazio Innova, the innovation agency of the Lazio Region with a budget of 5 million EUR134. The Lazio Region aims to promote the creation of innovative startups with high growth potential, in particular those that intend to capitalize on the results of scientific research and the skills acquired therein, supporting an activity plan lasting no more than one year, which allows them to find the necessary finance to consolidate the business idea, becoming of greater interest to investors in venture capital.

Bando donne innovazione impresa (Tender Women innovation and entrepreneurship). Managed by Lazio Innova135. 5 million euros to support innovation in female entrepreneurship, contributing together with other regional, national and European actions to spread the values of entrepreneurship and work among the female population and maximize the quantitative and qualitative contribution of women to economic and social development.

NIDI (Nuove Iniziative D'Impresa, new enterprises initiatives). Managed by the Puglia Region with a budget of 54 million EUR136. NIDI is the fund through which the Puglia Region supports, with non-repayable grants and repayable loans, people who have lost their jobs, young people and women who want to start professional firms or micro-enterprises, established less than 6 months ago or not yet established, existing micro and small businesses that want to achieve a generational takeover in their management, employees who intend to safeguard their jobs by taking over companies in crisis or confiscated companies for which they work.

MINI-PIA. Managed by the Puglia Region with a budget of 20 million EUR137. Mini-Pia provides Integrated Incentive Packages aimed at micro and small businesses, including small businesses that acquire the qualification of medium-sized business exclusively through shareholdings, as well as freelancers.

Lombardia Venture. This is a joint-venture Joint venture fund between Lombardy Region and private investment funds with a budget of about 40 million EUR.[138]
The regional intervention provides for the establishment of a "Fund of Funds" called "Lombardia Venture" with the aim of pushing the Venture Capital market in Lombardy into the most capital-intensive segment.

Trentino Startup valley. Managed by Trentino Sviluppo - HIT innovation HUB Trentino.[139] Trentino Startup Valley is a unique ecosystem, designed to offer startuppers and new entrepreneurs an excellent accompaniment program, characterized by personalized coaching, economic support, workspaces, dedicated networks and access to specialized consultants, investors and business angels.

Various other regional programmes. There are a number of smaller scale programmes to support SMEs in innovation in most Italian regions.

5.4.7 LATVIA

Buildit. Managed by SIA "AIFP Buildit Latvia[140]. An Acceleration Programme with a focus on IoT and hardware startups from all over the world. Key areas: wiithin the industries of hardware, IoT, mobility, productivity, smart living, energy, health-tech. Buildit offers an investment of: up to €50k at the pre-seed stage; up to €250k at the seed stage. BuildIT also offers: Workspace in the city center;Accelerator program with world-class mentoring; Contacts with Asian & Europeanmanufacturers and investors. Since 2020 BuildIT is EIT Manufacturing HUB in Latvia.

Commercialization Reactor Fund. An Acceleration Programme with a focus on deep-tech startups. Key points: the business idea should be science or technology based with novelty and clear origin from the IP ownership position; 6 month programme (entry and advanced level); must have an MVP or working prototype; scalable business model on the B2B market. Commercialization Reactor Fund offers investment of: up to €50k at the pre-seed stage; up to €250k at the seed stage[141].

5.4.8 NETHERLANDS

Top Sectors. These cover important industry/public sectors like health, food, logistics, etc. Within these top sectors limited direct funding is available to directly support innovation activities which includes startup support. Most relevant for digital startups are topsector ICT [142] and High Tech Systems and Materials.[143] The other top sectors may be interesting for digital startups that focus on specific application domains.

RVO. RVO is a Dutch science and development support organization focusing mostly on industry support with a focus on SMEs and also startups.[144]

TNO. TNO is a Dutch Resarch and Technology Organisation with a substantial digital division. TNO to a limited extent generate and supports startups.

National Growth Fund. National Growth Fund supports large projects with an allocated budget of around 10 billion euro.[145] Substantial investments are in for example AI, Data, Quantum, and other digital technologies.

InvestNL. InvestNL ws founded in 2019. It is an investment company owned by the state with a budget of around 2 billion euro.[146] One of the focus areas for investments is Deep Tech, including digital and quantum technologies.

Techleap[147] is a government installed organisation directly focussed on startups is with a limited budget of 5 million per year.

5.4.9 POLAND

Polish Development Fund. The Polish Development fund runs a programme of funding, mentorship, and advisory support for SMEs. The programme was launched in 2017 and it is ongoing, with a total cumulated budget of 5 billion EUR.[148]

5.4.10 ROMANIA

Programul de accelerare a dezvoltării întreprinderilor mici și mijlocii (Program to accelerate the development of small and medium-sized enterprises). This programme is administered by Ministry of Economy, Entrepreneurship and Tourism in collaboration with Agencies for Small and Medium Enterprises.[149] The program is a measure to encourage and stimulate the development of small and medium enterprises in priority production sectors, using digital solutions. The programme runs from 2023 until 2027. In 2023 the total budget was 10 million EUR and reached 500 beneficiaries.

Startup Nation. A programme managed by the Government of Romania whose main objective is to stimulate the establishment and development of small and medium-sized enterprises and to improve their economic performance, to achieve smart, sustainable and inclusive economic growth based on digitization, sustainable development, innovation and entrepreneurial training and the creation of new jobs the work.[150] The programme was launched in 2021 and is ongoing with a total budget of 2.2 billion EUR.

Femeia antreprenor (Woman Entrepreneur Program – MEEMA). This programme is administered by Ministry of Economy,Entrepreneurship and Tourism in collaboration with Agencies for Small and Medium Enterprises.[151]

5.4.11 SPAIN

ENISA (Empresa Nacional de Innovación, National Innovation Enterprise). ENISA is part of the Spanish Government (Ministry of Industry, Trade, and Tourism).[152] It offers funding to startups and scaleups through participatory loans aimed at promoting the growth and innovation of SMEs. The loans range between €25,000 and €1.5 million.

Activa Startups. Run by Spain's Ministry of Industry and Tourism and part of Spain's Recovery, Transformation, and Resilience Plan.[153] The Activa Startups program, run by Spain's Ministry of Industry and Tourism, fosters innovation through collaboration between startups and established companies. It focuses on digital transformation, emerging technologies, low-carbon economies, and the circular economy. The initiative provides financial support to SMEs and startups for developing innovative projects and solving technological challenges. €44 million allocated to assist over 11,100 SMEs by 2023.

Fond-ICO Next Tech. A Joint initiative of the Official Credit Institute and Axis with the Secretary of State for Digitalization and Artificial Intelligence.[154] Fond-ICO Next Tech is a joint initiative of the Official Credit Institute and Axis with the Secretary of State for Digitalization and Artificial Intelligence, aimed at transforming the Spanish production model through support for the Deep Tech industry, enhancing its competitiveness and capacity for job creation.Its primary goal is to boost the growth of startups with a strong technological profile, as well as to contribute to the promotion of venture capital in Spain and attract international investment. Fond-ICO Next Tech makes direct investments in companies, as well as investments in venture capital funds, technology transfer funds, and other types of corporate funds or vehicles. For the promotion of a startup or the scalability of projects based on new technologies, projects can be presented to this fund, which is endowed with 4 billion euros through a public-private collaboration with the Spanish venture capital sector.

Kit Digital. Run by Ministry for Digital Transformation and Public Administration through Red.es.[155]
Kit Digital is a Spanish Government initiative aimed at supporting companies, including startups, in implementing specialized digital solutions that can drive growth or project management. Currently, companies with up to 50 employees are eligible, with varying amountsdepending on the business size. Kit

Scal'E-nov. Scal'E-Nov is the start-up accelerator in the Grand Est Region, created at the initiative of the Grand Est Region, with the support of the CCI Grand Est and Bpifrance, and in collaboration with its private partners. It is supported by Grand E-nov+, the Regional Innovation and International Prospecting Agency of the Region Grand Est. Main areas: Health, Wellbeing & beauty, job recruitment, food, transportation and enterprise software.

BIC Montpellier (Montpellier business and innovation centre). The Business and Innovation Centre - BIC - in Montpellier is an incubator dedicated to supporting innovative projects. Dedicated to young start-ups with high growth potential, since 1987 it has offered high-level expertise which allows their managers to benefit from support which maximizes their chances of success. Awarded numerous times for its tools and support programs, including internationally, it actively contributes to the birth of tech champions in the Montpellier metropolitan area, in the fields of digital, health, environment, ENR or even sustainable agronomy. It is in In the top 5 of public incubators worldwide with 90% startups still in business after 3 years.

Incubateur Belle de Mai. It is the incubator of the Région Sud Investissement. Created in 1999, the Belle de Mai Incubator is a thematic incubator with a team fully invested alongside project leaders, entrepreneurs, future startuppers. Leading them towards the creation of their innovative business and supporting them towards growth is the incubator's mission. Main areas: Media, Transportation, Education, Fintech, Sports and Enterprise Software.

Pulsalys. This is incubator and accelerator of deeptech innovations in Lyon & Saint-Etienne, builds the innovative products and services of tomorrow, by transforming scientific discoveries from the laboratories of the University of Lyon into economic opportunities for companies and startups108. Created in December 2013 as part of the Future Investment Program (PIA) under the status of Technology Transfer Acceleration Company (SATT), PULSALYS has become in a few years a key player in attractiveness and development economy of the territory of Lyon / Saint-Etienne. Main areas: Health, Energy and Enterprise Software.

7 Technopoles Bretagne. This is an association of technopoles of the Région Bretagne109. "The 7 Technopoles Bretagne association was created in October 2014 by all the regional technopoles: Technopole Brest Iroise, Technopole Anticipa (Lannion), Lorient Technopole, Technopole Quimper-Cornouaille, Le Poool (Rennes), Technopole Saint-Brieuc Armor and VIPE Vannes. This network represents a key operator of innovation in Brittany, based on a network of local actors, certified by the national RETIS network (incubators, technopoles, CEEI), experts in supporting innovative companies, covering the entire Breton territory. Driving the entrepreneurial dynamic in Brittany, the teams from the 7 Breton technology parks support the creation of around 80 new innovative companies per year, generating jobs for Brittany. They also support innovative companies in their development.

Incubateur X Up. This is the incubator of the Institut Polytechnique de Paris110. Since 1794, the École Polytechnique has been training engineers to the highest level. The scientific and technological dimension combined with a unique ecosystem allow the school to support and incubate some of the most innovative technological start-ups in the country. With the X-Up programs, X-Fab and support services, the objective is to meet all the needs of innovation players through the accelerator and incubator, as well as financing tools, coworking and prototyping spaces to encourage creativity and the emergence of high-potential entrepreneurial projects. Deeptech focus with 80% of startup created still in business after 5 years.

Incubateur Télécom Paris. A precursor of incubation since 1999, the Télécom Paris incubator, central element of the Télécom Paris Novation Centre, is today a reference in the digital world in Paris111. Thus, some of the best FrenchTech startups have been able to benefit from the support of the incubator to accelerate the development of their technology-focused product or service! In addition, the links with the entire academic ecosystem at the Institut Polytechnique de Paris and the network of financiers give the incubator a unique position and vision in terms of entrepreneurship in key areas of digital Deeptech.

IMT Starter (Telecom Sud Paris). The IMT Starter incubator is a structure that promotes the emergence young digital companies with strong potential for innovation, development and job creation112. Through this support structure for business creation projects (in terms of hosting, advice, technical support), Télécom SudParis provides support to the entrepreneurship of tomorrow. To carry out its action and establish a lasting relationship with value-creating start-ups, IMT Starter relies on multiple skills. Those of its founding Grandes Ecoles, Télécom SudParis, Institut Mines-Télécom Business School and ENSIIE, and their teacher-researchers.

Le soutien à des projets d'innovation et de première industrialisation (Support for innovation and first industrialisation projects). This measure (with a budget of 1.3 billion EUR) concerns the work of companies and partners in the Microelectronics and Connectivity and Connectivity programme for which the decision was made in June 2023. Support of 12 lead partners and around a hundred academic and industrial indirect partners. Content of the measure: aid in the form of grants (€1.3bn) notified to the European Commission or in accordance with the R&D&I aid framework Development of industrial production lines based on innovative technologies.[155]

L’IA Booster (The AI Booster). "IA Booster helps SMEs in all business sectors to get their AI projects off the ground. It is a 4-stage support programme that starts by raising awareness among SMEs of the value of their data and the potential use cases for AI tailored to each company's business operations, providing them with a range of tools and resources to self-assess their digital maturity and train themselves. In the subsequent stages, companies are supported by expert consultants to assess their data assets and potentially, carry out a feasibility study, plan a proof of concept and carry out an initial implementation to demonstrate the benefits. The measure is open to SMEs and SMIs at different stages of their digital process. It aims to improve their understanding of AI technologies and to promote adoption based on their specific business needs and expected return on investment. The dissemination of successful deployments of AI technologies in SMEs should stimulate the interest of other companies to start their own AI journey. Target: 500 SMEs.

La Mission French Tech (Mission French Tech). Since 2022, the Mission French Tech will provide priority support to Next 40 companies on the legal front, with the support of public administrations and a member of the Council of State115. Mission French Tech provides legal support to Next 40 companies by putting them in touch with the right contacts in the public administrations and, secondly by assessing proposals that have a positive consequences for the ecosystem with the support of a member of the Council of State. Start-ups are consulted when the drafting of legislation.

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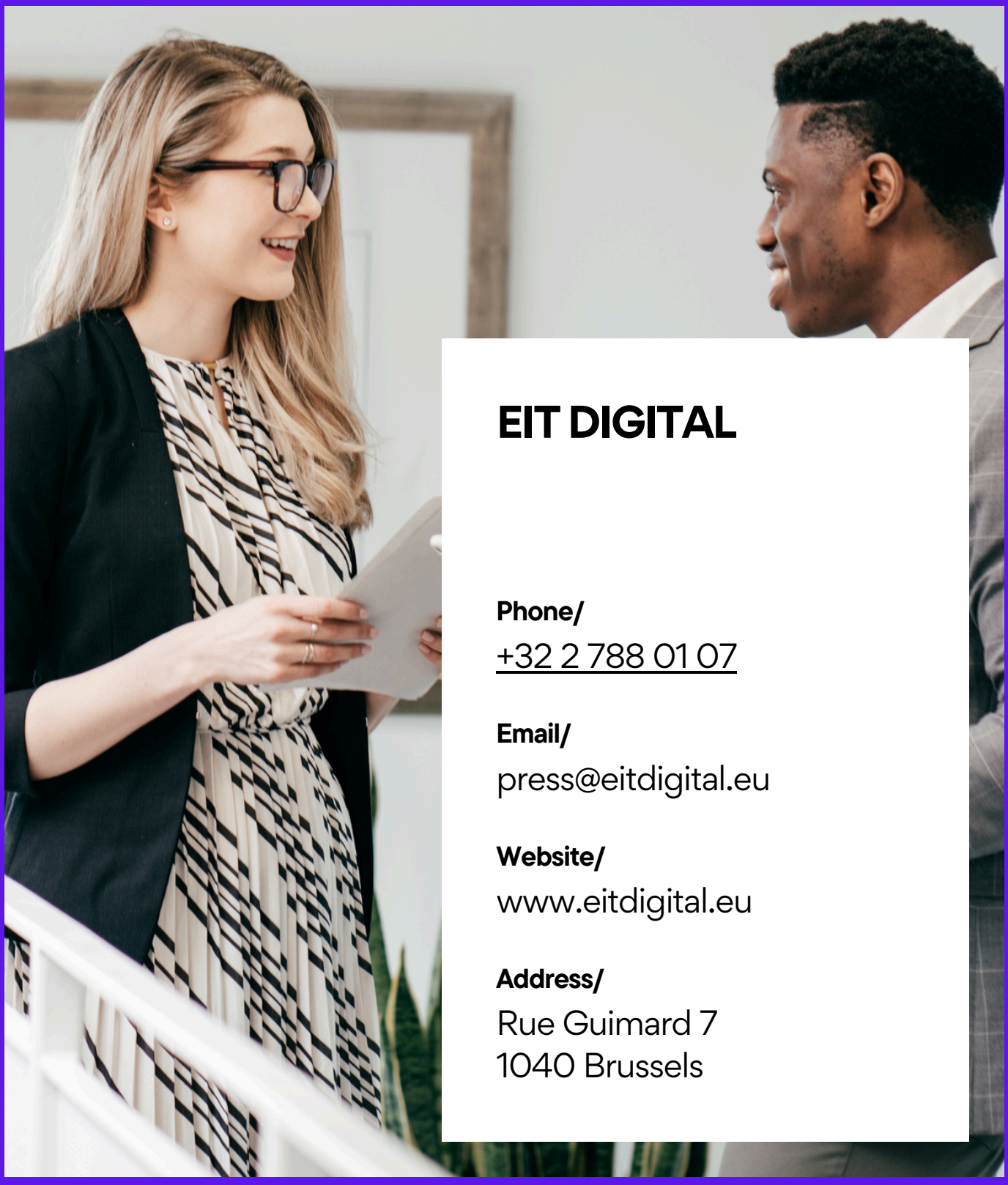

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