European Commission

DIGITISING EUROPEAN INDUSTRY

PROGRESS SO FAR, 18 MONTHS AFTER THE LAUNCH

DRAFT 21 NOVEMBER 2017

Digital Single Market

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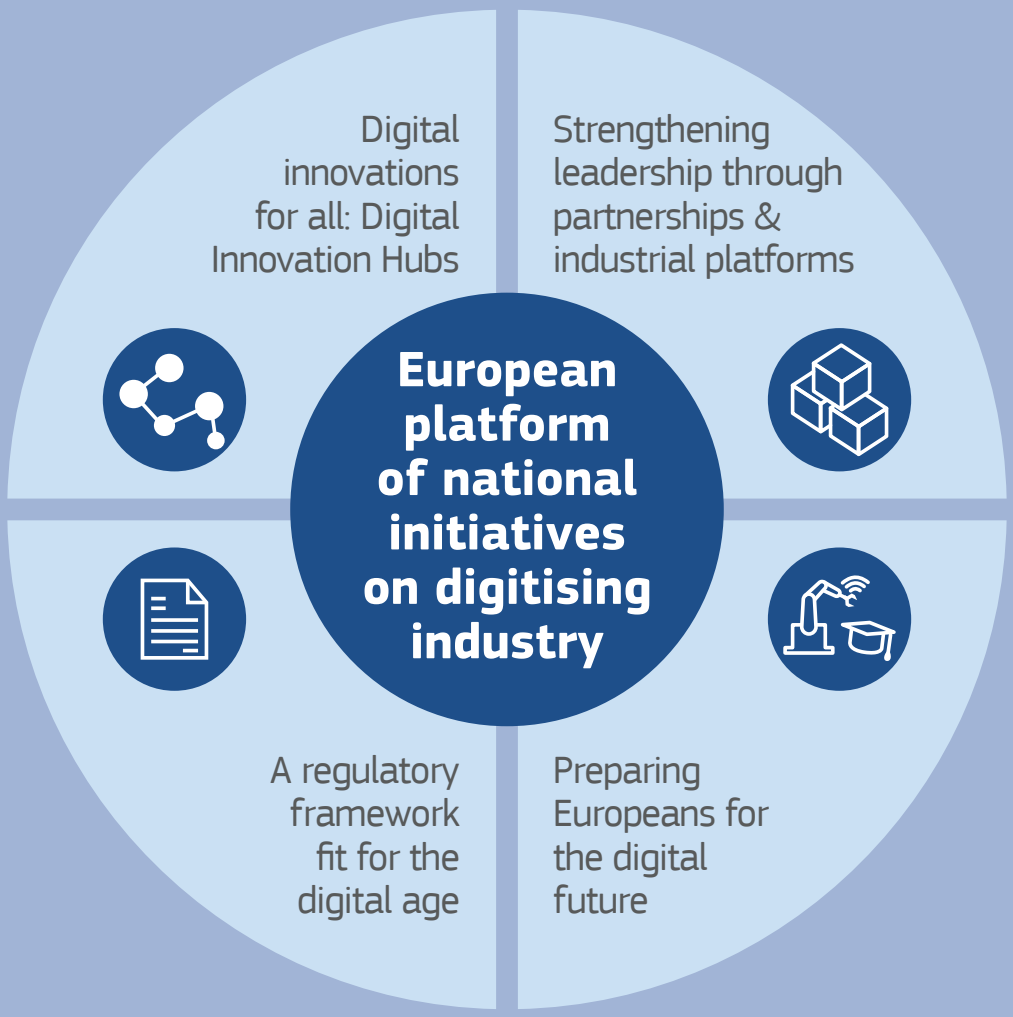
A EUROPEAN STRATEGY FOR THE DIGITISATION OF INDUSTRY

The 4th industrial revolution is unfolding worldwide, opening up new horizons driven by new-generation digital technologies such as the Internet of Things, High Performance Computing, cloud computing, big data, robotics, artificial intelligence and 3D printing. This change of paradigm has a profound impact on products, processes and business models in every industry, from construction, health and agri-food to the tourism and audiovisual sector. The European manufacturing industry alone accounts for 2 million enterprises, 33 million jobs and 60% of productivity growth. Digitisation of products and services can add more than €110 billion of annual revenue for industry in Europe until 2020.

However, in order to unlock this potential, Europe needs to join forces under a common strategy that takes digitisation of the EU's economy forward. With this objective, the European Commission launched the Digitising European Industry strategy (DEI) in April 2016. The initiative aims to reinforce the EU's competitiveness in digital technologies and ensure that every business in Europe - whichever the sector, wherever the location, whatever the size - can draw the full benefits from digital innovation.

The Digitising European Industry Initiative is a key element of the Digital Single Market strategy, which aims to make the EU's single market fit for the digital age. This need was also recognised at the Digital Summit in Tallinn in September 2017, where European leaders aspired to make the EU the ideal home for enterprises and innovators in the digital age and to accelerate the digital transformation of industries.

Building on and complementing the various national initiatives for digitising industry, the DEI strategy is structured around five main pillars:


Digital innovations for all: Digital Innovation Hubs
Strengthening leadership through partnerships & industrial platforms
European platform of national initiatives on digitising industry
A regulatory framework fit for the digital age
Preparing Europeans for the digital future

1.0

EUROPEAN PLATFORM OF NATIONAL INITIATIVES ON DIGITISING INDUSTRY

The state of the digitisation of industry varies across sectors, particularly between high tech areas and more traditional ones, and between Member States and regions. There are also large disparities between large companies and SMEs.

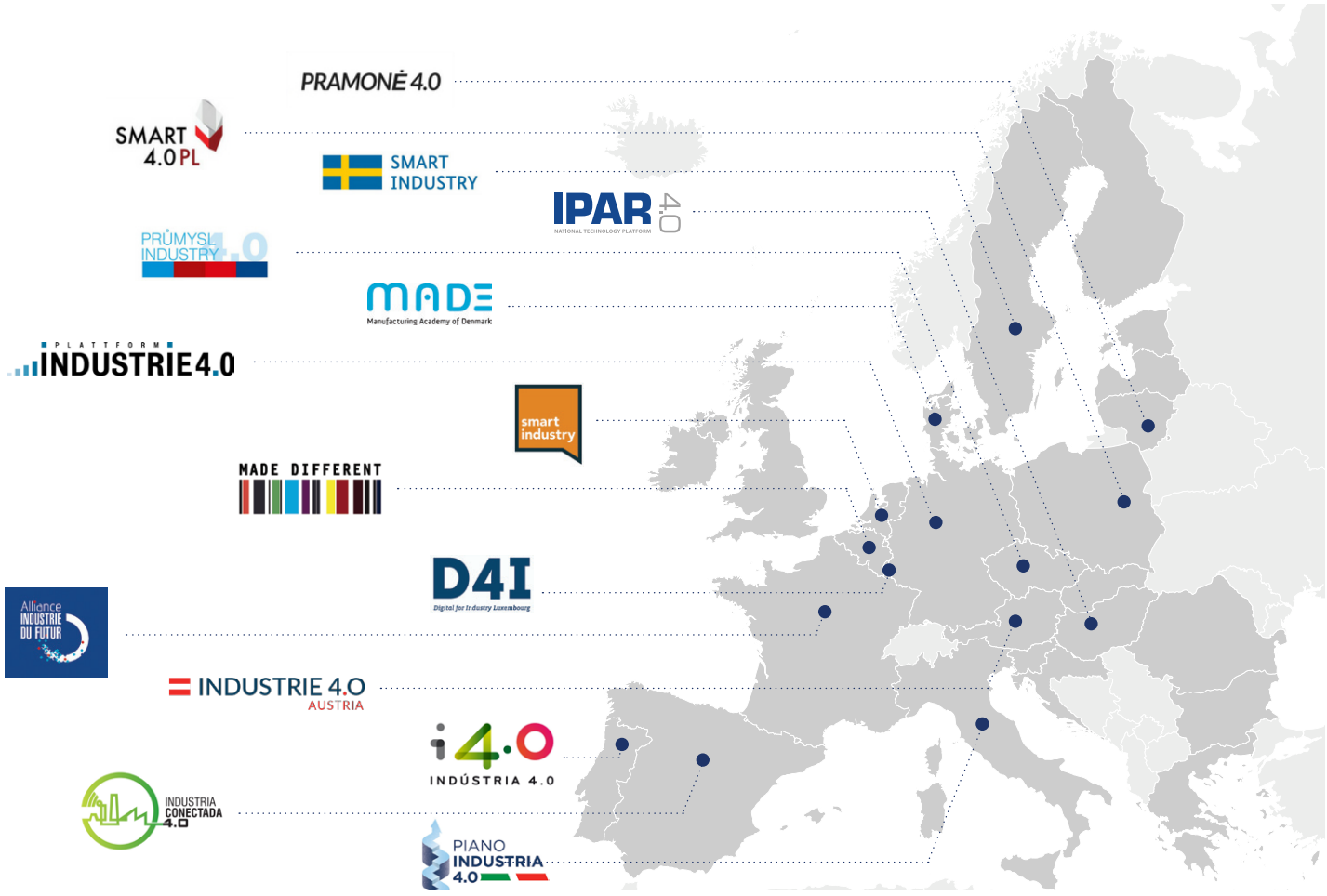
Industrial value chains are connected across borders and the digital revolution brings challenges that can only be addressed through a coordinated EU-wide effort. The European platform of national initiatives on digitising industry offers the coordination framework needed to bring together all Member States and ensure coherence and collective steer.

ADDING VALUE AT EU LEVEL

Launched by the European Commission in March 2017, this forum aims to build a critical mass of initiatives and investments for digitising industry, and to ensure the commitment of Member States, regions and private sector to achieve the Digitising European Industry goals. The focus is on adding value at European scale and not duplicating actions and efforts already done by Member States and regions.

The platform builds on and complements the 15 national initiatives that already exist across the EU and it will expand to welcome new initiatives as they are launched – at least 7 Member States are preparing a national initiative. This coordination is at the core of the Digitising European Industry strategy and it provides a forum to:

- Identify challenges that need to be addressed at EU level
- Share experiences and best practices
- Trigger collaboration and boost co-investments
- Explore common approaches to regulation, skills and jobs



Existing National Initiatives for digitising industry across the European Union

The ultimate goal is to make sure that actions taken by Member States can complement and reinforce each other. It is only at EU level that the combination of public resources and private investments can reach the critical mass needed for Europe's industry to compete worldwide.

In this respect, the strong leadership of the European Commission has led to the commitment from several groups of Member States towards important co-investments in EU-wide projects strategic for Europe's competitiveness, such as High Performance Computing and micro- and nano-electronics.

60 ROME DIGITAL DAY

During the Digital Day in Rome (March 2017) several Member States committed to concrete progress in high performance computing and connected and automated mobility and to the launch of the European platform of national initiatives on digitising industry.

The Digitising European Industry strategy is mobilising €5 billion of EU investment from Horizon 2020 between 2016 and 2020, expecting to attract a tenfold investment by Member States, regions and industry. The level of investment already committed by Member States since 2016 or foreseen until 2020 gives confidence that this target will be successfully reached.

ENGAGEMENT WITH STAKEHOLDERS

The DEI strategy includes strong stakeholder engagement. High level governance meetings of the European Platform are held twice per year. They offer a forum for representatives of the national governments and initiatives to meet with European Public Private Partnerships, European federations of business, and social associations to take stock of progress and identify areas of actions where the EU can add value.

To support the high level governance meetings, two specific mission-oriented working groups were launched in autumn 2016 on Digital Innovation Hubs and Digital Industrial Platforms. There are also working groups on standardisation and digital skills. They are a key part of the DEI strategy. Working groups regularly present their findings and recommendations to the high level governance meetings and they help ensure deeper involvement of the Member States, regions and industry.

Last year, together with the German hosts, the European Commission initiated the first yearly European stakeholder forum for Digitising European Industry. The event brought together 500 participants from all over Europe to raise awareness about the importance of the Digitising European Industry strategy, to discuss its action lines in a pragmatic and delivery-oriented way, and to share experiences and exchange best practices.

Industry 2.0 meets Industry 4.0 at the Stakeholder Forum 2017

What is the European Commission doing?

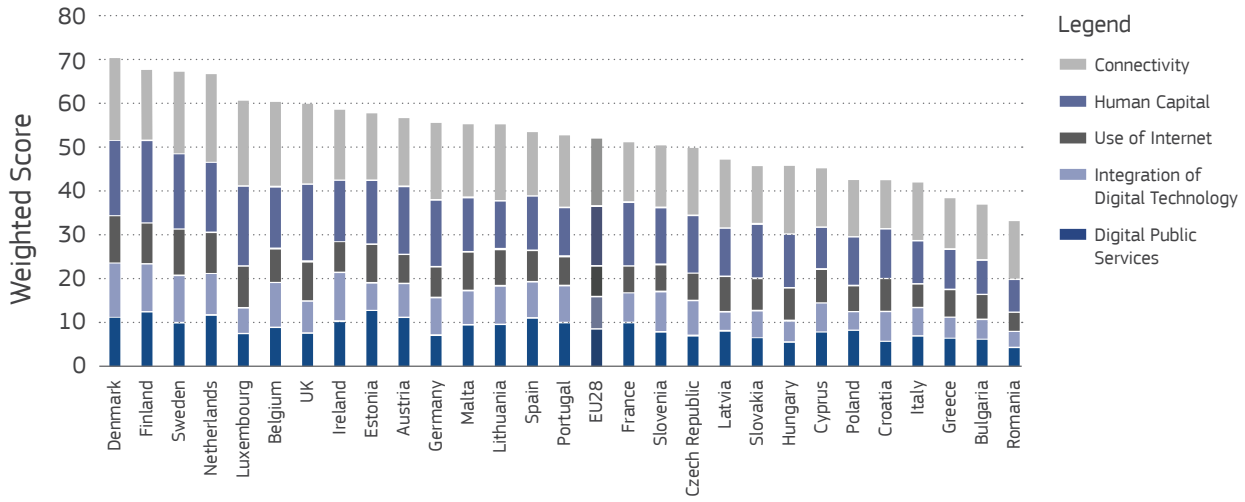
- Maintaining political mobilisation through regular meetings of the European Platform of National Initiatives and ensuring that this multilateral collaboration benefits the whole EU
- Encouraging national initiatives for digitising industry by outlining policy approaches to digitisation and by sharing experiences
- Monitoring implementation of actions within the Digitising European Industry strategy
- Supporting Member States to launch and maintain digitisation strategies and commit for collective actions and investments
- Reinforcing the broader involvement of stakeholders across the EU

NATIONAL INITIATIVES ON DIGITISING INDUSTRY

The European Commission monitors the state of digitisation across the EU through different indexes and indicators — a country overview for all 28 Member States compiles the relevant information for digitising industry and shows the state of play across EU.

The Digital Economy and Society Index (DESI) shows that the EU is making progress in digital. However, more efforts and investments are needed to close the gap between top digital players and lower-performing countries and to make the most of the digital opportunities.

Digital Economy and Society Index, by Main Dimensions of the DESI



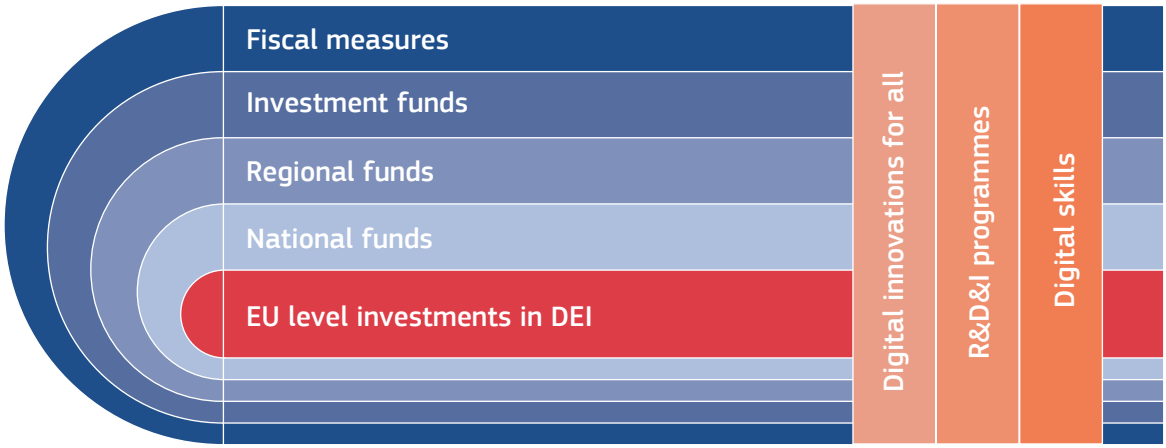
European Commission, Digital Scoreboard 2017

The Digital Transformation Monitor takes stock of Industry 4.0 policy initiatives across several EU Member States. The results identified the need for systematic cooperation and exchange of good practices at EU level.

More detailed analysis of the existing **15 national initiatives for digitising industry** and relevant national measures along the action lines of the DEI strategy concluded that:

- Digitisation is a key element of national industrial policies. Some are among the 'trend-setters' and many are 'fast followers' in absorbing the emerging trends.
- EU-collaboration is necessary to face worldwide competition. Europe brings added value, prepares for legal certainties and encourages essential co-investments to successfully reach leadership positions across the EU.
- Specific measures employed by Member States to encourage investments in research, development and innovation (R&D&I) include incentives and access to finance.
- The Digitising European Industry strategy makes significant progress towards the mobilisation of close to €50 billion of public and private investment until 2020. The analysis of national initiatives has provided reliable - although non-exhaustive- financing information in this respect.
- Member States recognise the need for digital skills and have set up actions related to education and training.
- No one-size-fits-all: addressing the needs of national industrial fabrics led to different national measures, providing a coherent and coordinated national vision.

In summary, clear alignment of national initiatives along the action lines of the DEI strategy is gradually taking place.



National measures to multiply EU investments on digitisation of industry

		AT	BE	CZ	DE	DK	ES	FR	HU	IT	LT	LU	NL	PL	PT	SE
INCENTIVES TO INVEST IN R&D&I	Innovation vouchers		●	●	●			●	●		●			●	●	
	Amortisation schemes					●		●		●						
	Foreign direct investments measures	●		●											●	●
	Tax relief	●	●			●	●	●		●	●		●	●		●
ACCESS TO FINANCE	Guarantee/ Loan fund						●	●	●	●			●	●	●	
	National innovation fund		●	●	●	●		●				●	●	●		●
	Venture capital Start-ups support	●			●	●	●	●		●			●	●		●
PATENTS & IPR INCENTIVES		●	●		●					●	●	●		●		

National financial measures

		AT	BE	CZ	DE	DK	ES	FR	HU	IT	LT	LU	NL	PL	PT	SE
DIGITAL INNOVATIONS FOR ALL	Test-beds				●			●	●		●		●	●	●	●
	R&I infrastructure	●	●		●		●	●	●	●		●		●	●	●
	DIH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Clusters		●		●	●	●	●		●	●	●	●		●	
R&D&I PROGRAMMES	Basic technology research	●	●			●		●	●	●			●	●	●	
	Industrial/ Applied research	●	●	●	●	●	●	●				●	●	●		●
	Pilot & Demonstrators	●	●		●	●			●			●		●	●	●
	Standardisation	●			●		●	●		●	●	●	●	●	●	
	International cooperation	●	●	●	●			●	●	●	●					●
	R&I PPPs					●				●		●	●			●
	Regional level		●		●	●	●	●					●			●
REGULATION			●	●	●	●	●	●	●		●	●	●	●	●	●
DIGITAL SKILLS		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

National actions along the DEI strategy

2.0

DIGITAL INNOVATIONS FOR ALL: DIGITAL INNOVATION HUBS

Only about 1 out of 5 companies across the EU are highly digitised. Similarly, around 60% of large industries and more than 90% of SMEs feel lagging behind in digital innovation. The digital revolution brings opportunities for big and small companies, but many of them still find it difficult to know in which technologies to invest and how to secure financing for their digital transformation.

Within this context, Digital Innovation Hubs (DIHs) can help ensure that every company, small or large, high-tech or not, can take advantage of digital opportunities. A Digital Innovation Hub is a place where companies –especially SMEs, startups and mid-caps– can get help to improve their business, production processes, products and services by means of digital innovations. At the core of the DIH there is normally a competence centre such as a a research and technology centre or an innovation-oriented university department. Digital Innovation Hubs offer the following services:

- Access to digital technologies and competences
- Infrastructure and training to test digital innovations
- Financing advice
- Market intelligence
- Networking opportunities

Member States and regions play a key role in establish DIHs that support the digital transformation of the industry in their regions. This can be financed through European Structural and Investment Funds (ESIF) or other national or regional funds. The role of the European Commission is to network the DIHs. For this, **the European Commission is investing €100 million per year on DIHs from 2016 to 2020**.

Key elements and services of a Digital Innovation Hub

NETWORKING DIGITAL INNOVATION HUBS THROUGH HORIZON 2020

Digital Innovation Hubs need to focus on the main needs of the industry and build on the technological strengths available in their region. They must also collaborate to offer all necessary expertise to companies across Europe. For instance, an SME from a region has a good idea for a new product, but the facilities to produce it are only available in a DIH of another region. In that case, collaboration between the two DIHs should ensure that the company receives the support to realise its idea. This is the aim of the pan-European network of DIHs.

I4MS (ICT Innovation for Manufacturing SMEs) and SAE (Smart Anything Everywhere) are two of the key European initiatives helping to build this network and boost innovation. They foster the collaboration of SMEs, startups and mid-caps across their value chains with the European DIHs. Companies can run small scale experiments to implement and test digital innovations.

Other EU research & innovation initiatives are also contributing to the development of the DIHs network: the European Coordination Hub for Open Robotics Development (ECHORD++), the Open Data Incubator Europe (ODINE), the Network for Supercomputing Expertise for SMEs (SESAME NET) and the Access Center for Photonics Innovation Solutions and Technology Support (ACTPHAST).

In 2016-2017, the EU launched DIH projects to support **600 innovation experiments** where about **150 Digital Innovation Hubs** and more than **1.200 startups, SMEs and mid-caps** take part.

More initiatives on Digital Innovation Hubs will be supported from 2018 to 2020, with a total investment of €300 million within the Horizon 2020 programme.

SMEs currently face difficulties to access finance for their digital transformation because financial intermediaries have the perception of a relatively high credit risk. Therefore, the European Commission is exploring with Member States and the European Investment Bank whether and how a European Digitisation Investment Fund could help bridge this gap.

Success Story

A 3D Scanner to design made-to-measure shoe insoles using cloud-based HPC

Podoactiva, a Spanish traditional podiatrist company, saw the potential of digitisation to create a unique method to scan feet in order to produce made-to-measure medical insoles. Through their participation in the European initiative I4MS, they partnered with the Spanish IT company Inycom, which provided them with the necessary specific software. The Spanish Institute for Biocomputation and Physics of Complex Systems (BIFI), acting as a DIH, provided them with the necessary **High Performance Computing (HPC) infrastructure** and know-how to run this **software on the cloud on a pay-per-use basis**, helping them to develop a fully working 3D Scan Insole Designer.

Thanks to this innovative solution, Podoactiva and Inycon have now private clinics that use this technology in Spain, Portugal, Italy and Mexico, selling made-to measure products to customers worldwide.

Apart from Podoactiva, the Italian SME Base Production also benefited from this cloud-based solution. Thanks to it, they expect in the next 3 years to multiply their turnover by 3 up to €750.000, gain an additional 3% in their market share and reduce their time-to-market by 40%.

The EU made this innovation possible with an initial €321.000 investment.

Success Story

An autonomous robot to make agriculture more digital

Fendt is a German company that manufacturers agricultural tractors and machines. Although for long this has been seen as a quite traditional sector, Fendt wanted to exploit the benefits of bringing robots to agriculture.

Through their participation in the EU Robotics Research Project ECHORD++, they partnered with the DIH in the Service Robotics Research Centre at the University of Applied Sciences in Ulm. The result of this collaboration is MARS, an **innovative mobile robot that autonomously plants seeds** while the workers can monitor the process from any location. The robot also takes care of every plant, reduces the use of fertilisers and pesticides, and contributes to sustainability and savings in energy, time and costs.

With this innovative solution, Fendt fuels a paradigm shift in farming practices and it could help to solve challenges arising from climate change as well as shortage of skilled labour. With this new product, Fendt also opens new market opportunities for its own business and helps other companies in the agricultural sector to be more competitive.

At the AGRITECHNICA 2017 trade fair, the world's biggest trade fair for agricultural machinery, MARS won a silver medal in the innovation award category.

Success Story

ACT PHAST
Access Center for Photonics Innovation Solutions And Technology Support

A photonic gyroscope for safer transportation systems

AEROSPAZIO Tecnologie s.r.l. is an Italian SME established in March 2000 specialising in the fields of electric propulsion, thermovacuum and space simulation. They provide high qualified test services for space applications to some of the main European players such as Electric Rocket Propulsion.

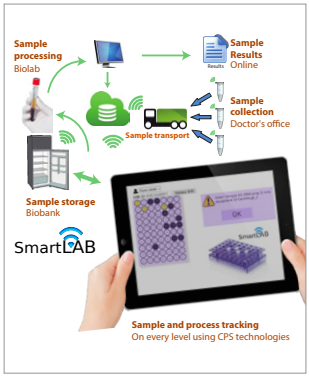
Aerospazio recognised a need in the marketplace for all moving vehicles – manned and unmanned – to be equipped with a more reliable and precise gyroscopic solution which is essential for the navigation and attitude control system of vehicles for safer transportation systems.

Through the EU initiative ActPhast, Aerospazio engaged with the COBRA Research Institute of the Technische Universiteit Eindhoven, who helped them to develop an **integrated photonics-based gyroscopic solution**. Photonic integration technology will allow for dramatic reduction in the size of such a gyroscope in comparison to the existing fiber-based ones. In particular such a gyro could be valuable in applications in space satellites, where relatively low power and low volume are required.

The ACTPHAST project involved the innovative combination of different integrated photonic technologies into a single system, commencing with a rapid 3-month feasibility study of less than €20K which was fully subsidised by ACTPHAST, allowing for the next phase development of a working prototype.

Success Story

SAE
SmartAnythingEverywhere



EuroCPS
Cyber-Physical Systems

A smart laboratory with cyber-physical systems to improve the diagnose of cancer

The Hungarian company NEUMANN offers advanced screening technology to diagnose cervical cancer in women. However, they were facing the challenge of how to optimise the processing, transportation and storage of the thousands of biomedical samples they received in their laboratories. Thanks to their participation in the EU initiative SAE they teamed up with the Budapest University of Technology and Economics in Hungary as a DIH and with Intel Ireland and ST Microelectronics in France as technology providers. Through this collaboration they developed a smart laboratory equipped with **chips and sensors** that track the medical samples at all times. This allows keeping the samples stored in the right conditions and correctly identified to avoid loss or confusion between different patients.

Thanks to this solution, NEUMANN expects to augment their revenues by up to €2 million in the coming 5 years. INTEL and ST Management will also profit from NEUMANN's success with higher sales of their components.

TRAINING AND DEVELOPMENT OF SKILLS

Helping companies to accomplish their digital transformation also means advising and training them on those digital technologies that are relevant for their business, and to make sure that everybody in the company has sufficient digital skills. This is a crucial role played by Digital Innovation Hubs, which dedicate around 15% of their efforts to training and skills development.

The European network of Digital Innovation Hubs aims at reinforcing this aspect. Through the leading involvement of the EIT Digital in one of the recently selected network of DIHs, the skills dimension will be further strengthened.

THE EUROPEAN CATALOGUE OF DIGITAL INNOVATION HUBS

In order to create a strong network of Digital Innovation Hubs it is crucial to link together the infrastructures and facilities that are already in place across Europe. With this goal, the European Commission launched the European catalogue of DIHs, a repository that includes more than 450 already existing hubs and that will keep growing with new additions in the future. The catalogue is a practical tool for DIHs to collaborate and network effectively. In the future it will also be a key place to share best practices and gather information about the expertise and support facilities offered across Europe. Policy makers can use it to further develop their digitisation programmes.

WIDENING TOWARDS REGIONS NOT WELL COVERED BY DIGITAL INNOVATION HUBS

One of the goals of the Digitising European Industry strategy (DEI) is to have a Digital Innovation Hub in every region by 2020. However, many regions are not yet well covered by DIHs. In order to help them, the European Commission has launched **coaching and training programmes for new DIHs**.

Under the I4MS initiative, 29 new DIHs received support from the existing network of hubs on how to develop a business plan, identify the needs of industry in their regions and operate their services. With €2 million support by the European Parliament, the European Commission has also started a similar training programme targeting 30 new DIHs in Central and Eastern Europe.

These efforts will be reinforced in 2019 with **€8 million under Horizon 2020** in order to support new DIHs in underrepresented regions with strong industrial activity. This will allow them to link with strong DIHs from other regions to support innovative local SMEs in their region to master their digital transformation.

European Catalogue of Digital Innovation Hubs
Preliminary version, from September 2017

3.0

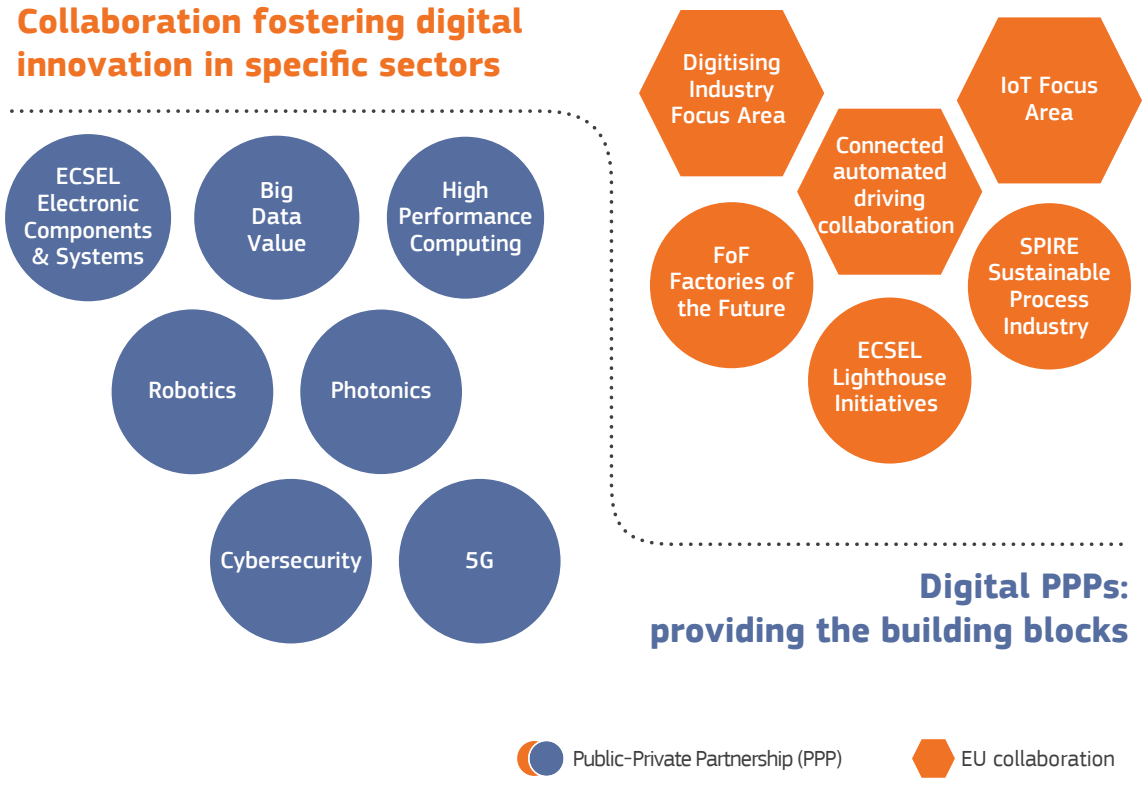
STRENGTHENING LEADERSHIP THROUGH PARTNERSHIPS AND DIGITAL INDUSTRIAL PLATFORMS

With the advent of the digital revolution, products and services increasingly combine different digital technologies. For instance connected and automated cars integrate vision systems, robotics, artificial intelligence, mobile communication, and more. To build such products, one needs both the digital technology building blocks like smart sensors, robotics components, artificial intelligence modules and mobile communication systems, and at the same time the means to integrate those building blocks into applications.

Digital industrial platforms integrate the different digital technologies into real-world applications, processes, products, and services; while new business models re-shuffle value chains and blur boundaries between products and services.

To reinforce the EU's competitiveness in digital technologies, the Digitising European Industry strategy (DEI) supports Public-Private Partnerships (PPPs) that develop future digital technology building blocks.

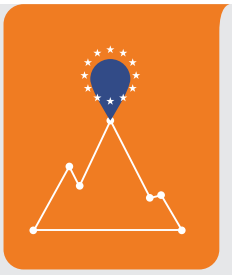
At the same time, the European Commission supports partnerships and EU-wide collaborations that foster digital innovation in specific sectors. To accomplish all this, the EU, Member States, and regions need to cooperate and co-invest under common priorities. For the period 2018-20, the EU alone is investing more than €3 billion in these areas, roughly 2/3 on the development of digital building blocks and 1/3 on platform building, large-scale piloting, pilot lines and related actions.



DEVELOPING THE DIGITAL BUILDING BLOCKS

To make Europe a leader in digital technologies it is important to develop strategic research and innovation agendas at EU level and to provide a critical mass of resources to address them. For this purpose the European Commission has established Public-Private Partnerships (PPPs) and a Joint Undertaking under the EU's Horizon 2020 programme in key digital technologies such as 5G, data value, High Performance Computing (HPC), cybersecurity, photonics, robotics and electronic components & systems.

The PPPs have proven to be effective in developing the technology building blocks which underpin the digital revolution. They are successful in joining efforts at the European level for digital industrial innovations in different fields and in attracting investments by industry.



Co-investing for European Leadership

The example of the **ECSEL Joint Undertaking**, a special type of PPP, shows that alignment of regional, national and EU strategies is feasible and that they can draw considerable private investments and achieve ground-breaking impact on competitiveness. ECSEL has aligned national and EU industrial strategies beyond research and innovation and reversed the decline in production of digital components and embedded software in Europe. The €500 million invested by the EU in 2014-16 have drawn in 4 times that amount in additional investments from public & private sectors and secured leading positions in micro- and nano-electronic equipment, sensor technology and low power electronics; all essential for the data infrastructure, the Internet of Things and the next generation of mobility.

This experience points the way ahead for the future, for example for pooling resources from the EU, Member States and the private sectors under a common R&D&I European strategy on HPC which encompasses the full HPC ecosystem and creates world-class leading **HPC infrastructure**, something that no single European country can afford to develop alone.

Artificial Intelligence – the next digital revolution

Artificial intelligence (AI) will be one of the key drivers of economic development in the future. Ever more autonomous robots are used in factories, homes, cities and hospitals; all major car manufacturers are developing self-driving cars, and machine learning techniques are today at the heart of online platforms.

This technology could contribute up to €15.7 trillion to the global economy by 2030 and it can bring solutions to some of the world's biggest societal challenges, such as treating diseases and minimising environmental damages of farming. At the same time, the emergence of AI also leads to fears related to the impact that robots will have on jobs and the labour market.

The European Commission is looking at how to ensure a focused and ambitious EU action on autonomous systems and AI. The goal is to ensure that Europe counts with an integrated vision for technological leadership, legal certainty and increased societal acceptance in this ground-breaking technology. Current and future research & innovation programmes cooperating under a Europe-wide strategy have a key role to play to build Europe's technology base, to overcome fragmentation, and to support roll-out of advances into innovative applications.

FOSTERING INNOVATION IN SECTOR-SPECIFIC DIGITAL INDUSTRIAL PLATFORMS

In addition to the technology-oriented PPPs, other partnerships and collaborations focus on the application of different technologies in specific industrial sectors. That is the case for the PPPs on Factories of the Future (FoF) and Sustainable Process Industry (SPIRE) and also for the EU collaboration around connected & automated driving. Specific Focus Areas in the EU's Horizon 2020 programme support actions across several industrial sectors, such as IoT and Digitising Industry.

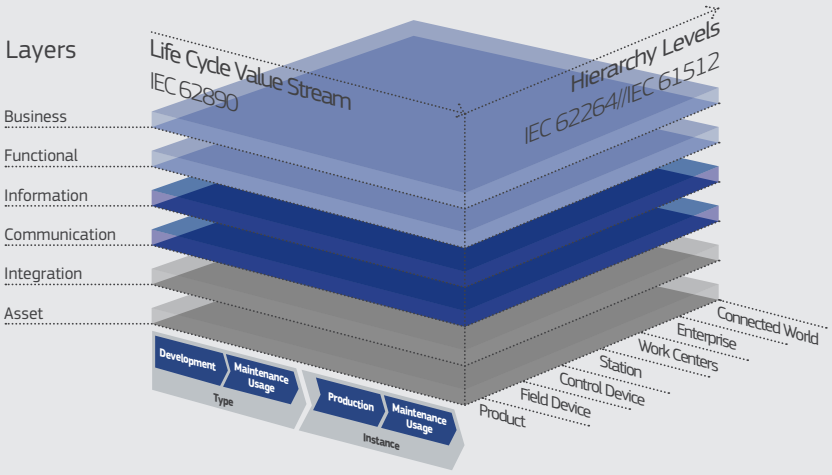
They emphasise the importance of the integration of key technologies into future sector-specific digital industrial platforms covering full value chains across the EU, and of large-scale piloting and experimentation to gradually develop and mature such platforms.

Similar in importance as online platforms in the consumer market, digital industrial platforms are key to place Europe in the lead of digital transformation. Digital industrial platforms combine various functions implemented by different technologies via clearly specified interfaces, and make data available for use by applications. For instance, in a smart factory, a platform could take data from the machines on a shop floor, make it accessible to monitoring and control applications, allow third-parties to develop applications based on that data, and also connect different stakeholders such as users and application developers. Equipped with appropriate business models, digital industrial platforms ultimately create ecosystems of different groups of market actors in a multi-sided marketplace.

These ecosystems are very important because in order to create new innovative products and services, industries need to agree on how technologies can be integrated. Nowadays, few individual companies are able to cover the whole value chain themselves; they need the products and services of other companies and vice versa. Therefore, companies in a certain industrial sector need to agree on how their technologies and systems can be integrated, what the interfaces are and how specified functions can be implemented. These industry agreements or platforms are crucial to create new markets and opportunities for Europe.

Promising digital industrial platforms building on European strengths:

- **Digital industrial platforms for the connected smart factory** will support much higher levels of distribution and customisation of manufacturing processes across the value chains, with businesses being able to cater to the needs of individual consumers. Interoperability will be supported by following widely accepted reference architectures, such as RAMI 4.0 (Reference Architecture Model Industry 4.0). RAMI gives a framework to position different applications, specifications and standards with respect to each other, promoting common understanding.



Source: Plattform Industrie 4.0 and ZVEI

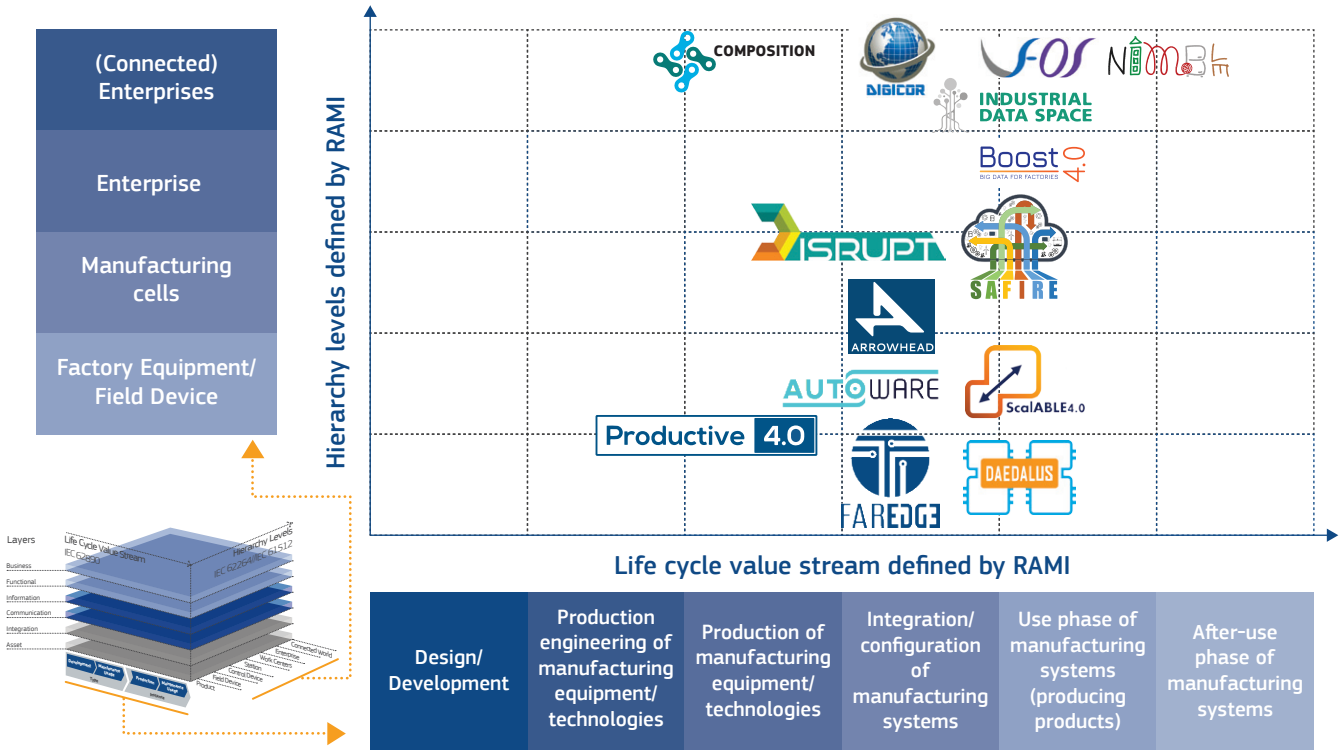
- **Industrial data platforms** offer virtual environments that facilitate the exchange and connection of data between different companies within a secure business ecosystem. This also requires shared standards and common governance rules such as the Industrial Data Space (IDS). This initiative was launched in Germany in 2014 and has led to a consensus among a large number of research & technology centres and industrial actors across the EU, paving the way for an internationally accepted standard.

- **FIWARE** is an open platform that consists of a set of high-level software components available to anyone today. All components come with public specifications and an open source reference implementation that can be used freely. FIWARE components (or 'enablers') are used by startups, SMEs and large enterprises in a wide range of industrial sectors, such as manufacturing, agriculture and smart cities. FIWARE has been initially developed by the Future Internet Public-Private Partnership.

INVESTING IN PLATFORMS AND PILOTING IN HORIZON 2020

In 2016 and 2017, the European Commission invested €100 million in Large Scale Pilots to foster the deployment of IoT solutions in Europe in smart living, smart farming & food security, smart cities, wearables, and autonomous driving. In the Factories of the Future PPP, €70 million are invested in reference implementations and pilots of platforms for the shop floor and for collaborative manufacturing. In 2016, in the ECSEL Joint Undertaking, Member States and the EU invested around €100 million with equal share in Lighthouse Initiatives fostering the adoption of microelectronics components and cyberphysical systems across full value chains in production and mobility.

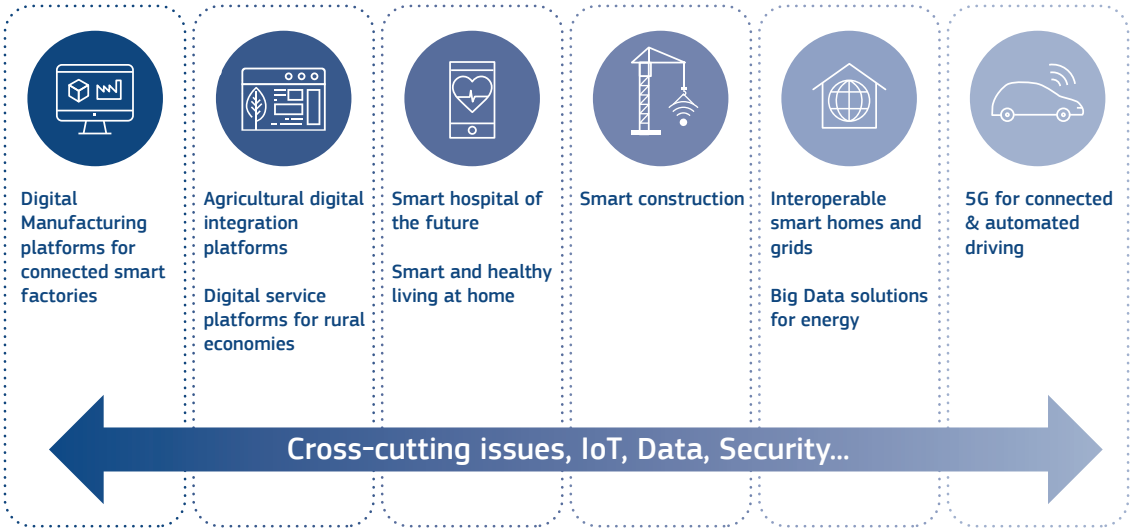
Mapping EU platform projects on the RAMI 4.0 reference architecture model



Note: This includes a portfolio of more than €100 million EU investment across different projects

CONNECTED FACTORIES

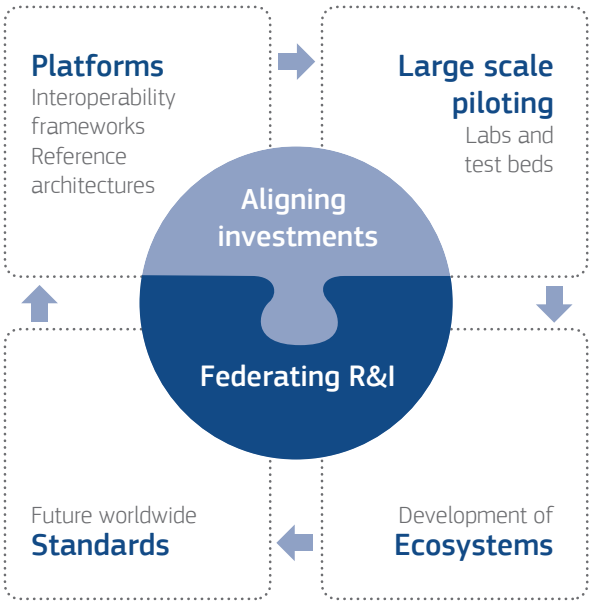
For the period 2018-20, with an investment of around €300 million, the EU is reinforcing its support to strategic next-generation platform building and piloting through large scale federating projects. The aim is to foster user-supply cooperation and link Member States and industrial investments under common EU-wide strategies:



In order to increase the chances of wide deployment of industrial platforms, any of the 10 – 20 projects to be supported must address the full cycle from platform development and piloting to ecosystem building and standardisation:

- **Platform building:** digital industrial platforms need to be designed and implemented via open specifications and reference implementations, preventing dominant positions of individual players and allowing all the actors to take part.
- **Large-scale piloting:** large scale testing and experimentation pilots are necessary to validate digital industrial platforms in both controlled environments and in real-life use cases across application fields.
- **Ecosystem building:** the take-up of digital platforms is fostered by enlarging the ecosystem of actors involved – in particular SMEs – in the development, validation, and deployment of these platforms in applications. This incudes devising appropriate business models involving platforms.
- **Standardisation:** setting up common rules on compatibility, interoperability, quality and safety of platform components and interfaces is essential to make platforms work in real markets.

As far as appropriate, projects shall federate and extend on-going initiatives and deploy testing facilities across the EU. This is key to achieve a significant multiplier effect for EU investments under common EU-wide strategies, leading to alignment of national programmes and ultimately to strengthening competitiveness of EU actors.



STANDARDISATION

In the digital world, billions of connected devices – including smartphones, cars, household appliances, and sensors – should communicate safely and seamlessly, regardless of their manufacturer, technical details or country of origin. For this they need a common language: standards.

However, the rapid change and increased convergence of digital technology means that the traditional standard setting process falls short. This prevents European companies from scaling up in the face of fierce global competition. Moreover, digital businesses increasingly define standards outside traditional standards developing organisations, and often outside Europe.

Whereas standardisation primarily is industry business, EU-level strategies and actions help to coordinate and strengthen EU positions:

- Synchronisation and coordination at European level of scattered standardisation efforts related to the digital transformation of industry helps consolidating EU positions and strengthening EU actors in international fora. This is an area where standardisation working groups in Member States and in PPPs, Europe's Multi Stakeholder Platform on ICT Standardisation as well as the European standardisation organisations ETSI, CEN and CENELEC play a crucial role.
- Industrial platform building and large-scale piloting are bottom-up processes that enable European industry to accelerate and lead the development of worldwide standards.

4.0

A REGULATORY FRAMEWORK FIT FOR THE DIGITAL AGE

A digital-friendly regulatory framework is important for EU's industry and economy to strive. The **Digital Single Market strategy** adopted in May 2015 paves the way in this direction with the goal of opening up new opportunities and enhancing Europe's position as a world leader in the digital economy.

The Digital Single Market strategy has already outlined several measures that can have a key impact on European industries, companies and SMEs. Some of the most relevant for the digitisation of industry are the proposals on cybersecurity and free flow of non-personal data.

In the near future, the European Commission will also address other issues such as the relations between online platforms and the businesses that use them. The aim is to increase transparency and trust in the online platform ecosystem. New measures will also aim to support the timely detection and removal of illegal content by platforms, while preserving the freedom of expression.

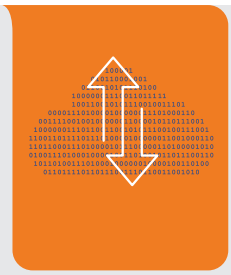
Another key area for action, as stated in the Digital Single Market mid-term review, is the liability challenges emerging from the Internet of Things and artificial intelligence. These technologies are making it possible to develop new autonomous products and services such as smart homes and more intelligent robots. However, this also poses challenges in terms of liability in case of damage or incidents caused by these products, so the European Commission is assessing possible ways of approaching these issues.

Completing the Digital Single Market could contribute **€415 billion per year to the EU's economy**, create new jobs and help sectors such as industry to fully benefit from digital opportunities.

Cybersecurity

Cybersecurity is essential for fostering trust and a prosperous economy and society. To equip Europe with the right tools to deal with cyber-threats, the European Commission has proposed a full set of new measures. One of them is a permanent and stronger mandate of ENISA, the **EU Cybersecurity Agency**, which assists Member States and EU institutions in strengthening cyber resilience. The European Commission also proposed a new **European cybersecurity certification framework** that will support an increased uptake of certification, which is a key instrument to ensure that products and services in the digital world are safe to use. Additionally, the Commission in the course of next year will explore the creation of a network of **European Cybersecurity Competence and Research Centres** with a EU centre at its heart that will help develop and roll out the tools and technology needed to protect Europe from cyber-threats.

Free flow of non-personal data



Data has become the most valuable resource of the global economy. This asset brings new opportunities to all sectors. Removing localisation restrictions is key to unlock its full potential. The European Commission has proposed a regulation on free flow of non-personal data to address this challenge.

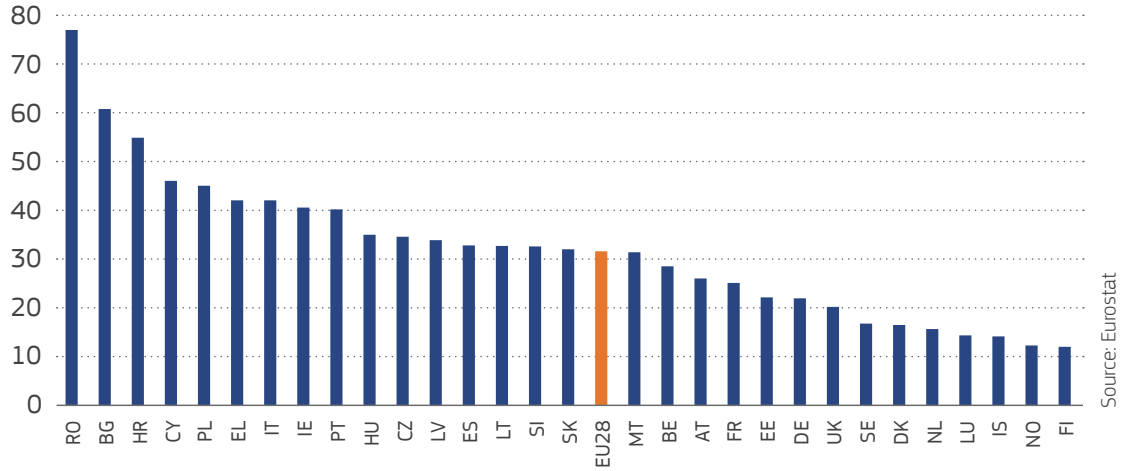
The proposed measures, together with the General Data Protection Regulation (GDPR), will create **a common European data space** without unjustified or disproportionate national rules restricting companies' location choices for data storage and processing. Companies will have greater flexibility, cost efficiency and legal certainty to digitise their data. As a result, Europe's data economy could double its value to 4% of GDP in 2020 and create more than € 1.9 billion additional revenue in manufacturing, which is the sector that will benefit the most.

5.0

PREPARING EUROPEANS FOR THE DIGITAL FUTURE

The digital transformation is structurally changing the labour market and the nature of work. These changes may affect employment levels, the types of work available and the distribution of income. To make the most of the digital transformation and ensure all Europeans are ready for these changes, major investments in reskilling citizens are needed.

Share of labour force with no or low digital skills



No or low digital skills (% of individuals in the active labour market) - 2014

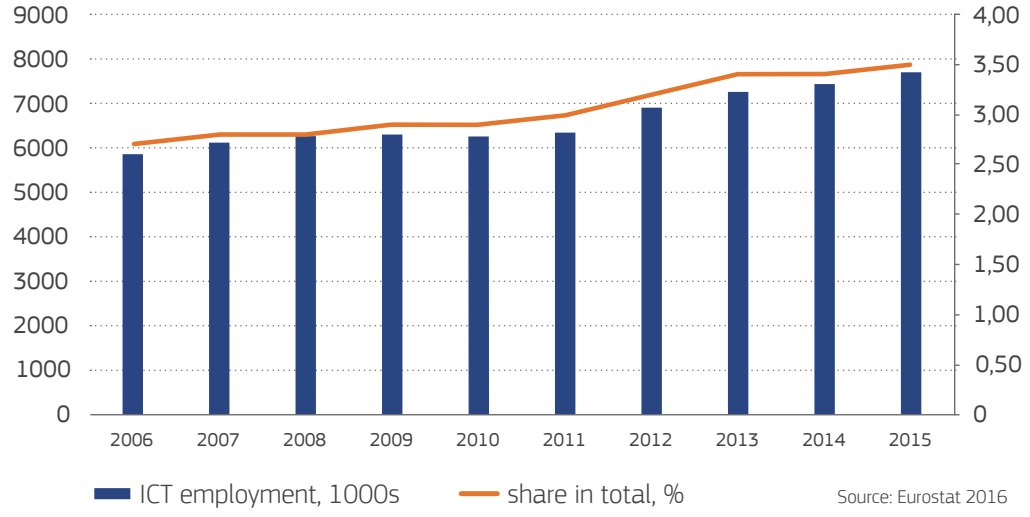
Adapting the workforce and our education and learning systems is a key priority of the Digitising European Industry (DEI) strategy and more broadly of the Digital Single Market strategy. While competence for education and skills policy lies mainly in the hands of the Member States, the European Commission has a complementary role where its actions coordinate and support those of Member States. As such, it has launched several initiatives to support actions in this direction. In particular:

DIGITAL SKILLS AND JOBS COALITION

The Digital Skills and Jobs Coalition (DS&JC), launched on 1st December 2016 as one key action of the European Commission's new Skills Agenda for Europe, brings together Member States, companies, social partners, non-profit organisations and education providers to take action to improve digital skills of all types in Europe. More than 280 members have already joined the initiative, with 70 making concrete pledges to provide training to the unemployed, offer massive open online courses (MOOCs) or deliver cutting-edge training to ICT specialists, for example. Some of the key objectives by 2020 are to train 1 million young unemployed people for vacant digital jobs and support upskilling of the workforce, especially in SMEs.

- ***Digital Innovation Hubs can play a key role in this respect by broadening the training and skills development they offer – a key target within the DEI strategy. Aligning this offer with the DS&JC will further multiply the results.***

Employment of ICT specialists in the EU in absolute terms and as a share of total employment, 2006-2015



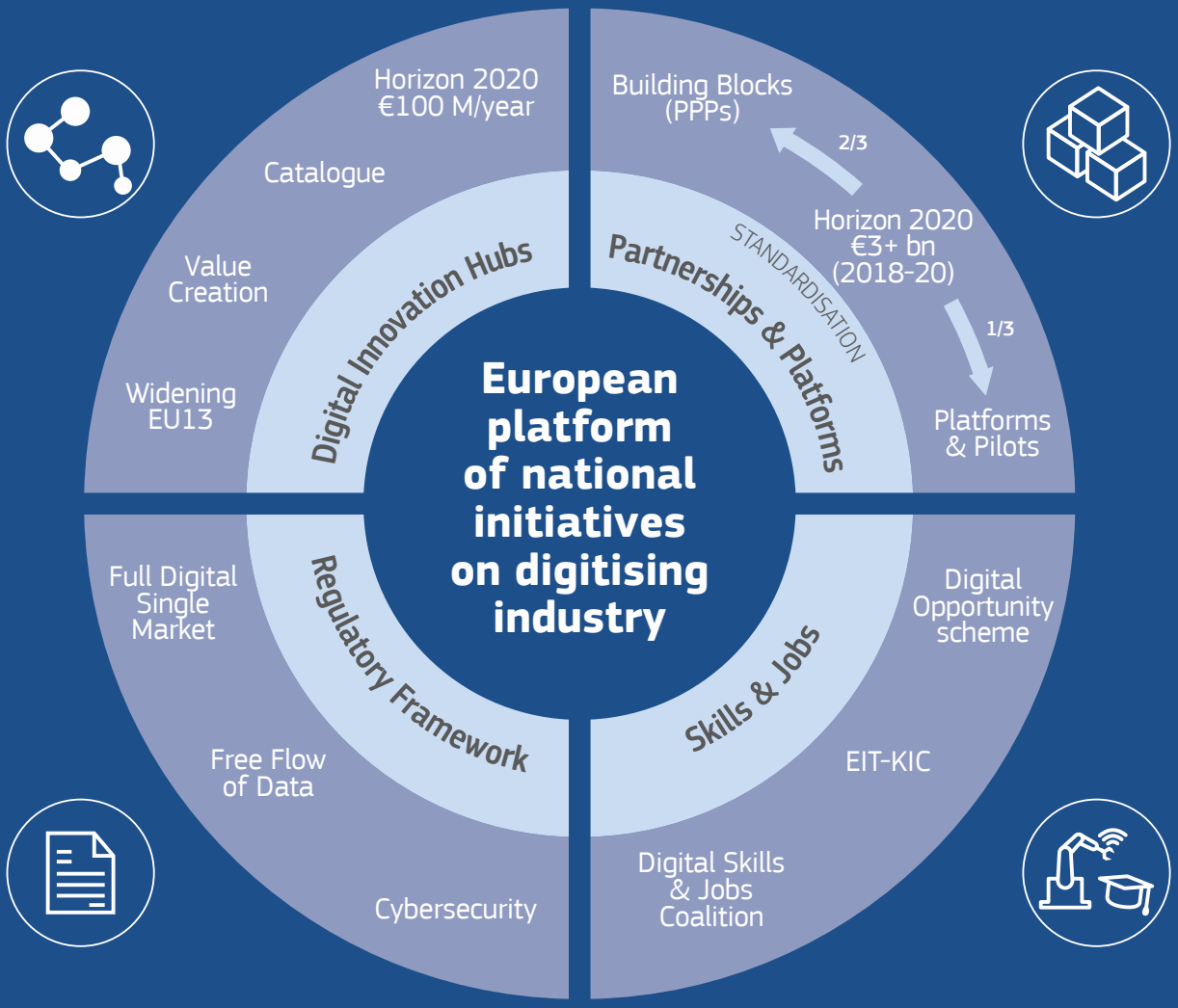
Source: Eurostat 2016

DIGITAL OPPORTUNITY SCHEME

The recently launched «Digital Opportunity» pilot scheme, funded with €10 million from Horizon 2020, offers students and recent graduates the opportunity to carry out a paid cross-border traineeship with the aim of improving their digital skills. The pilot project will be implemented through the mechanisms of Erasmus+ and will provide students with hands-on experience in key fields such as cybersecurity, data analytics, quantum, artificial intelligence, programming and software development. The traineeships will take place over the period 2018-2020. If successful, it is hoped to expand the initiative in the future.

- ***Digital Innovation Hubs will be involved in this programme, offering traineeships in relevant domains and ultimately helping to make Europe's workers ready for the digital age.***

THE DIGITISING EUROPEAN INDUSTRY STRATEGY AT A GLANCE



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