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BUSINESSEUROPE RECOMMENDATIONS FOR A SUCCESSFUL DIGITAL TRANSFORMATION IN EUROPE

EXECUTIVE SUMMARY

The ongoing fourth industrial revolution is radically modifying the global economy, and particularly manufacturing and industry-related services.

Europe needs a true digital transformation to regain global competitiveness and deliver growth and jobs. If we succeed, Europe could see a gross value add worth 1.25 trillion euros by 2025 in manufacturing alone.

Europe needs an overarching shift to become the most dynamic digital growth region in the world, taking into account the digital economy's global nature and business integration in global value chains, requiring more **global convergence** of rules and standards.

This means **accompanying change**, avoiding focusing primarily on possible risks and shift the **approach to regulation**. This can be achieved in particular through:

- A **comprehensive and coordinated strategy**, avoiding fragmentation while looking at national best practices and encouraging the creation of digital ecosystems across the continent, especially for SMEs and start-ups.
- A **digital transformation roadmap** based on achieving robust and cyber-secure infrastructure, first class manufacturing, supportive and market-relevant standards, interoperability, strong intellectual property and European technological solutions.
- Guidance and support to **embrace digitalisation** for all companies and SMEs in particular, reversing inadequate trends in **technology and innovation investment**. This can be achieved through raising awareness, encouraging financing and supporting R&D.
- Adopting an innovation-friendly approach to data to empower the digitalisation process and offer robust solutions for smart and big data applications throughout value chains. This requires also a balanced approach to the issue of **access for third parties to non-personal, machine-generated data**.
- An assessment on how best to adapt labour markets and work organisation in order to derive maximum benefits of the digital transformation for business and workers. Adaptation to the increased **work flexibility** and the **skills** required is essential.
- Understanding the challenges of digital transformation and **encoding digitalisation in EU policy and in the European economic DNA** in order to allow businesses and citizens to take advantage of this massive potential.

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Introduction

Digital transformation is crucial to ensure Europe's competitive advantage in the global economy and deliver growth and jobs. With a completed and fully functioning Digital Single Market in Europe, it is estimated that Europe will gain 4% of GDP by 2020.

Digital is borderless by definition and allows real-time connections between countries, companies, objects and citizens. Digital can truly be at the heart of Europe's recovery, but only if the EU triggers a real digital transformation and brings forward globally competitive propositions via distinctive innovation. In order to take full advantage of the digital transformation and compete effectively worldwide, the EU must timely complete the European Digital Single Market, ensuring free movement of goods, people, services, capital and data. This will allow and encourage individuals and businesses to seamlessly transfer, access and exercise online activities, ultimately defining a new scenario for doing business in Europe.

A fourth industrial revolution is ongoing and is radically modifying the economy, the functioning of manufacturing and industry-related services. It is improving products, processes, business models, value networks, information management, and is affecting workplaces, employment relationships and business strategies.

Digital technologies are delivering cross-sectoral efficiencies to business, including SMEs. The Internet of Things (IoT) is also a reality. The market for IoT components and systems has grown 160 % in 2013 and 2014, and is still expected to grow more than 30% in the next ten years. This can have a total potential economic impact of 3.4 to 9.8 trillion euros per year in 2025 (depending on the factors impacting on its development, such as declining technology costs and users' level of acceptance) and be equivalent to about 11 % of the world economy in 2025.

By 2025, Europe could see its manufacturing industry add a gross value worth 1.25 trillion euros. To the contrary, if we fail to turn the digital transformation to our advantage, the potential losses can be up to 600 billion euros by 2025 – i.e. losing over 10% of Europe's industrial base¹. Also, if we cannot leverage the potential of the digital revolution, the EU's stated aim of increasing manufacturing's share of European GDP to 20 % by 2020 will be simply out of reach.

Digital transformation is based on a growing ecosystem of advanced computing, data analytics, low-cost sensing and communication devices, new levels of connectivity, IT applications over the Internet, combined with business services know-how, that impact all value creation drivers and force companies in all sectors to rethink their business models. This means reduced costs and improved efficiencies, greater speed and scale, smarter products and services. Ultimately it enables first-time-right design and zero-defect, demand-driven production.

Digital is also one of the elements supporting and advancing **servicification, with increasingly integrated services elements throughout the industrial value chains.** For most modern industrial companies, the manufacturing and services elements are so highly intertwined that it is not possible anymore to categorise them into different sectors. As services are where much of the competitive advantage, profits margins and revenues lie, servicification can highly benefit European competitiveness.

¹ *The digital transformation of industry*, Roland Berger and BDI, March 2015, http://www.rolandberger.com/media/pdf/Roland_Berger_digital_transformation_of_industry_20150315.pdf



But there is much more to it than that. Digital provides companies possibilities to shorten time-to-market, increase flexibility and product customisation at cost of economies of scale and ultimately leads to greater customer choice and satisfaction, bringing better commercial results of both existing and new products. This can be amplified by **ensuring governments and public administrations also embrace digitalisation to the full**, including in the provision of public services. E-health is a clear example of this approach, which can lead to great efficiencies and immense societal benefits.

In order to allow businesses and citizens to take advantage of this massive potential, it is essential that EU policy makers not only understand the challenges that this transformation is bringing about and address them appropriately, but also **encode digitalisation in EU policy and in the European economic DNA**.

New challenges for a new environment

The EU has the potential to become one of the most dynamic digital growth regions in the world. But for that to happen, we need the right conditions for innovation, **accompanying change and avoiding focusing primarily on possible risks**.

Trends in relation to the gap between Europe and other regions of the world (e.g. US and Asia) in crucial aspects like the **level of technology and innovation investment**, as well as the **approach to regulation and its proliferation** have to be reversed.

Legislators need to take into account the digital economy's global nature and the consequent **increase European business' integration in global value chains**. This requires more global convergence of rules and standards. Otherwise, a regional approach to a global phenomenon risks conflicting with today's and tomorrow's business models.

Several specific areas need to be addressed if Europe wants to make the most out of the digital revolution:

- **A European model for digitalisation**

Many countries are looking at digitalisation to make the most out of their competitive advantage. Europe is a world first class manufacturer, but is less advanced in ICT as well as in business services. The EU is the only major economy where investment in broadband has declined. Only eight of the world's top 100 high-tech companies have their headquarters in Europe. The EU is still lagging behind major competitors in R&D investments and turning them into marketable products or services. Emerging economies like China are rapidly catching up as the competition for global innovation leadership positions. R&D investments in the EU are hardly on track to reach 3% target by 2020.

In this context it is key that Europe encourages digitisation of industry and develops a comprehensive and holistic strategy, based on first class manufacturing, adequate protection of privacy, confidentiality and integrity of data, supportive and market-relevant standards, interoperability, strong security and intellectual property and European technological solutions (through fablabs, large scale pilots, specialised competence centres, supply ecosystems by promoting broad-based, open, interoperable, horizontal, digital platforms that any business can use to make its products, processes or services ready for the digital age – e.g. Smart Cities – and governments leading by example). To ensure the best opportunities for growth, jobs and new innovations, such a strategy has to

be well coordinated between Member States and at European level, avoid a fragmentation of national approaches, ensure compatibility at international level, while also look closely at national best practices and encouraging the creation of digital ecosystems across the EU, especially for SMEs and start-ups.

- **A holistic approach**

Turning industry digital is not only about investment in digital tools and technologies. Digital is disruptive and companies need to rethink their value chains and way of doing business. Areas like resource processes, asset utilisation, labour, inventories, quality, supply/demand match, time to market, after sales services will have to be redesigned in a digital mode to achieve full productivity return. This process will need massive knowledge input particularly for SMEs. Business services, universities and research centres will have a fundamental role in providing this critical knowledge base to manufacturing companies. European and national fora focused on digital manufacturing are tools to increase awareness and facilitate knowledge and technology transfer to benefit all stakeholders.

- **Embracing transformation**

Figures show that a very limited number of companies have developed a comprehensive investment strategy to grasp the potential of digitalisation. The use of advanced digital technologies such as mobile solutions, social media, cloud computing and big data is low, with 1.7% of EU enterprises making full use, and 41% no use. This issue needs to be addressed, because all companies – of any size and in any sectors – can benefit from digitalisation.

Digitalisation is still insufficient in particular for SMEs and in the less technologically advanced regions of Europe. A recent report by the European Commission's Joint Research Centre shows that the negative impact of distance on trade costs matters four times less online². This means that increased digitalisation could actually result in a more inclusive environment, in which SMEs can benefit from huge growth opportunities, no matter if they are located in more remote or traditionally less prosperous regions in Europe. As a result, it is key that all businesses independently of their scale or of the place they operate from are able and encouraged to grow and improve their efficiency and competitiveness thanks to digitalisation.

- **Clarity in the approach to data**

Digitalisation of industry is mainly based on connectivity, collection and analysis of data, not only personal data, but also non-personal/industrial data, for example data produced by machines. Currently, there is a certain degree of legal uncertainty in this field. Today, businesses are using in most cases contractual solutions in order to address issues related to ownership, collection and processing of data. Clarity in roles and liabilities for the treatment of these data is crucial. In addition, it is important to recognise that different categories of data have to be treated differently with different rules applying for their use.

As Europe competes in a global market, the European legislative framework must allow European companies to compete globally. It is important to analyse the current legal situation identifying where the gaps are. This does not mean automatically that legislation

² *The drivers and impediments for Cross-border e-Commerce in the EU*, Estrella Gomez-Herrera, Bertin Martens and Geomina Turlea, JRC Technical Reports, 2013, <http://ftp.jrc.es/EURdoc/JRC78588.pdf>

should be proposed. Policy makers must refrain from rushing into regulation, but rather carefully assess if and where action or coordination at European level are needed.

- **Labour markets needs and skills demand**

Digitalisation offers opportunities for companies – e.g. new forms of communication and production and increased efficiency in business operations. Through digitalisation the ability to react quickly and flexibly to individual customer requirements and to supply “on demand” will be essential to maintain the competitiveness of European industry.

There are also opportunities for workers, e.g. more autonomy and flexibility in work organisation, more possibilities to balance work and private life, more learning opportunities as well as access to more potential work opportunities. Some existing jobs and areas of activity will evolve; some jobs will disappear, but new activities will appear, leading to overall employment gains. Using the example of Germany, the Boston Consulting Group³ forecasts that by 2025 the introduction of digital industrial technologies will lead to a 5% net increase of jobs, in particular in IT and data science.

The key challenge is to adapt EU and national skills policies to better meet the rapidly evolving labour market needs generated by the digital economy. This challenge is more acute and immediate in the ICT sector, but digitalisation will lead to new skills needs in all sectors. BUSINESSEUROPE and the other cross-industry EU social partners agreed to work on skills needs in digital economies as part of the EU social dialogue WP 2015-2017.

Recommendations to enable digital transformation

BUSINESSEUROPE would like to present its recommendations on the following aspects:

1. Adopt an innovation-friendly approach to data

Our regulatory framework, in particular concerning collection, use and analysis of personal and non-personal data, must empower the digitalisation process that will fuel growth in Europe. Legislation must enable data-driven innovation, with appropriate rules striking the right balance between **protecting EU citizens’ rights and facilitating the free flow of data** in the single market. New rules should also ensure clarity between the role of data controllers and processors. While companies should freely decide where their data is physically stored, there should not be forced data localisation policies, as companies need data to flow freely within the EU single market and beyond to be able to function.

A starting point could be to incorporate privacy by design features to certain machines producing data – reflecting the type of process, the needs and the risks involved and avoiding a top-down, one-size fits-all approach. This would allow transparency and control over what is collected and aggregated (and to whom it is disclosed). Where possible data can be technically anonymised or pseudonymised to facilitate and secure their usability. Legislation or guidelines should incentivise pseudonymisation. Pseudonymisation is not just one of more possible tools to improve data security because processing pseudonymised data significantly decreases risks for the rights and interests of data

³ Man and Machine in Industry 4.0, Boston Consulting Group, September 2015, https://www.bcgperspectives.com/Images/BCG_Man_and_Machine_in_Industry_4_0_Sep_2015_tcm80-197250.pdf



subjects. A consistent approach to **anonymisation and pseudonymisation** may offer robust solutions for smart and big data applications.

It is also key to carefully assess and define a balanced approach to the issue of **access to data for third parties**, and particularly to non-personal, machine-generated data. While openness is essential for the digital economy's development, it is also important to take into account negative developments potentially resulting from unlimited third-party access to data, in particular from the perspective of who has already carried the burden of pre-investment costs. Any debate on potential legislation in this field on the question of data ownership has to be based on thorough analysis of pros and cons of any solution. Caution also applies to granting open access to research data from private-sector R&D or from public-sector research performed in collaboration or (co)financing with industry.

2. Ensure standards enable interoperability and digital industrial processes

Standards are extremely important to enable digital industrial processes. Many products will only be ready for market if they can be integrated into worldwide information and communication networks. Interoperability is therefore key. The ability of connected machines to work together is absolutely critical to unleash the potential of digitalisation – without it, 40% of potential benefits of Internet of Things cannot be realised⁴.

To facilitate innovation, standards enable interoperability between digital processes, digital devices or digital processes and physical machines. It is also desirable that management software is interoperable. Workflow management (for instance, information related to production localisation) must be digital as much as possible. For this, it is first necessary that the manufacturing and digital sectors interact with each other on data and information via standardised procedures. **Digitalisation needs standards based on a broad consensus between all stakeholders.** Giving a more prominent role to business in standards development processes and using a bottom-up approach are the only ways to ensure market relevance to achieve wide acceptance and application.

European businesses place great importance on international standardisation in digital. As the competitiveness of digital products and processes rely on their ability to be globally competitive, the standards supporting them should be globally relevant. Businesses therefore choose standards development organisations that produce globally implementable standards. This is on an equal footing to targeting bodies that have leading expertise in the appropriate technological field.

Regulators should not set technical standards or mandate specific technologies. They should focus on stipulating the basic requirements related to public interest such as safety, security and privacy, relying on the available expertise and processes governed by the ESOs in these areas to contribute to standards that serve public interests as articulated in regulation. Involvement by authorities to correct shortfalls should be exceptional rather than routine. A **bottom-up approach to digital standardisation** is needed if Europe is to keep up with the pace of technology. For example, the GSM or DVB standards were not mandated as such by the Commission or set by Member states. However both standards were strongly supported by both through infrastructure investment and collaborative direction setting - governments can play a helpful role in this area.

⁴ The Internet of things : Mapping the value beyond the hype, McKinsey Global Institute, June 2015, http://www.mckinsey.com/insights/business_technology/the_internet_of_things_the_value_of_digitizing_the_physical_world

3. Enable investment and roll-out of digital infrastructure

A robust infrastructure is the backbone of the digital economy and ensuring the right incentives for private investment to take place is a fundamental prerequisite to EU industry's digitalisation. The success of the digital transformation relies on no-gaps broadband networks and the guarantee of a high quality of service for mission-critical applications. Plant and machinery must be connected as extensively and securely as possible. It needs to support accelerated demand for mobility and data access. Ubiquitous high speed networks are the key enabling technology for the full realisation of an industrial Internet. The upcoming review of the EU Telecom rules will be an opportunity to achieve these objectives.

Competition and strong incentives for continued investment in the EU on broadband infrastructure will be essential to meet the exponential connectivity and quality demands associated to digitalisation with particular attention to industrial areas often left behind when located outside the urban areas. As foreseen in the Juncker's investment plan, investments must be particularly directed towards the development of high speed networks and the adoption of digital technologies by SMEs.

Greater harmonisation in spectrum allocation is also important to meet the increasing demand for connectivity. The application of various national policies across the EU creates inconsistencies and fragmentation of the single market, which hamper the roll-out of services and the completion of the single market for wireless broadband communications. Greater coordination and consistency would also enhance the predictability of the network investment environment.

At the same time, implementation of the recent **net neutrality** rules must ensure the best effort principle and guaranteed quality classes. Ensuring the Internet remains open and accessible to all is crucial to sustain further growth and increased usage. But it is also important to adhere to the differentiated demand for connectivity at different quality levels. This is particularly indispensable for safety or real-time critical applications, such as smart grids or emergency stops in wireless factories.

Looking at aspects related to **logistics**, focus on networks should take into account different sectors and their relations to digital infrastructure, for instance e-retailers and delivery services. The degree to which overall benefits of digitalisation are achieved is dependent on the effective interconnections between these sectors and actors. What has begun with a stronger digital networking between companies and transport modes will develop to fully automatic logistics systems. Production and intra-logistic processes implicate new requirements for transport and trade logistics. Transparency, affordability and reliability have to be a common basis for interaction by all involved. For a multitude of stakeholders ranging from global shipping businesses over national operators to small and local delivery companies, digitalisation drives demand for new products and services. Price transparency, interoperability and access where required by markets and legislation are key. It is commendable that a number of steps are already being taken, for example with new Europe-wide cross-border solutions especially tailored as a response to market demand driven by digitalization.

4. Ensure the highest possible degree of cybersecurity

In a connected world, machines and elements of sometimes globally organised supply chains will exchange data with each other. Any chain is just as strong as its weakest link.



In order to ensure the reliability of these systems and to protect data of persons and machines, **a high degree of cybersecurity is indispensable.**

It is necessary to **raise awareness**, especially vis-à-vis SMEs, about the need to enhance cybersecurity, the adequate instruments to prevent and react to threats and the existing best practices within the EU and beyond. Fora for exchange of information must be created and further supported at EU and global level.

Specific application - CLOUD COMPUTING

The growing use of cloud is more and more inevitable for companies in the framework of industrial digitalisation. Cloud delivers not only savings to companies related to their IT systems, but it also responds to a specific strategic vision (for instance, allowing the co-existence of different IT systems after an acquisition). Promoting the use of cloud in Europe is key. Some specific elements must be taken into account:

➤ **Defining and balancing responsibilities**

In terms of data protection, cloud users are data controllers, responsible for any data breach and for compliance with data protection regulations. The cloud user makes sure through the contract that appropriate security measures are put in place by the cloud service provider. It is important for legal clarity that there is a clear distinction between the responsibilities of the data controller and data processor. There is already a provision in the current legal framework, in the EU model clauses for the data subject to pursue the processor in cases of negligence. The future application of data protection rules should not create a system of joint and several liabilities which would hamper the development of cloud in Europe.

➤ **Transparency on applicable rules and requirements**

In order to reinforce security and trust in the cloud, which is a pre-condition for cloud uptake, transparency can be achieved by setting up a checklist of cloud contracts requirements:

- list the countries where data is likely to be located, including those from which data access can occur (e.g. in case of remote maintenance);
- list of cloud supplier's subcontractors;
- provider's contractual obligations (safety, responsibility, confidentiality, reversibility, data protection).

➤ **Promoting cloud certification**

Voluntary certification based on international standards can be very useful in ensuring state-of-the-art security measures and legal compliance.

Cooperation must take place between public and private actors to foster innovation, exchange information and disseminate best practices on cybersecurity. The role of industry self-regulation must be recognised as a capital factor, as companies are best placed to rapidly recognise and respond to cyber threats. This will help achieve ad-hoc flexible solutions adapted to rapidly changing environments and to the new security needs that, by the contrary, rigid rules cannot achieve.

5. Seize the opportunities of digitalisation at the workplace

Europe needs to assess how best to **adapt labour markets and work organisation** in order to derive maximum benefits of the digital transformation. A process of adaptation to the **increased work flexibility required by digital industries is essential**. Production shifts can have different starting times for each worker. In the future, machine operators might even work for different companies on different days of the week.

Our working time and employment regulations should be sufficiently flexible and support EU businesses competitiveness in the digital age. This will depend more and more on the ability to react quickly and flexibly to customer requirements and to supply 'on demand'.

Ensuring people have appropriate skills is also crucial. To come to grips with the complexity of the digitalised industry, the workforce must be able to think and act across systems. For example, an engineer in a technology enabled factory must not only understand production processes and manufacturing techniques, but also grasp the underlying IT infrastructure and be aware of the new security risks.

In addition, **new occupations and job profiles are emerging**. For instance, the pervasive information generation in a connected world calls for specialists who filter relevant business information out of the huge data volumes. Skills needed for SME entrepreneurs deserve special focus, to enable them to digitalise and grow their business online.

According to the European Commission, 40% of EU citizens only have a basic level of digital skills. At the same time, the need for digital skills is becoming increasingly pronounced - by 2025 90% of jobs are estimated to require some level of digital skills. The EU must **ensure that education and training systems are adapted** to the ever evolving labour market needs, focusing in particular on STEM skills and digital literacy.

Education systems have to offer **interdisciplinary study programs** that integrate several competences, such as IT with business management or engineering without forgetting the digital art and design. Hybrid models based on combined theoretical and practical learning must also be promoted. Moreover, some innovative approaches to digital skills development, such as the school "42" in France, could be promoted on a European scale.

The upcoming European skills strategy announced by the Commission for 2016 must include a strong emphasis on digital skills. A stronger link is needed between EU higher education priorities - Bologna process, vocational education and training Copenhagen process - and the EU grand coalition on digital jobs and skills, which BUSINESSEUROPE fully supports but has so far not been fully integrated into the EU skills policy.

The development of e-apprenticeships could help to better meet the needs of the digital economy. Education systems also need to improve teachers' training, promote the understanding of programming and coding, and ensure that young people are able to cope with technology and its developments at an early stage.

Likewise, **training and re-training workers and jobseekers is essential to help them keep pace with the advancements of technology and develop their employability**. This is a particular challenge for an ageing workforce. One way of promoting active ageing could be to develop inter-generational approaches by which younger colleagues help older workers develop their capacity to use digital equipment. Teaching methods should reflect the nature of digital economy, e.g. by using open online courses, virtual classrooms, information gathering and analysis using internet and big data etc. BUSINESSEUROPE



supports the idea of a coherent EU strategy for digital learning and open educational resources to be mainstreamed across all education and training sectors, so to efficiently contribute to people's education and training. Attention should also be paid to teachers' skills, to enable them to prepare students to the digital economy.

Digital learning could be particularly advantageous for continuous education and training and in instances in which people are balancing work and private commitments. It can also be a time- and cost-efficient way for companies to offer training opportunities and support the development of employees according to their individual interests and needs. However, not all training needs will be met with online learning. Inter-personal relations and training will remain essential to transfer know-how in many jobs.

6. Take action to encourage investment, support R&D and raise awareness

Facilitating and encouraging financing and investment in the productive sectors and their digital transformation is crucial. In many cases the digital transformation must be carried out in parallel with ongoing routine operation of companies. This implies an increased complexity and a need for funding. With this in mind, we have to design financial instruments that not only allow technological companies to develop new products but also allow the productive sectors to test and refine them as a prior step to their adoption. The imperative of digital transformation does not only concern infrastructure and hardware. Support to digital content, e-commerce and services is absolutely key to succeed in this process. In other words, it is essential to support the early adopters that commit to new technologies for all aspects of business in the early stages, in order to ensure that the life cycle of the new technologies accelerates and achieves critical mass.

It is also imperative to generate fertile ground for transferring technology to the market, something which remains challenging in a fragmented Europe. This is in addition to **encouraging private and public R&D**. In particular, both public and private research institutes and universities should include alignment with the needs of the productive sectors representing the main focus of industrial research as one of their priorities. The use of existing financial instruments, such as Horizon 2020 and the Juncker Plan, should ensure that this objective can be achieved.

Finally, **awareness-raising actions** should be directed to financial institutions to make them more responsive to the potential return on investment in digital transformation and more inclined to finance the material and immaterial investments needed. Also, companies - especially SMEs - should be offered information and guidance at national and EU level to enable them to embrace digitalisation.

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