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The Digital Economy in Southeast Europe

Opportunities and challenges

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- The digital economy represents the future of economic growth in the world and the EU. It is estimated that almost the digital economy will create one million new jobs and more than 500 billion euros of new growth in EU countries by the end of 2020. With unified policies like the Digital Single Market, the EU can offer much to its citizens as well as become more competitive when compared to the US and some Asian countries.

- In terms of digital societies, economy and innovation, there is a gap between Northern and Southern Europe, which can cause even deeper divides in the future with the growth of a digital industry and Work 4.0, especially in the Southeast European countries.

- SEE countries are lagging behind in creating building blocks for a successful digital economy and Industry 4.0. Even though e-government projects have made substantial changes in the functioning of countries and their economies, further efforts are required at both regional and national levels in terms of taxation, social systems, labor laws, the modernization of education, support for innovation, PPP and social dialogue to prepare for Industry 4.0, the sharing economy and e-business.

- Potentials for new jobs, skills and growth in the EU and SEE are huge, but whether these new economic areas will be fair in the social context remains to be seen.

- In order to realize the opportunities of the digital economy in SEE, this paper presents a number of policy recommendations for regional, as well as national levels.

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Summary

The 21st century belongs to the digital economy: the growth of online businesses, e-commerce, the digitalization of industries and easy access to high speed Internet have brought about new challenges in an increasingly globalized world. What was twenty years ago only a small part of the economic trend, today is the mainstream. We can no longer talk or write about the digital economy as a separate part of the world's global trends. Today, the digital economy is the real economy and by the end of the decade it will pave the way for what is referred to as the Fourth Industrial Revolution - full automation and data exchange in production processes, the Internet of Things, Cloud programming, analysis of Big Data and new ways in which computer systems will communicate with people.

According to the European Commission's estimates, in 2020 almost 1 million Information and Communication Technology (ICT) specialists will be in demand in the labor market with the overall value of digital economy amounting to almost 500 billion euros at the same time.

These trends offer many opportunities, but can also pose great challenges for the world of labor, businesses, consumer rights, citizens, and the education system. The European Union recognizes the need to develop, regulate and stimulate a framework for the digital economy in its member states because the digital economy, despite the fact that it is predominantly based on the virtual bits and bytes in cyberspace, is still limited by national legislative barriers, the technological (infrastructure) development of member states, the differences in standards and strategies, digital literacy and low levels of cross-border e-commerce.

In response to all these challenges, the European Union has developed a range of strategies, legal proposals and financial instruments in the field of digital competitiveness and digital economy to ensure that the European Union remains at the top of global competitiveness, while at the same time its citizens and businesses can reap the benefits of the Digital Single Market and the Industry 4.0.

Creating a framework for the functional Digital Single Market is especially important for the countries of Southeast Europe which, despite their leading positions in some segments such as cross-border e-commerce, are still far behind other member states in terms of creating a digital society and economy. SEE region's struggle to reach the EU average in the digitization of the economy and society is partly caused by their exhaustive transition process and political turmoil, but catching up with the rest of the EU in supporting digitalization and innovation can push the region into a new era of economic development and growth.

The aim of this is paper is to contribute to the understanding of the digital economy in the EU, Industry 4.0 and the impact it will have on the Western Balkans.

1. What is digital economy?

The digital economy, also known as the Internet economy, by its definition refers to the economy based on ICT technologies. In today's world the boundaries between the digital and traditional economy have been blurred and we can safely say that *digital is traditional*. The digital economy grows seven times faster than any other branch of economy and produces almost 5 new jobs for every 2 that are lost in the "offline" economy.

The main building blocks of a successful digital economy are supporting infrastructure (networks, telecom, hardware and software), e-commerce and the modernized ways of conducting business, which include new skills and processes. In recent times social networks and Internet platforms have also become essential parts of digital economy.

Given its expected broad impact on society, including new growth and jobs, the European Union has set as its goal the creation of sustainable Digital Single Market with the purpose of harvesting the benefits of the Digital Age. Since 2000 "digital" has been integrated in the heart of Europe's politics through strategies, reports, funds and key polices. But the journey to Digital Europe has taken longer than expected due to the fragmentation in national politics, differing legal frameworks and

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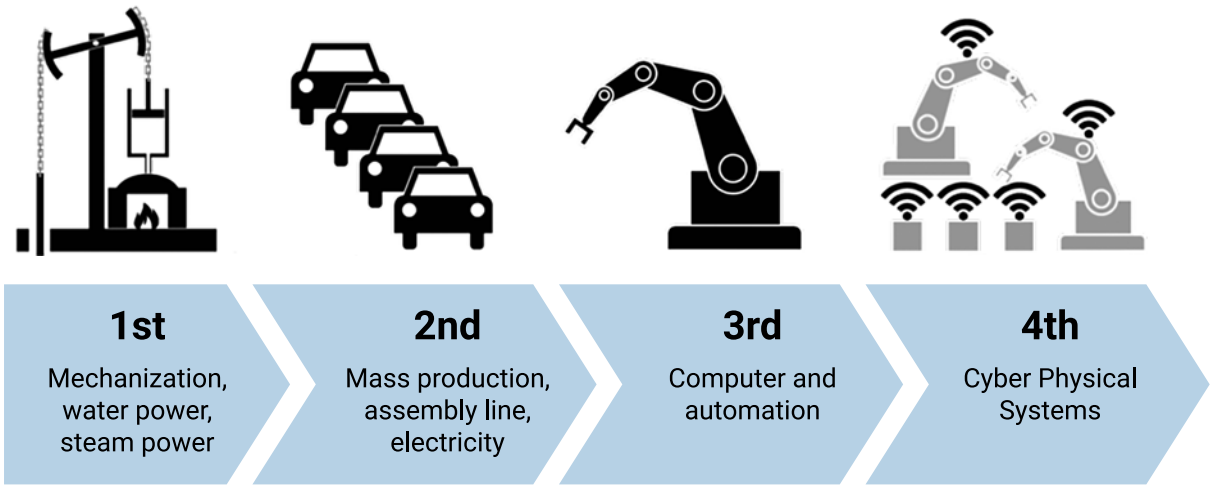
Image 1. Four industrial revolutions



the diverse interests of member states. Now, with the new DSM package it is expected that the EU will have a functional Digital Single Market by year 2020 and a "healthy" basis for Industry 4.0 or the Fourth Industrial Revolution.

Industry 4.0 represents how we are going to live and work in the next decades. It is characterized by the fusion of cyber-physical systems, the Internet of Things and Cloud computing, and it represents a profound transformation of society, production and governance while at the same time blurring the lines between physical and digital spheres. With billions of connected people and devices the possibilities arising from the Fourth Industrial Revolution are almost limitless. Artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3-D printing, nanotechnology, biotechnology, new materials, quantum and Cloud computing are just some of these possibilities. When compared with the previous industrial revolutions, the Fourth is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country bringing new models for growth, better quality of life and development, as well as new challenges. The other side of the Industry 4.0 includes potential problems for educational systems, social welfare, labor markets, and can even trigger greater inequality in society.

2. The road to Digital Europe

2.1 Brief Introduction to Key policy 2000 – 2020

The digitization of the economy and society has been in the center of Europe's key strategies since 2000. The Lisbon Strategy adopted for the period of 2000-2010 stated that by the year 2010, the EU should become "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion."[1] The strategy included a comprehensive reform program and was a response to the global challenges and progress of the US and Japan in the knowledge economy and information and communication technologies (ICT).

Poor coordination between member states, very broadly defined goals and the economic crisis of 2008/2009 spelled failure for the Lisbon Strategy, even though certain progress has been made in the area of digital competitiveness of the EU and its member states. Building on the experience from this earlier period, the EU created a new and more realistic strategy Europe 2020 with the aim of achieving sustainable, inclusive and smart growth by 2020.[2]

1. Lisbon European Council, March 2000, http://www.consilium.europa.eu/en/uedocs/cms_data/docs/pressdata/en/ec/00100-r1.en0.htm

2. Europa 2020 – A strategy for smart, sustainable and inclusive growth, March 2010, http://ec.europa.eu/europe2020/index_en.htm

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The document was designed as a ten-year strategy for growth and the creation of new jobs in the EU. Its aims were not only to overcome the crisis, but also to address the shortcomings of the European model of development and create the conditions for growth through joint cooperation on five key objectives that include employment, research and development, climate change/energy, education, social inclusion and poverty reduction.

The goals of the Strategy are defined through seven key and accompanying priorities focusing on the digital economy, innovation, employment, industrial policy, the fight against poverty, youth policies and the efficient use of resources. The initiative for supporting the digital economy, called the Digital Agenda for Europe[3] (DAE) was presented in August 2010. It was comprised of seven pillars with almost 120 measures developed to ensure increased access to broadband networks for both citizens and companies, increased usage of e-government services, and reducing the digital divide through education, while increasing the number of ICT experts, standardization in ICT, support for e-commerce, data protection and Cloud computing.

Since most of the DAE measures were implemented by 2015, the European Commission proposed a new key document, the Digital Single Market Strategy (DSM).[4] This document was named after one of the DAE pillars signifying that the Digital Single Market was still to be achieved. The Strategy has three pillars and 16 initiatives that should provide the foundation for a viable and functional Single Market for digital goods and services regardless of borders and national states fragmentations.

Furthermore, the new strategy was necessary given the rapid growth of the digital economy (5-7% more than the traditional economy), a need for more digital literacy, unlocking the potential of cross-border e-commerce, the obsolescence of certain legislative solutions, and major problems in geo-blocking,[5] which treated citizens of some member states of the Union differently, and the need for the modernization of EU legislation related to the digital economy - copyright, consumer rights, Internet access, new rules of e-commerce and audiovisual directive.

In 2016, together with the modernization of existing policies, the EU has presented the "Digitizing European Industry" package (part of the DSM Strategy) in the field of Cloud computing, ICT standardization, the new e-government action plan and the Internet of Things (IoT) thus initiating major steps to unlock the potential of the Fourth Industrial Revolution (Industry 4.0).

2.2 Digital Competitiveness and Digital Agenda for Europe 2010-2015 – first numbers

With the Lisbon Agenda at its end and the new Europe 2020 in the making, the EC decided in 2009/2010 to design a tool to benchmark Digital Europe for the measurement of information society, suggesting new areas for investigation and developing a list of key indicators. By the end of 2010 it was clear that despite the overall failure of the Lisbon agenda caused by its non-binding character and the economic crisis, irreversible progress had been made in the field of ICT and Digital Economy especially after the revision of the Strategy and the creation of new areas of interest for the EU. The tool – the Digital Competitiveness Report - showed success in the fields of ICT usage in homes (including broadband and a narrowing of the digital divide), in business and in ICT innovation, but it still demonstrated a lag in the use of e-commerce and cross-border ICT cooperation coupled with the problem of geo-blocking.

In 2010 the European digital economy continued to grow in size and scope, with 60% of the EU population using the Internet on a regular basis.

3. Digital Agenda for Europe – key publications
https://ec.europa.eu/digital-single-market/en/digital-agenda-europe-key-publications

4. Digital Single Market Strategy
https://ec.europa.eu/digital-single-market/en/digital-single-market

5. Geo-blocking refers to an online practice where access to content is restricted based upon the user's geographical location. For example it prevents shoppers in some countries from being able to buy products and services for cheaper prices overseas. It is widely used by many companies, online platforms and websites. Countries of SEE are most affected countries by geo-blocking in Europe.

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Broadband was available to 94% of the EU population, and it was accessed by 56% of households and 83% of enterprises. The value added by the European ICT industry was around 600 billion euros (4.8% of GDP) with ICT services accounting for 80% in R&D and 25% of total business R&D in the EU in 2009/2010. The broadband market was the largest in the world (with a rise in investments) while 60% of European citizens used the Internet daily.

Unfortunately, in terms of digital skills and access to high-speed Internet this progress has been fragmented between the member states - especially between Northern and Southern Europe, a division that to a large extent remains still today.

Due to the relative success in the area of digital economy in 2010, EU stakeholders and decision-makers decided to create a flagship initiative within Europe 2020 to support the further creation of the Digital Single Market – the Digital Agenda for Europe.

The Digital Agenda formed one of the seven initiatives of the Europe 2020 Strategy which sets objectives for the growth of the European Union by 2020. The Digital Agenda was proposed to better exploit the potential for information and communication technologies (ICTs) in order to foster innovation, economic growth and progress with the main objective of developing the Digital Single Market.

The stakeholders, especially the European Council, called for the creation of a Digital Single Market by 2015, the creation of better digital infrastructure, the promotion of new skills needed for the digital age and for closer cooperation in fighting cybercrime. The European Commission was tasked to present draft proposals for a more ambitious reform on telecom rules, fairer taxation of digital goods, the modernization on IPR rules, the modernization of customer rights in digital shopping, the development of a harmonized spectrum policy, support for the introduction of high quality infrastructure to facilitate cross-border e-commerce, support for innovation and the creation of new jobs in the digital age, and the development of a framework for a safer digital Europe. These goals were divided into seven pillars with more than one hundred measures that included legislative proposals, documents and action plans.[6]

6. The following table is a short summary representing key actions taken under Digital Agenda for Europe

Pillar	Brief description of measures
Achieving the Digital Single Market	Establish a system for the free flow of online services and entertainment across national borders by breaking down various barriers. Boost online business, establishing a single area for online payments and the protection of EU consumers in cyberspace. Actions included: - Licensing for online works and preserving out of print works - Opening up public data and stimulating online content market - Protecting IPR and simplifying distribution - Create a framework for eInvoicing - Revision and update of eSignatures and eCommerce directives - Transposing of VAT directive and review of Data protection rules - Consumers Rights Directive, EU online rights and EU online Trustmark - Spectrum Policy Plan

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Enhancing interoperabilty and standards	Proposing a series of measures that will allow interoperability of devices, applications, data repositories, services and networks. The Digital Agenda identified improved standard-setting procedures and increased interoperability as the keys to success. Actions included: - Legislation on ICT interoperability - Guidance on ICT standardisation on procurement - European Interoperability strategy and its implementation in member states - Implementation of Granada and Malmö declarations[7]
Strengthening online trust and security	Through this pillar EU has strengthened its policy to combat cybercrime, child pornography and breaches of privacy and personal data security. By 2013 only 12% of EU citizens felt safe making online transactions, and use and re-use of personal data has since become one of the most important political questions in the EU. At member states level a series of measures, including new agencies and modern laws, were adopted in the last three years. Actions included: - Reinforced Network and Information Security Policy - Establishment of the European Cybercrime platform and European Cybercrime center - Implementation of telecom rules on privacy - Set up on national alert platforms - Reporting of illegal online content - EU cyber-security strategy - Directive on network and information security - Establishment of harmful content alert hot-lines
Promoting fast and ultra-fast Internet access for all	Using EU funds and private-public partnership, next generation access networks were established in Europe allowing competitively priced and ultra-fast Internet. A goal was set at 30Mbs for all citizens by 2015 and 100Mbs by 2020. Actions included: - Funding of high speed broadband - European Spectrum Policy Programme - Deployment of NGA Networks - Member States to develop and facilitate Broadband plans and investments - Regulatory measures for non-discrimination and wholesale prices to promote investment and competition - Safeguarding Open Internet for consumers - Reduction of cost for High Speed Networks
Investing in research and innovation	Increasing EU investment in ICT research and finding the best solution for putting research results on the world market as products and services. Actions included: - Leverage more private investment in ICT research and innovation, coordination and pooling of resources - Faster access to EU funds - Development of new generations of web applications - Member states to double their annual spending on ICT development - Establishment of the European Cloud Partnership and Cloud Computing Strategy - Moving of Public Services to the Cloud - Private Public Partnerships of High Performance Computing - Support to micro and nano technology research in line with the Industrial Strategy

7. The Malmö Declaration commits EU public administrations to promote open standard to ease the path for the new products. The Granada Declaration complements the Malmö Declaration on eGovernment by encouraging the development of more efficient interoperable public services that promotes the re-use of public sector information, increase the efficiency of government and lead to a measurable reduction in administrative burdens on citizens and businesses as well as contribute to a low-carbon economy. More information on Malmo Declaration: https://ec.europa.eu/digital-single-market/sites/digital-agenda/files/ministerial-declaration-on-egovernment-malmo.pdf More information on Granada Declaration: http://www.minetur.gob.es/es-es/gabineteprensa/notasprensa/documents/declaration.pdf

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Promoting digital literacy, skills and inclusion	Even though the Internet has become a necessity for the most EU citizens, many are excluded from using it for different reasons – accessibility, excluded groups, low digital literacy. Through this measure EC proposed tackling the digital divide between people and member states. Actions included: - More funds from ESF for Digital Literacy - Recognition of ICT skills - Increase the number of women in ICT workforce - Modernize "New Skills for Jobs" agenda - Modernization of consumer education - Ensure accessibility to online public services - Member States to prioritize eLearning and Digital Skills in national policies on education - Grand Coalition for Digital Jobs[8]
ICT-enabled benefits for EU society	Digital technologies have enormous potential to benefit our everyday lives and tackle social challenges. The Digital Agenda focused also on ICT's capability to reduce energy consumption, digitize cultural heritage, support the lives of aging citizens, revolutionize health services and deliver better public services like Smart Transport or Public Lighting. Actions included: - Ensuring compliance between ICT sector and Energy sector - Assess contribution of smart grids - Support Solid State Lighting - Secure access to one's own health data - Certification of eHealth - Reinforce Assisted Living program - Support e-government services and create cross-border e-services - Further support of ICT in railways and air traffic - Develop and implement Smart Cities, Smart Aging, Green Traffic and Energy Efficiency Building Private-Public Partnership - Support to Europeana (Digital Library of common culture and history) - Support to Intelligent transport systems

With more than 120 measures the EU expected to see tangible changes in the e-commerce sector, telecom rules, e-government, infrastructure and a boost in digital trust and literacy by 2015. In 2012 the Internet economy created 5 new jobs for every 2 lost in offline business. It also had a growth of almost 12% per year and is larger than most of the member states of the EU-13's economy.[9]

In the telecom sector the EU recorded more mobile phone connections than there are citizens in Europe with almost 7 million jobs directly in the ICT sector and half of the production growth coming from direct investments in ICT.

By 2014 most of the actions (around 3/4) were implemented in the area of broadband access (better networks at lower costs), a redesign of the telecom sector (lower prices and abolishment of roaming), supporting start-ups, security measures, digital inclusion (especially for more vulnerable groups), e-government (almost half of the EU

8. Grand Coalition for Digital Jobs (also known as a Digital Skills and Jobs Coalition) is a multi-stakeholder network that started as a pledge in 2013 of EC, business and associations with a goal of reducing Digital gaps in the EU. Today, the Coalition is set to develop a large digital talent pool and ensure that individuals and the labor force in Europe are equipped with adequate digital skills. It also brings together member states that have to develop National Digital Skills Strategies by 2017. More information: https://ec.europa.eu/digital-single-market/en//digital-skills-jobs-coalition

9. Stimulating growth and employment: an action plan for doubling the volume of e-commerce in Europe by 2015, European Commission, Brussels, 2012. http://www. europa.eu/rapid/press-release_IP-12-10_en.htm

population communicates online with the administration) and regular use of Internet.[10]

But even though most of the measures within the DAE were achieved by 2015, challenges still remained. Not all EU citizens have access to high speed Internet, the demand for ICT specialists is higher than the number of available experts and the pressure for basic digital skills among the work force is mounting. It is expected that by 2020 more than 90% of the available jobs in EU will require at least basic digital skills. Furthermore, SMEs are still not reaping the full benefits of e-commerce and cross-border business while new challenges coming from Industry 4.0 are ahead of us. One great obstacle to the modernization and common approach to the digital economy has been short-term individual interests of member states themselves. For example, spectrum policy[11] has been on the "table" for almost a decade. Therefore, with the continuation of the remaining action measures from the DAE and by adding new updated goals, the European Commission was urged to step forward with a new plan and strategy for the period 2015 – 2020 with an even tighter system of coordination and viable roadmap.

2.3 The Digital Single Market (DSM) 2015 – 2020

In May 2015 the European Commission presented a new document called the **Digital Single Market strategy (DSM)** with the objective of bringing down barriers in digital entrepreneurship and unlocking the vast potential of almost 500 billion euros and several hundred thousands of new jobs. Measures proposed by the DSM basically derive from the actions within the Digital Agenda for Europe that were not completed by 2015, especially those adopted in the later phase of the DAE implementation e.g. spectrum policy, modern copyright framework, data industry and audiovisual rules combined with a new and modern approach to Cloud computing, the abolition of geo-blocking, parcel delivery, Internet platforms and intermediaries. The new strategy is also one of the 10 European political priorities for the next five years, thus stressing the significance of the Digital Economy in the European politics.

The Digital Single Market Strategy sets out 16 initiatives in 3 main pillars:[12]

- **Better access for consumers and businesses to digital goods and services across Europe** – abolishment of key discriminatory differences in online business in order to facilitate e-commerce and cross-border digital trade
- **Creating the right conditions and a level playing field for digital networks and innovative services to flourish** – fast, safe and reliable infrastructure for delivery of digital content coupled with regulatory framework for innovation, investment and fair market competition
- **Maximizing the growth potential of the digital economy** – supporting the development of Cloud computing, Big Data analytics, digital skills and better e-government service

10. Digital Agenda targets progress report 2015, http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=9969

11. Radio spectrum is the basis for wireless communications like Wi-Fi or mobile phones, but is also key to areas like transport, broadcasting, public safety, research, environmental protection, smart regions and energy. The EU is looking for a common approach to define key policy objectives and set up general principles for managing radio spectrum in the internal market. In the area of SEE Radio spectrum strategies coupled with 4G/5G technologies can be a way for internetization of rural/underdeveloped areas with the purpose of creating new jobs and growth and improving quality of life.

12.The brief description of pillars and initiatives is summary of Digital Single Market Strategy published by the European Commission in May 2015. http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447773803386&uri=CELEX%3A52015DC0192

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Better access for consumers and businesses to digital goods and services across Europe	
Rules to make cross-border e-commerce easier	Due to the national restrictions (differences in consumer protection and binding obligations), many SMEs and consumers do not use e-commerce. Furthermore, the trust in e-commerce is still low. Most consumers trust their national sellers (68%) with a rapid decline in trust towards sellers from other EU countries (38%). With only 7% SMEs selling their goods online to other countries, with scarce legal protection in e-commerce and only a small part of goods and services being offered online, the EU is losing billions of euros in revenue and personal savings for citizens. Unlocking the potential of e-commerce has to become one of the priorities since relevant data shows that many opportunities are still locked by an inefficient legal framework and national boundaries. In some cases prices of products can be even up to 400% more expensive in cross-border trade than in domestic trade. Through this initiative EC will: - Update the e-commerce directive - Clarify contractual rights and obligations - Develop cross border enforcement cooperation - Review the regulation on Consumer Protection Regulation The EU expects that by having similar rules for e-commerce and with a better framework for consumer protection almost 57% of European SMEs would start selling their goods and services to other states online.
More efficient and affordable parcel delivery	Parcel delivery is not integral part of the digital economy but it is a tool for improving its quality and functionality. Unfortunately, high prices and the inefficient delivery of goods purchased online still hamper cross-border trade. Most SMEs selling online (62%) or trying to sell online complain about the high costs of delivery which can be even five times higher in cross border trade when compared to domestic delivery. Within this initiative the EC will: - Launch measures to improve price transparency - Enhance regulatory oversight of parcel delivery
Ending unjustified geo-blocking	Geo-blocking represents a practice in which sellers can refuse access to their digital goods and services based on the consumers /customers state of origin. A recent European survey showed that only 37% of online shops allow cross-border trade. It is mostly done for commercial reasons (segmenting the market along national borders and re-routing to local online shops with different prices) and it limits consumer's opportunities and choices. Almost 74% of complaints received by consumer right protection networks are connected to geo-blocking. To tackle this problem the EC proposed: - New Regulation on addressing geo-blocking (abolishing unjustly blocking) - Enhance the rights of recipients within Services Directive - Anti-trust inquiry in e-commerce
A modern, more European copyright framework	Digital content is one of the main growth factors in the Digital Economy with copyright being in the foundation of the European cultural creativity. Digital entertainment and media have a growth rate of almost 12% a year and a new copyright framework is needed to ensure cross-border access, purchase and portability of digital cultural goods. For example only 4% of VoD content is available for cross-border users and in most cases digital content bought in one Member State will not be visible/

13. VoD – Video on Demand – Services that allow users to watch digital video content when they want. Examples of VoD providers include Netflix, HBO Go, Amazon Video or Google Play.

	accessible in another. The EU needs a more balanced system of copyright that will ensure incentives for the creation of new content, but also allow portability and cross-border usage of cultural goods and to achieve that the Commission has proposed modernized copyright rules to facilitate wider online availability of content across the EU, to modernize the framework of exceptions and limitations and to achieve a well-functioning copyright market place. Also, a review of Satellite and Cable Directives was done in autumn of 2016.
Reducing VAT burdens	Different VAT systems in member states additionally complicate trade across borders with almost 80 different rates in 28 countries. Since 2015 a VAT on digital goods is paid in the customer's residence country and not in the residence country of the company selling the goods. On SMEs side, investment in harmonization with VAT rules in each country can amount up to 5000 euros per country which makes the establishment of web-shops that cover all 28 member states extremely expensive for micro entrepreneurs. To tackle this problem the European Commission will propose cutting this burden – for example, with a single interaction point, a new common threshold and simpler, single audits. A new plan for VAT changes presented in 2016 should allow for fairer taxation of digital goods, unified forms for VAT reporting and new lists of goods with a lower VAT rate that will include certain digital goods (e.g. digital books and Internet publications).

Creating the right conditions and a level playing field for digital networks and innovative services to flourish	
An overhaul of the telecom rules	Today the telecom sector is still struggling with the lack of connection between national markets, lack of regulatory consistency (especially concerning radio-frequencies) and with insufficient investments (rural areas). A more structured approach is needed when it comes to access to high speed and efficient broadband at reasonable prices. For example, the Croatian government was recently asked by the EC to establish a framework that will decrease the Internet prices by 30%. A new coordinated approach is needed for 700 MHz band which can be used for the "Internetization" of rural areas, and European regulatory bodies for electronic communication have to be strengthened in order to cope with the challenges of modern telephoning, which include Internet services like Viber, Skype or WhatsApp. In September 2016 the EC proposed a set of measures to ensure that everyone in the EU has the best possible Internet connection in order to participate in the digital society and economy. These proposals encourage investment in very high-capacity networks and accelerate the roll-out of 5G wireless technology and free Wi-Fi access points in public spaces. Measures in this "Connectivity for a European Gigabit Society" include: - European Electronic Communication Code (set of rules and objectives on how the telecom industry should be regulated) - Common EU broadband targets for 2025 (all public services should have 1 gigabit speed, all households at least 100Mbs and all urban areas and transport lines should have access to 5G wireless networks) - 5G wireless technologies (Action plan for coordinated 5G deployment all across the EU in the period 2018 – 2020) - Free Wi-Fi connections for citizens (120 mil euro initiative to help cities and municipalities offer free Wi-Fi in public spaces)

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A review of the audio-visual media framework	The development of new business models and fast technological changes have a big impact on the audio-visual environment. Access to content has drastically changed in the last years (fast Internet, smart phones) and a new review of the Audiovisual Media Services Directive is needed.
An analysis of the role of online platforms	Internet platforms (e.g. search engines, social media, e-commerce platforms, app shops) play a central role in the social and economic life of European citizens. They are innovators in the digital economy and they can be of great help to SMEs in reaching new markets and customers. New and disruptive platforms that have recently emerged in the area of mobility and tourism, education, financing, living (AirBnB) and Transport (Uber) are becoming a great challenge for traditional business models. The rise of this new *sharing economy* is exponential and it can trigger new regulatory (or self-regulatory) solutions in the part of the EU. Within this initiative the Commission will assess the role of platforms, particularly focusing on issues of transparency, use of information (e.g. the right to be forgotten), relationships between platforms and suppliers and how to tackle illegal content on the Internet.
Reinforcing trust and security in digital services and in the handling of personal data	Cybercrimes are daily occurrences. They can target states, business or private citizens equally and they can cause substantial damage in the economic sense, as well as in personal data losses. The numbers show that the interception of data, online payment thefts and thefts of identity are on the rise in the whole world. At this moment only 22% of EU citizens have complete trust in search engines, social networks or e-mail providers, and 72% of European citizens believe that they are giving to much personal data to different online services. To regain trust and increase the security level, the EU must reform the data protection rules, push forward a new Directive on the common level of networks and information security, and conduct review of the e-privacy Directive (this legal act currently addresses only traditional telecoms and needs to be expanded to other providers of electronic communication services).
Other measures	A partnership with Industry on Cyber Security

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Maximizing the growth potential of the digital economy	
Propose European free flow of data initiative	Big Data, Cloud computing, Open Science and the Internet of Things are future engines for new growth in the digital economy. The Big Data sector has a global rise of 40% per year, seven times more than the ICT sector. However, the European market is still fragmented between member states meaning that it cannot harvest the full benefits of the data economy. Expensive data centers and national legislation on digital infrastructure (national data on national infrastructure) also hamper progress. In this initiative EC will: - Present EU Strategy on data driven economy - Fund research and innovation in the field of Big Data and Open Data - Present "Digitizing European Industry" Initiative - Present legislation on re-use of public data - Launch European Cloud Initiative (European Open Science Cloud and European Data Infrastructure)
Define priorities for standards and interoperability	With the new DSM package, the EU means to modernize and expand its European interoperability framework (including norms) in order to achieve better communication between digital components (devices), data storages, chains of supplies, services, industry and the public sector. For example, most of e-government services cannot communicate with other similar services across national borders. With a modernized framework and clear priorities in interoperability the EU can speed up the process regarding 5G networks, Industry 4.0, Big Data Analytics and Cloud computing. A Normization is a vital part of this initiative since most of the norms in ICT are dictated by the industry itself, primarily the non-EU industry. A new plan for normization should define priorities for technologies and areas that are essential for the creation of the Digital Single Market.
An Inclusive Digital Society	As it was already mentioned in all strategic documents on the digital economy and society, the EU will soon face a problem with a deficit of a properly skilled workforce and a lack of ICT specialists. EC studies show that demands for new ICT specialists are now growing at the rate of 4% per year and that at least 825.000 vacancies in the sector will not be fulfilled in the next couple of years. In the field of basic digital skills the EU is experiencing a slight rise, but it will not be enough. Today, almost 60% of Europeans have basic digital skills but in the next five years that number will have to be 90% if the EU wants to stay competitive. To improve these numbers, the EC will propose a new Initiative – New Skills Agenda for Europe, as well as continue supporting the Digital Skills and Job Coalition. But it is imperative that the member states continue with their support regarding the study of STEM sciences and bring the number of digitally skilled citizens closer to 90% through curricular reforms and lifelong learning. For an inclusive digital society to function, other services are also needed to improve the quality of life. Through this Initiative EC will also: - Propose an EU e-Health Action Plan - Contribute financially to the development of Telemedicine services for Aging-well - Support Smart Grids and Smart Buildings projects - Enhance e-Call system in car and transport - Present a new Action Plan for e-government in the period 2016-2020 (e-procurement and contract registers by 2019, e-ID and e-signature, propose a Single Digital Gateway, e-justice one-stop-shop, interconnection of insolvency registers, single electronic mechanism for registering and paying VAT, establish "only once" principle of business)

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The roadmap for completing the Digital Single Market published by the European Commission in 2015[14]	
Actions	**Timetable**
Better access for consumers and businesses to digital goods and services across Europe	
Legislative proposals for simple and effective cross-border contract rules for consumers and businesses	2015
Review the Regulation on Consumer Protection Cooperation	2016
Measures in the area of parcel delivery	2016
A wide ranging review to prepare legislative proposals to tackle unjustified Geo-blocking	2015
Competition sector inquiry into e-commerce, relating to the online trade of goods and the online provision of services	2015
Legislative proposals for a reform of the copyright regime	2015
Review of the Satellite and Cable Directive	2015/2016
Legislative proposals to reduce the administrative burden on businesses arising from different VAT regimes	2016
Creating the right conditions for digital networks and services to flourish	
Legislative proposals to reform the current telecoms rules	2016
Review the Audiovisual Media Services Directive	2016
A comprehensive analysis of the role of platforms in the market, including illegal content on the Internet	2015
Review the e-privacy Directive	2016
The establishment of Cybersecurity contractual Public-Private Partnership	2016
Maximizing the growth potential of the digital economy	
Initiatives on data ownership, free flow of data (e.g. between Cloud providers) and on the European Cloud	2016
The adoption of Priority ICT Standards Plan and extending the European Interoperability Framework for public services	2015
A new e-Government Action Plan including an initiative on the 'Once-Only' principle and an initiative for interconnection of business registers	2016

14. A Digital Single Market Strategy for Europe - COM(2015) 192 final, pp 22.

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2.4 How digital is Europe – Digital Scoreboard 2015 and DESI 2016 in EU

With the new policy and priorities in place, the EU achieved further progress in the digitalization of countries and economies. The last Digital Scoreboard published in 2015 showed that the EU had reached most of the designated targets concerning the European Digital Agenda. Sufficient progress has been made in the areas of regular usage of the Internet, domestic online shopping, basic broadband coverage, disadvantaged groups' access to the Internet, energy use in smart solutions and parts of e-government. Investments in R&D in ICT and ultra-fast broadband remain on the rise, but below expectations while cross-border commerce and SMEs selling online still remain challenging.

European Digital Agenda Targets – Digital Scoreboard 2015[15]		
Measures	**EU level**	**Countries of SEE**
Next Generation Access	NGA coverage reached 68% EU wide (a 40% rise in 5 years) but is mostly limited to the urban areas with only 25% rural coverage.	Croatia was below the EU average with 55% coverage and 10% for the rural areas. Slovenia remains above average with almost 80% of coverage in total, and almost 60% in the rural areas.
Roaming	Prices of roaming are in a constant decline with prices falling by more than 300% in comparison with local calls in 2007 to complete abolishment in 2017.	
Internet use	By 2015 more than 75% of the EU population used the Internet regularly (at least once a week). Number of non-users fell to almost 15% (from 30% in 2010). The number of disadvantaged groups' usage has also risen to more than 20% and daily use is also rising by 17% per year.	In 2015 Croatia and Slovenia were below the average with around 65% to 68% of Internet users but Croatia together with Greece, Cyprus and the Czech Republic experienced the biggest rise – almost 20% in the period of 2010-2015.
e-commerce by citizens	The EU wide target of 50% was reached by 2015 but with a clear difference in domestic shopping (44%) and cross-border trade (only 15%). Even though cross-border shopping is on the rise, the 20% target was not reached.	As a small member state Croatia has almost 30% of citizens shopping online with a 25% rise from 2009 to 2014. Slovenian citizens shopped online in even bigger numbers, reaching almost 40% by 2015.
SMEs selling online (with more than 1% turnover in online sales)	Small and medium enterprises have missed out on the online sales opportunities. In 2015 only 14.5% (3.5% rises in 5 years) of SMEs were selling online which was well below the target of 33%. Large companies are at 35% (6% rise in 5 years) and the gap between them and SMEs is increasing rapidly.	Together with the Czech Republic, Croatia is the European leader with 25% of SMEs selling online. Slovenia is below the EU average with about 13.5% of SMEs exploiting this opportunity.

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e-government	By the end of 2015 the target of 50% in the use of eGov services had almost been reached with some sub-targets (such as return of completed forms) already reached in 2014. Overall, the use of eGov is growing, although slowly, with Denmark, Sweden and Finland in the lead and Italy, Romania and Bulgaria in the back. For example, only 10% of citizens in Romania used eGov services in 2014 compared to almost 85% in Denmark.	A lot has changed in the field of e-government in the last two years in the SEE. By the end of 2014 Croatia was well below the EU average (33%) while Slovenia was already at 55%. By 2015-2016 the new e-citizens project in Croatia caused substantial rise in the e-government usage that was acknowledged by international prizes and reported in the DESI index in 2016.
Support for R&D in ICT	Support of R&D in the ICT sector only recently picked up the pace after the crisis in 2008-2010 and has reached its peak in 2014 with the tendency to grow. Unfortunately, to reach the levels targeted for 2020 the annual growth should be around 5.5%.	

Overall, by 2015 the objectives of Digital Agenda for Europe had been reached in many sectors, but the main goal still remained elusive – a flexible and functional Digital Single Market. Therefore, the European Commission pushed forward with the new key initiative to achieve those remaining goals. The results of this initiative are measured with a new tool – the DESI index[16] which in 2016 showed that the EU was increasing its digital society footprint, but with real and visible disparities between member states.

The findings show that since the adoption of the Digital Single Market Strategy, member states have made progress in 2015 and 2016 in areas such as connectivity and digital skills, as well as in public services, but the pace is slowing down. Overall more people, businesses and public services are going digital, but they still face problems, such as a lack of high-speed Internet coverage, lack of e-government services, as well as difficulties in shopping and selling across borders. On the other hand, most of the improvements resulted from better broadband speeds, their quality and prices, and the integration of digital technologies in SMEs' daily life and the digitalization of industry. Developments in digital public services and human capital all stagnated during this period.

Northern countries such as Sweden, Denmark, Finland and the Netherlands remain the most digital societies in the EU while the fastest growing countries include Estonia, Germany, Malta, Austria and Portugal. Bulgaria, Romania and Greece remain on the bottom of the list.

15. Digital Scoreboards for the period between 2011-2016 https://ec.europa.eu/digital-single-market/en/download-scoreboard-reports

16. The Digital Economy and Society Index (DESI) is an online tool to measure the progress of EU Member States towards a digital economy and society. As such, it brings together a set of relevant indicators on Europe's current digital policy mix. It measures five main dimensions: Connectivity (Fixed and mobile broadband, Speed and Affordability) Human Capital (Internet users, Basic Digital Skills, IT Specialists, STEM graduates) Use of Internet (Content e.g. news, Communication e.g. social networks and Transactions e.g. shopping) , Integration of Digital Technology (Business digitization (Cloud, Social media, RFID, Information Sharing, e-Invoices) and e-Commerce (online selling, cross border selling)) and Digital Public Services (e-Government). Results of DESI vary between 0 and 1, the latter being the better result. All member states are accordingly to their results grouped within one of the four groups: 1. running ahead, 2. lagging ahead, 3. catching up and 4. falling behind.
More information: https://ec.europa.eu/digital-single-market/desi

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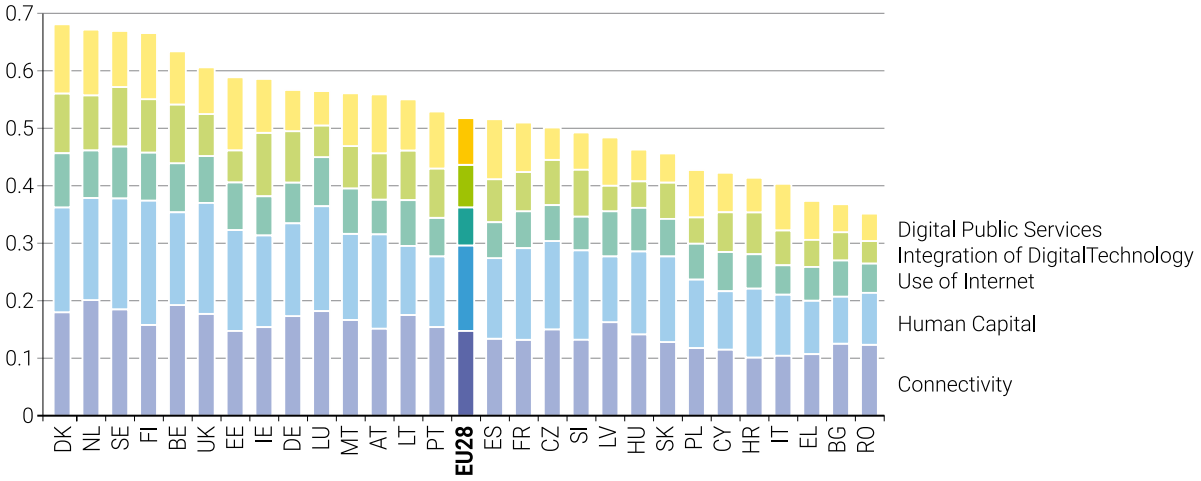
Graph 1. Progress of Member state countries according to DESI 2016 by elements



Also for the first time, the EU is being compared to some of the most digitized countries in the world (Japan, the US and South Korea) and preliminary results show that the top EU countries are also top worldwide digital performers. However the EU as a whole needs to significantly improve in order to lead on the global stage

The numbers in the Index show that more than 70% of European households can access high-speed broadband (at least 30 Mbps compared to broadband access during 2010-2015 when 10Mbps was the standard) which is almost a 10% rise compared to 2015. This means that by 2020 almost 100% of European families will have high speed access to Internet. The number of mobile broadband subscriptions is rapidly increasing and now almost 75% of Europeans use mobile broadband. But in the long run the EU needs new telecom rules to tackle the new market challenges that will arrive with technologies such as the 5G communications network.

In the field of education and skills the number of science, technology and mathematics (STEM) graduates has slightly increased in the EU but almost half of Europeans (45%) lack basic digital skills. These include an understanding of e-mail, editing tools (writing/copy/paste) and a basic understanding of operative systems (e.g. installing devices).

E-commerce still remains a missed opportunity for SMEs. In 2016 almost 2/3 of all European internet users shopped online, but only 16% of SMEs sold online, and only half of those (7.5%) sold across borders. These numbers are better than in 2014 and 2015, but still below the "old" target of 33% set for 2015. To address these issues the European Commission has presented a series of proposals on digital contracts and boosting e-commerce. These legislative acts should provide better protection of consumers during online shopping, help SMEs expand their online sales, improve transparency of cross-border parcel delivery, enforce EU consumer rules, and bring down discriminatory barriers like geo-blocking that have severely hampered smaller or less developed member states like those in the Southeast Europe.

DESI indicators also point to the fact that the member states have increased the number of digital public services, however not their utilization. The number of internet users interacting with their administration online has stagnated at around 32%. However, additional reviews to the DESI index comprised within the EDPR[17] report show that some countries are making constant improvements to their e-government systems with the constant rise of users. One of those countries is Croatia, while Slovenia is showing an opposite trend having less e-government users in the last 12 months.

17. The EDPR report combines the quantitative evidence from the DESI (Digital Economy and Society Index) with country-specific policy insights, allowing the European Commission to keep track of the progress made in terms of digitalisation by each member state and providing an important feedback loop for policy-making at the EU level

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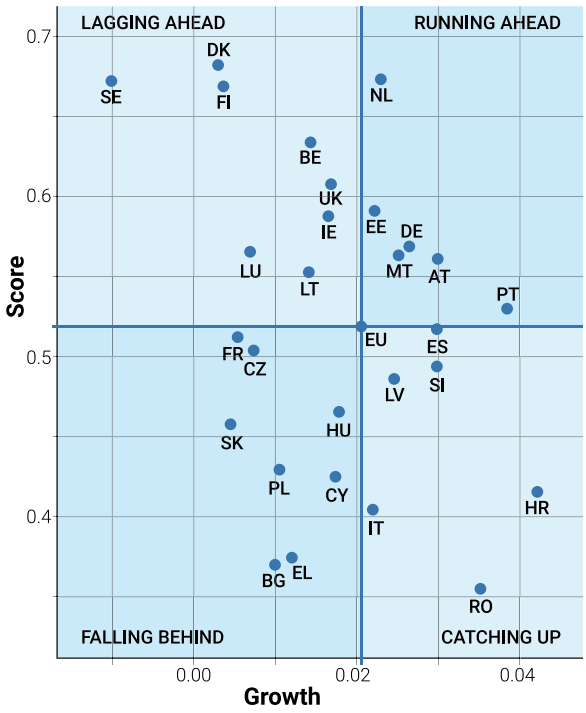
3. How digital is Southeast Europe

In 2015, at the end of the "policy life" of the Digital Agenda for Europe and the creation of the new initiative the Digital Single Market for Europe, SEE countries were below the EU average in the terms of digital society and economy, but with good prospects of catching up in the certain areas, even leading in areas such as online sales.

The DESI and the EDPR indexes both show that Croatia and Slovenia in 2016 grew faster (Croatia even had a faster growth than 24 other member states) than the average EU growth rate but still below the EU28 threshold which positioned them in the "caching-up" group. Catching-up countries are those that score below the EU average, but with a growth rate above the EU average in the last year. These countries are developing faster than the EU as a whole and are thus catching up with the EU average. Countries in this group include Spain, Croatia, Italy, Latvia, Romania and Slovenia.

Image 2. Countries in clusters according to their scores in the DESI 2016 showing Croatia and Slovenia in the catching-up group



Croatia

In the DESI 2016 Croatia improved its performance and now ranks 24th out of the 28 EU member states with the overall score of 0.42 and is approaching the EU average. The country has retained its status as one of the leading member states in SMEs selling online and cross-border trade. Almost 20% of SMEs are in the online sales with almost 9% of them doing so cross-border. EU average in this indicator is 16% and 7.5% respectively. However, Croatia is still lagging behind when it comes to Internet use and fixed broadband. Around 66% of Croats use Internet regularly (compared to the EU average of 76%) and less than 3% have high-speed connections (30% in the EU). This very low number of connections can be attributed to the fact that high speed networks mostly cover urban areas in Croatia and are considered to be extremely expensive. In comparison Croats on average spend almost 2.5 - 3% of their monthly disposable income on high speed internet compared to the EU average of 1.3%. Connectivity in Croatia remains one of the areas that need improvement especially in the rural areas where only half of the households have fast speed coverage.

In the category of human capital, Croatia's performance is still below average, but the country is making small progress. The number of regular Internet users is slowly rising (66% in 2015 compared to EU average of 76%) but digital skills and STEM[18] education remain quite low. Half of the population has basic or above basic digital skills, but less than 2% of Croatian students are in the STEM fields. The problem becomes even more serious when we consider that Croatia is the only EU member state that does not have obligatory ICT education in early stages of elementary education and is lagging behind in e-learning and the digitalization of schools (less than 10% of students attend digitally supported elementary schools and there are on average almost 26 students for every computer in Croatian schools or in laic terms one computer per class).

18. STEM – Studies in Science, Technology, Engineering and Mathematics

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Image 3. Comparison of the DESI indexes for Croatia and Slovenia

On the other hand, the business sector in Croatia appears to be eager to take advantages of the possibilities offered by online commerce with almost every fifth company doing so. Other indicators like the usage of e-invoices and Cloud services place Croatia within or higher than the EU average.

In digital public services, Croatia's performance is improving. All indicators show demonstrated growth – both in the number of users and services, and particularly in the open data benchmark where Croatia is well above the EU average due to the new approach of opening up datasets to the general public and private sector.

Slovenia

Ranked 18th in the European DESI index, Slovenia remains a regional leader in Southeast Europe. Together with Croatia it is a part of the "catching-up" countries, but with a slower growth than its neighbor. Overall the Slovenian business sector is the best performing actor in the DESI index, reaching the EU average and above the average in the integration of digital technologies. The country has almost the same indicators for basic digital skills (51%) and STEM graduates (2%) as Croatia, but with better numbers when it comes to ICT specialists (4.8% compared to 2.9%). It still has to catch up on the use of Internet benchmark, and its weakest ranking is in digital public services due to the fact that less and less citizens are e-government users and open data is not freely used by SMEs.

In terms of connectivity Slovenia is below the EU average, but progress has been made. Slovenia has 84% coverage of rural areas and 95% of overall coverage with almost 21% of Slovenes having fast broadband, which is almost eight times better than in Croatia. With the price of the internet connection being 1.7% of average monthly income, Slovenia is in the group of member states with high costs, but still cheaper than in Croatia. Slovenia also has set in motion a new plan to cover 96% of the country with 100Mbps broadband by 2020 through a 355 million EUR public-private partnership.

Regarding human capital, Slovenia shares similarities with Croatia – 51% of the population has basic digital skills, around 2% of the graduates are in the STEM area but with slightly more Internet users (71% in Slovenia and 66% in Croatia), and a good position regarding the share of ICT specialists in the workforce that almost doubles the number in Croatia. But just like in Croatia, the specialized ICT labor is highly mobile and recruiting sufficient number of professionals can become a challenge in the near future. The development of digital skills and the importance of ICT education are well embedded in the whole educational system, from kindergarten to universities and

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through lifelong learning measures and complementary programs, to the formal educational cycle. The country also has a Digital Coalition that brings together stakeholders in the development of the digital economy and digital jobs. Recently, Slovenia announced measures to increase digital skills for the less educated and the less skilled segments of the labor force above 45 years of age. In this sense Slovenia is far ahead of Croatia.

Slovenes are generally less keen on using segments Internet to get fresh news, as well as on using VoD, video calls or even social networks. In all these categories Slovenia either fares worse than it did in 2015 or stagnates. For example, 5% less Slovenes use the Internet to read news, while use of social networks declined by around 7%. In these categories Croatia has seen a significant rise of 10% and 5% respectively. On the other hand, more than half of Slovenian citizens shop online.

In terms of the integration of digital technologies, Slovenia is performing better than in 2015 with considerable progress made in online and cross-border sales and e-Invoicing. With the new legislation in place that makes e-Invoicing obligatory when dealing with public administration it is expected that those numbers will rise even more. Also, almost 16% of SMEs are selling online, which is less than in Croatia, but with bigger turnover shares coming from that trade.

In the area of Digital Public Service, Slovenia has stagnated with almost no progress since last year. Even more oddly, the number of Slovenes using e-government has fallen by 5%. Therefore, the Government has introduced a new portal with more than 30 services hoping that the citizens will pick up the pace. In contrast, e-health solutions like e-prescriptions are in full use in both countries covering almost 100% of the population.

A brief list of challenges for the Development of Digital Society and Economy in SEE in 2016

Croatia	Slovenia
Connectivity needs improvement (especially in rural areas – 80% have fixed broadband but only 50% high speed connection with staggeringly low number of subscribers – 2.8%). But with digital infrastructure projects in rural areas new growth can be achieved.	Connectivity needs some improvement (80% of all households have fast Internet coverage and 21% are using it) but Slovenia plans to cover most of the country with 100Mbps connection by 2020.
Digital Skills remain at 50% but STEM education is quite low with less than 2% in the age group between 20-29 years. ICT education does not cover all stages of formal education. This poses a problem for ICT industry in the future but also for Croatian prospects within Industry 4.0 and the innovative capacities of the country.	Digital skills are at 51% with STEM graduates at around 2% with a large pool of ICT experts. Slovenia has digital skills and ICT education implemented in all cycles of education with special programs for older and less skilled segments of the labor force. Challenges still remain with computer literacy and e-inclusion of citizens living in rural areas.
Shopping online is still below the EU average for citizens (44% compared to 65%) but SMEs selling online are above average. The digitalization of business is around or above the EU average.	Shopping online is still below the EU average for citizens (52% compared to 65%) but it has seen a steady growth and SMEs selling online are the same as the EU average but with bigger turnover. Slovenian business use "bottom-up" (e.g. OpeningUp Slovenia) initiatives to integrate digital solutions rapidly into their production processes.

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In e-government services Croatia is below the EU average (interaction in Croatia is 21% compared to 32%) with new e-Citizens system in place with prospects of a rise in the number of users.	Slovenia is also below the EU average with a decline of users by 5%. But new eGov portal will hopefully bring those numbers up again and new measures are being prepared for eProcurement and eJudiciary.
Countries of SEE do not have Industry 4.0 strategies but there are separate documents that have some references to it like Digital Slovenia 2020[19] and e-Croatia Strategy.[20] But while Digital Slovenia Strategy is being implemented, the e-Croatia Strategy is going through the slow process of adoption.	

Having compared the two countries, the main conclusion is that all the key building blocks that support the digital economy need to improve – better and more accessible digital infrastructure, e-skills, e-commerce and e-government. They are also a prerequisite for any discussion about the prospects of SEE in the light of the Fourth Industrial Revolution and they pose a great financial and political challenge for the governments and businesses in the Western Balkans.

But these challenges also present future opportunities that can "turn the tables" in the digital economy in the Southeast Europe.

For example, development in rural areas – fast internet combined with new EU measures for rural areas can create new jobs and give new impetus in less developed regions, e.g. modern agriculture, small manufacturing, etc. Also the Transposition of Cost Reduction Directive and EU or state funded building and maintaining of new digital infrastructure can reduce the price of connections and generate more jobs.

New hubs and accelerators can be built in smaller towns and if combined with lifelong learning it can provide a sustainable environment for new companies. For example, smart solutions in agriculture and fisheries combined with digital skills can bring many underdeveloped and depopulated areas in SEE back to life.

Small EU countries also have an advantage in their size. Due to the fact that the local market is smaller they are more inclined to sell online and seek new clients in cross-border trade. This fact has been supported by the digital scoreboard in the cases of Croatia, the Czech Republic, Malta, Lithuania, Denmark, Belgium and Ireland. Cross-border trade can greatly increase the incomes of SMEs and create new jobs. Therefore it is one of the main opportunities for SMEs in the digital economy in Southeast Europe. For example, Croatia has seen a rise in the export of digital goods of almost 12% with some examples of SMEs that export more than 30% of their trade. Furthermore, the ICT sector today accounts for almost 3% of the GDP and employs more than 30.000 people with an estimate from the Croatian Employers Association that ICT will add more than 20.000 new jobs in the following nine years.[21] Therefore, the stimulation of e-commerce and the fair taxation of digital goods and digital business can provide a much needed economic boost in countries like Croatia.

Opening up datasets for the use and re-use of public data can be an important driver of growth. By making data freely available without restrictions, governments in the region can enable the private sector to leverage public data, develop new products and create new economic values and jobs. This potential is slowly being used in Croatia, but remains locked in Slovenia.

19. Information Society Development Strategy to 2020 – DIGITAL SLOVENIA 2020
http://www.mju.gov.si/fileadmin/mju.gov.si/pageuploads/DID/Informacijska_druzba/pdf/DSI_2020_3-2016_pic1.pdf

20. e-Croatia 2020 Strategy draft https://uprava.gov.hr/UserDocsImages/e-Hrvatska/e-Croatia%202020%20Strategy%20(20.01.2016.).pdf

21. ICT sector as a generator of new jobs and export (HR), http://www.hup.hr/ict-sektor-generator-novih-radnih-mjesta-i-izvoza.aspx

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The creation of these new jobs combined with the problem of the basic digital skills deficit among the general population creates new imperatives in the educational policies in the SEE region. Supporting STEM education, lifelong learning and adult education in the field of achieving basic and advanced digital skills must become an imperative for key decision makers in the next couple of years. Therefore, the continuation of curricular reform, the equipping of e-schools and support for e-learning are of the highest importance.

The creation of broad e-government, Industry 4.0 and Smart Enterprises Strategies is a necessity if the countries in SEE want to experience growth and open new jobs in the foreseeable future. The creation of these documents must be a product of an inter-governmental working group with the cooperation of unions, academia and the business sector and following extensive public consultations.

By missing out on these opportunities the digital and innovation gap between SEE and Western/ Northern Europe will widen, leaving the Western Balkans as a "second grade" region, with a high rate of out-flux of highly skilled experts and virtually no chance to profit from the Fourth Industrial Revolution.

4. What is the future – Industry 4.0 and the European answer to it

The world and Europe stand at the brink of the next Industrial Revolution, one that aims to remove the barriers between the physical and the digital world. The so called Fourth Industrial Revolution integrates cyber-physical systems, the Internet of Things (IoT), Big Data, robotics and Cloud computing, all of which are the building blocks of Industry and Work 4.0.

The changes that come with Industry 4.0 can potentially raise income levels in the EU, improve quality of life, change the way business is done, open new markets, lower the costs of living, give new impetus to e-commerce and digital currencies, attribute to the rise of digital skills and create new jobs. But they can also cause ruptures in social systems, make "old" jobs obsolete even faster, put a lot of pressure on the protection of consumer rights and even open up the question of human rights in the digital era.

Recent numbers published by the European Commission show that the manufacturing sector in the EU accounts for 2 million enterprises, 33 million jobs and 60% of the productivity growth, and it is estimated that the digitalization of products and services can add more than €110 billion euros of annual revenue in Europe in the next five years.[22]

European industry is strong in digital sectors such as electronics, the energy sector, telecommunication, business software, and laser and sensor technologies and the EU has excellent research and technology institutes. So far the digitalization of industry has proven its worth with almost 1/3 of new GDP growth in the period between 2001 and 2011 coming from adopting new technologies and innovation in production processes.

However, Europe's high-tech sectors face severe competition from other parts of the world (mainly the US and Japan), and many traditional sectors and SMEs are lagging behind in adopting new technologies. There are also large disparities in

22. Digitizing European Industry, https://ec.europa.eu/digital-single-market/en/digitising-european-industry

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digitization and innovation support between regions and member states. To face this challenge, the EU pushed forward with the Digitizing Industry initiative aimed at helping companies, researchers and public authorities make the most of the new technologies using public and private funding on the European, national and regional level. For this purpose the EU plans to mobilize up to €50 billion euros of investment in support of the digitization of industry through the following: [23]

- Digital Innovation Hubs (DIH) – almost 90% of European SMEs feel that they are lagging behind in digital innovation. To help them the EU will support the creation of pan-European networks of bottom-up digital innovations across all industrial sectors. So far several DIH initiatives already exist e.g. Open Data Incubator Europe or Innovation for manufacturing SMEs and the EU plans to support digital innovation with 37 billion euros and digital hubs with 5.5 billion;

- Industrial platforms - this initiative will foster EU-wide coordination between public bodies, private sector and research efforts with national and industrial strategies. Some platforms funded through H2020 already exist e.g. FIWARE and the Open Data Platform while new projects that will enable the integration of relevant digital technologies, such as IoT, Big Data, Cloud, and HPC; autonomous systems, artificial intelligence and 3D printing into integration platforms addressing cross-sector challenges are under review;

- Standards for boosting digital innovation – focus on five areas: 5G technologies, Cloud computing, the Internet of Things (IoT), Data Technologies and Cybersecurity. With billions of connected devices the EU needs to ensure that all forces in Europe pull in the same direction, using standardization as a strategic instrument of EU industrial policy. For this purpose a new legislative proposal on ICT standardization priorities was published in 2016.

- European Cloud Initiative – is a package of measures that will allow European scientists (European Open Science Cloud), business and public administration access to world-class data infrastructure, high-speed connectivity to transport data and super-computers to process it. Also, this initiative will make it easier to exploit Big Data opportunities and support data-driven innovation that can help boost Europe's competitiveness, especially for start-ups, SMEs and companies who can use data as a basis for R&D and innovation. The world's production of data grew 2000-fold in the last 15 years with almost 90% of data circulating today on the Internet being created less than 2 years ago. It is this data that will certainly boost competitiveness and innovation.

- The Internet of Things (IoT) - IoT represents the next disruptive innovation that connects physical objects with virtual ones, and through the Internet crates a triangle with humans. It combines both worlds (physical and virtual) into a smart environment that can make the way we live and do business safer, easier and more efficient. The European IoT initiative has three pillars that aim to create: a Single Market for IoT (easy plug-and-play system for devices all over the EU), an IoT ecosystem (open platform to foster innovation and development), and human centered IoT (respecting European values, the protection of personal data and security). The EU expects that by 2020 more than 6 billion IoT connections will be in existence bringing the overall value of the IoT market up to one trillion euros. It is expected that IoT can bring vast economic benefits in many industries, but also in the public sector through smart cities, smart energy and Intelligent Transport.

- Digital public services – In 2016 the European Commission proposed a new e-government Action Plan for the Acceleration of Digital Transformation of Public Administration. It proposes a range of measures to be implemented in the next 3 years and that include use of contract registers and full e-procurement, use of eID and eSignature, eInvoicing, Single Digital Gateway, One-stop shop for e-Justice, interconnection of all European business registers, job mobility portals, etc.

23. Ibid; Measures described in this chapter are a short summary of Digitizing European Industry action plan

24. Advancing the Internet of Things in Europe, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016SC0110

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- Skills and Jobs – By 2020, it is expected that there will be 825,000 unfilled positions for digital jobs in the EU due to the lack of digital skills and the low number of students in STEM sciences or specialized VET education. The Digital economy and Industry 4.0 are changing the structure of employment and are creating new and different types of jobs. The need for digital skills will soon affect all jobs – from engineering, health, finance, agriculture to ICT and the EU needs to "up its game". Every citizen needs to have at least basic digital skills in order to live, work and learn but with the upcoming challenges of Industry 4.0 more advanced skills and new educational policy framework will be needed.

In a nutshell, to succeed and harvest the benefits of Industry 4.0, the EU needs solid networks, a functional digital single market that can boost the digital economy, promotion of digital skills and jobs, and finally data-driven innovation.

But the EU can still be at risk of "missing the bus" and Industry 4.0's benefits. With no common language, culture and significant differences in national strategies and legislation the EU can face big problems coming from the gaps between the member states. Just as digital gaps exist in the creation of a common Digital Single Market, so exists the innovation gap between the North and the South of Europe. The recent European Innovation Scoreboard[25] and GDP indicator shows that the countries that are the most innovative and close to becoming more "Digital" are Denmark, Germany, Finland, France, Ireland, Sweden, the UK and the Netherlands. Also, most of the European innovative SMEs with a worldwide reputation come from the same countries, while at the same time a majority of companies from other member states do not do business outside of their national borders and invest almost insignificantly in innovation. If the EU wants to lead in the new era and not just follow or participate, it will need to boost the digital economy for consumers and business and invest more into R&D and an innovative society – innovative start-ups, digital education, Big Data analytics, smart cities, creative SMEs, European online platforms, etc. can become building blocks of the future economy.

Countries in SEE are also lagging behind when it comes to Industry 4.0. Slovenia has a strategy that puts the issues of Industry 4 on the horizon but is still coping with the creation of the foundations for effective digital economy, while Croatia still struggles with issues deriving from the transition era and effects of globalization. On a regional level both countries are, in terms of innovation, moderate or modest innovators with the exception of effects city of Ljubljana, which is in the group of strong innovators. In terms of innovative member states Slovenia does fair better than Croatia. To catch up, SEE countries must speed up in reaching the EU levels in the digital economy, support innovation in the private and public sector, including social innovation, create regional digital innovation hubs and put more of the EU's money from cohesion and regional development funds into Industry 4.0 supportive projects. Also, interactions between Cohesion funds and Horizon 2020 or even better use of the "Juncker Plan" can prove to be a vital tool for underdeveloped parts of the EU.

25. The European Innovation Scoreboard – previously *Innovation Union Scoreboard* – provides a comparative analysis of innovation performance in EU member states, other European countries, and regional neighbors. It assesses the relative strengths and weaknesses of national innovation systems and helps countries identify areas they need to address. Since innovation is a key component in any Industry 4.0 Strategy it has also been used for the purposes of this paper. https://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en

5. Conclusions and Recommendations

The digitalization of industry and society will bring new opportunities for the citizens of the EU, and SEE especially, in the form of new jobs (even some that never existed such as big data analyst), new growth and new digital skills. Once the DSM package is in place we can expect new or better digital infrastructure, the abolishment of geo-blocking, more e-commerce, more digital skills, and hopefully less barriers in cross-border cooperation. But there will still remain challenges to tackle. Most notably the "digital gap" between the north of Europe and the rest of the EU, the innovation lag of almost 20 member states and the possible social system crisis that can emerge from the Fourth Industrial Revolution.

To overcome these obstacles the EU has to finish the creation of the Digital Single Market, which should lay the foundations for a competitive and efficient digital economy. This work includes creating strong and solid networks, the promotion of digital skills and jobs, supporting a data driven economy and, finally, strong European and regional alliances that will jointly co-create a modern legal framework for the development of the digital economy. The EU should also use financial instruments like EFSI fund, EU funds and public-private partnerships to stimulate the process of the "networkization" of Europe for Big Data and the Internet of Things (which is increasingly becoming the "Internet of Everything") and for investments in the fields of service deliveries, supporting start-ups, ICT education, innovation and R&D. Without these preconditions the EU will never become a leader in the digital economy.

But whether the European model of the digital economy will be a fair one in the social context, still remains to be seen.

As far as SEE is concerned, we must accept the fact that we are lagging behind Western economies in terms of adopting technology and its transposition into society. The innovation and digital gaps clearly show that SEE still has a lot of work ahead in achieving the EU average. Only by creating the basic building blocks of the digital economy we can assure that the benefits of the Digital Single Market will come in effect in Southeast Europe.

As the countries of SEE share common geopolitical and economic challenges, they should gather their "brightest minds" in a regional joint force whose task would be to study the good practices in technology, legal frameworks, education, IT support and Cloud adoption in Western Europe.

Western Balkans countries (especially candidate countries) should work together towards promoting local innovation and digital products, building a coherent SEE strategy to make them ready to "plug" their economies into the European Digital Single Market and strengthen their countries' position as a coherent block when applying for funding.

On the national level SEE countries should tackle the main issues presented in the DESI index. Those include problems with the low level digital skills of their citizens, the lack of connectivity and especially the coverage of rural areas and the lack of trust in e-commerce and cross-border digital trade. But these challenges also present an opportunity for SEE. A consistent approach to the transposition of the DSM package into national legal frameworks and following EU-wide actions is one of them.

Untapped potential can also be found in harvesting the good sides of Internet platforms and the sharing economy (a hybrid market model between selling and gift giving in peer-to-peer exchange using online platforms for transactions or facilitation). Small and sometimes over regulated countries can benefit a lot from innovative approaches to the Internet economy and peer-to-peer exchanges.

Other opportunities can be found in regional and national actions and even though SEE countries still need a better strategic approach to the digital economy there are already many examples (start-up accelerators, hubs, business-academia cooperation, EU projects) that prove that SEE is capable of bridging the North-South gap in the near future.

But the EU and SEE should prepare for the possible downsides of the digital economy and Fourth Industrial Revolution. As already mentioned, new technologies will change the way business is done and will have a great impact on the labor market. New technologies and Industry 4.0 can yield greater inequalities, disrupt the labor market and create

new ways for the exploitation of workers in the modern age. The latter has already been seen in the sharing economy platforms where it is hard to establish rules between employers and employees. Also, new the industrial revolution can deepen the gap between more and less innovative countries, usher a new wave of worker displacement, segregate the labor market on "low-skill/low-pay" and "high-skill/high-pay" segments and lead to an increase in social tensions.

Taking into account European polices and initiatives, and regional and national positions, key decision makers should follow these points of action:

On the regional level:

1. Promote regional/European wide cooperation between digital companies with the purpose of promoting a new industrial model and co-create interoperability solutions.

2. Develop cross-border innovative hubs taking into account the possibilities for new growth in areas with sufficient digital skills and technological infrastructure.

3. Create and promote regional cooperation in the digital economy (digital alliances) through all sectors – public, private and civil, with the purpose of creating a regional digital single market in the fields of telecommunications, e-commerce, cross-border business and digital infrastructure.

4. Actively work on putting an end to retail roaming charges in the Southeast Europe. After the abolition of roaming charges in the EU in 2017, SEE will remain an area of high prices that will seriously harm the potential for regional cooperation in the digital economy.

5. Enforce EU competition rules (especially in EU member states and gradually in candidate countries in SEE) in order to prevent excessive market concentration and abuse of a dominant position, to monitor competition with regards to bundled digital content and to actively work on solving the problem of geo-blocking. Geo-blocking is a hampering factor in building the digital economy and has created a "second grade citizen" in SEE due to their inability to access digital content.

On the national level:

1. Using national budgets, EU funds or private-public partnerships, countries in Southeast Europe should build digital infrastructure allowing high speed connectivity for all and covering all regions especially rural ones. Connectivity in combination with the liberalization of parcel delivery can be a solid foundation for the creation of new companies and jobs in less developed areas.

2. Create national digital alliances between the government, IT companies, NGOs, telecoms and universities with the goal of furthering public consultations on EU policies (the Digital Single Market in particular), promote inter-sectorial cooperation, promote and support education in STEM sciences and ICT, coordinate nationwide policies and projects in the field of digital economy/digital industry. These alliances should also be involved in actions that will arise from the complex interconnectivity of policies like the intertwinement of the digital economy with the sharing economy and the circular economy.

3. Create national strategies for the digital economy, innovation and Industry 4.0 that will include more sectors (most of the regional digital strategies focus on e-government) and actors (most strategies focus on the public sector) and will clearly state what the role of the "digital" in society is.

4. Provide plans to tackle the forthcoming problems of the lack of digitally literate people and technologically obsolete industries – asses the effects of the digital economy on employment, support lifelong learning and adult education programs in the field of digital skills (for all generations), modernize ICT curricula in formal education (especially in Croatia in early stages of education) and encourage social partners to become partners in the transformation of the economy (new forms of employment, labor laws in the digital age, and support for workers).

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5. Facilitate general public debate on the benefits and challenges of the Fourth Industrial Revolution and its impact on the labor market with the goal of preventing a "winner takes all economy" that can usher a new era of general inequality. Unions, NGOs, and employers' associations should be included in this dialogue from the beginning to ensure that the impact assessment of the digital economy and Industry 4.0 is done properly and covers labor rights in the digital age and the level of preparedness for the digital labor market.

6. States, together with trade unions, must devise an approach to the rising question of the sharing economy in the digital age. On one hand, it should support startups that are built on this new economic approach, but on the other hand it must tackle the issues like new types of jobs (e.g. Cloud jobs) and possibly new forms of worker exploitation that can be found in certain areas of the sharing economy that include freelancing and outsourcing.

7. Support National Curricula frameworks that will include modern ICT education for all generations and support e-school projects. Lifelong learning strategies should be updated to cover new skills and jobs in the digital labor market, especially for older and less digitally literate workers. Putting ICT education in the curriculum early in the education cycle (kindergarten and first years of elementary school) can prove beneficial for tackling youth unemployment in the future.

8. Devise and implement programs for the development of technology centers in less industrialized regions for the support of start-ups and innovation

9. Promote and support development of start-up accelerators to facilitate growth and create new jobs.

10. The continuation of support for innovation projects, public-private partnerships in smart solutions and smart enterprises in key economic areas like tourism, agriculture, ICT and engineering. Industry innovation and the modernization of current models of production should receive strategic and financial support from the state.

11. Promote and encourage the use and re-use of public sector information, the use of digital technology to access and simplify administrative procedures and support the efforts in creating a "paperless" state with modern public administration. Also, SEE countries should encourage the creation of smart and sustainable solutions in areas like smart cities and smart transport.

12. Countries should continue to improve consumer protection, especially in the area of digital commerce and trading in digital goods. Also, data protection (aligned with the European Data Protection Package) must be of the highest importance within regulatory bodies.

13. Ensure fair and sustainable taxation policy in the digital economy that will align tax rates for digital content and similar physical goods (e.g. VAT on books in Croatia is 5% while e-books have a 25% rate) and the stimulation of e-commerce and investment in digital should be necessity in SEE.

More reading:

European Digital Single Market
https://ec.europa.eu/digital-single-market/

Digital Competitiveness and Digital scoreboard
https://ec.europa.eu/digital-single-market/en/digital-scoreboard

Digital Economy and Society Index
https://ec.europa.eu/digital-single-market/en/desi

Industry 4.0 paper by European Parliament
http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2015)568337

Work 4.0 green paper by German ministry of labour
http://www.bmas.de/SharedDocs/Downloads/DE/PDF-Publikationen/arbeiten-4-0-green-paper.pdf?__blob=publicationFile&v=2

European Innovation Scoreboard
https://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en

The California Challenge – How (not) to regulate disruptive business models, FES, 2016,
http://library.fes.de/pdf-files/id-moe/12797-20160930.pdf

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Imprint

Published by:
Friedrich-Ebert-Stiftung, Regional Office for Croatia and Slovenia, Praška 8, HR 10000 Zagreb, Croatia

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About the digital economy in Southeast Europe

The digitalization of the economy as the Fourth Industrial Revolution is something new, especially for the countries of Southeast Europe. Digitalization is creating both new opportunities and challenges for companies and their employees. Which opportunities stemming from the digital economy and Industry 4.0 can the countries of Southeast Europe take advantage of? What is the situation regarding the implementation of Industry 4.0? And what are the barriers and challenges for business? How is the Digital Revolution changing the world of work? How can actors in society and politics promote and support this debate in Southeast Europe?

The Friedrich-Ebert-Stiftung Regional Office in Zagreb

The Friedrich-Ebert-Stiftung (FES) is the oldest political foundation in Germany with a rich tradition in social democracy dating back to 1925. The work of our political foundation focuses on the core ideas and values of social democracy – freedom, justice and solidarity. This connects us to social democracy and free trade unions.
The office of the Friedrich-Ebert-Stiftung in Zagreb was established in 1996 and is responsible for the project work in Croatia and Slovenia. Our key objectives and activities include strengthening democratic institutions, addressing economic and social reform concepts, inter-ethnic reconciliation and dialogue, supporting and promoting trade union activities, supporting organizations for the development of an active and pluralistic society.