

**MONITORING PROGRESS IN NATIONAL INITIATIVES
ON DIGITISING INDUSTRY**

Country report

Slovenia

July 2019



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Summary

Slovenia is part of the group of medium-performers¹ among EU Member States when it comes to digitalisation. On the Digital Economy and Society Index (DESI), Slovenia ranks 15th in 2018, which is an improvement by one place compared to the year before. Slovenia can praise itself with quality and stable human capital. The level of innovation, especially in niche areas, is very high. However, broadband connectivity and take up of digital services by the Slovenian economy, especially SMEs, remain a challenge.

Slovenia has two comprehensive strategies in place regarding digitising industry. Digital Slovenia adopted in 2016 acts as a development strategy, setting guidelines for creating an information society by 2020. The guidelines with set measures are then concretized in the Smart Specialisation Strategy, in which Slovenia identified its priority areas for future investment.

Overall, at least EUR 880.32 million have been invested across initiatives of the different pillars of the Digitising European Industry (DEI). The main initiatives under Pillar 2 that stand out and have been adopted recently include the establishment of Digital Innovation Hub Slovenia in 2018, a national one-stop-shop, FabLab Network Slovenia (2017) and the creation of nine Strategic Research and Innovation Partnerships (2016) covering nine priority domains identified in the Smart Specialisation Strategy. Regarding regulation (Pillar 4), Slovenia has or is in process of adopting legislative acts, which transpose relevant EU Directives. Nevertheless, the country still lacks regulation more focused on digitisation.

To address the issue of low uptake up of digital technologies by Slovenian companies (Pillar 5), several measures have been launched in the field of the digital skills development, offering training to employers. Trainings are offered through Digital Academy and Competence centres for human resources development spread throughout the country. To address the issue of digital skills divide, Slovenia established the Digital Coalition in 2016, a national platform aiming to reduce ICT illiteracy in the country. Slovenia also has in place a strategy to increase the use of ICT in Slovenian education until 2020.

Table 1 presents an overview of the main initiatives identified, that will be further detailed in this report. Table 2 presents a short SWOT analysis of Slovenia on digitalisation.

Table 1: Overview of initiatives

Initiatives	Starting year	Overall strategy/ DEI Pillar/ support mechanism	Type of initiative	Sectors targeted	Digital technologies targeted	Size of companies targeted	Budget
Digital Slovenia 2020	2016	Overall strategy	Development Strategy	All (mostly industry, entrepreneurs hip, infrastructure, construction)	Internet of things Big Data Cloud Computing Mobile Technologies	All	N/A
S4 – Strategy of Smart Specialization	2015	Overall strategy	Operational Strategy/ Platform	Research and Development	All	All	EUR 817 million (by June 2018)
Digital Innovation Hub Slovenia	2018	Pillar 2	DIH	Multisector	All	All	Funding from national grant programmes (2.6 million EUR from 2019-2023) and European programs (Horizon, Interreg), paid services (prototyping, training etc) and membership fees.
SRIP – Strategic Research and Innovation Partnership	2016	Pillar 2&3	Cluster Initiative	Multisector	ICT, photonics, plasma, robotics, process technologies.	All	EUR 817 million (by June 2018)
FabLab Network Slovenia	2017	Pillar 2&3	Fablabs	Multisector	All	All	Total value: 4.4 million EUR (2017-2018) Funding from national programmes (4 million EUR), Interreg (200,000 EUR). Remaining programmes: 200,000 EUR.

Initiatives	Starting year	Overall strategy/ DEI Pillar/ support mechanism	Type of initiative	Sectors targeted	Digital technologies targeted	Size of companies targeted	Budget
Act on Electronic Communications (ZeKOM-1C)	2016	Pillar 4	Regulation of electronic communications networks and services	All	Electronic communication	All	N/A
Electronic Identification and Trust Services Regulation	Preparation since 2018, start in 2019	Pillar 4	Regulation of electronic transactions	All	Electronic business	All	N/A
Act on Information Security	2018	Pillar 4	Regulation of electronic transactions	All	Information security	All	N/A
Strategic guidelines for further implementation of ICT in the Slovenian education until 2020	2015	Pillar 5	Strategy	Education/ Schools	ICT	All	31,000,000 EUR (2015-2018)
Competence Centres for Human Resources Development	2010	Pillar 5	Competence centre	Multisector	All (mostly e-business)	All	3 public calls for application (2010-2018: 12,470,000 EUR) + 1 open call (900,000 EUR)
Digital Academy	2017	Pillar 5	Training	Electric and electronic industries (new sectors emerging; tourism)	E-business, digital business models, process technology, internet of things	Electronic and Electrical industry	Funding from paid services.

Initiatives	Starting year	Overall strategy/ DEI Pillar/ support mechanism	Type of initiative	Sectors targeted	Digital technologies targeted	Size of companies targeted	Budget
Digital Coalition	2016	Pillar 5	Coalition, open forum	All	All (mostly e-services)	All	No dedicated funding scheme; coalition members contribute on a voluntary basis.
Public tender to support digitalisation of SMEs	2017	Support mechanism	Call for projects	All	All	All	1st call: 2.5 million EUR (2017-2018) 2nd call: 9,450,000 (2019-2023)
Tax Incentives for Investments in Research and Development	2006	Support mechanism	Tax Relief	All	All	All	N/A

Table 2: SWOT of the country on digitalisation

<p>Strengths:</p> <ul style="list-style-type: none"> • Stable and highly-educated human capital • Stable political and economic environment • High level of innovation (especially in niche areas) • Good infrastructure • Increase in the number of ICT-start-ups 	<p>Weaknesses:</p> <ul style="list-style-type: none"> • Low digital literacy, lack of e-skills and deficient use of available advanced e-services and ICT solutions by certain population segments • Insufficient investments and lack of access to finance (Slovenia below the EU average)² • Low take-up of digital services, especially by SMEs (lack of capacity)
<p>Opportunities:</p> <ul style="list-style-type: none"> • Increased political awareness and support for the digitalisation process, hence increased number of initiatives and strategies in recent years • Significantly higher investments in the development of information society and the ICT sector • Significant progress in entrepreneurial environment (increase in Entrepreneurial Culture score)³ • Development of new e-services of state administration (including healthcare, the public sector, partly local self-government services) within the common service IT-infrastructure. 	<p>Threats:</p> <ul style="list-style-type: none"> • Conservative view among people on the integration of new technologies and relatively high level of unwillingness for skills re-qualification • Lack of ambition and political courage for the ultimate implementation of technology. Projects are in place, but they are not implemented. • Brain drain. • Many pillar-specific initiatives have been launched only recently. Their real impact still needs to be seen.

1 General context

The objective of this report is to analyse the current status of national initiatives on digitising industry in Slovenia. The analysis has been conducted against the background of the Digitising European Industry (DEI), which was the first industry-focused initiative of the Digital Single Market launched by the European Commission in 2016.

Similar country reports will be produced for each of the 28 EU Member States. These national reports allow to:

- Monitor the development of national initiatives on digitising industry;
- Compare different national approaches; and
- Identify best practices of national initiatives.

Monitoring and reporting back on the development of the existing national initiatives is an important element of the DEI initiative, and this report should be seen as one part of it.

For more details about the DEI and our methodological approach for the country report, please consult the document attached.

1.1 Economic context and status on digitisation

General economic context^{4,5}

Slovenia has performed well economically over the past years. In 2017, the economic growth reached 4.9%, reaching a ten-year high. Foreign demand was the main economic growth factor in 2017, similarly to 2016, with exports increasing by 10.6%. The economic growth remained strong also in 2018 with 4.3% (4.6% in the first half). For the next two years, economic forecasts predict a slowdown (3.3% in 2019 and 3% in 2020) due to lower export-market gains as higher wages are expected to take their toll on the competitiveness of exporters. Nevertheless, both domestic consumption and domestic spending are predicted to remain strong and are expected to maintain the high economic growth in the near future.

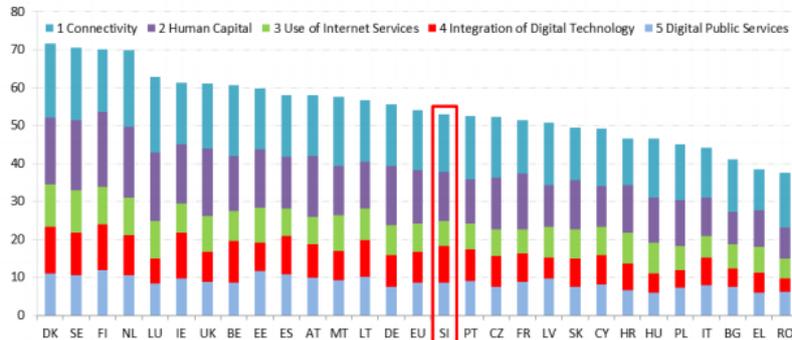
The labour market has developed favourably as well. The unemployment level has been steadily decreasing from 6.6% in 2017 to 5.6% in 2018. The future predictions remain positive, with the unemployment level to fall further to 5.3% in 2019 and 5.1% in 2020.

The Slovenian economy is based on a strong and innovative industrial sector. In 2017, the industry had a share of gross value added of 27.5%, above the EU average of 19.6%.

Status of digitisation

According to the DESI Report 2018, Slovenia ranks 15th out of the 28 EU Member States and belongs to the medium-performing cluster of countries. Compared to the year before, Slovenia progressed by one rank (16th in 2017).

Figure 1: Slovenia in the DESI ranking (2018)



Source: DESI 2018 – Country report Slovenia

Almost everyone in Slovenia has broadband internet coverage and the country is making progress in fast broadband coverage (98% in fixed broadband coverage and 83% in fast broadband coverage). At 77%, fixed broadband internet take-up remains close to the EU average (75%). Nevertheless, in some connectivity segments, Slovenia remains below the EU average. For example, with 66% of mobile broadband take-up, Slovenia is lagging behind the EU average (90%). Similarly, with 24% of fast broadband take-up, Slovenia is behind the EU average (33%). Relatively high prices for broadband connectivity might be the reason for the low take-up of fast broadband with speeds of 30 Mbps and above. Ultra-fast broadband take-up (13%) remains close to the EU average (15.4%).

In the Human Capital Dimension, Slovenia fell by one rank in 2018 compared to the year before. The number of regular internet users rose from 73% to 77%, but despite the increase Slovenia still has a slightly lower percentage of regular internet users compared to the EU average (81%). Slovenia is below the EU DESI values in all segments of the Human Capital Dimension (Internet Users, At Least Basic Digital Skills, STEM graduates). The strongest score is the number of ICT specialists, where Slovenia, with 3.5%, scores just slightly below the EU value (3.7%). The Eurostat data on the share of graduates in science, technology, engineering and mathematics (STEM), reveal that Slovenia is the country with high share of STEM graduates (33.3/1000). Nevertheless, companies in Slovenia tend to complain about not being able to find workers with digital skills. Slovenia is also characterized by a big divide in digital skills. While the younger generations are starting to reap the benefits of the inclusion of digital content in their school curriculum, the older generations remain excluded. Additionally, unwillingness to engage in skills re-qualification or engage in lifelong learning remains low among the older population.

Regarding the integration of digital technology, Slovenia is above the EU average and was ranked 7th in 2018 according to the Digital Technology Integration Index (DTII), which corresponds to an increase by four ranks compared to the year before (11th in 2017). In terms of enabling conditions leading to digital transformation in the country, measured by the Digital Transformation Enablers' Index (DTEI), Slovenia is scoring below the EU average. Ranking as 20th in 2018, with no change in comparison to the year before, Slovenia belongs to the group of Member States with a moderate enabling environment. The country's ability to catch up and converge depends mostly on the country's decision making about future industrial policy.

According to the World Economic Forum’s Readiness for the Future of Production Report 2018, Slovenia’s main drivers of production are its sustainable resources, as presented in the figure below.

Figure 2: Slovenia’s readiness for future production

Readiness Overall Assessment				
Drivers of Production				5.7
Driver	Weighting	Rank	Score /10	
 Technology & Innovation	20%	35th	4.8	
 Human Capital	20%	27th	6.0	
 Global Trade & Investment	20%	40th	5.6	
 Institutional Framework	20%	27th	6.8	
 Sustainable Resources	5%	5th	8.6	
 Demand Environment	15%	67th	4.2	
Structure of Production				6.8
Structure	Weighting	Rank	Score /10	
 Complexity	60%	12th	8.3	
 Scale	40%	39th	4.6	

Source: World Economic Forum, Readiness for the Future of Production Report 2018

The table below summarises some of the economic and digital indicators for Slovenia.

Table 3: General economic and digital indicators for Slovenia

	% GDP from manufacturing	% increase GDP per cap PPP	DESI position – and change	DESI sub-indicators Human Capital, Use of Internet, Integration of Digital Technology in 2018
Slovenia	27.5%	4.9% (2016-2017)	15 th in 2018 16 th in 2017	<ul style="list-style-type: none"> Human Capital: 15th in 2018 (16th in 2017) Use of Internet Services: 23rd in 2018 (no change compared to 2017) Integration of Digital Technology: 8th in 2018 (7th in 2017)

1.2 National strategy on digitising industry

The table below presents an overview of the national strategies on digitising industry.

Table 4: National strategies on digitising industry

Name	Digital Slovenia 2020	Slovenian Smart Specialisation Strategy – S4
Type	Development Strategy	Operational Strategy/platform
Starting date	2016	2015
Objective	<p>Speed up the development of a digital society and become a reference environment for the introduction of new digital technologies.</p> <p>Three documents included in the strategy define strategic development orientations:</p> <ul style="list-style-type: none"> • Strategy for the development of the information society by 2020 • Next Generation Broadband Development Plan 2020 and Addendum • National cyber security strategy 	<p>The purpose of S4 is to create a comprehensive innovation eco-system that will spur innovation and development of medium and high-tech solutions in niche areas. The goals of the strategy are concretized:</p> <ol style="list-style-type: none"> 1. raising added value per employee 2. Improve Slovenian competitiveness in global markets: <ol style="list-style-type: none"> a) increase the share of high-tech intensive products in exports from 22.3% to EU-15 is an average of 26.5%; b) increase the share of exports of services with a high share of knowledge in exports from 21.4% to 33%, which means halving the gap to the EU average; 3. Raise entrepreneurial activity from the current 11% at least to the EU average level, i.e. 12.8%.
Ministry/ministries in charge (website, contact person)	<p>Ministry of Public Administration, Information Society Directorate Uros Svete, Director of the Information Society Directorate Email: Uros.svete@gov.si Phone: +386 1 478 4778 http://www.mju.gov.si/fileadmin/mju.gov.si/pageuploads/DID/Informacij_ska_druzba/pdf/DSI_2020_3-2016_pic1.pdf</p>	<p>Government office for Development and European Cohesion Policy Marko Hren Email: Marko.Hren@gov.si Phone: 00386-14003370 http://www.svrk.gov.si/en/areas_of_work/slovenian_smart_specialisation_strategy_s4/</p>
Scope of the strategy/action plan	<p>The strategy covers all areas of life and development (public services, entrepreneurship, households).</p>	<p>The strategy focuses on nine domains (areas of application) implemented by nine Strategic Research and Innovation Partnerships (SRIPs). Each SRIP has adopted the Action Plan. Specifically, in domains 1.1. Smart cities and communities and in the domain 3.1. Smart factories with key enabling technologies</p>
Measures included in the strategy/action plan	<ul style="list-style-type: none"> •The establishment of the Slovenian Digital Coalition • Broadband infrastructure (project co-financing) • Strengthening and systemic regulation of the national cybersecurity system (establishment of a national authority) 	<p>Direct incentives (tax reliefs, support for research and innovation, public research infrastructure, human resources (human resource centres), promotion of economic transformation (smart factories, ICT horizontal network).</p>

Name	Digital Slovenia 2020	Slovenian Smart Specialisation Strategy – S4
		Innovative ecosystem measures: clustering, flexible education system (career platform) and supportive environment for innovation (setting up a start-up, future lab)
Overall funding and distribution by volume and source of funding (public/private, EU/national)	EU/national	EUR 817 million (2016- June 2018) Public/private, EU/national

Digital Slovenia 2020⁶

The starting point for Digital Slovenia 2020 is the Europe 2020 strategy adopted by the European Commission in 2010, the Digital Agenda for Europe and the Single Digital Market Strategy. Together with RISS - Research and Innovation Strategy of Slovenia and SIP - Slovenian Industrial Policy, Digital Slovenia is one of the three key sectoral strategies with guidelines for the creation of an innovation knowledge society. According to general public and industry, the strategy is correctly set and addresses the core issues for Slovenia's lagging. However, the speed of introducing changes remains problematic in Slovenia.

S4- Slovenian Smart Specialisation Strategy⁷

Slovenia concretized the S3 priorities in one single and consistent framework – Slovenian Smart Specialisation Strategy (S4). The S4 Strategy collectively follows the guidelines from Digital Slovenia, Research and Innovation Strategy (RISS) and Slovenian Industrial Policy. In the Slovenian Smart Specialisation Strategy, S3 priorities are linked to the nine areas of application, which are grouped in three principal domains: 1. DIGITAL (Smart Cities and Communities, Smart Buildings and Home), 2. CIRCULAR (Networks for the Transition to a Circular Economy, Sustainable Food, Sustainable Tourism); and 3. Industry S4 (Factories of the Future, Health-Medicine, 3 Mobility, Materials as Products). S3 implementation is then concretized through Strategic Research and Innovation Partnership (SRIPs). There is one SRIP implemented for each domain. SRIPs are further elaborated in the continuation of the report (see Chapter 2). Slovenian approach to S3 has been recognised as an example of smart story. The European Commission included Slovenia in the Handbook as an example of good practice.

1.3 EU cooperation in the field of digitising industry initiatives

Slovenia is actively partnering in several cross-border cooperations on the topic of digitalisation.

Strategic Research and Innovation partnerships (SRIPs), established within the Slovenian Smart Specialisation Strategy (S4), are extensively entering into several smart specialisation platforms. Slovenia is participating (either as a leading region or as a participating region) in 11 Industrial smart specialisation platforms⁸:

- Digitalisation and Safety for Tourism (SI leading region)
- Advanced material on battery (West Slovenia as a leading region, East Slovenia as participating region)
- Artificial intelligence and Human Machine Interface (SI participating region)
- Efficient and Sustainable Manufacturing (SI interested region)
- High Performance Production through 3-D printing (SI participating region)
- Personalised medicine (SI participating region)
- SME Integration to industry 4.0 (SI leading region)
- Social Economy (SI participating region)
- Sustainable buildings (SI participating region)
- Solar Energy (SI participating region)
- Bioenergy (SI participating region)

Slovenia is also partnering in the following Interreg projects⁹:

- INNOGROW: Regional policies for innovation driven competitiveness and growth of rural SMEs (Interreg Europe)
- Cd-ETA: Collaborative Digitization of Natural and Cultural Heritage (Interreg Europe)
- TRINNO: Business ecosystem for Tradition and Innovation (Interreg Europe)
- ERUDITE: Enhancing Rural and Urban Digital Innovation Territories (Interreg Europe)
- Slovenia is also a partner in the Smart Factory HUB Project, which is part of Interreg Danube Transnational Programme. The aim of the project is to develop R&D and business policy conditions for transnational cooperation in the manufacturing industry.

In 2015 Slovenia signed the Declaration of cooperation on Artificial intelligence (AI) and is part of the Coordinated plan on artificial intelligence¹⁰. Slovenia is also involved in the ECSEL joint undertaking - the Public-Private Partnership for Electronic Components and Systems.

Slovenia is leading the OpeningupSlovenia initiative, which started in 2015. It is a bottom-up created and top-down supported initiative in which Slovenia as a first European Member State will try to create a unique nationwide research environment in open education. The initiative tries to stimulate high-quality learning through new technologies and digital content and was given support by 40 institutions and entities from 18 countries in the South-eastern European region and outside the European Union. The initiative plans to access finance by partners applying separately or as a consortium for funds through programmes Erasmus +, Horizon 2020 and European Structural Funds¹¹.

2 Other policy support to digitising industry

2.1 Boosting innovation capacity

The table below presents an overview of the main initiatives to boost innovation capacity (pillars 2 and 3 of the DEI).

Table 5: National initiatives to boost innovation capacity

Name	Strategic Research and Innovation Partnerships (SRIPs)	Digital Innovation Hub Slovenia	FabLab Network Slovenia
Type	Cluster initiative	DIH	Fablab Network
Starting date	2016	2018	2017
Objective	The aim of the established partnerships is to link the investment and innovation potentials of the partnerships and to organize them in a single innovation ecosystem in order to penetrate the global markets and achieve stronger positioning in the priority areas S4 (healthy living and working environment, natural and traditional sources with apprentice).	The DIH is a central national one-stop-shop to provide, connect and support knowledge, business and technology expertise, technologies, experimental and pilot environments, best practices, methodologies and other activities necessary to fully enable the Slovene Industry to build digital competencies, innovation models and processes, support its digital transformation and raise its competitive advantages based on digital processes.	The goal is to promote innovation and development of the local economy. With municipalities as members of the network, entrepreneurship can be promoted in all Slovenian regions.
Relevant for Pillar 2 ¹² or Pillar 3 ¹³ or both	Pillars 2 and 3	Pillar 2	Pillars 2 and 3
Short description	SRIPs are long-term partnerships between companies, the research sphere, (country and municipalities, and linkers, users and non-governmental spheres - the 'square helmet' (quadruple helix). SRIPs are established in all nine areas of application within the S4 Strategy for Smart Specialization: 1) Smart cities and communities 2) Smart buildings and home with a wood chain 3) Networks for the transition to the holding economy 4) Sustainable food processing 5) Sustainable tourism 6) Factories of the future	DIH Slovenia Industry is a Digital Transformation one-stop-shop in Slovenia and beyond. It creates awareness and provides services to grow digital competences, share digital experience and case studies locally, regionally and internationally, influence the government to adapt regulation and open its data to foster entrepreneurship. It is the only national one-shop in the country.	The National Network of fabrication laboratories serves as a platform for learning, intergenerational integration, creativity and support to creative makers, start-ups and companies. The FabLab Network is coordinated by the Faculty of Electro-engineering of the University of Ljubljana, Laboratory for Telecommunications and Laboratory for Multimedia. It is supported by organizations from the field of research, education, fabrication laboratories, companies, municipalities and other

Name	Strategic Research and Innovation Partnerships (SRIPs)	Digital Innovation Hub Slovenia	FabLab Network Slovenia
	7) Health-medicine 8) Mobility 9) Raw materials as products		supportive organizations such as Chambers of Commerce. The network is a member of the Digital Skills and Jobs Coalition.
Granting organisation	Government of Slovenia and European Fund for Regional Development	EU funding programmes (Horizon, Interreg, European Cohesion Funds)	National grant programmes, EU funding programmes (Horizon 2020, Interreg)
Participating organisations	Strategic research and innovation partnerships are partnerships between enterprises, research organizations, governmental institutions and municipalities, and linkers, users and non-governmental spheres. In total, SRIPs currently have 783 members, of which 83% are enterprises, of which 21% are large companies. The membership increased by 24% since the creation of the partnerships.	Chamber of Commerce (coordinator) University of Ljubljana, University of Maribor, FabLab Network Slovenia, Technology Park Ljubljana, SRIP Factories of the future, International Institute of Business Analysis, TECOS – Tools Development Center of Slovenia, Wood Industry Cluster	Around 70 partners from different spheres: Faculty of Electrical Engineering (coordinator) Academic organisations (University of Ljubljana, University of Maribor, University of Primorska, etc.) Supportive organizations (Chamber of commerce, Chamber of Craft and Small business of Slovenia, etc.) Municipalities Economic sector Research organizations Fabrication laboratories (Simbioza, Stikalnik, Roglab, etc.)
Sectors targeted	Multisector	Multisector The DIH Slovenia focuses on supporting the industries that are highlighted as priority ones by Slovene Smart Specialization Strategy (S4), such as: smart cities and communities, smart buildings and smart factories. However, it does not exclude other industries from S4, ranging from high-tech to more traditional ones.	Multisector

Name	Strategic Research and Innovation Partnerships (SRIPs)	Digital Innovation Hub Slovenia	FabLab Network Slovenia
Technologies targeted	In SRIP- Smart Cities and Communities/ICT Horizontal Network the key enabling technologies are: ICT and photonics. In SRIP-Smart factories, the key enabling technologies are: plasma, robotics, process technologies.	All	All
Funding (split by private/public and national/EU), state period/annual funding	<p>By the summer of 2018, EUR 817 million were approved:</p> <ul style="list-style-type: none"> • 389 million EUR in the field of R&D, • 113 million EUR in the field of human resource development, • 296 million EUR in the promotion of entrepreneurship • 17 million EUR in the field of internationalization <p>Figures refer to all nine domains cumulatively. Distribution of funding is divided between EU/national. Co-financing is in accordance with the state aid rules (co-financing from 20 to 75% depending on the instrument). Support for the operation of the clusters is in the range of 50%.</p>	<p>Funding split between national resources and European Cohesion funds:</p> <ul style="list-style-type: none"> • 2.6 million EUR approved by the Ministry of Economic Development and Technology for the period 2019-2023 • DIH Slovenia is currently actively applying for several programmes to get EU funds, but since the initiative has been established only in 2018 the EU funding part is unknown 	<p>Funding split between national and EU sources.</p> <p>Total: 4.4 million EUR (2017-2018) National programmes: 4 million EUR (1st call; 2.6 million; 2nd call: 1.6 million) Interreg Europe: 200,000 EUR Other (private sources, paid services): 200,000 EUR</p>
Current status of initiatives	Ongoing	Ongoing	Ongoing

Strategic Research and Innovation Partnerships (SRIPs)¹⁴

Strategic Research and Innovation Partnerships (SRIPs) are long-term partnerships between business community, research organisations, state and municipalities and facilitators, innovation users and NGOs. The aim of these partnerships is to pool investment and intellectual potentials of Slovenian stakeholders, and help the stakeholders set up a comprehensive innovation ecosystem with the aim of entering global markets and improving the position in S4 priority areas. Stakeholders cooperate in the form of coordination of R&D activities, sharing of capacities, exchange of knowledge and experience and networking and collective representation of interest abroad. There is a SRIP created for each of nine priority domains outlined in the S4 Smart Specialisations Strategy (in total nine SRIPs).

- I.1 Smart Cities and Communities; I.2 Smart Buildings and Home, including Wood Chain;
- II.1 Networks for the Transition to a Circular Economy; II.2 Sustainable Food; II.3 Sustainable Tourism;
- III.1 Factories of the Future; III.2 Health-Medicine; III.3 Mobility; III.4 Materials as Products

SRIPs have a total of 783 members of which 83% are enterprises, large enterprises accounting for 21% of these, with a balanced structure in both cohesion regions. The membership of SRIPs grew by 24% since 2016. By June 2018, a total of EUR 817 million has been approved under the calls for proposals and programmes.

The SRIPs involving key enabling technologies are: SRIP 1.1 Smart Cities and Communities/ICT Horizontal network (ICT) and SRIP 3.1 Factories of the future (robotics, photonics, process technologies, plasma).

Digital Innovation Hub Slovenia¹⁵

In 2018, Digital Innovation Hub Slovenia was established. Key initial partners of the DIH are coming from the S4 specialization platform SRIP (Factories of the Future, ICT innovation network, Smart cities and communities), National institute of business Analysts (IIBA), the industry (members of above mentioned SRIPs, TECOS), the national FabLab network, universities (University of Ljubljana, University of Maribor), SME's supportive environment (Chamber of Commerce and Industry of Slovenia, Technology park Ljubljana, wood industry and other clusters).

Beside DIH Slovenia, there are five other market-specific DIHs in Slovenia (six DIHs in total): 1. Digital Innovation Hub for Smart Manufacturing (Pomurje Technology Park), 2. Digital Innovation Hub of Eastern Slovenia (DIGITECH SI -East), 3. DIH AGRIFOOD - Digital Innovation Hub for Agriculture and Food production, 4. HPC5-High Performance and Cloud Computing Cross-border Competence Consortium, 5. Styrian Technology Park, STP. These DIHs are market and sector specific, whereas DIH Slovenia is the only national and non-market specific DIH.

DIH Slovenia was granted 2.6 million EUR from the grant programme to support digitalisation of SMEs for the period 2019-2023. Because the initiative is at its operational beginning, it is hard to assess the number of companies that benefit/ will benefit from it. The initiative is as such open to all companies. Currently, the DIH Slovenia also applied for funding from the Horizon 2020 programme and it is waiting for the publication of results¹⁶.

FabLab Network Slovenia¹⁷

Slovenia developed the national reference network FabLab of creative laboratories in 2017 within the framework of the Interreg Europe ERUDITE project. The initiator and coordinator of the network is the Faculty of Electrical Engineering, University of Ljubljana, in cooperation with the Information Society Directorate of the Ministry of Public Administration. The network includes about 70 partners coming from the industry, educational organisations, municipalities and business support organisations. The main objective of the network is to recognize and use the entrepreneurial potential of local communities in Slovenia. In total there are 28 fablabs in Slovenia.

Impacts, challenges and perceptions

Slovenia's innovation capacity exhibits some strong points, but also some strong deficiencies. The Digital Technology Integration index ranking of Slovenia is 7th (above EU average), but according to the Digital Transformation Enabler's Index, Slovenia is ranked 20th (below EU average). According to the Digital Transformation Scoreboard 2018, Slovenia is displaying a moderate digital transformation performance. In four out of seven dimensions, Slovenia scores above EU average: in fields such as e-leadership and entrepreneurial culture Slovenia is scoring about 10 percentage points above the EU average. On the contrary, investments and access to finance remains a big challenge, since on this dimension Slovenia scored almost 30 percentage points below the EU average. Similarly, in supply and demand of digital skills Slovenia is scoring around 12% below the EU average. With around 2% of GDP spent on ICT, Slovenia is scoring below the OECD average.

Despite performing badly in some dimensions according to the Digital Transformation Scoreboard 2018, Slovenia's level of innovation is rather high, especially in niche areas identified in the S4 Smart specialisation strategy. The number of start-ups is steadily increasing. There were in total 86 start-up companies in 2012, in 2013 already 147 and in 2014 the number increased to 419¹⁸¹⁹. The share of ICT start-ups in particular is high in Slovenia and, in this dimension, Slovenia is scoring above the EU average by about 10%²⁰. Both industry associations and national authorities agree that Slovenia possesses very qualified human capital and that needed knowledge is available in the country. Slovenia is technologically well developed and could act as a reference model for the introduction of new business models based on disruptive technologies.

A bigger issue is the level of uptake of these digital technologies by Slovene companies, especially SMEs that lack capacity. Because companies typically lack resources (mostly financial), development engineers usually focus on core business operations rather than on technology transfer²¹. For that reason, it is of crucial importance for the country to develop and offer enough measures/instruments for companies to overcome such obstacles. Another challenge identified is lack of political readiness to realize projects developed by the Slovene R&D sphere. Slovenia in the past developed several projects, which were never implemented or even tested. There is an absence of political vision to drive the digital transformation of the country.

2.2 Regulatory framework for digital age

The table below presents the main initiatives related to a digital regulatory framework (Pillar 4).

Table 6: Main initiatives under Pillar 4

Name	Act on Electronic Communications (ZeKOM-1C)	Electronic Identification and Trust Services Regulation	Act on Information Security
Type	Regulation of electronic communications networks and services	Regulation of electronic transactions	IT security regulation
Starting date	The Act was adopted in 2012. Amendments to the Act transposing the Directive were adopted in 2016.	The project started in 2018, entry into force expected in 2019.	2018. Secondary legislation will be adopted in 2019.
Objective	Transpose the EU Directive 2014/61 and introduce measures to reduce the cost of establishing high-speed networks in national legislation.	Renewal of national legislation on electronic commerce and electronic signatures.	The purpose of the law is to regulate the field of information security and to ensure a high level of security of the networks and information systems in the Republic of Slovenia, which are essential for the smooth functioning of the State in all security conditions and provide essential services for the preservation of key social and economic activities.
Short description	The act sets the legal framework for facilitating faster deployment of high-speed electronic communications networks by reducing their costs. The Act regulates the construction of networks and associated infrastructure for the construction of the broadband network. Within the next two years ZEKOM-2 has to be adopted according to the new European Code.	The act will transpose the Regulation (EU) N°910/2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS Regulation).	The Act regulates information security and transposes the EU Directive 2016/1148/ES. The Act, which SI have timely adopted within the deadline, is now followed by the enforcement of secondary legislation. The deadline set is the first quarter of 2019. The deadline for the establishment of the Control Center for Cybernetics Incidents is set for January 1st 2019, and the establishment of a National Body for Cyber Security for January 1st 2020.
Sectors targeted	All	All	All

Impacts, challenges and perceptions²²

Slovenia has shown some progress in updating its regulatory framework by transposing several EU directives in recent years, however the country is mainly tracking and transposing the EU directives and does not particularly stand out in this area. If Slovenia is able to adopt the Law on Electronic Identification and Trust services in 2019 as planned, then Slovenia will join five Member States that have so far managed to pass the law. According to national authorities, Slovenia also did not make any big progress in transforming the regulatory approach to data (e.g. free flow of data, clarity on ownership, use, liability) to support the digitisation of industry. The Information Society Directorate from the Ministry of Public Administration is familiar with the concept and the idea to establish access to data useful for businesses and product development. However, there is no fixed date for when the formal development of the regulation will start. Similarly, no initiatives have been taken so far to change accounting treatment to enable digital investments to be recorded as capex.

Some improvements and positive effects of the legislation have been observed such as a steep increase of investments in joint construction and increased awareness of the shareholders about the Act on Electronic Communications (ZEKOM). It is estimated that the number of interest applications for building construction increased by ten times in 2017. As assessed by national authorities, obstacles are not as much of a regulatory nature as they are socially rooted and therefore represent much bigger challenges (for example, lack of digital skills among the population). In the near future the government plans to adopt the Law on Electronic Identification and implement the bylaws of the Law on Information Security. On 4 December 2018 the national group for amending the law on Electronic Communication, which must be done within next two years, has already been created.

Industry associations assess the regulatory framework as mediocre and assess the uptake of digital technologies as result of the regulatory measures as low. For Slovenia to create the regulation fit for the digital transformation, updating, simplifying legislation and withdrawing current legislation is necessary. According to the industry associations, the harmonization of legislation is urgently needed.

2.3 Skills development

The table below presents an overview of the main measures for digital skills development (Pillar 5 of the DEI).

Table 7: Slovenian main initiatives to develop digital skills

Name	Strategic guidelines for further implementation of ICT in the Slovenian education until 2020	Competence centres for human resources development	Digital Academy	Digital Coalition
Type	Strategy	Competence centre	Training	Coalition, platform
Starting date	2015	2010	2017	2016
Objective	The Guidelines have six goals: 1. Develop and test innovative pedagogical approaches, models and strategies, 2. Develop platforms and cooperation, 3. E-competences, 4. Informatization of institutions, 5. E-education in higher and adult education, 6. Evaluation (measuring the progress)	The aim is to stimulate the strengthening of entrepreneurial skills, and the so-called "soft skills" in areas identified by experts as the competences of the future.	In comparison with larger companies, SMEs have more difficulties to access financial resources, and the Academy helps them to digitally transform at a moderate price, increase their knowledge and consequently, increase their competitiveness on a global scale.	The aim is to improve digital literacy and digital competence across target populations according to identified gaps: improve e-skills, e-inclusion and the overall quality of life for the population and help to better integrate ICT in education and lifelong learning for inclusion in the digital society.
Short description	Strategy provides guidelines for opening the education in an open, innovative and sustainable learning environment which is facilitated by the innovative use of ICT that will enable individuals develop competences for the 21st century.	Open workshops and trainings conducted throughout the country in cooperation with various stakeholders. Workshops are led by top Slovenian and foreign lecturers and experts from various fields. Workshops are free and are intended for managers and employees. In addition, one of the fundamental goals of the project is to raise the overall awareness of the managers and key employees about the importance of lifelong learning. In 2017 there have	Digital Academy is a three-year educational program aimed primarily at SMEs. In the introductory module, SMEs become acquainted with the trends of digital transformation and in the following modules the knowledge of each individual company is focused on a concrete project (technology transfer, the resolution of the new business model). Digital academies are sector-oriented. For example, the Chamber of Commerce organizes the Academy for the electrical engineering sector. Other organizations follow the	The Digital Coalition is a national strategic partnership for digital employment. The main goal of the Slovenian Digital Coalition is to pursue EDA goals and above all to improve digital skills of the population, direct young people to ICT professions and connect them with needs and training. Digital Coalition is a platform (open forum) composed of stakeholders working in the field of digitalisation of trade and

Name	Strategic guidelines for further implementation of ICT in the Slovenian education until 2020	Competence centres for human resources development	Digital Academy	Digital Coalition
		been 43 workshops with more than 1,000 participants.	initiative. In 2017, the Slovenian Tourist Organization organized digital academy for the sector of tourism.	industry, smart cities, e-commerce, e-inclusion, cyber security and other areas related to the development of digital society. The Coalition was established in 2016 as planned in the Digital Slovenia 2020 strategy. The Coalition is set until 2020.
Granting organisation	National budget, European Social Fund, European Regional fund, Erasmus +, Horizon 2020	Ministry of labour, family, social affairs and equal opportunities, European Social Fund; Public Scholarship, Development, Disability and Maintenance Fund of the Republic of Slovenia	N/A	Government of the Republic of Slovenia, Ministry of Public Administration
Participating organisations	National Education Institute, Centre for Vocational Training, National school for leadership in education, University of Ljubljana, University of Maribor, University of Primorska, Education Research Institute, Academic and Research Network Slovenia, Josef Štefan Institute, Anton Martin Slomsek Institute, Bistrica Primary School, Ljubljana School Centre etc.,	Ministry of labour, family, social affairs and equal opportunities, companies	Chamber of commerce - Chamber of Electronic and Electrical Industry	Chamber of Commerce Government of RS, The Rector's Conference of the RS, Coordination of independent research institutes of Slovenia (KOsRIS) Community of the municipalities of Slovenia, Network of non-governmental organizations for an inclusive information society

Name	Strategic guidelines for further implementation of ICT in the Slovenian education until 2020	Competence centres for human resources development	Digital Academy	Digital Coalition
Sectors targeted	Formal Education (primary, secondary, higher and adult education)	Multisector	Electronic and Electrical industry	All
Funding (split by private/public and national/EU), state period/annual funding	Funding split national/EU. Total value (2015-2018): 31,000,000 EUR ²³ 2015: 6,000,000 EUR 2016: 6,000,000 EUR 2017: 8,000,000 EUR 2018: 11,000,000 EUR	Funding split by national government programmes and European Social Fund. In the period 2010-2018 there have been three public calls for application (2010-2018: 12,470,000 EUR) and one open call (900,000 EUR).	Private sources (from education sessions)	No dedicated funding scheme; coalition members contribute on a voluntary basis
Current status of initiatives	Ongoing	Ongoing	Ongoing	Ongoing (until 2020)

Strategic guidelines for further implementation of ICT in the Slovenian education until 2020²⁴

The Ministry of education, science and sport published Strategic guidelines for further implementation of ICT in the Slovenian education until 2020. National authorities and industry associations both believe that the Guidelines are assessed as useful and show final awareness that radical changes are needed. However, according to industry associations, the Guidelines are too ambitious and not sufficiently concrete. The ICT industry was insufficiently considered in the preparation and implementation of the Guidelines as the industry could advise which competences need to be developed.

Competence centres for human resources development²⁵

Competence centres for human resources development have achieved significant results at sectoral level (paper, glass, woodworking, etc.) and among individual enterprises. During 2010-2015, 19 branch models of competences were developed. The models are valuable tools for the Center for Vocational Education and Training in determining the needs and guidelines for the development of the vocational and technical education system. More than 300 companies were trained by 14,500 employees, who joined 50,000 times in training. 50% of participants were involved in professional training, 15% in other professional skills and 15% in soft skills development. The first call (2010-2013) for the establishment and operation of competence centres for human resources development was published in 2010 with a budget of EUR 2,750,000. Seven competence centres were chosen for the training of 100 staff members in the field of: glass, computer science, telecommunications, tool making, accounting, chemistry and robotics. The second tender (2012-2015) was published in 2012, with a budget of EUR 5,000,000. 12 competence centres were chosen with over 200 members in the field of paper, design management, woodworking, logistics, trade, construction, trade, waste management and security. The third call for tender was published in 2016 with a budget of EUR 3,967,000 and with EUR 250,000-400,000 distributed per individual partnership.

Industry associations assess the competence centres as useful, especially in the development of competence models. However, the participation is limited to the Competence Centres consortium partners and is not opened to outside companies. It is considered as a closed measure. Occurrences of duplicated models have been reported as well.

Digital Academy²⁶

The Digital Academy is organized by the Chamber of Commerce, starting in 2017. The Academy is targeting SMEs in the electrical engineering sector. Industry associations assess the measure as useful in training digital transformation managers and has a high uptake. The usefulness of the Academy has been recognized and has slowly been transferred to other industry sectors. For example, in 2017 the Slovenian Tourist Organization organized the first Digital Academy for the tourism sector. The fact that the Academies are sector specific is considered as an advantage. However, according to industry associations, more financial resources would be needed, since current financial resources are insufficient to train enough managers.

Digital Coalition²⁷

The first Digital Coalition open forum was held in 2017. So far, three working groups have been established. The Groups focus on: Digital Competences and Education, Digital Environment and

regulatory measures, Digitisation of industry and cooperation. The main activity of the working groups composed of experts is to formulate goals, overcome challenges and draft proposals for broader programmes. Typically, in the first phase, the Coalition working groups identify actual needs and key challenges faced by businesses and civil society. This phase was successfully managed and in 2018 the implementation phase entered the second phase of developing the real cases, specific projects and changes within the legal and regulatory framework. One of the most recognizable achievements of the Coalition so far has been the creation of Blockchain Think Thank in January 2018.

The achievements of the Coalition will only be able to be assessed by the end of the second phase in the form of proposals and regulatory changes. According to the Digital Slovenia 2020 strategy, the Digital Coalition is set until 2020. So far, the Coalition is perceived to be useful and cooperation between stakeholders from private and public sector proved to be successful²⁸. However, the Coalition faces some barriers. The Digital Coalition membership is based on genuine interest and expertise rather than profit potential. This approach might ensure impartiality of the Coalition member's interests; however the Coalition could benefit from greater financial support and more balanced funding model in order to deliver on its objectives.

Impacts, challenges and perceptions

According to the DESI 2018 report, 54% of Slovene population is estimated to have basic or above basic digital skills. With about 33/1000 of STEM graduates (science, technology, engineering and mathematics), Slovenia shows satisfactory results compared to the EU average. Despite these figures, a big divide in digital skills remains among different population groups, older population being particularly vulnerable. According to the Digital Transformation Scoreboard 2018, Slovenia scores more than 10 percentage points below the EU average in the demand and supply of digital skills. The conservative view among the population towards digital transformation is also problematic, especially among older generations. Consequently, people show high level of unwillingness towards skills requalification²⁹.

The government uses international surveys (ICILS 2013, ESSIE 2012, PISA 2015 and 2018, TIMMS, ePIRLS) to measure digital skill gaps. After 2015 there have not been any survey to measure digital skills. The results of the second survey on ICT in education in Europe will be available after March 2019³⁰.

2.4 Support mechanisms

Public tender to support digitalisation of SMEs³¹

The Slovenian Ministry of Economic Development and Technology published on 1st September 2017 a public tender "Establishment or upgrade of electronic commerce in SMEs for the period 2017-2018" . The aim of the e-commerce call is to improve the opportunities for SMEs to enter or expand their business to foreign markets, thereby increasing their international competitiveness. The public tender covers only the fields of application that are clearly defined in the valid S4-Smart Specialization Strategy. The funds are shared between East and West cohesion region and co-financing amounts up to 70% of eligible costs. The funding that an individual company can receive may not be less than EUR 5,000 and not higher than 30,000 EUR. The Ministry supported 97 SMEs in the 2017-2018 call, which were entitled to up to EUR 2,500,000 in grants cumulatively in the period 2017-2018. The key activity financed by Ministry was the strengthening of competences, which included general training and awareness in the field of digitization and

presentation of examples of good practices in the introduction and implementation of digitization in foreign and Slovenian companies.

Due to the great interest of SMEs in financing activities included in the call, the Ministry opened a new call to allocate EUR 9,450,000 for the digitisation of SMEs in the period 2019-2022, with the main emphasis on strengthening digital competences and skills. It is planned that by 2023, 250 SMEs would benefit from the tender.

Tax Incentives for Investments in Research and Development³²

Business enterprises that are investing in research and development (R&D) can apply for tax deductions. The tax relief is 100% of investments in the R&D activity. The net effect is determined by the tax rate, which depends on the legal form (legal or natural person). Currently, most of the tax relief is claimed by companies for which the tax rate amounts to 19%. Tax deductions for R&D activities can be exercised by taxpayers in the framework of the tax procedure with the Financial Administration of the Republic of Slovenia (FURS) under the Corporate Income Tax Act (ZDDPO) or the Personal Income Tax Act (ZDoh - for sole proprietors). Only successful, profit making, companies are eligible for the tax deduction. Tax deduction is an incentive because it can reduce the expenses due to risky activities of research and experimental development (RR) that are not fully predictable in nature. Therefore, companies can also plan for R&D expenses by simultaneously achieving two effects - a competitive advantage with R&D activity and a lower tax base for this amount.

3 Conclusions

The following table provides an overview how the different digitalisation initiatives implemented in Slovenia have been funded.

Table 8: Breakdown for the financing of initiatives

	Pillar 2	Pillar 3	Pillar 4	Pillar 5
	Digital Innovation for all	Partnerships and industrial platforms	Regulatory framework for digital age	Preparing for digital future (skills)
Digital innovation Hub	2.6 million EUR			
Strategic Research and Innovation Partnerships	817 million EUR (2016-2018)			
FabLab Network Slovenia	4.4 million EUR			
Act on Electronic Communications (ZEKOM-1C)			N/A	
Electronic Identification and Trust Services Regulation			N/A	
Act on Information Security			N/A	
Competence centres for human resources development				13,370,000 EUR (2010-2018)
Digital Academy				Paid services
Strategic guidelines for further implementation of ICT in the Slovenian education until 2020				31,000,000 EUR (2015-2018)
Digital Coalition				N/A
Public tender to support digitalisation of SMEs	1st call: 2.5 million EUR (2017-2018) 2nd call: 9,450,000 (2019-2023)			
Tax Incentives for Investments in Research and Development	N/A			
Total spending	At least 880,320,000 EUR			

Slovenia belongs to the medium-performing countries according to DESI, ranking 15th in 2018. The country exhibits a number of strengths but also faces some severe challenges.

One of the biggest strengths of Slovenia is human capital. The knowledge needed for digital transformation is concentrated in the country. It is reflected in the high number of ICT start-ups (above EU average) and a high share of STEM graduates. Digital infrastructure is good and stable. According to national authorities and industry associations consulted, Slovenia has a potential to serve as a reference model for the introduction of new digital technologies and new business models.

However, the low take-up of digital technologies by Slovenian companies, especially SMEs, is a challenge. Low governmental investment and lack of channels available for companies to access finances are mostly problematic. In this dimension, Slovenia is scoring far below the EU average. Similarly, the distribution of digital skills knowledge among the population is not balanced. Young populations benefit from digital-related courses in their school curriculum and possess basic and above basic digital skills, whereas older population significantly lacks digital competences. Slovenia is also known to be a conservative environment when it comes to introducing new and more radical technological changes and people show high unwillingness for the requalification in their later years.

To address the challenges Slovenia showed a proactive approach and several initiatives have been launched in recent years, with a majority of initiatives starting in 2016 and 2017. The highest number of initiatives has been adopted under the Pillar 5 (Skills development). Slovenia has in place the Guidelines document for the informatization of educational institutions and implementation of innovative pedagogical approaches. The Competence Centres for Human Resources Development have been operational since 2010 and so far more than 300 companies had a chance to participate. In 2016 the national Digital Coalition has been established with an aim of increasing digital literacy and competence in the country. The Coalition is also a member of The Digital Skills and Job Coalition. Industry sectors are trying to increase the digital literacy through the Digital Academies. Under the Pillar 2 and 3 most notable initiatives include the Digital Innovation Hub Slovenia, the only national one-shop-stop created in 2018 and FabLab Network. Strategic Research and Innovation Partnerships, through which Slovenia is implementing its S3 priorities, have been established over all 9 identified domains. The slowest progress has been shown with regards to the regulatory framework. Slovenia is transposing all the necessary EU Directives, but it lacks more focused regulation regarding digitisation.

Nevertheless, Slovenia can be assessed as a country with a lot of potential regarding digitisation, especially in terms of the knowledge. In the future the country should continue with its proactive approach and in certain areas consider increasing its efforts to address the remaining challenges.

The box below presents a good practice initiative.

Box 1: Good practice

Strategic Research and Innovation Partnerships (SRIPs)

Strategic Development and Innovation Partnerships (SRIPs) are private-public partnerships of all nationally relevant and investment stakeholders currently engaged in Industry 4.0 priority areas (government bodies, research institutes, scientific centres, universities, clusters, social partners etc.). There are nine SRIPs in total covering the nine priority domains identified in the Smart Specialisation Strategy. SRIPs are actively taking part in 11 industrial smart specialisation platforms. In the period 2016-2018 in total 817 million EUR have been distributed. The growing membership (783 members of which 83% are enterprises) shows that the initiative has been largely accepted by the Slovenian R&D and economy sector.

To conclude, the table below provides a general overview of the main digitalisation initiatives implemented in Slovenia, the level of take-up and perception of their impacts and the overall progress Slovenia has made so far with regard to digitalisation.

Table 9: Total input output overview

		Pillar 2	Pillar 3	Pillar 4	Pillar 5
		Digital Innovation for all	Partnerships and industrial platforms	Regulatory framework for digital age	Preparing for digital future (skills)
Application	Name of key initiatives (start dates in brackets)	Digital Innovation Hub Slovenia	Strategic research and innovation partnerships FabLab Network Slovenia	Act on Electronic Communications, Electronic Identification and Trust Services Regulation, Act on Information Security	Digital Academy, Competence centers for human resources development, Strategic guidelines for further implementation of ICT in the Slovenian education until 2020
	Funding (total amount and period)	2.6 million EUR between 2019 and 2023	821.4 million EUR between 2016 and 2018		44,370,000 EUR between 2010 and 2018
	Industries addressed	Multisector	Multisector	e-business	Business management, electronic engineering
	EU programme involved	European Cohesion Funds, Horizon, Interreg	European Cohesion Funds, Interreg	N/A	European Social Fund
Usage	Perception of initiative	Governmental support is not perceived comprehensive (2/5).		The regulatory framework is perceived to have improved slightly, but it could improve faster. Harmonization still needed.	The government initiatives on digital skills are perceived as rather useful (3.5/5)
	Take-up	6 DIHs	28 Fablabs		N/A
Outcomes	Perception of outcomes	The level of take-up of digital technologies is perceived as low (2.5/5)	The level of innovation in digital industries is perceived as high, especially in niche areas (4.5/5)	The regulatory framework is perceived to be relatively fit for the digital age (3/5)	The required skills and labour resources are considered to be somewhat available to enable digitization (2.5/5)
	Outcome metrics	2% of GDP spending on ICT (below OECD average) DESI ranking: 15th in 2018 (16th in 2017) DTII ranking: 7th in 2018 (11th in 2017) DTEI ranking: 20th in 2018 (no change since 2017)		Between 2015 and 2017, total capex spending in Slovenia increased by 8.7%. Increase in the number of start-ups: 86 (2012), 147 (2013), 419 (2014).	The number of people employed with ICT specialist skills increased by 10% between 2015 and 2017. In the same period, the share of enterprises providing training to develop ICT skills fell from 28%

		Pillar 2	Pillar 3	Pillar 4	Pillar 5
					(2015) to 27% (2017). 59% of workers received training (2017).
	Change in outcomes	From 2017 to 2018, Slovenia improved from 16th to 15th rank in the DESI ranking on integration of Digital Technology.			
End-goal	Productivity growth	Between 2015 and 2017, real productivity per person employed in Slovenia increased by 0.9%.			
Summary		Slovenia has recently launched a number of initiatives in all 5 pillars. The highest number of initiatives have been adopted under pillar 5. The prospects look promising, although it is still too early to determine the outputs and outcomes of these initiatives.			

ANNEX 1 List of stakeholders interviewed

Type of stakeholder	Name of organisation
Government representative	Ministry of Public Administration, Information Society Directorate
Government representative	Government office for Development and European Cohesion Policy, Smart Specialisation Coordination Division
Government representative	Ministry of Education, Science and Sport
Industry association	Chamber of Commerce
University of Ljubljana	Faculty of Electrical Engineering

ENDNOTES

¹ Medium-performing countries are Spain, Austria, Malta, Lithuania, Germany, Slovenia, Portugal, Czech Republic, France and Latvia. Based on Digital Single Market report 2018.

² Based on Digital Transformation Scoreboard 2018.

³ Based on Digital Transformation Scoreboard 2018.

⁴ European Commission. Economic Forecast for Slovenia. Available at: https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-performance-country/slovenia/economic-forecast-slovenia_en

⁵ Government of Slovenia. Highest economic growth in a decade. Available at: http://www.vlada.si/en/media_room/news_from_slovenia/news_from_slovenia/article/highest_economic_growth_in_a_decade_61048/

⁶ Ministry of Public Administration. Digital Slovenia 2020. Available at: http://www.mju.gov.si/si/delovna_podrocja/informacijska_druzba/digitalna_slovenija_2020/

⁷ Government office for Development and European Cohesion Policy. Smart Specialisation strategy. Available at:

http://www.svrk.gov.si/si/delovna_podrocja/strategija_pametne_spezializacije/

⁸ European Commission. Smart Specialisation platform. S3 Thematic Platforms. Available at: <http://s3platform.jrc.ec.europa.eu/s3-thematic-platforms>

⁹ Official website of Interreg Europe: <https://www.interregeurope.eu/in-my-country/slovenia/>

¹⁰ European Commission, Digital Single Market. EU Member States sign up to cooperate on Artificial Intelligence. Available at: <https://ec.europa.eu/digital-single-market/en/news/eu-member-states-sign-cooperate-artificial-intelligence>

¹¹ Official website of OpeningupSlovenia: <https://www.ouslovenia.net/>

¹² Measures facilitating the adoption of new technologies by industry

¹³ Measures to develop technology building blocks

¹⁴ Government Office for Development and European Cohesion Policy. Strategic Research and Innovation Partnerships (SRIPs). Available at:

http://www.svrk.gov.si/en/areas_of_work/slovenian_smart_specialisation_strategy_s4/strategic_research_and_innovation_partnerships_srip_in_detail/

¹⁵ Official website of DIH Slovenia: <http://dihslovenia.si/>

¹⁶ Based on the interview with the representative of the Faculty of Electroengineering from the University of Ljubljana.

¹⁷ Official website of FabLab Network Slovenia: <http://fablab.si/en/>

¹⁸ Slovenian startup ecosystem. Available at: <https://www.netokracija.si/slovenski-startup-ekosistem-140-startupov-1400-clanov-in-skoraj-1-milijon-dolarjev-na-kickstarterju-58923>

¹⁹ Sukic. S. (2015). Analysis of a comprehensive support environment for the development of startup companies in Slovenia. University of Ljubljana, Faculty of Economics. Available at: <http://www.cek.ef.uni-lj.si/magister/sukic1619-B.pdf>

²⁰ Based on the Digital Transformation Monitor 2018.

²¹ Based on the interview with the representative of the national authority (Government office for Development and European Cohesion Policy).

²² Based on the interviews conducted with the representative of the national authority (Ministry of Public Administration) and representative of the industry association (Chamber of Commerce).

²³ Figures provided by the Ministry of Education, Science and Sport of the Republic of Slovenia.

²⁴ Ministry of Education, science and sport. Strategic guidelines for further implementation of ICT in the Slovenian education until 2020. Available at: http://www.mizs.gov.si/fileadmin/mizs.gov.si/pageuploads/URI/Slovenian_Strategic_Guidelines_ICT_in_education.pdf

²⁵ Public Scholarship, Development, Disability and Maintenance Fund of the Republic of Slovenia. Competence centres for human resources development. Available at: <http://www.sklad-kadri.si/si/razvoj-kadrov/projekti-2007-2013/kompetencnacentri/>

²⁶ Chamber of Commerce. Digital Academy. Available at: https://www.gzs.si/zbornica_elektronske_in_elektroindustrije/vsebina/Strokovna_podro%C4%8Dja/Digitalna-akademija-DA

²⁷ Digital Transformation Monitor. Slovenia: Slovenian Digital Coalition. Available at: https://ec.europa.eu/growth/tools-databases/dem/monitor/sites/default/files/DTM_Slovenia_FINAL.pdf

²⁸ Ibid.

²⁹ Based on the interview with the representative of the national authority (Ministry of Public Administration).

³⁰ Based on the interview with the representative of the national authority (Ministry of Education, Science and Sport).

³¹ Ministry of Economic Development and Technology. Activities and measures to promote internationalization of companies. Available at: http://www.mgrt.gov.si/si/delovna_podrocja/internacionalizacija/aktivnosti_in_ukrepi_za_spodbujanje_internacionalizacije_podjetij/

Digital Slovenia. Digitalisation. Available at: https://www.gzs.si/Portals/SN-informacije-Pomoc/Vsebine/GG/2017-osebna/GG_Digitalizacija_september_%202017.pdf

³² Ministry of Economic Development and Technology. Promoting Innovation and Technological Development. Available at: http://www.mgrt.gov.si/si/delovna_podrocja/tehnoloski_razvoj/spodbujanje_inovacij_in_tehnoloskega_razvoja/