European Union
European Regional
Development Fund

DigiBEST
Interreg Europe

ATTACHMENT 1

DIGIBEST PEER REVIEW REPORT

AUSTRIA

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18 FEBRUARY 2022

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TABLE 1. LIST OF ABBREVIATIONS USED IN THE TEXT

AF	Application form
AP	Advisory Partner
AWS	Austrian Promotional Bank
BDRM	Business Digitalisation Regional Road Maps
BMDW	Austrian Federal Ministry for Digital and Economic Affairs
BMVIT	Austrian Federal Ministry for Transport, Innovation and Technology
CRM	Customer Relationship Management
CV	Curriculum Vitae
DESI	Digital Economy and Society Index
EC	European Commission
eIDAS	EU regulation on electronic identification and trust services for electronic transactions in the European Single Market
ERDF	European Regional Development Fund
ESF	European Social Fund
EU	European Union
FFG	Austrian Research Promotion Agency
GP	Good Practice
HP	Hosting partner
ICT	Information and Communication Technologies
IE	Interreg Europe
JS	Joined Secretariat
LP	Leading partner
MC	Management Committee
MoEPRD	Ministry for Environmental Protection and Regional Development
PP	Project partner
PR	Peer Review
PRM Guidelines	Peer Review Methodology Guidelines
PRR	Peer Review Report
RIS3	Regional Innovation and Smart Specialisation Strategy
ROP	Regional Operational Programme
RRP	Recovery and Resilience Plan
RS	Regional Studies
RTD	Research and Technological Development
SG	Steering Group
SH	Stakeholder
SME	Small and medium enterprise
SP	Sending partner
STEM	Science, technology, engineering and mathematics

This PR methodology is using specific terms, such as:

- **PR expert** – the expert hired by the project sending partner;
- **Hosting partner** – the project partner responsible for organizing the PR event;
- **Hosting region or country** – the region or country, where the PR event takes place;
- **Sending partner** – the project partner responsible for hiring and sending the PR expert;
- **PR process** – the whole process starts from hiring PR experts by PPs until conducting the Joint PRR of the DigiBEST project by the AP.
- **PR event** - PR online or onsite visit to the HP's region during which the field research will be done.

Throughout the DigiBEST project a **definition on the digital transformation** of the European Commission is being used: "Digital transformation is characterized by a fusion of advanced technologies and the integration of physical and digital systems, the predominance of innovative business models and new processes, and the creation of smart products and services." Advanced digital technologies provided in the processes of digital transformation, such as the Internet of Things, big data, advanced manufacturing, robotics, 3D printing, blockchain technologies and artificial intelligence, as well as smart use of ICT in SMEs offer businesses new opportunities for building on their competitiveness.[1]

[1] https://ec.europa.eu/growth/industry/policy/digital-transformation_en

1 Introduction

This review consists of a study carried out by external experts on the current state of play of SMEs digitalisation in Austria.

The study is part of a broader peer review action carried out in the framework of the DigiBEST project whose goal is to support and promote SMEs competitiveness in Austria through digital transformation, enhancing SMEs capacity to use advanced technologies and innovative business models towards smart, sustainable, and inclusive growth.

The following specific objectives have been established under this assignment:

- Identification of the main challenges, barriers, and difficulties in the digital transformation of Austrian SMEs.
- Analysis of the main policy instruments for promoting business digitalisation and identification of improvement opportunities.
- Analysis of successful practices implemented in other European countries in the digitalisation field and their potential transferability to Austria.
- Advising on concrete digitalisation-related solutions to foster digital transformation in micro, small and medium-sized enterprises based in the country.
- Recommendations for new or improved policy instruments to overcome existing shortcomings.

In particular, the review is to contribute to providing the Hosting Partner with some insights on how to support the following topics under its digitalisation support initiatives:

- Safety and cybersecurity.
- New digital forms of work.
- Inclusion and gender equality.
- Agri-food and food systems.

The review was based on two main sets of activities: desk research, including examination of literature, policy documents and in particular the "DigiBEST Analysis for Austria" report prepared by AWS; and field research, which consisted mainly in carrying out online meetings at the peer review online event organised by the Austrian partner.

With regard to desk research, the analysis of the above-mentioned report sent by AWS was a central part of this activity. Topics included in the report on the economic context and business activities, innovation system and digitalisation supporting policies proved to be significant for a better understanding of the country's situation regarding the challenges posed by digital transformation.

Other documents and websites were consulted, either from the bibliographic list offered by the Hosting Partner in the submitted report or from other sources consulted on the initiative of the experts, which were helpful for a better understanding of the Austrian socio-economic framework and innovation ecosystem.

The field research comprised basically online meetings organised by the Hosting Partner on the 13th and 14th of January 2022. An introductory meeting was previously held on the 10th of January 2022. The meetings brought together the Hosting Partner representatives (i.e., AWS),

Sending Partners' representatives (i.e., Trøndelag County Council (Norway) and Intermunicipal Community of Tâmega and Sousa (Portugal)) and the experts. Lists of questions previously submitted in writing by the experts were asked and answered by the AWS staff during the event, having been agreed that part of the questions would also be answered in writing after the event.

The peer review online event essentially served to promote brainstorming discussions around the four above mentioned topics that are of interest to the Hosting Partner in view of possible future measures to be developed by AWS: cybersecurity, digitally enabled forms of work, inclusion and gender equality in ICT, and digital solutions for more sustainable agri-food value chains.

The agenda for the two-day event was divided into four main parts:

- Day 1, morning: presentation of DigiBEST project, and presentation and discussion of the DigiBEST report on Austria prepared by AWS.
- Day 1, afternoon: discussion on how to promote cybersecurity and new digital forms of work (e.g., hybrid working, dislocated working) in national public programmes supporting digitalisation.
- Day 2, morning: debate on the role of digital technologies in promoting social inclusion and gender equality, and how this support can be ensured through public funding dedicated to digital transformation.
- Day 2, afternoon: debate on how digital solutions can contribute to making the agri-food value chain more sustainable and efficient. This session was also participated by representatives of the Technical University of Vienna and WPZ Research - Centre of Economic Policy Vienna.

The full agenda of the event can be found as an annex to the report.

The Peer Review event was expertly organised by the Hosting Partner. Overall, the interviewees generally responded clearly to the asked questions, having provided relevant information for the peer review exercise, including in writing in the weeks following the event.

From all the information and data collected during the desk and field research phases, the following issues will be addressed in the final chapters of this report:

1) Why Austrian SMEs don't fully exploit new technologies (ICT), digital tools and advantages presented by digitalisation to boost their competitiveness?
2) What are the key challenges of SMEs digital transformation and how they impact SMEs business performance?
3) What are the main problems and shortages, and what are the solutions and recommendations for overcoming existing problems and barriers?
4) Recommendations to improve HP existing policy instruments, and what are the major gaps identified in existing (reviewed) policy documents and how could they be solved.
5) Which GPs related to the digitalisation of SMEs have proven to be successful dealing with existing drawbacks?
6) GPs which could be the most suitable for interregional learning and possible transferring.

2 Presentation of the Peer Review team

In the framework of this peer review (PR) exercise, Austria Wirtschaftsservice (AWS) acted as the Hosting Partner (HP), which main role was to organise and host the PR event as part of the field research phase. The HP set the event agenda and invited the participants to attend the online meetings. Before and after the PR event, the HP was responsible for interacting with other PR team members by providing supporting documentation and coordinating the event agenda. In particular, prior to the event, the HP provided the experts, Sending Partners (SPs), Advisory Partner (AP), and DigiBest coordinating partner (Latvian Ministry for Environmental Protection and Regional Development (MoEPRD)), with a report containing a detailed analysis on the state of play in Austria, along with the organisation of an introductory meeting that was held three days before the PR event.

The Latvian Ministry for Environmental Protection and Regional Development (MoEPRD), participated in the online event as DigiBEST project coordinator, delivering a detailed presentation on the project.

The University of Latvia acted as the AP, being responsible for ensuring that the DigiBEST methodology was followed and implemented during the PR process. The AP participated in all PR meetings contributing to the discussions.

The Trøndelag County Council (Norway) and the Intermunicipal Community of Tâmega and Sousa (Portugal) played the role of SPs. The responsibility of SPs within the PR process was mainly to hire external experts and coordinate initial communication between the HP and the respective experts. SPs also participated in the PR event meetings, contributing to the exchange of knowledge and experiences, and identifying practices implemented in the HP that could be of interest to them regarding the digital transformation of their territories.

For the present peer review action, the experts Arild Haraldsen and Augusto Ferreira were appointed respectively by the Trøndelag County Council, and Intermunicipal Community of Tâmega and Sousa.

The experts were responsible for implementing the PR activities according to the Peer Review Methodology (PRM) guidelines. Throughout the PR process, both experts jointly carried out desk research and field research analyses in order to obtain useful information to prepare the peer review report (PRR). Desk research was undertaken on the basis of information and documents provided by the HP and SPs, as well as other publicly available documents and information. During the field research phase (i.e., PR online event), the experts were able to obtain further information on the current state of play of digitalisation in Austrian through discussions and subsequent receipt of written information.

In a non-exhaustive list, the peer review team can be presented as follows:

Hosting Partner (HP) – Austria Wirtschaftsservice (AWS):

- Christina Koch. Christina Koch is working at Austria Wirtschaftsservice and is responsible for EU-projects focussing on innovative topics in the field of creative

industries, digitalization and green transition since 2010. Until recently she was also the leader of the Interreg Europe Project *Regional Creative Industries Alliance (RCIA)*. She holds two Master degrees in Sociology as well as in International Relations.

- Wolfram Anderle. Wolfram Anderle is working at Austria Wirtschaftsservice in the promotional fields of innovation and technology projects. He has set up numerous promotional schemes for computer aided manufacturing, digitalisation und special transition schemes for innovation and technology. After his studies in food production and biotechnology he worked several years in an industry's research and development laboratory. Changing to the ERP-Funds – one of the predecessors of Austria Wirtschaftsservice – he was responsible for the ERP's technology programmes.

- Bianca Kahr. Bianca Kahr is working at Austria Wirtschaftsservice in the department of Entrepreneurship. At aws she is the program manager for the State Award of Innovation, the highest honor given out to extraordinarily innovative Austrian companies by the Federal Ministry of Digital and Economic Affairs. Moreover, she is coordinating the Interreg Alpine Space Project "Circular 4.0", supporting Austrian companies to introduce circular economy with the help of digitalization into their daily business. Bianca Kahr holds a Master's degree in International Relations and is currently finishing her Master's degree in Anglophone Literatures and Cultures.

- Sabine Pümpel. Sabine Pümpel is working for aws since 15 years. She Designed, established, advanced, and directed the pilot version for the first Austrian funding and promotion program for innovation within the creative industries. Later she was responsible for the aws 4-year strategy program (2019-2022) for & with the aws general management; including strategic orientation, programming, steering of the multi-stakeholder process and the scientific support. Her current focus is on Sustainable Foodsystem innovation / Foodsystem transformation.

Advisory Partner (AP) – University of Latvia:

[Information to be requested from University of Latvia]

- Zane Zeibote. PhD in Regional Economics, M.A.in Economic Policy Management, McGill University, Canada. Since 2010 she has been a Project Manager at the UL CETS. Her areas of expertise are EU economic integration, project management, regional and cohesion policy, tourism management, health tourism promotion, business digitization. She is the project manager for Horizon-2020, Interreg, ERSAMUS+ and other projects. She has a long- standing experience in working in different capacities for the Ministry of Foreign Affair and in 2000- 2010 worked as an advisor to the President of Latvia on Economic Affairs.

- Denize Ponomarjova. Since 2011 works as a project manager and coordinator at the Centre for European and Transition Studies, the University of Latvia - she has been involved in several EU funded projects, organised several international conferences and coordinated international scientific publications. She has also worked as an assistant of the ambassador and senior desk officer at the Embassy of the

Republic of Poland in Riga (2011-2015). She holds a MSc degree in European Studies (University of Latvia) and is a PhD candidate in Demography (University of Latvia).

- Davis Vītols. Project manager assistant at the University of Latvia, Centre for European and Transition Studies (since November 2020), main responsibilities – implementation of Interreg Europe project. Currently studying "International Business Administration"(BSc) at Tilburg University, Netherlands.

Sending Partner (SP) - Intermunicipal Community of Tâmega and Sousa:

- Susana Alves. Head of Multidisciplinary Team of the Investment and Territorial Promotion Agency of the Intermunicipal Community of Tâmega and Sousa. More than 15 years of experience in the design, planning and implementation of regional development projects in public organisations in the fields of tourism, culture, agri-food, entrepreneurship, internationalisation, and business competitiveness, namely under the EU funding cycles Portugal 2020 (2014-2020), QREN (National Strategic Reference Framework 2007-2013) and QCA III (2000-2006). Extensive experience in organising national and international events and specialist in Marketing and Communication.

Sending Partner (SP) - Trøndelag County Council:

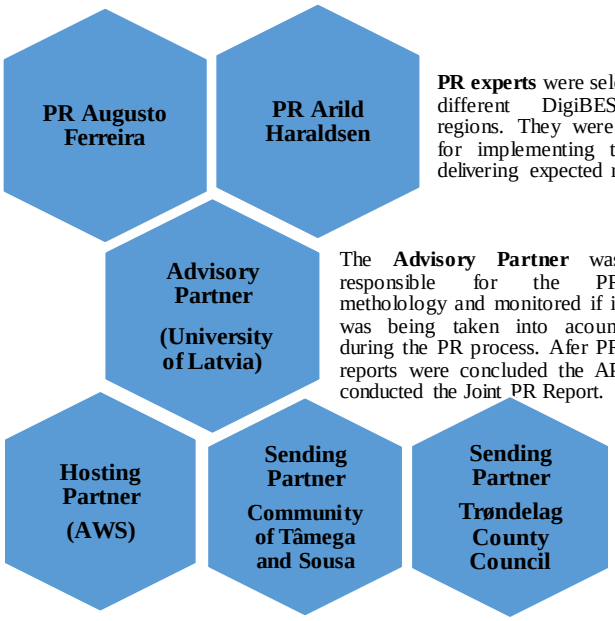
- MSc Eistein Guldseth. Senior adviser Digital transformation at Trøndelag County Council. Project manager for Trøndelag County Council for Industri 4.0 Trøndelag and Interreg Europe DigiBest projects.

Experts:

- Augusto Ferreira: independent consultant in science, technology and innovation (STI) policies, with special interest in Digital Economy, including business digital transformation, smart cities, and territorial digital strategies.

- Arild Haraldsen: Master of political science, longtime consultant in strategy and digitalisation, author of several textbooks on strategy and digitalisation, managing director of NorStella (a foundation for developing standard for interoperability), vice chair of the Bureau in UN/Cefact, independent consultant.

FIGURE 1. STRUCTURE OF THE PEER REVIEW TEAM



PR experts were selected from 2 different DigiBEST partner regions. They were responsible for implementing the PR and delivering expected results.

The **Advisory Partner** was responsible for the PR methology and monitored if it was being taken into acount during the PR process. Afer PR reports were concluded the AP conducted the Joint PR Report.

HP was responsible for organising and hosting PR events and make sure that PR experts had access to key documents and people to interview.

SP was responsible for hiring PR experts. Each SP had 2 external PR experts. SP undertaken responsibility for coordinating cooperation and communication between the HP and PR experts.

3 Peer Review implementation

The desk research task focused on documental analyses that could inform, on the one hand, about economic and business activities in Austria, as well as the characteristics of the national innovation system and, on the other hand, on implemented public policies to support business digital transformation.

Such analyses had as central focus the small and medium-sized enterprises, seeking to understand their role in the Austrian economy and innovation ecosystem, as well as the policies and measures taken for their digital transformation.

The DigiBest report on Austria prepared by the Hosting Partner was the core piece of the desk research phase. The information presented in the report was very useful for the overall understanding of the country's economic evolution, national innovation ecosystem, public and private digitalisation performance, business digital transformation (particularly SMEs), and public policies and instruments for the country´s and business digitalisation.

Apart from the national analysis report provided by AWS, a wide variety of bibliographic sources were consulted, including reference reports on numerous topics and diverse information found on websites run by Austrian government entities and other institutions, as well as by international bodies.

Specifically on Austria and on key aspects related to the digitalisation of the country, reports published by both Austrian government entities[2] and the European Commission[3] were studied. Numerous Austrian websites were visited to collect information on policies, strategies and instruments for digitalisation. To better understand the national policy landscape, information was gathered for instance from websites on Digital Austria[4] and Digital Roadmap Austria,[5] broadband strategies 2020 and 2030,[6] e-Government Act,[7] Digital Competence Framework for Austria (DigComp 2.2),[8] e-Government Portal for Businesses,[9] Cooperation Open Government Data Austria,[10] national ICT Security Portal,[11] and Digital Team Austria initiative,[12] among other relevant guiding policies and strategies that are better described in the following chapters (in particular in chapter 6).

Official publicly available information on the main policy instruments for business digital transformation, addressing particularly SMEs, was also accessed, including the several priorities and measures under the ERDF National Operational Programme 2014-2020,[13] SME

[2] E.g., “Why you should research in Austria” (Austrian Business Agency)
[3] E.g., “Digital Economy and Society Index (DESI) 2021 – Austria”, “Digitalisation in Austria: state of play and reform needs” and “e-Government in Austria” (all from the European Commission).
[4] https://www.digitalaustria.gv.at/
[5] https://www.digitalroadmap.gv.at/en/
[6] https://digital-strategy.ec.europa.eu/en/policies/broadband-austria
[7] https://joinup.ec.europa.eu/sites/default/files/inlinefiles/eGovernment_in_Austria_2018_vFINAL.pdf
[8] https://www.fit4Internet.at/view/verstehen-das-modell/&lang=EN
[9] https://www.usp.gv.at/
[10] https://www.data.gv.at/infos/cooperation-ogd-austria/
[11] https://www.onlinesicherheit.gv.at
[12] https://www.usp.gv.at/coronavirus/finanzielle-unterstuetzung-hilfestellungen.html
[13] https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/europe/2014at16rfop001 and https://www.efre.gv.at/foerderungen/massnahmen

Initiative ("KMU Digital"),[14] AT:net programme,[15] and Digital Innovation Hubs.[16] Another relevant instrument in this field - the Industry 4.0 programme - was the subject of a detailed presentation delivered by AWS during the peer review event.

In order to further realise the role played in digital transition, the websites of some of the country's main political actors were also analysed, namely the Ministry for Digital and Economic Affairs (BMDW)[17] and the Ministry of Transport, Innovation and Technology (BMVIT),[18] as well as two most relevant national agencies in this field: AWS - Austrian Promotional Bank,[19] and FFG - Research Promotion Agency.[20] The role of the Austrian Economic Chambers[21] was also examined.

Several reference reports were analysed considering the Hosting Partner's intention to integrate the following topics into business support initiatives: cybersecurity,[22] digitally enabled forms of work,[23] inclusion and gender equality in ICT,[24] and digital solutions for more sustainable agri-food value chains.[25]

The 2020 and 2021 versions of the EU Digital Economy and Society index (DESI) were extensively studied, focusing on Austria's digital performance and progress.[26] Furthermore, several studies from international bodies such as the Organisation for Economic Cooperation and Development (OECD), European Commission, and European Committee of the Regions were also investigated in order to understand how national and regional governments can play a strategic role in supporting business digital transformation.[27]

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[14] https://www.kmudigital.at
[15] https://www.ffg.at/atnet_markteinfuehrung
[16] https://www.interregeurope.eu/policylearning/good-practices/item/4861/digital-innovation-hubs-dih/
[17] https://www.bmdw.gv.at/en.html
[18] https://www.devex.com/organizations/federal-ministry-of-transport-innovation-and-technology-bmvit-austria-139338
[19] https://www.aws.at/en/
[20] https://www.ffg.at/en
[21] https://www.wko.at/service/Austrian-Economic-Chambers.html
[22] E.g., "Recommendations to the European Commission and European Parliament: For a cyber resilient Europe with increased digital autonomy, restoring sovereignty and supporting the socio-economic development", "Input to the Digital Europe Programme 2021-2027: Priorities for supporting the implementation of policy, technology, competitiveness, and competence-building", "The role of the regions in strengthening the European Union's cyber security", "Support to SMEs, coordination with countries and regions" (all reports from ECSO - European Cyber Security Organisation); "Perspectives on transforming cybersecurity" (McKinsey & Company); "Challenges to effective EU cybersecurity policy" (European Court of Auditors).
[23] E.g., "Exploring policy options on teleworking: Steering local economic and employment development in the time of remote work" (OECD); "Teleworking during the COVID-19 pandemic and beyond: A Practical Guide" (International Labour Organization); "Productivity gains from teleworking in the post COVID-19 era: How can public policies make it happen?" (OECD).
[24] E.g., "Bridging the digital divide: include, upskill and innovate" (OECD); "Recommendations for action: bridging the gender gap in Internet and broadband access and use" (United Nations); "Bridging the gender gap in digital, research and industry: What is the way forward?" (European Parliament); "The effects of digitalisation on gender equality in the G20 economies" (Women20).
[25] E.g., "Reducing Consumer Food Waste Using Green and Digital Technologies" (United Nations); "Recommendations for Action in Food Waste Prevention" (EU Platform on Food Losses and Food Waste); "Disruptive Technologies in the Agri-Food Sector" (Government of Ontario).
[26] https://digital-strategy.ec.europa.eu/en/policies/desi-austria
[27] E.g., "Shaping Europe's digital future" (European Commission); "The state of digital transformation at regional level and COVID-19: induced changes to economy and business models and their consequences for

In order to identify some of the best European practices in digital economy and to consider their potential transferability to Austria, the Interreg Programme[28] and DigiBEST[29] project portals were also analysed.

A list with the main documents consulted under the desk research phase is provided in the bibliography section.

The following tables summarise the main findings resulting from the peer review desk research (Table 2) and field research (Table 3).

TABLE 2. PEER REVIEW DESK RESEARCH FINDINGS

No	Source of literature, document or information on the website reviewed or analysed	Date	Main findings and conclusions
1	**DigiBest report analysis on Austria**	February 2021	The report sets the context for the country's economic and business activities, innovation system, and policies and instruments for digitalisation. It highlights the progress that has been made regarding SMEs' digital transformation, as well as the challenges ahead including need of business higher adoption of ICT, faster development of digital skills, and reinforcement of incentives for digitalisation.
2	**EU Digital Economy and Society index (DESI)**	2021	Austria is moving up in the EU ranking, being above average on most indicators. To achieve the ambition of being a leading digital country, it will have to improve digital infrastructure, as well as to accelerate the integration of digital technologies and ICT skills in businesses.
3	**Digital Austria (portal)**	2019 - ongoing	Federal Government's initiative for a successful digitalisation of the country, Digital Austria encompasses three priorities – society, economy, and public administration. It includes a dedicated action plan underpinned by five main pillars: 1) Digital economic transformation; 2) e-Government and administration; 3) Education and research); 4) Health care; and 5) Cybersecurity.
4	**ERDF National Operational Programme 2014-2020 (portal)**	2014-2023	With an ERDF contribution of about 660M€, it is a key policy instrument to strengthen SMEs' RTD, innovation and competitiveness. Under the programme's two first priorities, Austrian SMEs can find support for digital transformation.
5	**SME Digital Programme (*KMU Digital*) (portal)**	2017 - ongoing	Key initiative to foster digital transformation in SMEs supporting the acquisition of

regions" (European Committee of the Regions); "Rural regions of the future: Seizing technological change, in Rural Well-being: Geography of Opportunities" (OECD).

[28] https://www.interregeurope.eu/policylearning/good-practices/

[29] https://www.interregeurope.eu/digibest/good-practices/

			consulting, training and tools for new business models, digital management, digital production, e-commerce and e-marketing, cybersecurity etc.
6	**Industry 4.0 programme (*Industrie 4.0*) (presentation delivered by AWS)**	2015 – ongoing	Important instrument dedicated to Industry 4.0 supporting business digitalisation and production processes through three main phases: analysis and conceptual phase; investment in equipment, computing, networks, processes, and software; and education, training, and qualification.
7	**Norwegian Ministry of Local Government and Modernisation (2021) Strategy for data driven economy**	January 2022	The growth of the computer economy is expected to be an important driver for economic growth. Data economy is value creation that happens when data is one important input factor in the production of goods and services, or when data is a driver for innovative solutions
8	**Norwegian Ministry of Local Government and Modernisation (2021)**	January 2022	The COVID-19 pandemic tested the Norwegian digital infrastructure. The build-up of several years of platforms and management for sharing data, provided explicit solutions for compensation to industry ab public during the pandemic.
9	**Norwegian Ministry of Local Government and Modernisation (2019) Digital Agenda**	January 2022	The agenda looks to ways in which ICT solutions are to simplify and improve the public sector by being increasingly user oriented. The agenda also sets out a plan to improve the digital infrastructure and what role the authorities should play in enabling digitalisation and value creation in businesses.
10	**Norwegian Ministry of Trade and Fisheries (2019) Strategy for small – and medium-sized enterprises**	January 2022	Ensuring continued high levels of human development is key to remaining globally competitive. This includes enhancing digital skills among SMEs, as competitiveness is increasingly decided by levels of digitalisation; data-oriented, data driven and innovation.
11	**The value of Data (2019), Menon Economics**	January 2022	Home - Menon Economics
12	**Auroral - Baseline for digitalised rural ecosystems in Europe**	January 2022	An EU-founded project to build an Architecture for Unified Regional and Open digital ecosystems for Smart Communities and Rural Areas Large scale application. Its focus so far is on tourism and transport. https://auroral.eu
13	**Digital21_strategi_2018.pdf**	February 2022	Norway's strategy to promote the business community's (SMEs and others) to develop and make use of new technology and knowledge along with the increasing digitalisation. The plan covers more than 60 concrete measures
14	**Portuguese Action Plan for Digital Transition (document)**	2020 - ongoing	The plan prioritises digital inclusion, business digital transformation, and public services. It delivers 12 key initiatives, including schools' digitalisation, digital inclusion of 1 million adults, qualification of 3,000 new ICT

			specialists, social tariff for Internet access, e-residency programme (digital identity system), technological free zones, digitalisation of SMEs in rural areas, digital innovation hubs etc.
15	**Portuguese Industry 4.0 Programme (portal)**	2017 – ongoing	Through two consecutive phases, the programme aims at supporting more than 40,000 businesses (mostly SMEs) and 750,000 workers to promote knowledge on i4.0, implement i4.0 solutions, and foster digital upskilling actions.
16	**Portuguese National Initiative Digital Skills e.2030 (INCoDe.2030) (portal)**	2017 – ongoing	The programme encompasses five pillars (Inclusion; Education; Qualification; Specialisation; and Research) to address three critical challenges. 1) digital literacy and inclusion; 2) upskill and reskill specialists in digital solutions and technologies; 3) RTD activities under international cooperation.
17	**Portuguese Recovery and Resilience Plan (RRP) (document)**	2021 - ongoing	In the Portuguese Recovery and Resilience Plan (RRP), the contribution to the digital objectives amounts to 22.1% of RRP's allocation, exceeding the digital target of 20%.

TABLE 3. PEER REVIEW FIELD RESEARCH FINDINGS

Activity	Where and when	Stakeholders met	Policies and actions discussed
Meeting	*Online peer review event 13.01.2022 (morning)*	AWS staff, DigiBEST partners, experts	Presentation of the DigiBEST project; presentation of the "DigiBEST Regional Analysis for Austria" report; presentation and discussion on the country's performance in digitalisation and business digital transformation (particularly of SMEs), including current public policies and instruments.
Meeting	*Online peer review event 13.01.2022 (afternoon)*	AWS staff, DigiBEST partners, experts	Debate on how to integrate cybersecurity and new digital ways of work (hybrid working, dislocated working) in Austrian public programmes supporting digitalisation.
Meeting	*Online peer review event 14.01.2022 (morning)*	AWS staff, DigiBEST partners, experts	Discussion on the role digital technologies can play in promoting social inclusion and gender equality, and how can these topics be supported by public schemes dedicated to digitalisation.
Meeting	*Online peer review event 14.01.2022 (afternoon)*	AWS staff, DigiBEST partners, experts, representative of WPZ Research, representative of *Technische Universität Wien*	Debate on how digital solutions can contribute to making the agri-food value chain more sustainable and efficient, including issues such as circular economy, food loss and food waste, shortening of supply chains, smart packaging and labelling, regionality and seasonality of supply systems, reorganisation of value chains etc.

4 Objectives and tasks of the PR Experts

The main goals established by the Sending Partners for the experts were very similar and are related to the fulfillment of the following tasks:

- Analyse a study report on Austria previously delivered by the Hosting Partner.
- Conduct desk research to collect relevant information on the digitalisation of Austria, and in particular on the business sector and SMEs.
- Participate in an online peer review event organised by the DigiBEST Austrian partner in order to gather information and experiences from local stakeholders, including the preparation in advance of questions to be answered by the participants at the event.
- Identify the main challenges and barriers in digital transformation of Austrian SMEs, and especially of small and microenterprises.
- Examine the main policies, initiatives and instruments that have been put into action in the country to support digital transformation of the business community.
- Study the transferability potential of good practices identified in the DigiBEST project to Austria.
- Advise on possible solutions and recommendations addressing the issues raised by the Hosting Partner.

The experts have been required by the Sending Partners to carry out the above-mentioned actions through three main phases:

- Phase 1: desk research (documents and websites analysis).
- Phase 2: field research (online event hosted by the Hosting Partner).
- Phase 3: final report structured around the following principal chapters:
  - Introduction.
  - Peer review team presentation.
  - Peer review implementation process.
  - Experts' goals and tasks.
  - Characteristics of digitalisation in SMEs.
  - Governance and policy framework.
  - Main barriers to SMEs digitalisation and possible solutions.
  - Good practices.
  - Findings and conclusions.
  - Recommendations.

The experts decided to carry out practically all desk and field research tasks together to ensure that any information included in the peer review report would always be double-checked.

It is believed that the continuous feedback exchanged between the experts, as they were both knowledgeable about all material collected and produced under the three phases, reduced the risk of individual errors leading to mistaken outputs.

Although this task-sharing and mutual validation process may have been more time consuming, it is considered it proved to be effective in ensuring more accurate and robust conclusions.

Bearing these principles in mind, but in order to ensure an expeditious writing of the report, it was decided that chapters 5, 8 and 10 would be written by Arild Haraldsen, while chapters 6, 7 and 9 would be written by Augusto Ferreira, always with the contribution of the other expert. Both experts were responsible for the completion of chapters 1, 2, 3 and 4. All the main findings, conclusions and recommendations are therefore presented in the report by mutual agreement.

5 Characteristics of SMEs digitalisation

These are our analyses on business (SMEs) digitalisation for Austria based on The Regional Analysis (desk research), other documents such as Digital Roadmap Austria,[30] and our observations and finding during the PR event.

SME's role in the he digital economy in general

Despite the potentially tremendous benefits, small and medium-sized enterprises (SMEs) lag in the digital transformation. Enabling SME digitalisation has become a top policy priority in OECD countries. SMEs could be the corner stone of the new digital economy but have several barriers to overcome for using the opportunities new technology provides.

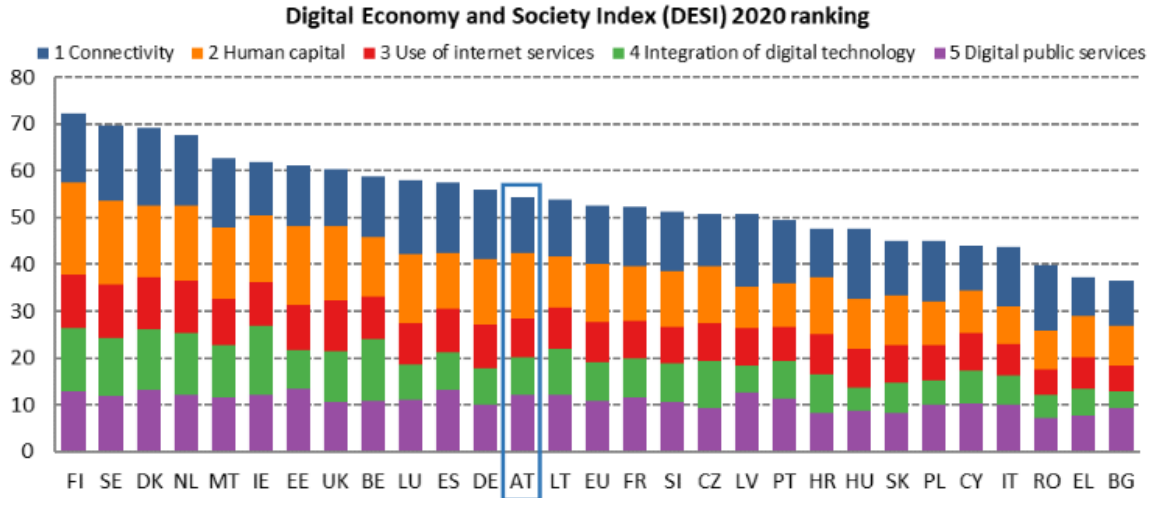
Emerging technologies, as diverse as they are, offer a range of applications to improve performance and overcome the size-related limitations they face in doing business. However, there is also a balance between using technologies and strategies for creating new business models. The SMEs must be better prepared for this challenge.

Main features of The Regional Analysis

Austria has 9 million inhabitants with a business structure mainly based on industry, but with an increasing service industry. The economy is very much export oriented. SMEs make up about 80% of the business community. Austria is among the 20 richest countries in the world.

As shown in the following figure, Austria ranks 13th in the evaluation and performs slightly above the average EU-level.

FIGURE 2. AUSTRIA RANKING IN DIGITAL ECONOMY AND SOCIETY INDEX



The DESI-report shows that Austria is above EU-average in digital skills but lag in high-capacity networks and the digitalisation of business. The country scores relatively high especially in human capital and digital public services. However, when it comes to broadband development and the use of the Internet, Austria is lagging, mainly because of a "lock-in" on

[30] https://www.digitalroadmap.gv.at/en/#gemeinsame-leitprinzipien

older versions of high-speed broadband and has a relatively weak performance in the digitalisation of businesses.

The results show that there's a big difference in digitalisation according to the size of a company. The use of ICT's, especially technologies like Big Data, E-Commerce, smart systems or cloud services, is less common in small and middle-scale companies. In the rural areas of Austria, the number of small and middle-scale companies is predominant, which leads to the understanding that the digitalisation in companies is less advanced in the rural areas of Austria, compared to the urban regions.

There is also a lack of funding for the SMEs and start-ups that want to develop their business models using technology / digitalisation.

Several programmes like (ERDF - European Regional Development Fund) and SME Digital have been launched with the aim of provoking structural change in SMEs to increase productivity and profitability. They have also established the Digital Innovation Hubs programme which aims at building a network of partners and providing SMEs with digital know how.

The strategy

The goals of the SME strategy as described in The Analysis, are

a) to increase awareness among companies,
b) to promote investments in digitalisation,
c) to optimize digital collaboration and
d) to create an SME environment that favours innovation and digitalisation.

Awareness

The strategy is to encourage cooperation between each individual company to digitalise and cooperate between companies in a value chain. Digital focus topics are open data, artificial intelligence, the cloud systems and so on.

The industry has long been concerned with the question of how existing manufacturing- and business processes along the value chain can be linked to information and communication technology and has coined the term "Industry 4.0". The main aspect is to ensure fair competition for all operators in different regions and especially sparsely populated areas to be competitive in the digital age.

Financing

To improve the environment for start-ups continuously and to set general basic conditions, the startup country strategy is launched.

The goal is to promote innovation and entrepreneurship through fx. to increase in seed funding from aws (Austrian Business Service) and allocation of the aws Business Angel Fund. (*The role of the Aws is to strengthen the domestic business location and the competitiveness of its companies as well as to secure jobs in the long term).*

Optimise digital collaboration

A tool for optimising digital collaboration is usuall to create digital platforms. The use of digital platforms in Austria is however highly sector specific. The focus is on *the current needs* of the members and direct stakeholders.

However, the weakness is lack of cooperation between start-ups and big companies, lack of innovation and a risk aversity. It also seems that the regulatory framework is not adapted to the digital age.

Competence building

The main challenges and barriers for the further expansion of digitalisation consist of competence building. Even though companies expect better chances in acquiring customers and reducing costs through digitalisation, the implementation sometimes ceases to function because of the missing know-how.

Although digitalisation is believed to have great potential for rural regions, in practice there are only a few projects that go beyond the pilot stage. In Austria's rural regions, the topic of digitalisation is only sporadically received or in connection with certain topics such as making the business location more attractive or modernising the administration. There seems to be a lack of network-building, especially in the rural areas.

The overall conclusion

The overall conclusion of the Analysis is that half of the SMEs lacks a companywide digitalisation strategy. On the other side 50% of the SMEs says that their employees have digital skills above average. The recommendation is to develop tailormade ICT-consulting services as well as practice handbooks, and networks to exchange experiences, in addition to finance high-speed broadband.

Based on this, the recommendations seem to differ somewhat from what the analysis showed: SME has no tradition of collaborating in a value chain and lacks an overall strategy for digitalisation for this purpose.

It therefore seems to be a lack of strategy rather than a lack of digital skills or knowledge of what novel technology can provide to give SMEs competitive advantage and a more prominent role in the digital economy.

Observations after PRE-event

“Industry 4.0” propose several strategic steps. Among these are a broadband Internet strategy and a 5G strategy, which goes hand in hand with the broadband strategy.

The federal ministry of education, science and research has launched an industry strategy to strengthening of the Austrian innovation system.

In addition to this strategy, the digital roadmap has created measures for start-ups – "the start-up packet" which improves the general conditions for founders:

- Risk capital bonus of 20 percent for investors to encourage investment in innovative startups
- Increase in seed funding from aws (Austrian Business Service) and allocation of the aws Business Angel Fund
- Funding for non-wage labor costs for the first three employees of innovative startups
- Introduction of startup fellowships for academic spin-offs.

The last strategy in this field of action is the open-source software position paper strategy.

This strategy puts Austria Wirtschaftsservice (AWS) in a central position to improve the competiveness of start-ups and SMEs through digitalisation. AWS is a promotional bank owned by the government and offers a broad range of support including financial support and runs programmes to promote the digitalisation of the economy.

This is also in line with what AWS stated at the PR-event: ***The main obstacle for SMEs to increase its competiveness by digitalisation, is the availability of venture capital.***

However – financing is only one issue to reduce the barriers for SMEs and start-ups to be "digitalised". According to AWS's own website, the measures are far more comprehensive than only financing. ***The role AWS could take must therefore be seen as a facilitator where one uses several different instruments such as consulting, establishing networks for exchange of experience, and so on.***

The proposal was to reward projects that use women as fx project learders. Another proposal was to highlight women who assert themselves as role models in digitalisation. In our view, however, it is not possible to solve SME's competitiveness with the use of digital technology by increasing the proportion of women in ICT projects. These are probably good measures but have marginal significance for the main purpose. See chapter 10 for some recommendations.

One ither issue was cyber security, an area that will probably become more important in the future, and which represents a serious threat to society's infrastructure and the security of individual companies. This is however probably a bigger problem for large companies than SMEs. The proposal was therefore for funding for purchasing of various types of ICT gags, including security equipment for the SMEs. Better solutions are however by facilitating advice support and training actions (e.g., through business associations) etc. This would configure relevant support for business competitiveness. See chapter 10 for some recommendations.

A proposal was presented for a project (Agora 4.0) called Food Systems as a measure within the circular economy. This is a project that addresses significant problems. However, the focus was on which technologies could be used in different parts of the value chain, and not on how the technology could change the business models. The guidelines for digitalisation should be **why, where, and how**, and not the other way around. This is therefore a more technology focused than business-oriented approach.

A digitised rural ecosystem

In a recent study from EU (AURORAL) the introduction of local digital ecosystems is presented. *A central consideration is the implementation of digital innovation platforms, that is cross-sectorial sharing of data in an ecosystem.*

AURORAL aims is to establish an overarching ecosystem which is connecting local platforms and ecosystems, taking innovation potentials to a new level. The European Commission states in 2021: „*Digital connectivity is a key enabler for the diversification of economic activities in rural areas. […] The development of innovation ecosystems will allow rural communities to create high quality jobs in rural areas in all sectors "*.

All reports and experiences throughout in Europe points to digital infrastructure as a core component and the introduction of ecosystems based thereon, are a central pathway for rural development.

This vision challenges several issues which were presented at the PR-event:

- There is a lack of interest in value chain collaboration between companies. This is reinforced by the fact that applications for funding often seem to be based on digitalisation in one's own business and not in collaboration with others. It is not common for several companies to apply together as a consortium or through an industry organisation.

- The main reason for this is that there is little or no trust between SMEs to share data or information about processes or business activities.

- The support to start-ups and SMEs is in general industry-neutral, but focus is recently being given to make sure to support sustainable industries, with social or environmental added value.

- Austria do not have an explicit innovation model, a strategy for sharing of data, apart from using GDPR or secondary data from research institutions. Austria do not have a special strategy for SMEs as part of an "ecosystem, but different regional ecosystems".

Summary analysis

1. Austria is as well positioned in terms of digital maturity as other countries.
2. SME's position in relation to digital transmission is deficient, but primarily due to a lack of incentives for cooperation, exchange of experience, trust-building, etc.
3. Funding is just one of the tools to promote digitalisation in the SMEs in addition to advice and exchange of knowledge. It is more important with co-operation through value chains, sharing of data through digital platforms, and focus on industries aiming for circular economy.

Comparison with Norway

Norway has many of the same characteristics as Austria: Small country with 5.5 million inhabitants, high GDP, an industrial structure with 90% SMEs, large service industry and

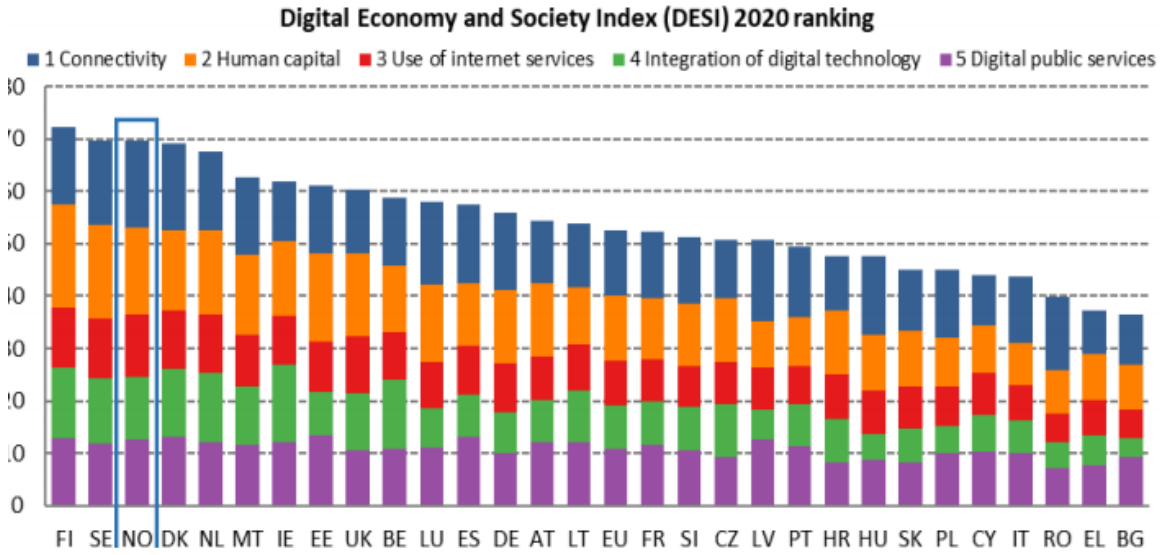
industry based on the utilisation of natural resources. Norway also has an export and external economy, with a highly educated population and a high degree of digitalisation and digital maturity.

In 2020, Norway ranked third according to the European Commission Digital Economy and Society Index (DESI).

The principles on which Norway is building its foundations are based on sustainable efforts to use technology to improve the organisational efficiency of public sector institutions, including the creation of electronic identification systems like eID, digital mailboxes, and one-stop-shop portals like Altinn. This fact, along with principles like not having users need to submit the same data more than once have led to high levels of digitalisation.

Norway has therefore a solid foundation on which to further develop digital solutions, both in business, government, and society in general.

FIGURE 3. NORWAY RANKING IN DIGITAL ECONOMY AND SOCIETY INDEX



The digital strategy

The digital strategy of Norway is building common digital elements (felleskomponenter) to improve the organisational efficiency of public sector institutions, including the creation of electronic identification systems like eID, and one-stop-shop portals like Altinn, along with the "once-only"-principle, i.e., companies and inhabitants do not need to submit the same data more than once.

The strategy for increasing SMEs competitiveness and development is twofold and centre on human development and digitalisation. The main objectives of the SME strategy are to

- facilitate easier daily operations through lessened administrative burdens, and a simplified overview of available support measures
- stimulating internationalisation and export

- stimulate increased levels of innovation through green, smart, and creative production
- access to competence and capital to ensure adaptability and development.

Digitalisation is seen as a horizontal policy objective, including policies to cooperate in a value chain.

The strategy of Digital 21

Initiated by the Ministry of Trade, Industry and Fisheries, in 2019, a national strategy, Digital 21 was established for the purpose to promote the business community's (SMEs and others) ability to both develop and make use of new technology and knowledge along with the increasing digitalisation. The plan covers more than 60 concrete measures while focusing on five primary tasks that business, academia, and the public sector must solve together.

These areas are as follows:

1) Establish a relevant knowledge and technology base and develop new business ideas.
2) Ensure sufficient competence within the right areas.
3) Make computer resources available and maintain a business-oriented development of infrastructure.
4) Ensure cybersecurity as a necessary premise.
5) Development of public frameworks that stimulate innovation and digitalisation.

These recommendations are based on three important principles where Norway probably is in the front in digitalisation in Europe:

Standardisation

There is mandatory for business and public sector to specify ICT deliverance to ensure that products can connect and interoperate with each other, boosting innovation, and keeping ICT markets open and competitive. The specifications are primarily used *to maximise interoperability*. The aim is to propose a high-level political process to deliver and ensure leadership through standards, fostering a high-level commitment from a broad stakeholder base, including from industry, standard-setting organisations, and the research community.

Sharing of data

Based on standards, borth technical standard and semantic (common understanding of the meaning on data-elements), Norway has started a lot of projects where all kind of companies interoperate in a common value chain, sharing data. This is of course based on EU’s General Data Protection Regulation (GDPR) which was introduced in 2016. GDPR provided an incentive to companies to improve their data handling routines, as users might be more hesitant to give companies access to their data. GDPR also allows countries to fine actors that do not adhere to it.

It shouldd be noted that sharing does not necessarily imply fully open access to a data set; sharing is usually subject to privacy protections such as de-identification and stakeholders must apply and be approved to access a data set.

Digital platform

Digital platforms are becoming increasingly crucial for the digital economy and thus for the economy and society. In Norway, digital platforms are widely accepted and used.

One of the most robust and successful digital platforms in Norway is the Altinn platform. Altinn is a web portal for electronic dialogue and production of digital services between companies, private individuals, and public institutions. The platform provides a wide range of services, including tax reporting, aircraft incident reporting, and correspondence services from health departments. EU Single Digital Gateway ranked the information under Altinn "Start and run business" as the best in Europe.

The government also aims to establish a common digital platform for public and private businesses entitled Datafabrikken (The "Data Factory"). The Data Factory aims to provide SMBs with quick and easy access to data, tools (like AI), and competence to develop new services and new industries. It also aims to lower related data barriers of entry for SMBs.

The digitalisation of SMEs is seen as an opportunity for reindustrialisation in Norway and reach new or larger markets. Sharing of data through platforms is seen as “the new oil”, substituting the old industry and creating a new more sustainable economy.

Comparison with Portugal

Portugal is a comparable country to Austria in population (10.3 million inhabitants) and territory size (92,212 km^2). In the 2020 edition of the European Innovation Scoreboard, Portugal was considered a strong innovator country, ranking 12th among the 27 EU countries.

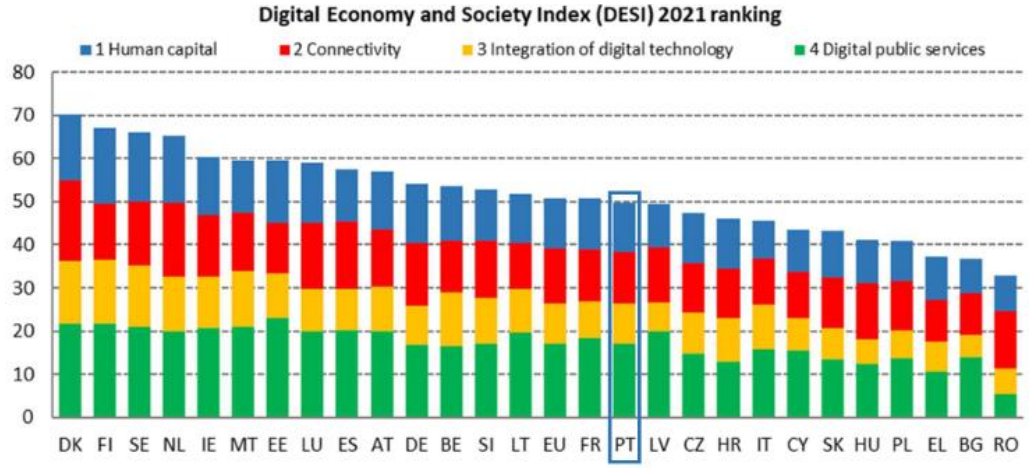
In 2020, the tertiary sector was the most important component of the Portuguese economy, representing 75.8% of the gross value added (GVA) and employing 68.1% of the working population. It was followed by the industry sector, which represented 21.8% of the GVA, encompassing 24.5% of total jobs. The primary sector only represented 2.4% of the GVA, while employing 7.4% of the working population.

The major industries in Portugal include machinery, electrical and electronics industries; automotive and shipbuilding industries; injection moulding, plastics, and ceramics industries; textile, footwear, and leather industries; and furniture, pulp, paper, wood, and cork industries. Modern non-traditional technology-based industries that have significantly developed over the last years include aerospace, biotechnology and information and communication technologies (ICT).

SMEs represent 99.9% of the total number of enterprises in the country. Among SMEs, 96% are micro-enterprises, 3.4% are small enterprises and 0.6% are medium-sized enterprises.

Portugal ranks 16th among the 27 EU Member States in the 2021 edition of the Digital Economy and Society Index (DESI).

FIGURE 4. PORTUGAL RANKING IN DIGITAL ECONOMY AND SOCIETY INDEX



On human capital, the country has significantly increased the proportion of ICT specialists over the last few years, bringing the figure close to the EU average. It performs below the EU average on basic digital skills but has a higher share of individuals with above basic digital skills. The share of female ICT specialists exceeds the EU average.

On connectivity, Portugal performs well in VHCN (very high-capacity network) and fast broadband coverage in at least 100 Mbps fixed broadband (63%), ahead of the EU's 34% average. However, it lags behind on mobile broadband take-up.

The proportion of enterprises with at least basic digital intensity stands at 51% versus an EU average of 60%. Portuguese businesses exceed the EU average on the use of ICT for environmental sustainability, SMEs selling online, and AI use. E-government users have increased to 57%, still trailing the EU's 64% average. Portugal's performance is ahead of the EU average in pre-filled online forms, and digital public services for the public and businesses.

In 2020, Portugal approved a national action plan for digital transition, which prioritises digital inclusion, business digital transformation, public administration, and digitalisation of education. In the Portuguese Recovery and Resilience Plan (RRP), the contribution to the digital objectives amounts to 22.1% of RRP's allocation, exceeding the digital target of 20%.

The operational programmes funded by the ERDF at national, regional, and sub-regional levels have clearly supported SMEs digital transition over the last years, investing heavily in computer equipment, software (including standard and bespoke software), ICT and business development services, and human resources training (also with ESF funding).

On integration of digital technology in businesses, Portugal is now promoting the development of digital innovation hubs and the reskilling of workers in ICT professions in the countryside. The country continues to support advanced technologies such as AI, advanced computing, and open data.

Improving digital skills remains a national priority as reflected in RRP, which includes initiatives for various population groups. In 2021, Portugal revised its national digital skills

initiative (INCoDe.2030), aligning its goals and lines of action with the new national action plan for digital transition.

In 2021, the country launched a new strategy for the digital transformation of the public administration (2021-2026). The new digital public services strategy embodies relevant EU policies, such as the single digital gateway and the eIDAS regulation, the eGov action plan, the interoperability framework, open data, and web accessibility. With this reinforced and aligned strategic framework, Portugal plans to promote among others, digital skills in schools (including connectivity and Internet access), upskilling and reskilling programmes for the labour force (e.g., “Emprego+Digital” or “Jovem+Digital”), and gender balance.

6 Policy context

6.1. Digitalisation policies and strategies

Austria has in recent years established a broad set of national strategies and platforms related to the country's digitalisation. Below a summary of those that seem to be the most relevant is presented, considering the objective of business digital transformation.

a) Digital Austria

This is the Austrian Federal Government initiative for a successful digitalisation in Austria.[31] Launched in 2019, it aims to consolidate Austria's role as a leading digital nation to guarantee prosperity, job opportunities and quality of life in the long term. Led by the Ministry for Digital and Economic Affairs, the initiative encompasses three key priorities:

- Society, aiming at a higher quality of life for all generations through digitalisation, including digital training and literacy for the population at large regardless educational background, age or gender.

- Economy, creating new opportunities for growth and jobs through business digital transformation, including the provision of financial support, and development and dissemination of best practices in digital transformation.

- Public Administration, under the motto "From a father state to a partner state", public services are to become as simple and user-friendly as possible through digitalisation. Traditional administrative procedures should be transformed from an electronic to a mobile government model, and digitalisation-friendly legal framework conditions to promote digital innovation are to be created.

A dedicated action plan was established within the initiative, which is underpinned by five main pillars: 1) Digital Economic Transformation; 2) e-Government and Administration; 3) Education and Research); 4) Health and Care; 5) Cybersecurity.

The strategy entails 20 initiatives. The priority "economy" contains eleven initiatives, such as fintech, automated mobility and artificial intelligence. There is a strong focus on SMEs. On the online portal where the strategy and action plan are presented, an overview of government support schemes to SMEs is provided.[32]

b) Digital Roadmap Austria

A comprehensive "Digital Roadmap Austria"[33] was published in 2017. In 2019 began the development of a "Digital Austria in 2050" vision, as a starting point for the overall digitalisation strategy (the above mentioned "Digital Austria") with the overarching goal of

[31] https://www.digitalaustria.gv.at/
[32] https://www.digitalaustria.gv.at/initiativen/wirtschaft.html
[33] https://www.digitalroadmap.gv.at/en/

providing the framework for the Austrian digitalisation strategy and harmonising already existing strategies.

"Digital Roadmap Austria", while lacking quantified targets, presented around 150 specific measures around 12 guiding principles including:

- Access to the Internet through a well-developed and affordable digital infrastructure for both citizens and companies.
- Creation of more and better jobs through digitalisation, training and qualifying people accordingly.
- Creation of new business and work models, including appropriate legal framework.
- Becoming one of the leading international digital business locations, supporting companies in their digital transformation for this purpose.
- Science and research are to be strengthened in the development of new digital possibilities, so that Austria will be one of the innovation leaders in the future.
- Ensuring security in the digital space as a shared responsibility of public institutions, businesses and citizens.
- Public sector as a driver of innovation in Austria, allowing citizens and companies to have simple and barrier-free electronic communication with public services.

c) Broadband strategies 2020 and 2030

After launching a Broadband Strategy 2020 aimed at achieving the target of 99% coverage of at least 100 MbPs downstream for households in 2020 (despite significant progress, the goal had yet not been achieved in that year), a Broadband Strategy 2030[34] was launched in 2019 to ensure full coverage of symmetric Gigabit connections throughout the country by 2030. It was decided to opt for a market-driven network roll-out, confining the use of public funds to areas with little chance of benefiting from private sector investments. The Broadband Strategy 2030 entails five progressive phases: nationwide provision of ultrafast broadband connections (100 Mbit/s) by 2020 (phase 1); market launch of 5G in all state capitals by 2020 (phase 2); Austria as a 5G pilot country by the beginning of 2021 (phase 3); availability of 5G services along main transport paths by 2023 (phase 4); and availability of gigabit-capable connections nationwide by 2025, including nationwide 5G coverage (phase 5).

d) e-Government Act and e-Government Act 2020

The expansion and implementation of electronic official services are among the priorities of the Austrian Federal Government. The heart of the e-government law, and the basis for Digital Austria, is the e-Government Act [35] (2004, amended in 2018).

With the Austrian e-Government Act 2020 the right to electronic correspondence with public authorities entered into force. All citizens have now the opportunity to handle all their contacts with the authorities electronically. They also can send documents electronically.

[34] https://digital-strategy.ec.europa.eu/en/policies/broadband-austria

[35] https://joinup.ec.europa.eu/sites/default/files/inlinefiles/eGovernment_in_Austria_2018_vFINAL.pdf

e) Digital Competence Framework for Austria - DigComp 2.2

In order to promote overall digital literacy, Austria has developed its own competence model for digital skills: "Digital Competence Framework for Austria - DigComp 2.2 AT",[36] which is based on the European Reference Framework for Digital Competences and serves to classify and compare digital skills. It defines digital competences in six areas and eight competence levels.

f) ICT Security Portal

Concerning cybersecurity, an ICT Security Portal[37] was launched in 2013 through the cooperation of about 40 partners (including administration and business). This central Internet portal deals exclusively with security in the digital world, including topics such as security advice, technology trends, cyber monitor on major threat trends, online guides, relevant authorities and institutions, etc.

g) One-Stop e-Government Portal for Businesses

USP –Unternehmensserviceportal[38] offers about 50 e-Government services for companies on a website with a single sign-in. All public tenders from over 7,000 authorities are announced in this one-stop platform.

h) Open government data strategy

"Cooperation Open Government Data Austria "or in short "Cooperation OGD Austria",[39] was founded in 2011 by the Federal Chancellery and the cities of Vienna, Graz, Linz and Salzburg aiming at providing non-personal and not infrastructure-critical data resources held by public bodies that can be made accessible in the interest of the general public without any restriction for free usage, dissemination and re-use. The strategy is seen to award the potential for sustainable social, cultural, scientific and economic progress, and as an adequate tool to increase the transparency of administrative action and to allow better cooperation between the government, businesses, research and citizens. Cooperation OGD Austria is responsible for managing this strategy.

i) Digital Team Austria

As the current COVID-19 pandemic forced enterprises to focus on news types of work such as teleworking and hybrid work, and the necessary digital tools were often not available in the companies, the Ministry for Digitalisation and Economic Affairs launched the "Digital Team Austria" initiative, a collaboration with ICT enterprises on a voluntary basis. The participating companies offered digital services for SME for at least 3 months free of charge, including for instance communication tools, better Internet access, digital services for work, training, advice, cybersecurity etc.

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[36] https://www.fit4Internet.at/view/verstehen-das-modell/&lang=EN

[37] https://www.onlinesicherheit.gv.at

[38] https://www.usp.gv.at/

[39] https://www.data.gv.at/infos/cooperation-ogd-austria/

Furthermore, Austria has taken a number of measures to help companies get through the pandemic period better,[40] such as chatbots informing about COVID-19 and subsidies for companies, improving cybersecurity by informing about COVID-themed phishing or malware e-mails and fake shops. The possibility of teleworking has been increased and online resources for students and teachers have been improved. A nationwide platform promoting Austrian online-sales platforms has been introduced.

6.2. Digitalisation policy instruments

The national policies and strategies on digitalisation presented above established a set of key guidelines for the digital transformation of the country, including businesses. But the main public policy instruments that put these strategies into practice, through concrete measures and resources, were above all the following five: ERDF National Operational Programme; SME Initiative; Industry 4.0 programme; AT:net; and Digital Innovation Hubs.

a) ERDF National Operational Programme 2014-2020

The "Investments in Growth and Employment Austria 2014-2020 - Operational Programme for the use of the ERDF funds"[41] had an ERDF contribution of about 660M€ and focused on five main priorities around which support measures were organised:

- Priority 1: Strengthening regional competitiveness through research, technological development (RTD) and innovation.
- Priority 2: Strengthening SMEs competitiveness.
- Priority 3: Promoting the reduction of CO2 emissions in all sectors of the economy.
- Priority 4: Sustainable urban development.
- Priority 5 Urban-Surrounding Development and CLLD/LEADER.

It is within the scope of the first two priorities that Austrian SMEs could find public support for digital transformation endeavours.[42]

Under **Priority 1**, such support could be obtained under:

- Measure 03: operational R&D projects and technology transfer (innovative R&D projects led by companies in view of new or improved products or processes in all technological areas).
- Measure 04: innovation advice (access by SMEs to supporting services for innovation and technology transfer activities).
- Measure 05: R&D and technology-oriented investments (innovative, high-quality products and services developed through new technologies or processes).
- Measure 06: clusters/networks support to existing or new business cooperation (e.g., clusters, networks, service alliances; fostering collaboration along the value chains and accelerating the dissemination of new technology trends, also engaging Higher Education Institutions and RTD entities).

[40] https://www.usp.gv.at/coronavirus/finanzielle-unterstuetzung-hilfestellungen.html
[41] https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/europe/2014at16rfop001
[42] https://www.efre.gv.at/foerderungen/massnahmen

Under **Priority 2**, support for digital transition activities was particularly available in two measures:

- Measure 09: support for growth in companies (operational investments in connection with SMEs growth phases, including production expansion projects and adoption of new technologies for production; in tourism there was support for strategic market investments).
- Measure 10: consulting services for SMEs (including advisory services in connection with growth phases, internationalisation, strategy development, new business models, innovation processes, reorganisation and learning processes, personnel development).

In coordination with the different federal states, it is decided in which states and through which funding agencies the measures are implemented.

b) SME Digital

At the federal level, SME Digital ("KMU Digital")[43] can be considered as the most important programme targeted at raising awareness and providing information and advice to SMEs. Led by the Austrian Economic Chambers in cooperation with the Ministry for Digital and Economic Affairs, the programme was launched in 2017 and has entered into phase 4 in 2021. SME Digital brings together different policy instruments for SMEs under a common heading, while focusing explicitly on raising digital awareness among SMEs and improving their digital skills. It covers a vast array of digital topics such as:

- Business models and processes: customer relationship management **(**CRM) tools, electronic invoices, 3-D printing, use of big data, logistics, optimal use of production resources etc.
- E-commerce and online-marketing: webshops, trustmarks, online marketing and social media etc.
- ICT and cybersecurity: data security, ICT security, cybercrime prevention etc.
- Digital administration: automation of administration processes, electronic bills etc.

After a reorganisation in 2019, the programme offers two different modules to beneficiary SMEs: analysis of SMEs digital potential (consultation module), and implementation of digital projects (implementation module).

The consulting module offers 1) potential analysis that helps entrepreneurs to assess the digital maturity of the company, which is summarised in a digitalisation map with an overview of the possibilities for improvement, and 2) strategic consulting through which certified consultants provide companies with support (2 days) in defining a strategic plan with concrete steps for implementation. The total amount of funding for all activities taken within the consulting module is 3,000 € per company: 80% of the costs up to 400 euro for each consultation for potentiall analyses, and 50% of the costs up to 1,000 € for each consultation for strategic consulting.

The implementation module offers companies funding for the implementation of investment projects in their digital infrastructure. 30% of the investment costs (material and immaterial

[43] https://www.kmudigital.at

goods) up to 6,000 € are funded by the state, helping SMEs to take their first steps towards digital transformation.

SME Digital also provides support for courses and training to foster digital skills in enterprises: 50% of the cost of selected courses is supported up to 4,000 € per enterprise. In addition, it offers online and offline information about digitalisation, from information events and webinars to a free online status check for enterprises. Until now, ten different digitalisation manuals have been developed for specific professions.

c) Industry 4.0 programme

AWS provides a specific programme dedicated to Industry 4.0 (i.e., "Industrie 4.0") supporting business digital transformation and production processes through three main phases: analysis and conceptual phase (phase 1); investment in equipment, computing, networks, processes and software (phase 2); and education, training and qualification (phase 3).

As mentioned at the PR event with AWS's staff, the programme aims to contribute among other key goals to enhance data integration within value chains, vertical integration and cross-linked production systems, implement cyber physical production systems, and new business models development. Launched in 2015, the programme annual budget has varied from 3.5 to 8M€ ensured by Austrian funds and delivered in the form of grants, often complemented by soft loans with low interest rates. The maximum grant amount is 500k€, with maximum 200k€ per phase.

A new phase of the Industry 4.0 programme is sought to be launched from 2022 onwards, which is expected to support new fields such as digital agriculture (Agro 4.0), agri-food systems and personalised medicine. It is being planned to introduce some new features such as cooperation projects in direction of virtual large companies, integrated educational projects involving training, education and qualification, promotion of gender quality, stronger focus on sustainability issues, data safety and security, and new forms of dislocated work.

d) AT:net

The AT:net programme[44] run by FFG - Austrian Research Promotion Agency focuses on start-ups and SMEs (while also funding larger firms) and supports the market launch and establishment of digital applications and products. Funding provided through AT:net is between 10 and 200K€ depending on the projects. AT:net has been in place since 2007 and has supported around 500 digitalisation projects.

Starting with an existing prototype, the programme supports the market launch phase through to full commercial operation based on the submitted market launch plan. Contrarily to other digital funding programmes, AT:net does not fund any research activities. The prerequisite for funding is the existence of a prototype, which is an essential criterion in the evaluation process. The focus of the projects must be on bringing the application/service to the target market, and eligible costs include prototype development and test activities, marketing, advertising, support for pilot customers/test installations, sales channels etc. In particular, the

[44] https://www.ffg.at/atnet_markteinfuehrung

programme supports software developments in which software solutions are tested at an early stage of maturity with pilot customers/beta users.

Projects dealing with the following topics are particularly welcome to AT:net: e-Government, e-Health, Ambient Assisted Living, e-Learning, e-Inclusion, electronic services to increase road safety, and support services for SMEs.

e) Digital Innovation Hubs

FFG - Austrian Research Promotion Agency started providing grants in 2018 to set up Digital Innovation Hubs (DIHs)[45] located at research institutions. Each DIH serves as a network of existing facilities ("digital centres") that use their expertise and infrastructure to facilitate SMEs digital transformation processes.

Funded by the Ministry for Digital and Economic Affairs, DIHs are intended to be a first contact point for SMEs regarding digitalisation, tailoring their services to regional needs. Topics such as Artificial Intelligence (AI), cybersecurity, blockchain and 3D printing are among their priorities. As many as six DIHs had been created so far.

6.3. Governance model

Presenting very briefly the governance model in the field of digitalisation, the main ministries at the federal level are the Ministry for Digital and Economic Affairs (BMDW)[46] and Ministry of Transport, Innovation and Technology (BMVIT).[47] BMDW is responsible for enhancing the framework conditions for digital transformation and coordinating and implementing e-government solutions. BMVIT oversees developing telecommunications policy and legislation, including centralised policy on frequencies and broadband roll-out.

However, there is also a Broadband Bureau[48], which is part of the Ministry of Agriculture, Regions and Tourism (BMLRT) that acts as a national competence centre for federal states and operators in order to promote the deployment of broadband networks in Austria.

The ministries are supported by two most relevant agencies in this field, which are AWS - Austrian Promotional Bank[49] and FFG - Research Promotion Agency.[50]

AWS is the main agency for the promotion and financing of companies (including SMEs) in Austria providing support in the form of grants, loans and guarantee schemes. It has a broad set of programmes to finance start-ups, business expansion and technological innovation.

FFG is the national funding agency for industrial research and development, funding schemes that play an important role in generating new knowledge and developing new products and

[45] https://www.interregeurope.eu/policylearning/good-practices/item/4861/digital-innovation-hubs-dih/
[46] https://www.bmdw.gv.at/en.html
[47] https://www.devex.com/organizations/federal-ministry-of-transport-innovation-and-technology-bmvit-austria-139338
[48] https://info.bmlrt.gv.at/themen/telekommunikation-post/breitband.html
[49] https://www.aws.at/en/
[50] https://www.ffg.at/en

services. FFG help businesses to absorb the risks involved in research, supports international networking and encourages careers in science.

The Austrian Economic Chambers[51] also play an important role in the policy landscape, namely through the SME Digital programme.

A new federal player that should also be mentioned is DIA – Digitalisation Agency established in 2018 under FFG. The aim of DIA is to improve awareness for all fields of digitalisation and to foster co-ordination between the actors at the federal and regional levels.

6.4. Overall analysis

As can be inferred from the description above, there is a broad range of strategies, initiatives and instruments developed and implemented in the country regarding digitalisation and business digital transformation.

In fact, Austria has developed several strategic guidelines covering various digital topics, from Digital Austria as a general strategy for the successful digitalisation of country's economy, society and public administration and which tries to harmonise other initiatives previously launched, to more focused strategies such as broadband strategies 2020 and 2030, e- Government Act, open government data strategy, Competence Framework for Austria - DigComp 2.2, and Digital Team Austria (for COVID-19 mitigation), as well as web portals such as the ICT Security Portal and the Austrian One-Stop e-Government Portal for business.

To implement the strategies mentioned above and others, several instruments have been put into practice, five of which stand out in this report considering the relevant impact they may have on digital transformation of Austrian businesses: ERDF National Operational Programme; SME Initiative; Industry 4.0 programme; AT:net; and Digital Innovation Hubs. These instruments are obviously not all the same importance (the volume of resources they involve is very dissimilar) nor do they pursue the same objectives, but they can be seen as being somehow complementary, considering the different types of activities they fund.

It can be concluded that the several public instruments to foster business innovation and digitalisation in Austria offer a wide range of support actions for companies, including SMEs. In fact, in a non-exhaustive list, SMEs can through the five instruments described above obtain funding for activities as varied as:

- research and technological development (RTD) with one or more entities of the scientific or technological system;
- acquisition of machinery/equipment;
- acquisition of external support services (e.g., technical, consulting);
- implementation of new/improved production processes and systems;
- launch of new products/services;
- new business models and management processes and systems, including organisation, marketing and sales (e.g., ERP, CRM);
- access to new markets and internationalisation;
- access to credit schemes;

[51] https://www.wko.at/service/Austrian-Economic-Chambers.html

– launch of innovative start-up companies.

Digital solutions, which can be transversally implemented in the above activities, including digital technologies, processes, and business models, can also be broadly supported by the aforementioned public policy instruments.

In conclusion, it can be said that the country has issued many strategies and initiatiaves for numerous aspects related to digitalisation, as well as various instruments to put them into action (although some of them not addressing digitalisation explicitly).

Efforts made in recent years to concentrate the implementation of measures on fewer government entities should be valued. The establishment of a digitalisation ministry (BMDW - Ministry for Digital and Economic Affairs) to coordinate the institutional architecture regarding ICT initiatives, and the launch of the "Digital Austria" initiative that encompasses the country's key challenges and respective planned measures, can be seen as positive steps in that direction.

The creation of a Digitalisation Agency (DIA), which works closely together with the inter-ministerial task force of "Chief Digital Officers", seems to be useful with a view to harmonising digital policies, although it is somewhat surprising that it works outside the ministry that coordinates digitalisation.

The multiple policy orientations found in the country may also lead to a certain loss of focus, as well as doubts about what the main goals are. In addition, some national strategies analysed under this review did not consider any indicators or targets to measure the progress of the country.

The mix of instruments used at the federal level also seems to be somewhat complex, among measures delivered by different ministries, state agencies and other entities such as the Austrian Economic Chambers. Moreover, it should also be borne in mind the regional and sub-regional levels (e.g., federal states and main municipalities), which have their own measures to encourage digital transition of the business community. Although, as reported during the field research event, there are clear rules for companies to know when they should apply for instruments available at national or regional level, such density of measures can hamper businesses – and particularly small and micro-companies – to fully harness the opportunities available for them.

Due to Austria's ambition to become a leading European country in this field, it was not clear during the desk and field research whether the necessary resources have been made available to achieve that objective, especially regarding business digital transformation. Although there is evidence that high investments are being made, for example in fixed and mobile infrastructure for ultra-fast Internet, concrete programmes for digital transformation in industry (e.g., Industry 4.0 programme) seem to have relatively limited budgets.

The nature of the support provided suggests a focus on the manufacturing industry and on relatively high investments (except for the SME Digital programme). No relevant instruments dedicated to small and micro companies have been identified.

Regarding companies' funding, in addition to non-reimbursable grants, there is a substantial volume of financing granted through loans, which may limit the involvement of companies in the respective programmes.

7 Main barriers for SMEs digitalisation and possible solutions

7.1. Awareness Raising & Collaboration

The country's principal barriers regarding "awareness raising and collaboration" reported by the Hosting Partner concern mainly to insufficient information and communication about digitalisation support programmes, little cooperation between large companies and SMEs (including start-ups), new challenges posed by the pandemic crisis in terms of work organisation, and the relatively limited proportion of ICT students (especially female) in all levels of education.

Communication on digital transformation support. We saw in the previous chapter that the landscape of public measures to support business digital transformation is somewhat complex and fragmented, with several initiatives being implemented by different entities, both at national and regional levels. In such a framework, SMEs may find it difficult to identify the right support they need.

Better signposting existing digital support provided by public entities seems to be a measure that would greatly benefit businesses, in particular small and micro-enterprises. Such a measure could consist of including all digital policy instruments on a single site - a portal or website - which could also provide information and advice on issues that are of interest to companies in view of their digital transformation, such as technologies and processes, e-commerce, connectivity, cybersecurity, training opportunities etc.

A portal like this could partly have a content similar to "fit4Internet"[52] but more focused on the business community, and could be promoted by business associations, chambers of commerce, clusters, and other entities with close proximity to SMEs. Inspiring examples of SMEs that have achieved success with the support of digital solutions could be presented here.

Cooperation between large companies and SMEs. Although the lack of cooperation culture among businesses is a common issue in many countries, there is nowadays greater awareness amongst larger companies that they can benefit from closer collaboration with their SME supply chains to better compete in global markets. It is a recognition that the development of collaborative relationships down the supply chain is not only compatible with success, but it can also be a driver of it. Small (often growing) companies can offer large companies access to innovative products and new customers. This is especially true in industrial and service sectors characterised by rapid change and innovation.

Austrian public policies should therefore incentivise supply chain diversity and the involvement of start-ups and SMEs (both commercially oriented and social enterprises). Under a model of open innovation, which has become an increasingly popular solution to address the systematic increase of market competitiveness, cooperation is an important success factor. It increases the ability of creativity, reduces time and diffusion of new solutions, and allows companies to better compete in rapidly changing markets. For innovative SMEs, it may lead to the development of both the company and new products.

[52] www.fit4Internet.at

Austrian public policies could therefore increasingly promote large-scale projects that bring together large companies, SMEs, start-up firms, business associations, clusters and RTD and innovation entities to jointly work on common projects towards the development of new products, services, or processes. Such projects could in certain cases involve just a single large company (e.g., an enterprise with significant contribution to national GDP) and suppliers or potential suppliers, creating "clubs of suppliers" around the core companies, hence creating more efficient, stable and sustainable supply chains, while empowering SMEs, decreasing imports with increased domestic supplies, increasing exports, and promoting high-tech innovation and entrepreneurship.[53]

Pandemic crisis and new forms of working. Teleworking has been encouraged by Austrian public authorities during the COVID-19 pandemic, and some measures have been taken to facilitate its implementation. For instance, the employer could not prescribe home office unilaterally and, on the other hand, there was no legal entitlement to telework. The employee should work from home only upon agreement with the employer and teleworking agreements identified the workplace, duration, weekly working hours, as well as the requirements for the bearing of costs for private expenses such as electricity, Internet or hardware.

As explained in the previous chapter, the Ministry for Digital and Economic Affairs encouraged the setup of "Digital Team Austria", a group of ICT companies that committed to offer free of charge digital services to SMEs for at least three months in order to facilitate teleworking. Services specifically designed to support mobile work could be ordered via the websites of the respective providers, including for instance solutions for video conferencing and online meetings, virtual workspaces, cybersecurity, digital training etc.

Although teleworking can be seen by many governments as a way to improve productivity, as well as additional benefits for a broad range of other policy areas, such as better work-life balance, less traffic congestion, decreased housing costs in urban areas, more job opportunities in rural areas etc., the fact is that not all companies, and particularly small companies, have been able to respond effectively to the challenges suddenly posed by the pandemic crisis. Actually, the implementation of the "Digital Team Austria" initiative, which is a very interesting example on how to help SMEs to deal with the pandemic in the short term, is the recognition of such difficulties.

As more stable and long-term solutions, and considering that new digital ways of work (e.g., hybrid working, dislocated working etc) may be here to stay, Austrian authorities could consider the creation of funding schemes to promote the adoption of teleworking by SMEs, mitigating their disproportionately higher costs compared to larger companies, including support for access to expert advice for development of teleworking plans; purchase, installation and assistance in ICT software, hardware and networks; cybersecurity tools; and training for workers and managers.

Along with this type of support, or instead of it, provision of funding is suggested for large-scale demonstration projects with the participation of SMEs and other stakeholders (e.g.,

[53] In this regard, please see the "Club of suppliers" measure implemented in Portugal around companies such as Bosch, Peugeot-Citroën or Volkswagen: https://www.iapmei.pt/PRODUTOS-E-SERVICOS/Incentivos-Financiamento/Sistemas-de-Incentivos/Incentivos-Portugal-2020/Clube-de-Fornecedores.aspx [PT]

business associations, clusters, technology and innovation centres, ICT service suppliers) to disseminate good practices in the adoption of teleworking by SMEs.

In fact, regardless of whether government policies directly support more or less small companies in the implementation of digital forms of work, it would always be important to facilitate the dissemination of best practice managerial practices developed in response to the increased use of teleworking.

The existence of high-quality communication services accessible in all Austrian regions to facilitate the adoption of remote work, and the overcoming of cultural and legal barriers to remote work, promoting for example the "right to telework" and the "right to disconnect", organisation of campaigns and guidelines to better deal with remote work, and adaptation of legislation for these activities, are other measures that seem crucial to encourage new digital ways of work in the country.

Low rate of ICT students. The relatively low proportion of ICT students was one of the problems pointed out by the Hosting Partner in the area of digitalisation. In particular, low female presence in ICT-related courses was reported. Moreover, the scarce presence of ICT young graduates in SMEs is also a trend that causes concern in Austria.

While the issue of increasing the number of students in the ICT area, and in STEM in general, is somewhat complex and deserves an in-depth analysis, there are a number of measures that could be considered by the government authorities:

- **Fostering teaching in STEM areas**. In order to boost the development of digital skills in the country, endeavours could be made in order to introduce digital and programming skills since the first cycle of studies and make more attractive further studies in secondary and higher education levels in STEM areas.
- **Greater attraction of ICT scientific talent**. The reinforcement of scholarship systems for international students in higher education (including PhD students and researchers), as well as the entry of qualified ICT specialists into the country, could be pondered in order to enhance the attraction and retention of digital talent.
- **Increased capacity of universities in ICT**. Incentives could be provided to universities to increase the number of students in ICT-related courses, as well as to create new university diplomas in emerging areas of knowledge and technology with high market demand.
- **Reskilling programmes**. In cooperation with Higher Education Institutions, RTD centres and business associations, reskilling initiatives could be launched aimed at graduates with employability difficulties, in order to retrain them in digital technologies with high-level demand in the labour market.

Regarding the limited presence of ICT specialists in SMEs, especially young graduates, there are countries that have launched specific traineeship programmes in small and medium-sized enterprises, which have shown effectiveness in the continuity of young professionals in the participating companies.

The barriers preventing women from accessing digital technologies and professions are complex and diverse and cannot be addressed in isolation. They require the integration of a gender perspective into relevant policies and strategies that explicitly address women's needs,

circumstances, and capabilities, as well as cooperation among all stakeholders (e.g., governments, businesses, others) to tackle the digital gender gap effectively.

Considering the information gathered on this subject, especially during the research field phase, a number of solutions are suggested to address this issue in Austria:

- Encourage female participation in publicly funded digitalisation projects, for example by increasing the evaluation score and/or increasing the public incentive rate to projects with significant female involvement.
- Award prizes to projects that represent good practices regarding female participation in digital transformation and disseminate them in the media.
- Encourage public procurement policies in the ICT area that positively discriminate suppliers that promote gender equality in their companies.
- Ensure gender balance in digital education at all levels of education.
- Include a gender component in all STEM and ICT-related curricula, as well as in educational materials.
- Support lifelong training in order to facilitate the professional transition of women to ICT-related positions, as well as training actions to improve women's upskilling and reskilling.
- Foster women's entrepreneurship and increase financing opportunities for female entrepreneurs and female-led digital start-ups (as most entrepreneurs, investors and workers are male).

7.2. Enabling Corporate Environment and Capacity Building

Under this topic there were two main issues raised by the Austrian partner: risk aversion to innovate, and shortage of ICT skills and specialists (including qualified trainers).

A wide range of factors influence businesses' capacity for innovating, which include internal culture and values, in-house competencies and skills, collaboration with the surrounding innovation ecosystem, level of integration in value chains, investment in training, financial capacity etc.

In any case, the innovation capacity of Austrian small and micro companies can be faster and more effectively reinforced if there is greater collaboration with external entities (including other companies under the respective value chains), more public financial resources for innovation activities, and if more high-tech and knowledge-intensive companies are created in the country. The following three measures are therefore proposed to help enhance companies' innovation and digital transition:

- **Promoting SMEs participation in local innovation ecosystems**. Instead of one-to-one projects in which an SME works with a single innovation service provider, micro and small companies would benefit from working with a wide range of partners for a faster diffusion of knowledge, technologies, and processes. More efforts could be done to foster multilateral projects bringing together a variety of actors (e.g., RTD and innovation centres, business associations, clusters, business incubators, SMEs, ICT firms) in order to gather the necessary knowledge, experience and resources to respond to specific digitalisation needs of small businesses.

- **Overcoming financial barriers to SMEs digitalisation**. It is necessary to facilitate support for the digital transformation of SMEs, paying particular attention to the needs of small and micro companies. Specific measures could be adopted to assist smaller businesses, for example calls for proposals exclusively dedicated to them, particularly if based in rural areas.

- **Knowledge- and technology-based entrepreneurship.** The country must continue to make efforts to create the best framework for knowledge-intensive entrepreneurship to flourish. New companies, especially if they are technology-based, invest more than average in new products, technologies and business models that can positively "contaminate" the national and regional innovation systems. Such firms are also able to retain and attract talent from elsewhere more easily. Investment in knowledge intensive entrepreneurship, especially if generated from Higher Education Institutions (i.e., university spin-off companies) and technology centres, but also from other innovative companies (e.g., corporate spin-offs), must remain a priority in Austria's policies.

Regarding the relative scarcity of ICT skills, including shortage of ICT specialists and qualified trainers, the 2021 edition of the Digital Economy and Society Index (DESI) report on Austria[54] notices that the country ranks 9th among EU countries on Human Capital and is above the EU average in all the indicators apart from the percentage of enterprises providing ICT training (18%), which is slightly below the EU average (20%). Austria scores well above the EU average in at least basic digital skills (66% compared to the EU average of 56%) and 69% of people have at least basic software skills, where the EU average is 58%.

In 2020, the percentage of ICT specialists slightly increased (4.5%), remaining above the EU average (4.3%) with the proportion of female ICT specialists remaining stable at 20% (EU average 19%). The percentage of ICT graduates (4.5%) is also above the EU average (3.9%). Nevertheless in 2020, 74.3% of enterprises in Austria that recruited or tried to recruit personnel reported that vacancies for jobs requiring ICT specialist skills were hard to fill.

The solutions proposed by the Hosting Partner in the analysis report on Austria seem suitable to address the shortage of ICT kills. On the one hand, it is necessary to promote education in the STEM area, particularly in ICT (as detailed in the previous topic). On the other hand, it is indispensable to reinforce lifelong learning in ICT (labour force upskilling), in particular for low-skilled workers, as well as implementing ICT reskilling actions for unemployed people or those willing to change their professional careers, involving for this purpose universities and RTD centres, as well as to invest in technical and professional education for young people in order to train and qualify intermediate technical staff.

Austria should moreover become attractive for ICT specialists coming from other European countries, or even outside Europe, asserting itself as a desirable country in the fierce international competition for this type of expertise.

During desk and field research, evidence was found that Austria has taken several measures to increase the level of digital skills of its population over the last few years. The Ministry for Digital and Economic Affairs (BMDW) is responsible for providing digital training activities

[54] https://digital-strategy.ec.europa.eu/en/policies/desi-austria

to the general population, which are not embedded in any formal educational process. The objective is for all people to be "equipped" with the necessary digital skills for their personal and professional development. In close cooperation with BMDW, the fit4Internet association[55], which also hosts the national coalition for digital skills and jobs, has launched initiatives targeting digital skills for the population in general and advanced digital skills for ICT specialists.

Furthermore, the steps taken regarding the development of a Competence Framework for Digital Skills led by fit4Internet are worth mentioning, as it is relevant to qualifying and quantifying digital literacy among the country's population, while enabling the use of digital technologies and ensuring broad participation of the whole society in the digital transition process.

All those measures must be valued and could be intensified to involve a greater number of beneficiaries. In fact, in addition to training the workforce, it is also important for the country to support the general population by developing citizens' digital skills towards greater civic participation and social inclusion, namely promoting new technologies and digital literacy, training actions on Office tools, Internet training for beginners, cybersecurity etc. Specific actions for children could also be considered, so as to help future generations to be proficient in digital skills through the provision of education on the use of ICT tools, including Office tools and Internet training for beginners, privacy and cybersecurity, introduction to computer programmeming, graphic design, web page development and management etc.

7.3. Administrative, Technical and Legal

One of the issues reported by the Austrian partner under this topic was the perception companies often have that there is excessive bureaucracy around application processes for public funding, which may discourage some of them to seek support. Although this view may not always correspond to reality, it is crucial to facilitate as much as possible all bureaucratic procedures in providing funding to companies. In particular, small businesses often experience difficulties in overcoming administrative burden and may be deterred from participating.

The deployment of user-friendly online tools could play an important role in facilitating such administrative and financial processes.

In addition to effectively simplifying bureaucratic procedures, it is also necessary to communicate with companies and their representative entities (e.g., business associations, clusters) in order to inform them about this simplification, presenting, if possible, testimonials from SMEs on the benefits resulting from the support received.

Another important aspect, which may be preventing ICT talent from entering the country, are the restrictive immigration laws. As suggested in the analysis report prepared by AWS, professional profiles for which the country has a deficit could benefit from more expeditious immigration processes, namely by streamlining the issuance of the "Red-White-Red Card", which entitles its holder to temporary settlement and employment with a specific employer.

[55] www.fit4Internet.at

Concerning reports on insufficient evaluation of national programmes and measures, this may not only be making it difficult to demonstrate to SMEs that the instruments put in place are actually useful for their innovation and digital transformation, but it may also prevent government entities from evaluating the effects of their policies in terms of efficiency and effectiveness, as well as from introducing improvements in planning and implementation processes.

As far as the evaluation of concrete projects is concerned, the funded projects must have clear established key performance indicators, with respective objectives and deadlines, whose fulfilment determines the level of funding to be allocated. The aggregated outcomes of all projects (overall impact) carried out under a given measure, as well as the most successful projects, could be disseminated afterwards as showcases among the business community.

Regarding reported difficulties concerning the development of an ultra-speed broadband infrastructure, it is true that Austria scores below the EU average for fixed VHCN (Very High-Capacity Networks) coverage and take-up. According to DESI 2021, although the country has improved significantly in VHCN coverage, increasing from 14% in 2019 to 39% in 2020, it still performs below EU average (59%). Rural VHCN coverage remains low, with 12% of households covered compared to 28% at EU level. As reliable fixed connections are a prerequisite for digital transition, further endeavours are needed in this regard. The use of the Recovery and Resilience national programme can play an important role to achieve this goal.

On the other hand, it should also be recognised that Austria is a pioneer in the roll-out of 5G technolgy. Consumers already have access to commercial 5G offers and the country boasts a very high level of mobile coverage and up-take. Actually, there is more mobile take-up than overall fixed take-up, indicating that some households and businesses may use mobile connection as a complement to or substitute for their fixed connection.

7.4. Financial and Economic

Under this topic, an issue related to funding difficulties in the project implementation phase (after initial phases of consulting, training, and pilot activities) was reported by the Hosting Partner.

As explained in detail in Chapter 6, programmes such as “SME Digital” and “Industry 4.0”, especially with the changes introduced in recent years, already allow Austrian SMEs to obtain significant support for the full implementation of digital solutions that can significantly transform their business.

As also mentioned in the same chapter, loans are an important component of Austrian public support for companies' digital transition projects. These are typically soft loans with low interest rates (below-market rates) with extended grace periods. However, despite the favourable conditions, loans are debt contracted by companies, so this model may limit their participation, especially of smaller ones. Ideally, an effort should be made to ensure that, within the rules in force in the country and in the European Union (in the case of use of ESIF - European Structural and Investment Funds), the provision of non-reimbursable grants could be reinforced, particularly for small companies, even if it would be necessary to fund a lesser number of projects under each instrument.

The possibility of creating a state venture capital fund to support the launch of start-ups in the digital field, as well as high-risk digitalisation investments by existing companies, would certainly be a positive measure. It would be expectable that such a fund would be as useful for creating new ICT companies as for supporting mature companies in digital investments.

As argued in the above topic on "Enabling Corporate Environment and Capacity Building", it would be beneficial to consider improved support for innovative small and micro enterprises, for example by offering higher co-funding rates in the provided grants or even launching specific calls for proposals for them. Such support would be particularly beneficial for small businesses in a growth phase, while care should be taken with micro-enterprises that have had such status and size for many years.

Challenges related to the unwillingness of small companies to invest in digital development projects, as well as the relatively little introduction of digital technologies in SMEs, were also reported in the DigiBEST report on Austria.

Firstly, it must be said that according to DESI 2021 report, the country is slightly above the European average as far as integration of digital technology is concerned, ranking 11th among EU countries. But while it is performing better regarding SMEs that have at least a basic level of digital intensity (63% against 60% of EU average) and enterprises using artificial intelligence (AI) (37% compared to the EU average of 25%), Austria is underperforming concerning the use of big data by enterprises (9% comparing to 14% of EU average), cloud (20%, below the EU average of 26%), and e-invoicing (22% of enterprises are using e-invoicing, which remains below EU average (32%). Regarding e-commerce, 22% of SMEs are selling online, well above the EU average of 17%, and 15% are selling online across borders (EU average 8%). However, the e-commerce turnover of SMEs (10%) is below the EU average of 12%.

Secondly, it is through concrete initiatives that the current state of play can be changed (e.g., SME Digital, Industry 4.0 programme, ICT of the Future, Production of the Future, AT:net, Digital Innovation Hubs etc), disseminating digital technologies and their potential, publishing successful business cases, and bringing the most diverse stakeholders closer together for faster and more effective knowledge sharing.

7.5. Policy and Security

Cybersecurity has become crucial to the digital world since more and more services move online. Austria does not have a separate national strategy for cybersecurity, but this topic has been included in other strategic frameworks and digitalisation support programmes.

With regard to cybersecurity in SMEs, some measures could be considered, as small businesses may, in many cases, not have the necessary means to protect from malicious cyber activities that threaten their activities:

- Consider eligible cybersecurity-related expenditures under all digitalisation support programmes.
- Provide small and medium-sized companies specific support for cybersecurity (including, for example, the purchase of cybersecurity tools and specialised assistance regarding procedures and installation of suitable systems), either through direct

support (e.g., cybersecurity vouchers) or the establishment of networks of cybersecurity providers.
- Support cybersecurity training programmes for companies – for instance led by business associations or clusters – and financially support SMEs to access those programmes.
- Develop joint cybersecurity promotion projects, involving universities, research and technological development (RTD) centres, companies (including SMEs) and business associations that directly address the needs of the business community and, in particular, small businesses.

The country may also want to look at cybersecurity as an opportunity for the Austrian economy, as the global market for cybersecurity products and services grows by 15-20% annually. This may involve, for instance, supporting research institutions such as the Cybersecurity Campus Graz established in Styria or the University of Applied Sciences at Hagenberg (Upper Austria) around which cybersecurity innovation hubs are being established. It would be important to boost business creation around these initiatives, which would favour local economies and help to better protect SMEs from digital threats.

At a more general level, the Austrian government should consider:
- Make the necessary investments to ensure that the country remains at the forefront of technological advances in cybersecurity.
- Qualify the population for cybersecurity issues, including school education, training, upskilling and reskilling programmes, giving particular emphasis to initiatives aimed at teachers and trainers.
- Strengthen the defences of digital networks, centralising their management and operation, paying particular attention to the security of critical IT infrastructures and all systems of national importance.
- Improve information sharing among national stakeholders on cyber threats and strengthen digital security partnerships.
- Ensure a safer "Internet of Things", disseminating codes of good practices on security and making the devices used by SMEs more secure.
- Implement automatic blocking threat systems through the use of specific blocking technologies that automatically protect companies and other organisations from malicious computer attacks.
- Apply more effectively existing international laws in cyberspace, imposing heavier consequences for those who act contrary to those laws, including the "dark web".

8 Relevance of Good Practices

In the Rgional Analysis of Austria, Digital Innovation Hubs (DIH) are suggested as a relevant tool for realising the digital change, innovation and potential digitalisation for SMEs.

DIH serves a network of existing facilitates that use their expertise and infrastructure to to facilitate digital transformastion process of SMEs.

However, this programme is heavily research-oriented with testing of technology as a main issue. This programme has been changed to EDIH (European Digital Innovation Hubs) which are more practical and "use-of- technology"-oriented. EDIH is created as a single organisation or a coordinated group of organisations with complementary expertise, with a not-for-profit objective that provides technological expertise and experimentation facilities to enable the digital transformation of industry and the public sector.[56]

This is therefore a much more useful tool for supporting digitalisation innovation for SMEs.

In Norway there has been an evaluation of how this works for the SMEs, see chapter 10, page 63.

8.1. Suggested good practices in Norway

When proposing good practices, it is important to keep in mind that context and different cultures in different countries are important to recognise. Case studies cannot be replicated one to one. Good practices are to serve as sources of inspiration, and these should be modified to fit the specific context in different countries in which the good practices are to be applied.

8.1.1. Climate calculator (climate footprint) in agriculture

Austria is planning for a project called "Food System" which address many of the topics of digitalisation and use of novel technology by the SMEs.

Digitalisation is a trend in agriculture. It helps the industry's contribution to increased food safety and overall sustainability worldwide. Trends include sensors for crop monitoring, when to water, where to sprinkle, automation, allocation of fertilizer, etc. Almost every bigger and smaller company in the industry in Norway works with its solutions. Therefore, there is a significant potential for collaboration and data sharing in the industry. For example, John Deere, one of the biggest suppliers to agriculture worldwide, has an Ag Management Solution platform that gives a complete overview and management of the machines. The solution contains receivers and displays, guidance and machine automation, precision farming solutions, and connected farm management. There are many similar solutions in the industry, and the potential for improvement and data-sharing is excellent.

In Norway there is f.x a similar project that has been going on for some time but have a different approach than provided by the Agora 4.0 in using technology to change the industry.

[56] European Digital Innovation Hubs in Norway (innovasjonnorge.no)

The case described in this case - The Climate calculator (footprint) – is part of at lager project in the agriculture sector.

The project is characterised by:

- A bottom up-process involving SMEs in cooperation with public sector and larger companies.
- Use of sharing of data based on standard API, a common platform, and creating an ecosystem consisting of domain-owned applications.
- It addresses the vision of sustainable digitalisation (reducing emission of CO2).
- It's part of a concept for circular economy (reducing the waste of food).

Short description of the background

The Norwegian government's goal is to reduce greenhouse gas emissions by 50% by 2030. Studies have shown that digitalisation can make up 15% of that target. «Smart houses» make up 3.9%, «precision agriculture» 2.9%, while «smart transport» and «smart work» (home office) have far less effect.

The agriculture sector aim is to reduce greenhouse gas emissions by 5 million tonnes of CO2 equivalents by 2030. However, the goal is not only to reduce climate emissions, but also to see how surplus carbon can be stored.

The lack of knowledge about how much the individual industry contributes to greenhouse gas emissions, is a challenge for the agricultural sector. In order to reduce greenhouse gas emissions, one must therefore find the industry's climate footprint, i.e., how much exactly the industry contributes to the pollution.

The agricultural sector consists of complex, dynamic processes, where production is based on biological processes. Research shows that the climate footprint varies based on what kind of production (cattle, milk, or grain), size of the farm, and the geography of the individual farm. The climate measures must therefore adopt to the individual farms production structure. The challenge is to change the individual farmer's behaviour.

For these reasons a Climate Calculator ("Farmer's dashboard") is developed for farmers to calculate emissions from each farm. **In this way, a detailed climate footprint is created from the individual farm, which gives the farmer the opportunity to adapt production in relation to the climate effects.**

The emission calculations are made by integrating a professional calculation model (HolosNOR), and consent-based data sharing (via Dataflow in Agriculture) where data from several sources are collected for the individual farm (soil and climate data, animal data from livestock controls, data from plant management systems, and data from accounting and billing systems and more). The calculator is based on international standards (IPCC).

The calculator was developed over a period of about 4 years and was partly financed from the state budget and the agricultural agreement with NOK 48 million. In addition, there is self-funding from players in the industry who provide data.

As many data can be both person-sensitive and/or business data that other actors should not be aware of, thorough work was done on privacy and data security in relation to GDPR legislation.

The value of such a calculator is thus first and foremost to reveal the climate footprint of the individual farm. It provides a better basis for decision-making for the farmer to reduce climate emissions in connection with his own soil and livestock production, and increased food quality through better control of the feed that the animals receive. It also provides better knowledge management of the individual farm, in collaboration with other farmers and / or actors in the value chain.

"Sustainable digitalisation" in the agricultural sector cover three steps:

- To uncover the industry's climate footprint **(knowledge effect).**
- To contribute to the restructuring of the industry, as well as highlighting the positive contribution from agriculture through increased uptake of CO2 **(productivity and competition effect).**
- To develop new products for new markets based on renewable bio-based products **(innovation effect).**

Circular economy

This project is part of the new circular economy:

Traditionally, digitalisation is about reducing the transaction costs within the company or along the value chain that the company is part of. This is the concept of «linear economy». However, "sustainable digitalisation" will in many contexts consist of "reducing waste". It stimulates strategic thinking in the form of circular economy where reuse of resources, reducing waste, letting resources remain in the economy, if possible, are key elements.

Data driven approach

The framework of this project is based on EUs **European Interoperability Framework** [57] which consists of 4 elements:

- *Technical interoperability*
- *Semantic interoperability*
- *Organisational interoperability*
- *Legal interoperability*

In practical terms the sharing of data is based on access to data by standard APIs, distributed through a common platform consisting of "domain-based" applications producing of a digital

[57] 2018-09-26_egov_conference_vienna_interoperability_by_default.pdf (europa.eu)

ecosystem. A digital ecosystem is a set of strategies for SMEs to develop their competitiveness.

This project is part of a bigger project started in 2007. The purpose is to provide standards and services for streamlining data flow, secure ownership of data, data sharing and thereby contribute to better decision making and increased competitiveness for Norwegian agricultural enterprises.

It is based on 3 core components:

1. Standardisation.
2. An infrastructure solution.
3. Services.

TABLE 4. GOOD PRACTICE: "AGRICULTURAL DATAFLOW"

Good practice general information	
Title of the good practice	***Agricultural Dataflow***
Category of the good practice	*Please choose one of the categories:* ■ *Awareness rising and collaboration;* ■ Sustainability *instruments;* ■ *Enabling environment;*
Organisation in charge of the good practice	*Agricultural Dataflow SA*
Description	
Short summary of the practice	Agricultural Dataflow SA develops and maintains standards and infrastructure to streamline central data flow, share data, secure ownership of data and provides better decision support for individual agricultural enterprises/farmers and the whole agricultural industry in Norway. Interaction and coordination between key players in Norwegian agriculture is the main instrument of achieving this. Standards and infrastructure solutions are worked out to facilitate effective transfer, sharing and standardisation of such data between different actors and agricultural enterprises. The solutions also allow for the development of databases for benchmarking and for use in decision support systems in the advisory service, by accountants, banks, public reporting, research and so on. The solutions provide real-time data, reduction of the number of registrations, better quality of data, comparability, and the possibility that various partners to agricultural firms employ the same number basis.
Resources needed	The company has currently a turnover of approximately 25-30 million and currently have 11 employees. Much of the operations and development, is outsorced.
Timescale (start/end date)	The Data Flow Project started a pilot project in 2007 and since then has 3 phases of the major project worked with standardisation, infrastructure solutions and pilot testing. Number

	of partners in the project has been expanded several times since its inception.
Evidence of success (results achieved)	Net present value of streamlining the data flow in the industry of approximately NOK 500 million in ten years in quantitatively documentable gains, Better decision support and the effect of using data Effects related to the possibility of documentation of sustainability (through the climate calculator for agriculture). Collaboration with other industries, fx the seafood industry, use of data in common solutions for sharing and use of data.
Potential for learning or transfer	This is an example of how low threshold workshops can mobilise enterprises that otherwise would be left out of the conversation on digitalisation. Making digitalisation fit the context of the businesses, rather than the other way around is key in this programme.

8.1.2. Development of digital networks – fixed and mobile – in non-commercially viable areas

Considering the complex orography of the Austrian territory and the difficulty in establishing digital networks in remote rural areas, the following example implemented in the Trøndelag County is suggested to faster develop high-speed digital infrastructure (fixed and mobile) in non-commercially viable areas.

TABLE 5. GOOD PRACTICE: "DIGITAL NETWORKS IN NON-COMMERCIALLY VIABLE AREAS"

Good practice general information	
Title of the good practice	***Development of digital networks (fixed and mobile) in non-commercially viable areas***
Category of the good practice	*Please choose one of the categories:* ■ *Awareness rising and collaboration;* ■ *Empowering tools;* ■ *Sustainability instruments;* □ *Enabling environment;* □ *Other*
Organisation in charge of the good practice	Trøndelag County Authority
Description	
Short summary of the practice	Digital transformation depends on access to networks, both fixed and mobile. Most of the development of networks takes place on a commercial basis, and coverage improves from year to year. However, the areas that still lack coverage, either fixed or mobile, must be expanded with public subsidies. From the year 2020 onwards, the Trøndelag County Council has assumed the responsibility to be a driver, coordinator and facilitator in

	collaboration with the municipalities regarding the expansion of those networks. This will ensure that businesses, households and other areas where people travel should have access to a timely and stable network. In the national context, Trøndelag is the foremost when it comes to developing high-speed digital networks in rural areas. And the region's efforts are often used as an example for other counties and municipalities. SMEs located in rural areas are cornerstones in the local communities. Trøndelag has a lot of remote rural areas, and the SMEs are imperative to maintain the population. Access to high-speed Internet is imperative. This is a regional development task that is viewed as extremely important at both local, regional and national level. It is a question of survival first, and digital transformation second. Companies are encouraged to file requests, and there are several individual projects based on that.
Resources needed	In 2019, NOK 60 million from national/regional funding, nearly the same amount from the municipalities were allocated. There are also contributions from suppliers. In Trøndelag County Council, two people are employed in the projects. And there are resources to involve controllers and legal advisers when needed.
Timescale (start/end date)	January 2008 – December 2025 (planned)
Evidence of success (results achieved)	In 2019, 3000 new fibre cable-based accesses to households and 15 new mobile cell towers for mobile networks (4G/5G and fixed radio) were built. Businesses in rural areas were given special priority. The success of getting these projects can be found in the cooperation-methodology model County Council/ municipalities/ telecom companies.
Potential for learning or transfer	Over a period of 15 years, Trøndelag has developed a model for cooperation that is seen as unique in the country. The model is based on the fact that there must be a fundamental trust and credibility between the actors, so that all work well together to achieve the goals. Openness, good communication and information are also key elements.
Website	https://www.interregeurope.eu/policylearning/good-practices/item/3836/development-of-digital-networks-fixed-and-mobile-in-non-commercially-viable-areas/

8.1.3. Other good practice cases

In addition to the examples mentioned above in Norway, it would be worth considering the transferability of the following cases from other Nordic countries:

https://digitaldenmark.dk/
https://www.business-sweden.com/
https://www.stafraent.is/
https://www.businessfinland.fi/

8.2. Suggested good practices in Portugal

8.2.1. Industry 4.0 programme

The "Industry 4.0" programme, integrated in the Portuguese Strategy for the Digitalisation of the Economy led by the Ministry of Economy and Digital Transition, aims at creating favourable conditions for the development of national industry and services in the new paradigm of digital economy.

The first phase of the programme, launched in 2017, encompassed three axes of action: 1) accelerate i4.0 in the business community through the adoption of i4.0 solutions and development of digital skills; 2) empower technology providers as i4.0 players, capitalising on the existing scientific and technological ecosystem, and fostering the development of i4.0 start-ups; 3) make Portugal an attractive hub for i4.0 investment. Phase I attracted mainly a leading group of enterprises in i4.0, well as companies from the mid-tier group that already had some experience in this field.

The second phase of the programme has been implemented since 2019 in order to reinforce and accelerate business transformational impact, aiming this time at reaching and influencing companies that have a i4.0 lower level of maturity. The programme is based on key three pillars:

- Generalise i4.0: stimulate the sharing of i4.0 knowledge, experiences and benefits among SMEs, technology providers and RTD institutions.
- Enabling i4.0: develop human capital skills towards the i4.0 reality through 1) academic offer of training on digital skills, and 2) workforce reskilling through the collaboration between companies and training entities.
- Assimilate i4.0: promote experimentation and adoption of i4.0 solutions and technologies by facilitating SMEs access to the necessary technical skills and funding.

TABLE 6. GOOD PRACTICE: "INDUSTRY 4.0 PROGRAMME"

Good practice general information	
Title of the good practice	**Industry 4.0 programme**
Category of the good practice	*Please choose one of the categories:* ■ *Awareness rising and collaboration;* ■ *Empowering tools;* □ *Sustainability instruments;* □ *Enabling environment;* □ *Other*
Organisation in charge of the good practice	Ministry of Economy and Digital Transition IAPMEI - Agency for Competitiveness and Innovation
Description	
Short summary of the practice	Through the Industry 4.0 initiative it is intended to generate favourable conditions for the development of SMEs in industry and services under the new paradigm of digital economy, through a set of measures based on three axes of action: -Accelerate the adoption of i4.0 by the business community

	through the "Capacitar i4.0" and "InCoDe.2030" iniatives, which aimed to qualify firms' workforce, demonstrate on a large scale i4.0 solutions such as technologies, processes and methodologies, stimulate inter-company activities for the development of digital skills, and create free and open access i4.0 training plans (e.g., (via e-learning). -Promote technological suppliers as i4.0 players. Capitalise on existing scientific and technological ecosystem, and creating a favourable context for the development of i4.0 start-ups that can have an impact on the digitalisation of the economy. -Making Portugal an attractive hub for investment in i4.0. Communicate Portugal as a hub for sharing experiences and know-how to attract resources, and creating favourable conditions (legal and tax) for investment in Industry 4.0. The Industry 4.0 programme is currently under Phase II, which includes a set of accelerating measures based on above mentioned three axes: Generalise, Empower and Assimilate.
Resources needed	I4.0 has a budget of €2.26 billion through the ERDF national operational programme (PT 2020) encompassing the following instruments: 1) i4.0 voucher (global allocation of €12M, will cover 1,500 companies, each voucher has a unit value of €7,5k); 2) SMEs Qualification; 3) Productive Innovation; 4) Research and Technological Development.
Timescale (start/end date)	2017 – ongoing
Evidence of success (results achieved)	Under phase 1, 95% of the 64 measures defined in the i4.0 programme had already been implemented, covering more than 24,000 companies and 550,000 people. Under phase 2, it is intended to engage 20,000 companies, train about 200,000 workers, and fund at least 350 business transformational projects.
Potential for learning or transfer	Although it involves a large budget, the programme is likely to be transferable to other countries willing to focus digital transformation endeavours under the same umbrella in order to achieve significant critical mass.
Website	https://www.interregeurope.eu/policylearning/good-practices/item/3925/programmea-portugal-industria-4-0/

8.2.2. Industry 4.0 referential

The "Industry 4.0 referential" initiative supports the managing authorities of national and regional digital transformation programmes to evaluate whether projects applying for funding include relevant Industry 4.0 investments.

TABLE 7. GOOD PRACTICE: "INDUSTRY 4.0 REFERENTIAL"

Good practice general information	
Title of the good practice	**Industry 4.0 Referential**
Category of the good practice	*Please choose one of the categories:* ☐ *Awareness rising and collaboration;*

	■ *Empowering tools;* □ *Sustainability instruments;* □ *Enabling environment;* □ *Other*
Organisation in charge of the good practice	National Operational Programmefor Competitiveness and Internationalisation (COMPETE 2020) - Managing Authority, Portugal
Description	
Short summary of the practice	Referentials for the assessment of Industry 4.0 relevance in the context of investment projects, regarding particularly project selection (e.g., increase or decrease rating, incentive amounts etc) are very useful for the managing authorities in charge of digitalisation support programmes. Such referentials are essential to evaluate whether projects include (or not) relevant investments in i4.0. As this is a relatively new concept for SMEs and for those who evaluate the applications, the Portuguese managing authority of the ERDF national operational programmefor competitiveness and internationalisation felt that some guidance was needed. In the application, SMEs explain what technologies already they use and how they will invest through the project in three main areas: **1)** Information systems (digital infrastructure, artificial intelligence and predictive algorithms, data analysis, cloud computing, cybersecurity); **2)** Connectivity between systems, equipment, products and people (sensors and IoT, remote operation, increased reality, intelligent machines); **3)** Advanced production systems (connected products and materials, operations, additive production, autonomous robots). Adjustments were made as some experience was acquired, being the most relevant the demand of a direct link to the expenses, which in turn helps SMEs to explain and the evaluator better understand the required investments. With the application, a given project is evaluated as a whole and specifically assessed regarding relevant investments in Industry 4.0. If positively assessed, the project would have higher score and, in some cases, also a higher incentive tax. This methodology helps SMEs to focus more on Industry 4.0, guides them to fill in the application, and allows the evaluators to have the relevant information structured and linked to the investments.
Resources needed	Human resources from the COMPETE 2020 managing authority, with the support from COTEC Portugal - Business Association for Innovation, and IAPMEI - National Agency for Competitiveness and Innovation
Timescale (start/end date)	2017 – ongoing
Evidence of success (results achieved)	This methodology was already used in 13 calls for proposals encompassing more than 5,800 applications since 2017 and has allowed SMEs to better realise what are the more relevant goals in i4.0, as well as evaluators to understand whether applicants are taking the appropriate steps for i4.0. All this information allows also to have strong data on the relevance of i4.0 investments, type of companies, types of technologies, etc.

Potential for learning or transfer	It's a simple methodology that starts with the identification of relevant technologies in Industry 4.0, making it easy to adapt to any country, region, sector, or programme. The referential can be used under specific support for i4.0 investments only, or to identify i4.0 relevance in innovation, qualification, or training investment projects. With the submission of applications and their evaluations, huge amount of data can be extracted about the type of SMEs (e.g., dimension, sector, region) and how they they are making their way to i4.0. (e.g., technologies, investments, etc.).
Website	https://www.interregeurope.eu/policylearning/good-practices/item/5347/industry-4-0-referential/

8.2.3. Support the competitiveness and innovation of small companies in low-density territories (SI2E programme)

The main objective of the SI2E programme is to promote entrepreneurship, competitiveness and innovation of micro and small companies located in low-density territories.

This instrument is implemented in Portugal in the framework of the different regional operational programmes, through the ERDF and ESF funding, and managed by Intermunicipal Communities and Local Action Groups.

Aiming at supporting small businesses in low-density areas and/or with high unemployment, SI2E allows the application of European Union funding for the launch of start-up companies or the expansion/modernisation of micro and small enterprises, including innovation, digitalisation, marketing, internationalisation etc.

The main beneficiaries must only be micro and small enterprises, including those engaged in craft activities or other activities on an individual or family basis, as well as local associations that regularly carry out an economic activity.

The measure supports beneficiary companies up to €235K in investments that include machinery and equipment, ICT equipment, software (including bespoke software and software as a service), consulting and studies, brands, participation in international fairs etc.

The Portuguese partner in the DigiBEST project - Intermunicipal Community of Tâmega and Sousa – is one of the entities in charge of implementing this instrument in Portugal.

Further information:
SI2E - Job and Entrepreneurship Incentive System

8.2.4. Alliance for Equality in Information and Communication Technologies (ICT)

The Portuguse Alliance for Gender Equality in ICT, whose main mission is to attract more women to careers in technology and engineering, reinforces the already existing network established under the "Engineers for a Day" programme.

"Engineers for a Day" started in 2017 and had already five editions, being integrated in the National Strategy for Equality and Non-Discrimination, and in the Digital Transition Action Plan. Since its creation, the programme involved about 10,500 young female students in more than 460 practical laboratory activities and mentoring sessions, promoting the option for engineering and technologies among non-higher education female students. It is coordinated by the Commission for Citizenship and Gender Equality (CIG) in conjunction with the Portuguese Association for Diversity and Inclusion (APPDI), Instituto Superior Técnico (largest engineering higher education institution in the country) and the Portuguese Association of Engineers.

The creation of the Alliance for Gender Equality in ICT represents therefore a formal commitment amongst all entities participating in the "Engineers for a Day" programme, serving as a relevant aggregator around this theme and addressing the need for gender equality to be transversal to the entire digital transition. The Alliance is coordinated by the Commission for Citizenship and Gender Equality (CIG) in articulation with the Portuguese Association for Diversity and Inclusion (APPDI) and other partner entities, including companies, universities, and municipalities.

The objective of the Alliance for Gender Equality is hence to promote women's digital inclusion and their participation in engineering and technology, furthering cooperation and dissemination actions amongst the partner entities.

In the framework of the Alliance, the signatory partners also reinforce their commitment to cooperate with each other in an active way to promote the more general objective of combating sexual segregation in educational choices and professions. The Alliance is also to promote the development of initiatives that contribute to action and reflection on the challenges and potential of emerging technological areas, such as artificial intelligence, in terms of equality between women and men.

Further information:

Alliance for Gender Equality in ICT:
https://www.portugal.gov.pt/pt/gc22/comunicacao/noticia?i=portugal-formaliza-alianca-para-a-igualdade-nas-tecnologias-de-informacao-e-comunicacao [PT]

Engineers for a Day:
https://www.engenheirasporumdia.pt/ [PT]

Commission for Citizenship and Gender Equality (CIG):
https://www.cig.gov.pt/

9 Findings and conclusions

Austria aims to become a European leader in innovation and digitalisation. According to the European Innovation Scoreboard 2021, Austria ranks 8th among the 27 EU Member States and is included in the "strong innovators" countries that perform above the EU average (just below the "innovation leaders" whose performance is well above the EU average). Regarding digitalisation, the country ranks 10th in the 2021 edition of the Digital Economy and Society Index (DESI).

Austria has had a strong economic performance in recent decades and has high standards of quality of life. The country has a strong export-oriented manufacturing sector and is home to industries that are world market leaders and innovators in various niches, having the 3rd highest industrial output per capita, 31% of the GDP based on manufacturing, and about 45% of all jobs directly or indirectly connected or dependent on the industrial sector. Subsidiaries of multinational enterprises found Austria an attractive location for business and research-intensive activities.

It is also a well performing country in terms of industry 4.0 technologies, both with regard to their overall adoption in the manufacturing sector and with regard to innovation and technology development. Especially in the machinery and equipment sectors the use of digital technologies is high.

Regarding the adoption of certain digital technologies such as cloud computing, e-invoicing or big data, the county's performance is lower. The ICT producing sector measured in value added to GDP is smaller compared to the leading innovation countries in ICT. Furthermore, whereas the overall digitalisation performance is marked by good performance in the manufacturing industries, weaknesses are identified in the service sector concerning the take-up of digital technologies.

Most SMEs – including micro-enterprises – are aware of digitalisation, although, as seen in the DigiBEST report on Austria, about half of them lack a companywide digitalisation strategy. Digital transformation projects in small and micro-enterprises are often closely related to broader investment projects. The most important challenges of SMEs seem not be found on the supply side (availability of solutions) but rather within the enterprises, related to in-house organisation, skills and know-how. This suggests that successful digitalisation projects in SMEs require organisational and technological know-how and often also a reorganisation of business processes. Financial factors are also relevant for larger digitalisation projects (investment projects) especially for small, micro and young enterprises.

There is a strong policy commitment to innovation and digitalisation, although digital policies would benefit from strengthened governance in policy making and implementation, including greater coordination among the relevant entities and higher harmonisation of instruments. Particularly for SMEs, the current policy landscape may seem rather complex, making it difficult to take full advantage of the support available to them. The establishment of a more systematic monitoring and evaluation framework of Austria's digitalisation progress seems to be necessary to better assess the efficiency of the measures, and more effectively address emerging needs. Regular international benchmarking exercises would allow a better understanding of how the country compares to digitalisation leaders.

Regarding human capital, the number of ICT specialists and graduates increased in the last years, but the lack of qualified staff to address the high demand in the labour market persists and can slow down the digitalisation of businesses. SMEs have difficulties in recruiting ICT specialists at every level. A stronger focus on ICT in all cycles of education, as well as training and re-training of employees and unemployed people is needed. Moreover, changing the criteria for the entry of skilled immigrants into the country would be beneficial to the economy.

Despite the high investment made in the last few years, deficits in broadband and fibre-based networks persist. Addressing this issue should remain a priority, as especially fixed-broadband take-up rates are lagging behind comparing to digital leading countries. Businesses, and particularly SMEs, need faster Internet connections for their digital transformation, and urban-rural divide in ultra-fast Internet access remains undiminished. On the other hand, Austria performs very well on mobile coverage, with 50% of populated areas already covered by 5G services.

The following paragraphs summarise the main findings and conclusions from the desk research and field research (per review event) and are organised around a number of topics considered critical to the successful digital transformation of Austrian SMEs:

Policy framework. The country has launched a large number of strategies for numerous aspects related to digitalisation, as well as various instruments to put them into practice (although some of them not addressing digitalisation explicitly). While efforts have been made in recent years to harmonise digital policies and measures under fewer government entities, the existing mix of instruments used at the federal level seems to be somewhat fragmented and complex, among measures delivered by different ministries, state agencies and other entities (e.g., Austrian Economic Chambers), not to mention public support available at regional and local levels. Such density of measures can make it difficult for small businesses to identify and use the support available to them. The creation of a Digitalisation Agency (DIA), which works closely together with the inter-ministerial task force of "Chief Digital Officers", seems to be useful with a view to harmonising digital policies, although it is somewhat surprising that it works outside the ministry that coordinates digitalisation.

Financial barriers to digitalisation. While aspects such as advice and training, cooperation and integration into value chains are of utmost importance for SMEs innovation, the lower financial capacity of these companies must be somehow addressed by public policies, especially when digital technologies, processes and business models will increasingly be a critical pillar for business competitiveness. Initiatives such as "SME Digital" and "Industry 4.0" already provide relevant support for enterprise digital transformation, but in general existing programmes require relatively high investments from beneficiary companies. No specific initiatives have been identified for small and micro-enterprises. Contrary to what happens in other European countries, where there are measures that benefit small businesses, particularly those based in rural areas (e.g., specific calls for proposals and provision of grants with higher co-funding rates), in Austria small and micro-enterprises appear to compete on an equal footing with larger enterprises.

Funding support instruments. Although there is evidence that high investments are being made, for example in digital fixed and mobile infrastructure, concrete programmes for digital transformation in industry (e.g., Industry 4.0 programme) seem to have relatively limited

budgets. Furthermore, the nature of the support provided suggests a focus on the manufacturing industry and on relatively high investments (perhaps with the exception of the SME Digital programme). Regarding companies' funding, in addition to non-reimbursable grants, the funding instruments rely considerably on soft loans which, although made on favourable terms to the borrowers, may not be the most appealing model for small businesses. The creation of a state venture capital fund to support business investments in digitalisation is being considered, which would be a positive measure to support the launch of start-ups in the digital field, and to leverage significant investments in existing companies.

Cooperation and networking. A certain lack of culture of cooperation among SMEs was perceived, either with other companies or with other organisations such as RTD and innovation centres. Few policy measures to change this reality have been found which could, for instance, strengthen supply chains diversity with the engagement of small enterprises and start-ups that could share data and information about processes or business activities, as well as multi-partner projects bringing together entities of the scientific and technological system, SMEs, large companies, business associations and ICT suppliers working around the development of new products, processes or markets.

Integration of digital technology. Like many other countries, Austria faces the challenge of supporting SMEs to invest more in digital solutions, including technologies, processes and business models. Comparing to the EU average, Austrian SMEs perform slightly better regarding basic level of digital intensity, online sales, and online sales across borders. However, the e-commerce turnover of SMEs is below the EU average. Looking at the entire business community (SMEs and large firms), the country is underperforming regarding the use of big data, cloud, and e-invoicing compared to the EU average. Significant efforts must therefore continue to be made towards the digital transformation of SMEs and companies in general, reinforcing the funding to the instruments that are in the first line of business support, disseminating digital technologies and their potential, publishing successful business cases, and bringing the most diverse stakeholders closer together for faster and more effective knowledge sharing.

Data sharing. No evidence was found that Austria has a strategy for sharing of data, apart from using GDPR or secondary data from research institutions. The government has a major role to play in facilitating data access to public sector data and facilitating data sharing within the private sector. Austrian enterprises, and especially SMEs, could be encouraged to share and re-use data among them to enhance business opportunities and improve internal efficiency. In order to foster the national data economy, measures could be implemented to further develop and raise awareness about the concept of B2B data sharing and its benefits, as well as to provide guidance to SMEs interested in sharing and re-using data among them. Promoting a culture of cooperation under value chains or innovation projects may also have a positive impact on the opportunities created in terms of data sharing through digital platforms.

Digital infrastructure. Despite very positive advances in recent years, the country remains below the EU average in terms of fixed VHCN (Very High-Capacity Networks) coverage and take-up. In particular, rural VHCN coverage remains very low, even when compared to the EU average. As high-quality fixed connections are a prerequisite for the digitalisation of the country, this is a critical aspect that must be given absolute priority by government authorities. This state of play represents a serious obstacle to the competitiveness of SMEs located in rural

and remote areas, as well as to the implementation of digital solutions in the activities of the primary sector, namely agriculture. On the other hand, Austria is at the forefront in the roll-out of 5G technology. The country enjoys a very high level of mobile coverage and up-take, and businesses may have been using mobile connection as a complement to or substitute for their fixed connection.

Cybersecurity. While not having a specific national strategy, there is evidence that cybersecurity has been included in a number of strategic frameworks and digitalisation support programmes. Considering that cybersecurity is crucial for small and medium-sized companies since increasingly business activities move online, more support for small businesses could be delivered in the future, namely eligibility of cybersecurity-related expenditures under all digitalisation support programmes, acquisition of specialised assistance and cybersecurity tools (e.g., through cybersecurity vouchers), establishment of networks of cybersecurity providers, training programmes, and collective projects on cybersecurity involving for instance RTD and innovation centres, ICT companies, SMEs and business associations. Bearing in mind the inspiring examples of the Cybersecurity Campus Graz (Styria) and the University of Applied Sciences at Hagenberg (Upper Austria), the country should invest in other initiatives that allow creating world-class research centres and innovation hubs in cybersecurity.

Digitally enabled forms of work. Teleworking has been encouraged by Austrian public authorities during the COVID-19 pandemic. The launch of "Digital Team Austria", through which a group of ICT companies supported SMEs in the implementation of teleworking, seems to be a good practice that could be considered by any other country. However, there is no clear evidence that other relevant measures have been launched to support SMEs in these endeavours towards new digitally forms of work (e.g., hybrid work, dislocated working etc), such as expert advice for development of teleworking plans, dissemination of key information and good practices, assistance with software and hardware, cybersecurity tools, training, etc. Furthermore, the uneven distribution of high-quality digital infrastructure across Austria may be hampering the adoption of remote work by SMEs, especially in rural areas.

Digital skills. Overall, Austria performs above the EU average in terms of digital skills, including basic digital skills, basic software skills, ICT specialists, and ICT graduates. According to the DESI 2021 report, the country is only slightly below the EU in the indicator on enterprises providing ICT training. However, clear evidence was collected during the desk research and field research phases that existing ICT skills in the working population are insufficient to meet the needs of the Austrian economy and society, including the shortage of ICT specialists and trainers. The same report also points out that about 74% of enterprises that recruited or tried to recruit personnel reported that vacancies for jobs requiring ICT specialist skills were hard to fill. The identified measures that are underway in the country seem to go in the right direction but need to be reinforced in terms of volume of activities, number of people and organisations involved, and level of results achieved. This includes intensified education in STEM (and particularly in ICT); more technical and professional education, and more lifelong learning in ICT; attracting ICT specialists from other countries; and strengthening the development of digital skills of the population at large.

ICT education and gender equality. The information collected in the desk and field research suggests that the number of ICT students in the Austrian education system is relatively low, and among those there is a minority female presence. Such a shortage has a negative impact

especially on SMEs, due to their lower capacity to attract digital expertise from the labour market. The Austrian authorities are therefore challenged to reinforce the measures being taken to foster teaching in STEM areas from the first cycle of studies to higher education, increase the capacity of universities to provide more ICT-related courses, carry out new training actions to reskill and qualify both employed and unemployed people, and attract ICT scientific and technical talent from abroad. Moreover, barriers preventing women from accessing digital technologies and professions must be removed through cross-cutting policies and strategies in the digital area (as well as in other areas), which may involve for instance increasing digital projects with female participation, awarding prizes to digital initiatives that promote female participation, disseminating best practices in the media, valuing female participation in ICT public procurement processes, reinforcing lifelong training, and promoting female digital entrepreneurship, among others.

Digitalisation of the agri-food sector. It was discussed at the peer review online event how digital technologies can contribute to making the agri-food value chain more sustainable and efficient, namely with regard to circular economy, food waste and loss, shortening logistical supply chains, packaging and labelling, transparency, limits imposed by seasonality and regionality, new forms of organising the value chain, promoting direct producer-consumer interaction etc. As general measures, it is recommended that:

- be better identified where and what causes the waste and losses that occur along the supply chain, namely in the phases of agricultural production, manufacturing, retail, catering/hospitality sector and final consumer;
- technologies such as the Internet of Things (IoT), artificial intelligence (AI), “Radio Frequency Identification” (RFID), robotisation and automation, “machine learning”, “big data analytics” and “block chain technology (BCT)” are applied in the sector, among others;
- that these technologies be applied to a large number of processes in the agri-food sector such as precision agriculture, smart packaging and labelling, transport, product traceability and awareness campaigns against waste;
- more training in digital skills is ensured for workers and entrepreneurs throughout the value chain;
- there is more research, technological and development (RTD) activities to better study the sector and obtain more accurate data, bringing together the academic and business communities;
- strengthen fixed and mobile infrastructures for high Internet connectivity, especially in rural areas.

Evaluation of digitalisation performance. It was concluded that the country should make more efforts to better assess the results of the implemented initiatives at national level regarding business digital transformation with a two-fold objective: on the one hand, to fully understand the short and long-term effects – including outputs, outcomes and impact – that the programmes are unleashing on beneficiary companies and the economy at large, making the necessary changes in the future; and on the other hand, to demonstrate to participating companies and the business community in general that the instruments at their disposal can be important drivers for their innovation and competitiveness. Such evaluation exercises would also make it possible to identify the best performing projects that could serve as showcases to be disseminated among the business community. Additionally, regular

international benchmarking exercises could be carried out, comparing Austria's performance to digital leaders, and perhaps exchanging experiences and best practices with them.

10 Recommendations for the Hosting Partner

Based on our discussion in the previous chapters, we recommend:

Recommendations for the Austrian Government

Strengthened governance. The current policy landscape may seem rather complex for SMEs, making it difficult to take full advantage of the support available to them. Digital policies would benefit from strengthened governance in policy making and implementation, including greater coordination among the relevant entities and higher harmonisation of instruments.

Support for small and micro-enterprises. Contrary to what happens in other European countries, where there are measures that benefit small businesses, particularly those based in rural areas, in Austria small and micro-enterprises appear to compete on an equal footing with larger enterprises. Specific initiatives could be tailored to the needs of small and micro-enterprises, especially if based in remote areas, including for example specific calls for proposals, provision of grants with higher co-funding rates, advice, training, and assistance in integration into value chains.

Evaluation of digitalisation progress. The government could consider the establishment of a more systematic monitoring and evaluation framework of Austria's digitalisation progress to better assess the efficiency of the measures, and more effectively address emerging needs. Regular international benchmarking exercises could be performed to allow a better understanding of how the country compares to digitalisation leaders.

Recommendations for AWS

As mentioned in chapter 7 ***a model of open innovation***, which has become an increasingly popular solution to address the systematic increase of market competitiveness, cooperation is an important success factor. It increases the ability of creativity, reduces time and diffusion of new solutions, and allows companies to better compete in rapidly changing markets. For innovative SMEs, it may lead to the development of both the company and new products.

Instead of one-to-one projects in which an SME works with a single innovation service provider, micro and small companies would benefit from working with a wide range of partners for a faster diffusion of knowledge, technologies, and processes ***in local innovation ecosystems.*** More efforts could be done to foster multilateral projects bringing together a variety of actors (e.g., RTD and innovation centres, business associations, clusters, business incubators, SMEs, ICT firms) to gather the necessary knowledge, experience, and resources to respond to specific digitalisation needs of small businesses.

The incentive plan should also focus on projects which ***support sustainable industries***, with social or environmental added value, to favour these projects in front of more general industry-neutral projects.

The funding should encourage ***sharing of data*** between companies for maximising value creation. The sharing of data should be based upon standards APIs and within the framework of EUs European Interoperability Framework (EIF).

The criteria for funding should ***encourage female participation*** in publicly funded digitalisation projects, for example by increasing the evaluation score and/or increasing the public incentive rate to projects with significant female involvement, and to award prizes to projects that represent good practices regarding female participation in digital transformation and disseminate them in the media.

Co-operation between companies in a value chain would also able better ***service for cybersecurity*** and facilitate advice, support, and training actions (e.g., through business associations) etc. This would configure relevant support for business competitiveness.

Value chain collaboration

SMEs must understand their own value creation potential. This means that one must think of value chains and industries in which SMEs are included. The most important motivation for SMEs is to see their own business opportunities in context and collaboration with other companies, including large companies, and the public sector. Values can only arise when the actors have a good understanding of the underlying challenges to be solved, and when they are able to formulate a good strategy for how the value potential can be redeemed.

Data sharing/open innovation

The European Commission assumes in its data strategy (2020) that the value of the data economy in the EU27 will increase from 301 billion euros in 2018 to 829 billion euros by 2025.

The main idea is that data (both private and public data) can be shared and used in a way that provides value for business, the public sector and society, according to the following principles:

- Data should be opened when they can and screened when they need to.
- Data should be accessible, retrievable, usable, and comparable with other data.
- Data must be shared and used in a way that provides value for business, the public sector and society.
- Data shall be shared and used in such a way that fundamental rights and freedoms are respected, and fundamental societal values shall be preserved.

Digital competence/skills

Surveys show that SMEs have greater digital competence than themselves believe. However, this must be triggered through practical project collaboration arenas and the establishment of experience arenas where competence exchange from various projects is shared with actors outside the value chain.

This will also remedy another fundamental problem mentioned in the Regional Analysis and during PR events, namely lack of trust between the actors. Companies are afraid that data sharing will weaken their own position in the market. This can be solved by developing secure data sharing architecture and good agreements for data sharing, as is done through the Auroral project.

In such contexts, it will also be possible to reduce the fear that legal obstacles are an insurmountable obstacle to cooperation. Many SMEs experience a lack of room for maneuver because they are afraid of breaking difficult and confusing legislation. It is therefore proposed that a guidance body be established on how the regulations (especially the GDPR) can be understood and practiced.

Cybersecurity

The analysis focuses on the use of security in the form of firewalls and two-authentication login. But by establishing data sharing in continuous value chains, the vulnerability is greater. This presupposes that a larger security plan is created with a better overview of how the data is used in other services, with private and public consumers.

The role of AWS

Our most important recommendation is that **it should be a strategic ambition for AWS to link the competence building closely to the funding operations.**

The role of AWS will then be facilitation of networking, sharing experiences from different projects, encourage implementation of new/improved production processes and systems, and new business models linked to its fundings criteria.

We therefore suggest that AWS takes a more holistic perspective on the problem:

A holistic approach

The approach should aim to establish networks between different business clusters to be able to exchange experiences from collaboration on digitalisation in value chains in combination with partial financing of such projects to SME companies.

One element would be the establishment of Digital Innovation Hub (EDIH) centres, which will assist SMEs and the public sector with a digital competence boost. The EDIH centres are one of the instruments in the EU's new Digital Europe Programme, which also Austria and AWS is about to join.

Experience from Norway

A similar approach has been initiated in Norway under the auspices of Innovation Norway - an organisation that has many similarities with AWS as it works with financing, but also provides competence building services[58].

The project is called the *«Digital transformation competence to SMEs from industry cluster companies»* and during the pilot period has had funding from the Ministry of Trade, Industry and Fisheries, and the Ministry of Local Government and Regional Development. In 2020, NOK 18 million was allocated in grants to companies and networks, and for the entire pilot period 2018-2020, NOK 31 million.

[58] innovasjonnorge.no

An evaluation has shown that such an exchange of experience not only contributes to the transfer of technological competence, but also how to conduct innovation work, further develop their business model and companies becoming more customer oriented. The networks are considered as a sparring partner who sees the company from the outside and can draw parallels to experiences that other companies have made.

The programme is particularly focused on value chain collaboration on environmental technology and bioeconomy projects, as well as regional district funds.

The scheme includes several actors with different roles and with a relatively complex and diversified incentive and financing structure. One could imagine that this presents challenges, but the experience is perceived as providing concrete learning, the criteria for participation are clear cut, and the case processing is fast.

This is a scheme that differs from ordinary advisory services adapted to small and medium-sized companies that "*want and need to adapt but can not or do not know how*". The scheme covers companies that have not themselves been able to invest in digital skills development.

The companies experience that they have gained access to updated knowledge about driving forces, technologies and opportunities related to digitalisation, and better insight into the companies' own digital maturity. It has also led to concrete behavioral changes in the sense that it challenges both the management style and the company's business model.

Annexes

- Agenda of PR event
- Lists of participants and screenshots (in case of online meetings)
- Photos taken during the PR event
- Video/audio recordings
- Presentations shown by the PR team during the workshop at the end of the PR event.

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