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Fields of action and measures

18  Education
20  Infrastructure
24  Research and innovation
26  Business
28  Work and jobs
30  Health, care and social affairs
31  Environment, energy, agriculture and climate protection
32  Mobility and transport
34  Media, civic courage and culture
36  Integration and inclusion
37  Security, protection and trust
39  Politics and administration
in Austria

The University of Vienna is the first node in Austria to be connected to the Internet
A room with 18 PC workstations and 2 PCs is set up in the New Institute Building (NIG) at the University of Vienna

The first text message is sent

The commercial phase of the Internet begins

The first smartphone ("Simon") goes on sale
Amazon sells the first book on its website

Internet packages are available for business and private customers

Help.gv.at and RIS (Legal Information System) go online
Online payment system PayPal is founded

Google is born

The first smartphone ("Simon") goes on sale
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Help.gv.at and RIS (Legal Information System) go online
Online payment system PayPal is founded

Google is born
The Bitcoin payment system (virtual money, cryptocurrency) is first described in a white paper.

The social network Facebook is launched.

The Data Protection Act comes into force.

Central Register of Residents goes online.

The eCommerce Act comes into force.

Launch of FinanzOnline.

Launch of YouTube.

Launch of Twitter.

All citizens covered by social insurance receive an e-card.

The first Wi-Fi hotspots become available at parts of the University of Vienna.

82% of all businesses use online services offered by public offices and authorities.

Over 50% of Austrians are online (use the Internet).

Electronic communication with public authorities is regulated in the eGovernment Act.

The Citizen Card (official identity document for electronic administrative procedures) becomes available.

Austria wins the United Nations Public Service Award for eJustice and RIS.bka.gv.at.

Wikipedia, the first freely licensed encyclopaedia, is launched.

Free instant messaging service Skype is introduced.
Digitization milestones

- Introduction of the mobile phone signature
- Launch of the Business Service Portal (USP)
- First test of a self-driving vehicle on public roads
- Launch of WhatsApp
- Google launches the Google Art Project, which enables users to take a virtual tour of major museums
- Over 80% of Austrians use the Internet
- Austria wins the United Nations Public Service Award for Open Government Data
- The first generation of 3D printers finds its way into private households
- The first 3D-printed house is built in Dubai
- Over 80% of Austrians use the Internet
- eInvoices can be submitted to the Federal Government
- 82% of all households have an Internet connection
- The Recipes Information System Austria (GISA) is launched
- ELGA, the electronic health record scheme, is launched in Vienna and Styria
- The Digital Roadmap for Austria is created

Common guiding principles

Guiding the way to the digital future

Over 100 experts from all ministries, the Länder (federal provinces), the Association of Cities and Towns, the Association of Municipalities, unions and employers’ associations, and other organizations were involved in creating the Digital Roadmap. Subsequently, hundreds of citizens took part in an online consultation process. The resulting consultation paper forms the basis for the present Digital Roadmap Austria. The Roadmap provides an overview of the current challenges and of existing and planned measures and activities. These are based on twelve guiding principles for shaping the digitization process in Austria.

On this basis, the Digital Roadmap presents around 150 specific measures in twelve fields of action in order to ensure that Austria can optimally exploit the potential of digitization. The Roadmap brings together the activities of all government departments in a joint Federal Government strategy paper for the first time. With digitization changing our world at a rapid pace, the Digital Roadmap is also in a constant state of flux. It is a dynamic strategy paper that is continuously adapted to the latest developments in digitization, thus reliably guiding us all towards the digital future.
The 12 guiding principles of the Digital Roadmap:

1. Every person in Austria should be able to take part in digitization. We want to bridge the digital divide.
2. Digital education should begin as early as possible. No child should leave school without digital skills.
3. Basic and human rights apply in the digital world too. We want to strengthen digital individual responsibility and civic courage.
4. Internet access via a well-developed and affordable digital infrastructure is essential to both citizens and businesses in Austria and should be guaranteed.
5. We want to create more and better jobs through digitization and to educate and train people accordingly.
6. Digitization leads to new business and working models, for which we want to create a modern legal framework.
7. Our aim is for Austria to be one of the world’s leading digital business locations. To this end, we must provide support to businesses for their digital transformation.
8. Science and research should be helped to develop new digital opportunities to ensure that Austria becomes an innovation leader in the future.
9. We will play an active role in shaping the European Digital Single Market.
10. We consider security in the digital sphere to be the joint responsibility of public institutions, business and citizens. Austria should continue to have high data protection standards.
11. We want to ensure and encourage a respectful online discussion culture and high-quality journalism in the digital world too.
12. The public sector also sees itself as a driving force for innovation in Austria. Citizens and businesses have the right to convenient, easy and accessible electronic communication with public administration.
History has shown that technological change can be a powerful force for positive change processes in society. New technologies have always presented people with challenges, but have also expanded their possibilities, made their lives easier and made progress possible. The Neolithic and industrial revolutions were the results of economic and social change made possible by technology, just as the invention of printing allowed science and world views to advance.

Digitization is part of everyday life

Digitization opens up a new chapter in our development. Digital infrastructures, products and services are changing business, science, society and politics. The technological changes associated with digitization currently include the use of information and communication technology in the manufacturing sector (Industry 4.0), the use of big data and artificial intelligence (AI), and the Internet of Things applications that are entering our everyday lives. Digitization is also changing the way in which we communicate, our social relationships, opportunities for us to participate and our working environment.

Digitization is not a development that we only will have to face in the future. It is neither a technological niche issue nor a business issue that is solely relevant to major corporations. It is already part of our everyday lives. It affects us all, e.g. with 92% of Austrian mobile phone users owning a smartphone, 6% more than in 2015. This means that almost everyone is constantly carrying a key to the digital world.

New opportunities

The potential of digitization is enormous and wide-ranging: it can open up new opportunities for growth, work and prosperity, improve health care, be a driving force behind the turnaround in energy policy, facilitate equal opportunities and social participation, support government transparency and help to enhance our democracy.

New challenges

At the same time, the digital revolution is confronting us with new challenges: the fear of constant monitoring and restrictions to our freedom are issues that must concern us just as much as protection from cybercrime and the ethics of artificial intelligence.

One intensively debated topic is the fear that digitization is replacing human labour on a massive scale. This fear has always accompanied any kind of technological change. It is clear that technological developments are changing work processes and the work itself. First, activities are being replaced; second, new areas of activity that do not currently exist will constantly emerge. Modern working conditions, social security and focused training measures for employees are important factors for leveraging the potential of digitization for new high-quality jobs.

Digital participation

Digitization does not just mean having access to new technologies, but participating in the opportunities offered by a modern society. Digital applications are having an ever increasing impact on knowledge, the world of work and freedom. Everyone in Austria should be able to benefit from
the opportunities of the digital world, regardless of origin, gender, age or social class. By ensuring that everyone can participate from a very early age, digital poverty can be prevented and a significant contribution made to combating poverty in future.

Digitization needs to be shaped

Digitization does not happen automatically. It is not a development that can only be marvelled at or simply awaited. To enable us to take advantage of the positive effects of digitization and avoid critical effects of this transformation process, appropriate political goals and priorities need to be set. Digitization needs to be shaped proactively in the interests and for the benefit of everyone. An obstructive approach or defensive behaviour towards digital change would only keep us on the international sidelines. The future cannot be stopped.

More innovation through digitization

Digitization plays a major role in the development of our innovative strength. In the face of international competition, innovation is one of the most important insurance policies for the future of Europe and of Austria. The ambitious goal of the Austrian Federal Government to make our country an innovation leader in Europe is becoming increasingly important in light of digitization. Digitization offers key technologies for the development of economic and social innovations. Only as a competitive innovation leader can Austria maintain and develop its economic and social model and ensure equal opportunities and social security through innovative and efficient enterprises and high-quality jobs.

The foundations of digitization

When shaping digitization in a positive way, key political tasks include the issues of data protection and cybersecurity, a modern legal framework for new business models, and the fair structuring of working conditions. Three areas form the essential foundation for successful digitization: develop an education system that prepares students for digital opportunities, provide a first-class digital infrastructure, and develop research and innovation policies that specifically promote Austria’s strengths.

Digital opportunities through education

Digitization requires our education system to evolve rapidly. Routine tasks become less important in the modern working world, while the scope of the work becomes more complex. There is a growing need for specialists in the digital economy, while participating in society also requires digital skills. The education system needs to take account of these requirements at all levels. Using digital tools in the education system must become standard practice. Digital media literacy is becoming an integral part of basic education. Retraining people who are already in employment ensures their employability. Innovations in education must be accelerated and quickly incorporated into the regulatory system on a wide scale.

Digital infrastructure

The digital infrastructure is the nervous system of Austria as a digital nation. In order to make Austria’s digitization a success, an efficient nationwide infrastructure is needed. The development and deployment of digital applications, products, services and forms of work is dependent on powerful broadband Internet connections. Moreover, when it comes to securing livelihoods and providing for the future in order to increase social participation and equal opportunities, the digital infrastructure is an essential tool for the future development of Austria. With its target of increasing nationwide broadband speeds to at least 100 Mbit/s by 2020 and playing a leading role in 5G development, Austria is taking an important step to safeguard its position and ensure that it continues to have a society worth living in.
Strengthening research and innovation

Research and innovation frequently lay the foundations for successful digital products and services – and we are only at the start of this development. As a centre of research, Austria is already a global leader in a number of disciplines (e.g. quantum computing, life sciences, metallurgy and the automotive industry). These fields of expertise must be strategically developed and further strengthened in the context of digitization and digital production. At the same time, science and industry must intensively tackle critical areas of digitization, for instance with regard to safeguarding civil liberties and basic rights, the data ownership of citizens, the intelligent international regulation of technology and media companies, and the ethical implications of artificial intelligence.

Digitization as a question of attitudes and values

Managing the digitization process successfully is also a question of social attitudes and values. Digitization requires joined-up thinking and action from us all. Just because something is technically possible does not mean that it is socially desirable. We must continue to decide on these issues. Ultimately, even in the digital age people must always take responsibility for decision-making. Digitization therefore needs convincing visions and a clear regulatory and social policy framework to implement these visions.

Digital humanism and the democratization of knowledge

The democratization of knowledge, free communication and free access to information, open data, open innovation and open source are potentials for our digital society that strengthen growth, prosperity and opportunities for social participation and allow our society to develop in a positive way. Open and shared knowledge will contribute to more fact-based public discussions and deliberations, becoming an important element of a new kind of awareness-raising. Personal interaction and the discussion culture in the digital world require formal and informal rules, individual responsibility and civic courage.

Visions for Austria 2025

The aim is for our country to play a leading role in shaping digitization as an innovation leader. Only then can we ensure that everyone in Austria can benefit from the advantages of digitization.

• In 2025, entrepreneurs will be the driving force behind a digital economy that generates new success stories and growth for Austria as a business location through new value chains and business models. Austrian businesses – from small SMEs to big leading enterprises – have made a name for themselves on the international market with their digital products and services based on successful research and innovation. It is worth investing in new technologies in Austria.

• In 2025, employees will benefit from a high level of employment and high-quality jobs in the digital business and working world. Continuous and flexible professional development will safeguard individuals’ employability and job satisfaction. Thanks to a first-class broadband infrastructure that enables employees to work from anywhere, the whole country will benefit from a digital job revolution.

• In 2025, young people will benefit from an equal opportunities education and training system that prepares them for the opportunities and challenges of a digital world. A modern curriculum, innovative forms of teaching and digital learning platforms will ensure that educational institutions – from nurseries and schools to universities – impart values, knowledge and skills that support personal development and employability.

• In 2025, citizens will experience new mobility concepts that offer convenience and a high degree of safety through intensive linking of private and public transport. Everyone will be able to find the quickest, cheapest and most environmentally friendly way of reaching their destination using a smartphone. Networked cars will warn us of potential dangers such as accidents, roadworks or black ice. Traffic jams will be a thing of the past.

• In 2025, the Internet will be a place of free knowledge and communication. Thanks to a culture of digital civic courage, an enlightened information culture and deep-rooted media literacy, hate posts and hoaxes will be a thing of the past. The positive aspects of unlimited opportunities to communicate, learn and develop globally will outweigh any negative aspects or fear campaigns.
• In 2025, the population will benefit from a reduction in the use of energy and resources. This will decrease personal energy costs and support the turnaround in energy policy to protect the climate. Smart technologies and applications will increase energy efficiency and reduce our dependence on energy from other countries.

• In 2025, patients will benefit from a health care system that makes first-class medical care and nursing available and affordable to all. The use of digital tools will support patients’ own health literacy, thus enabling them to enjoy better health. Personalized medicines and treatments will ensure that patients recover as quickly as possible.

• In 2025, citizens and businesses will benefit from an effective public administration system that is an efficient service provider, is itself an innovator and also supports innovation drivers. Digital communication will dramatically reduce the administrative burden and time-consuming bureaucracy. Citizens will receive customized service from government institutions. The state will become the digital partner of the citizens. Digitization will also enable people to become more involved in active citizenship and democratic decision-making processes.

To allow these visions – which are given as examples – to become reality, Austria must focus its political efforts on shaping digitization and driving it forward with lighthouse projects. The Digital Roadmap provides the strategic framework for it to do so.

Strategy: Digital Roadmap

Digitization is a cross-cutting political issue. In many fields and at various levels (e.g. government departments, regional authorities, unions and employers’ associations, NGOs, business), strategies already exist that cover particular aspects of digitization and identify specific measures to be taken in order to support and manage the digital transformation. We now need a coordinated approach bringing together politics, administration, unions and employers’ associations, business, science and research and also involving civil society. The Federal Government’s Digital Roadmap is the foundation on which all further coordinated activities can be built.

“Our aim is to play an active role in shaping digital progress for citizens, businesses and the whole of society. Austria must remain economically successful and everyone should be able to share in this prosperity. Education, research and innovation combined with an efficient digital infrastructure are the prerequisites for Austria’s path into the digital age. We have no time to lose. Let’s get started together!”

Mag.a Muna Duzdar,
State Secretary in the Federal Chancellery

Dr. Harald Mahrer,
State Secretary in the Federal Ministry of Science, Research and Economy
Scenario 2025: what will be possible?

Prospects for the digital future – and how they will benefit us

5G

The fifth generation of the mobile telecommunications standard is of major importance for mobile use of the Internet in future. Data rates of up to 10 GBit/s, low latency and a high density of connected end devices will enable a wide range of new business models and applications to be developed and will form the basis for the Internet of Things. Availability of the 5G infrastructure is therefore a high priority for the future development of Austria as a business location.

Increasing data transfer rates in mobile communications

<table>
<thead>
<tr>
<th>5G</th>
<th>10,000 Mbit/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTE</td>
<td>150 Mbit/s</td>
</tr>
<tr>
<td>UMTS 3G</td>
<td>40 Mbit/s</td>
</tr>
<tr>
<td>GSM 2G</td>
<td>0.24 Mbit/s</td>
</tr>
</tbody>
</table>

Internet of Things

In future, devices will make status information (e.g. current use, ageing, environmental conditions) available on the Internet and communicate with each other. Based on user requirements, devices can automatically provide support and make our lives easier. The industry benefits from improved maintenance of machinery since status information is automatically communicated. Devices on our bodies can communicate physical functions such as heartbeat and blood pressure and enable patients’ health conditions to be medically monitored from a distance.

The Internet of Things also provides the basis for autonomous driving, i.e. the ability of cars to drive themselves using sensors. This enables completely new mobility concepts, more convenience for road users due to the linking of private and public transport, and less pollution as a result of smart/optimized driving. If the potential of self-driving vehicles is fully harnessed, 90% of accidents will be able to be prevented by 2025. At the same time, there is likely to be a dramatic reduction in the number of vehicles on the roads. People born today may never drive a car themselves.

The Internet of Things is already reality: by 2020, there will be almost three times as many devices online as people.

Scenario 2025: what will be possible?
Big Data

The volume of data that we generate every day is no longer growing in a linear way, but exponentially. The amount of data currently available is too large and complex for it to be processed using conventional methods. The increased amount of information brings new opportunities, especially for the service sector and medicine, while the interlinking of large data sets enables completely new insights to be gained. New diagnostic methods make it possible to identify the genetic characteristics of diseases. This allows medicines and treatments to be developed that are precisely tailored to the patient’s personal disease profile. At the same time, the production and use of ever increasing volumes of data bring new challenges when it comes to safeguarding privacy and data ownership.

2.5 exabytes of data are generated every day. 90% of all data was created in the last two years.

Artificial intelligence (AI)

Computing power is growing at an exponential rate. The enormous volume of data created over the last few years forms the basis for the progress made in artificial intelligence. Machines are capable of processing both structured and unstructured data, with the latter including language or photos. As a result, we will in future be able to obtain an increasing amount of information from data that no one had previously been able to access. In addition, machines are capable of learning. Computers learn something new from every single scenario, which consistently reduces the potential for errors. A computer can diagnose a tumour within ten minutes. By 2030, neuroprosthetics could also be possible, with neural devices replacing motor, sensory or cognitive abilities that have been damaged due to injury or disease. This raises new ethical questions: What decisions can a computer be allowed to make? Who is liable if a machine makes the “wrong” decision?
Open knowledge

Access to information is considerably simplified by electronic data processing. Knowledge is no longer subject to the usual “laws of the market” since information is freely available in a variety of forms and can also be shared. The quality of knowledge is also improving thanks to the general public constantly developing their knowledge and skills. Online courses, simulators and personalized learning management systems allow people to learn and study at any time and in any place. Educational technologies (EduTech) such as serious games and learning apps help users to learn digital skills such as programming in an age-appropriate way. This “democratization of knowledge” plays a major role in promoting equal opportunities.

Augmented and virtual reality

Additional visual information or objects are overlaid onto the real world in real time, generally via glasses, creating an interactive virtual environment. The fields of application are almost limitless and range from tourism, leisure and education to the craft and construction industries. In future, for example, a building project could be viewed in a virtual space before construction has begun or instructions could be displayed directly on an object when it is being repaired or maintenance work is being carried out.

3D printing

3D printing could replace conventional manufacturing. It is already possible to build a house from parts produced entirely on a 3D printer, thus decentralizing production. Production and consumption are united in the same place, which has an enormous impact on sales, distribution and transport. The products produced could be precisely tailored to their intended use, e.g. knee joints can be cost-effectively produced for patients. Printing on a micro and nano scale enables tiny medical devices to be operated. Entire house or car parts can also be printed.
Smart materials (4D)

The next step involves objects and materials that automatically adapt to environmental conditions (e.g. clothes that become waterproof when it rains or materials that repair themselves if they become damaged). In future, new printing processes could also allow electrically functional ink to be printed on materials, creating active or passive devices such as resistors. This technology can facilitate cost-effective sophisticated electronic applications. Sensors for construction sites will in future be able to be used to monitor vibrations and the condition of the materials in buildings, bridges and infrastructure, making maintenance work significantly easier.

Intelligent energy networks (smart grids)

These allow direct communication between consumers and grid operators. Digital technologies can be used to control and manage supply networks centrally, ensuring that supply and demand are balanced in the distribution network – and making it easier to feed in renewable energy. By 2030, this will enable 6.3 billion megawatt hours of energy to be saved worldwide every year. The introduction of digital technologies allows customers to have better control over their consumption and the costs. Consequently, digitization will play a key role in increasing energy efficiency and encouraging a long-term switch to renewable energies.

Blockchain

A blockchain is a decentralized log that permanently and unalterably records defined transactions between two parties within a network. This eliminates the middleman since a blockchain is public and accessible to everyone worldwide. It does not belong to anyone and this transparency makes it virtually impossible for the blockchain to be manipulated. This technology can revolutionize the way in which we enter into contracts, trade on stock exchanges or carry out banking transactions. In future, for example, digital contracts could be made forgery-proof using blockchain technology.
Status quo: Austria’s digitization level

Austria in the European Commission’s Digital Economy & Society Index (DESI 2016)

Austria ranks 12th out of 28 in the digital index.

Scores are between 0 and 1: the higher the score, the better the country’s digital performance.
Austria in the five DESI dimensions

**Connectivity:** technological prerequisites for digitization, in particular level of development of the broadband infrastructure

1 14 28

**Human Capital:** digital competences and skills, from simple surfing to ICT specialists

1 8 28

**Use of Internet:** actual use of the Internet for online applications, communication and online shopping

1 25 28

**Integration of Digital Technology:** use of digital technology by businesses

1 10 28

**Digital Public Services:** availability and use of eGovernment services

1 6 28

Austria compared with the leading countries

The Digital Economy and Society Index (DESI) assesses the development of the digital economy and society in the EU countries using five dimensions and 30 indicators. Austria has average scores in three of the dimensions: Connectivity, Human Capital and Integration of Digital Technology. It scores above average in Digital Public Services, but is in penultimate place in Use of Internet.

In the World Economic Forum’s Networked Readiness Index (NRI), Austria is ranked 20th out of 143 countries. The index measures the degree of digitization on the basis of ten pillars, from the regulatory environment and infrastructure to human capital and Internet use.
Strengths and weaknesses profile of Austria using DESI sub-indicators

Building on strengths
Sub-indicators where Austria is in the top ten

<table>
<thead>
<tr>
<th>SUB-INDICATOR</th>
<th>RANK</th>
</tr>
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<tbody>
<tr>
<td>Enterprises sending eInvoices</td>
<td>1</td>
</tr>
<tr>
<td>Online services offered by public administration</td>
<td>2</td>
</tr>
<tr>
<td>Affordability of fixed broadband</td>
<td>3</td>
</tr>
<tr>
<td>Number of STEM graduates</td>
<td>3</td>
</tr>
<tr>
<td>Open data in public administration</td>
<td>5</td>
</tr>
<tr>
<td>Use of RFID technologies by enterprises</td>
<td>7</td>
</tr>
<tr>
<td>Use of ERP software</td>
<td>8</td>
</tr>
<tr>
<td>Basic digital skills</td>
<td>9</td>
</tr>
<tr>
<td>Use of online shopping by individuals</td>
<td>9</td>
</tr>
</tbody>
</table>

Overcoming challenges
Sub-indicators where Austria is in the bottom 10 countries

<table>
<thead>
<tr>
<th>SUB-INDICATOR</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual usage of social networks on the Internet</td>
<td>25</td>
</tr>
<tr>
<td>Individual usage of the Internet for music and video</td>
<td>24</td>
</tr>
<tr>
<td>Individual usage of the Internet for video calls</td>
<td>24</td>
</tr>
<tr>
<td>Individual usage of the Internet for messages</td>
<td>21</td>
</tr>
<tr>
<td>Households that subscribe to fast broadband (over 30 Mbit/s)</td>
<td>23</td>
</tr>
<tr>
<td>Households that use a fixed broadband connection</td>
<td>19</td>
</tr>
</tbody>
</table>

Source: European Commission, Digital Scoreboard
Level of digitization and income per capita

There is a strong positive correlation between income per capita and the digitization level of a country: the higher the level of digitization, the higher the prosperity level. Austria has potential for improvement: its degree of digitization is behind that in other countries with similar per capita income, such as Finland and the Netherlands.
The competent use of digital technologies and media is a key skill for participation in society, lifelong learning and increasing opportunities on the job market and thus also a prerequisite for preventing a digital divide. No child or young person should leave school without basic digital skills. Alongside technical abilities and knowledge about technology, a critical and reflective approach to technology must also be encouraged as part of media education. In addition, awareness of data protection and the responsible handling of data play a significant role. The ability to research and find information and to evaluate it critically is an important aspect of digital literacy.

Digital education should be widely integrated into the curriculum in Austrian schools and should be taught as early as possible – in nurseries – and at the same time in an age-appropriate manner in order to sustain the enthusiasm and interest of children and young people.

A well-qualified workforce significantly increases the attractiveness of a business location. First, everyone should have basic digital skills; second, experts and specialists are needed in the science, technology, engineering and mathematics (STEM) fields in order to be able to compete in a global marketplace. Subject-specific education in schools should lead to qualifications that are relevant to the job market. The existing gender gap in the IT industry must be addressed and the representation of women in STEM fields increased.

MEASURES:

• Consolidate existing initiatives and present a new overall digital strategy for schools in the first quarter of 2017
• Teach digital skills to school pupils in line with the digi.komp model and ensure that these skills are acquired via digi.check (see also http://www.digikomp.at/)
• Teach basic IT knowledge (coding, computational thinking) and encourage a fun approach to technology at primary school
• Encourage the reflective and responsible use of technology (media education, data protection, ethics) at school and provide hands-on programmes for adults to help them improve their media skills
• Strengthen subject-related and vocational training in key IT development areas such as network technology, business IT, commercial data processing and databases, digital business, computer engineering, media informatics and medical informatics
• Introduce special measures to increase the participation of girls and women in the digital and technical sectors

In line with the objective of providing the best education for everyone, digitization can be a crucial factor in opening up access to education. Linking 21st century technologies to modern teaching models will improve the quality of teaching and learning in education and training. To fully exploit the potential of digital media and tools, the education and training of teachers is a key factor. Well-prepared digital educational materials offer the opportunity for effective use. To this end, the ideal framework must also be created, e.g. in terms of network, hardware and software infrastructure.

Fair and sustainable models that contribute to equal opportunities in education will be introduced to improve access to digital media, in particular for educational institutions and learners.
MEASURES:

- Strengthen the digital skills of educators through training measures for the effective practical use of digital media and eLearning in lessons (teaching methodology) and through new forms and models in education and training (e.g. MOOCs and expansion of the Virtuelle Pädagogische Hochschule [Virtual College of Education])
- Develop peer learning models for the dissemination of site-specific eLearning concepts (knowledge transfer: experts’ school – beginners’ school) and promote networks of innovative schools
- Gradually introduce digital and interactive school books; make digital educational media and also openly licensed and free educational materials (Open Educational Resources, OERs for short) available; increase the availability of (self-organized) further training programmes
- Reinforce the use of innovative educational technologies (e.g. flipped classroom)
- Launch the Foundation for Innovation in Education 2017, which focuses in particular on the topics of digital education and accelerating EduTech (fund endowed with €50 million)
- Optimize the framework for the use of technology at school sites, in particular by increasing the availability of Wi-Fi and broadband
- Increase the use of open source software

At universities and colleges of higher education, the use of digital technology is increasing both in teaching and in the publication sphere. It offers numerous opportunities and at the same time requires educational and teaching approaches to be further developed. It must be ensured that it is legally permissible to share and expand teaching and learning materials and that appropriate quality assurance measures are taken.

By enabling users to learn at any time and in any place and focusing on individual requirements, the new technologies also offer great educational potential in adult education, continuing vocational training, extracurricular youth programmes and parent education.

MEASURES:

- Continue to develop the eInfrastructure repository initiative in line with the University Structural Funds Ordinance
- Reach an agreement on the creation of electronic teaching and learning programmes in the context of performance objectives with the universities and strengthen the multi-institutional initiative Forum neue Medien Austria [New Media Forum Austria]
- Ensure that the publication of teaching materials becomes standard. Publication should be protected by licences, which allow the materials to be shared and incorporated in other learning programmes.
- Prioritize digital competence training programmes for adult educators (e.g. adult education MOOCs) and new non-formal and informal education programmes delivered digitally (e.g. webinars, serious games) in extracurricular youth programmes and parent education.
Broadband Internet access forms one of the cornerstones of the digital revolution. Non-discriminatory, safe and efficient access to the Internet should be ensured as a service in the public interest in order to enable everyone to participate in economic life and in society. Without a high-quality and sustainable digital infrastructure, it is not just the use and operation of services that is restricted or made considerably more difficult, but also the use and development of technologies. To this end, we need to establish the necessary framework in terms of law, non-discrimination (net neutrality) and standardization as well as considering technological issues.

The implementation of the Broadband Strategy 2020, which aims to provide nationwide ultrafast Internet access by 2020, is an important step in also providing broadband in areas where rollout for private companies is not economically viable. Only investment that can also be sustainably used in a later rollout stage is supported. The funding instruments are designed to be used jointly to bridge the digital divide between town and countryside.

Due to the increasing digital integration of social and economic processes, mobile use of the Internet is rising significantly. The mobile telecommunications standard 5G, which is currently being developed, is likely to be the key technology of the future in this area. Higher data rates, low latency and a high density of connected end devices will enable a wide range of new business models to be developed in areas such as self-driving vehicles, Industry 4.0, digital agricultural engineering, trades and crafts, energy, eLearning, eGovernment, eHealth and logistics. Austria can only remain competitive on the international stage if the appropriate digital infrastructure is available. The aim is therefore to make Austria a leading 5G pilot country in Europe.

**Infrastructure funding programmes in the master plan:**

- BBA2020_A Area programme (access): expansion of the geographical coverage of high-performance broadband networks
- BBA2020_B Backhaul programme: connection of existing stand-alone solutions to efficient data highways
- BBA2020_LeRohr Ducting programme: funding of the laying of ducting during construction work for non-discriminatory use for broadband networks

In addition to financial measures, a legal framework and regulatory measures are required during infrastructure development in order to increase private sector investment in broadband expansion and to ensure competition and consumer protection. At the same time, the (re-)emergence of monopolies and excessive market concentration should be prevented.

**MEASURES:**

- Fund broadband expansion as part of the broadband offensive in areas where expansion is not economically viable for the private sector
- Specifically fund excavation costs as part of the broadband offensive in order to provide a connection for schools or small and medium-sized companies
- Develop a strategy to introduce the fifth generation of mobile telecommunications (5G strategy)
- Create a legal framework for the availability of infrastructure (e.g. shared use, frequencies)
The more complex the interconnections, the more important it becomes to ensure compatibility and interoperability. Open standards encourage productivity, migratability for consumers, data protection and the economic value chain. They also help to prevent or reduce market dominance and dependencies. A strategic standardization and standards policy will safeguard the interests of the Austrian ICT industry, with public administration able to act as an important driving force here.

Net neutrality:

Infrastructure managers are faced with the challenge of having to upgrade their networks due to the ever increasing volumes of data transfer. Their options for receiving remuneration for prioritizing certain services are limited by law. The equal treatment of data streams is one of the fundamental goals of an open Internet. Any exceptions can only be made in accordance with the net neutrality regulations.

MEASURES:

- Support programmes that can drive forward and accelerate the development of standards
- Encourage public administration and also research and educational institutions (universities, colleges of higher education, schools) to use open standards with scheduled migration paths so that all those involved can adapt their developments and investments accordingly
Overall "digital education" strategy
Education 4.0 brings together all the initiatives of the Federal Ministry of Education, specifically prioritizing digital skills, infrastructure and educational media. Digital education is to be increasingly incorporated into the education system.

Broadband Strategy 2020
The aim is to achieve virtually nationwide broadband coverage by 2020. To this end, one billion euros (the “broadband billion”) is being provided and is intended to benefit rural areas in particular.

5G strategy
Strategy to introduce the fifth generation of mobile telecommunications

RTI strategy of the Federal Government
Strategic and operational objectives will be defined in order to build on strengths in research, technology and innovation, enter new fields of the future and niches, set up transparent funding and decision-making structures, and ensure efficient and sustainable use of public funds.

Open innovation strategy
The opening, expansion and development of Austria’s innovation system will be driven forward and open innovation will be embedded in the innovation system as a guiding principle.

IP strategy
The intellectual property (IP) of Austrian businesses and researchers will be better protected and exploited commercially.

Creative industry strategy
Creative industries will be supported in their role as a driving force for innovation and transformation in the development and marketing of new products.

Startup country strategy
The environment for startups will be continuously improved and a framework created that encourages innovation and entrepreneurial spirit.

efit21 for digital education
efit21 prioritized the provision of ICT in Austrian educational institutions in order to improve the quality of teaching and learning and to integrate innovative learning scenarios into the education process.

ICT strategy
The cornerstones of the strategy propose focusing ICT measures on education, health and businesses over the next five years. Implementation levers include infrastructure, eGovernment, mobility, financing and security.

Cybersecurity strategy
The strategic principles, structures and processes as well as governance and cooperation between the government, business and society are laid down in this strategy. It focuses on protecting critical infrastructures, awareness-raising, research and development, and international cooperation.

eGovernment strategy
This strategy lays down the structures and elements required for the coordinated implementation of ICT and its communication in administration and defines principles for the implementation of digital processes.

Open government data strategy
Joint standards will be developed to create an effective environment that benefits all interest groups. Cooperation OGD Austria is responsible for managing this strategy.

Open Source Software position paper
This position paper describes how the opportunities of Open Source Software (OSS) can be best used for the common good.

Big data in public administration
The position paper will provide basic information for strategic decision-making in the big data sector. The focus is on structural, legal, economic and technical aspects in the administrative environment.

For more information, visit digitalroadmap.at
Research and innovation have formed the basis for the digitization of all areas of society, culture and the economy. Over the coming years and decades, research will create further – currently inconceivable – opportunities for digitization worldwide. This will result in the emergence of revolutionary digital technologies and applications; at the same time, a substantial benefit for society as a whole will be generated. Research and innovation therefore play a key role in economic and social development. Austria’s aim is to position itself internationally as an innovation leader in order to make the most of future opportunities.

As a research location, Austria has undergone dynamic development in recent years and is already a world leader in a number of disciplines and with a number of its institutions. In addition to sufficient funding for the public research system, Austria also needs appropriate measures and incentives to stimulate company-related research even further. Moreover, it needs to have thematic research focuses as well as a research base that covers all fields. To this end, existing areas of focus must be strengthened and expanded in the digital context. Furthermore, research itself should make use of digital methods.

**MEASURES:**

- Continue existing successful RTI programmes and initiatives; focus on Austrian fields of expertise and priorities in the digitization field; continue the thematic RTI initiatives Production of the Future, Mobility of the Future and ICT of the Future as well as the Industry 4.0 platform
- Strengthen the research focus on quantum physics and quantum technology by developing a quantum computer demonstrator and setting up an associated funding programme from 2017
- Strengthen Austrian research in the field of electronically based systems with the Silicon Austria funding initiative and establishment of a new research centre
- Continue the existing funding of security research (KIRAS programme), including research into cybersecurity
- Set up secure digital knowledge platforms to support the activities of key Austrian scientific experts and link them to project partners from business
- Increase the use of digitization to involve citizens in the research and innovation process (open innovation)
- Enable open access publication of all scientific publications up to 2025 as part of the open access strategy
- Develop an Austrian open data strategy for science involving the Austrian repository landscape
• Incorporate the participation of universities in open access and open data activities into the performance agreements
• Develop a forward-looking and sustainable concept for eInfrastructures and data management in the life sciences
• Ensure European links through targeted prioritization and an active search for partners under Horizon 2020 with a focus on digitization in conjunction with participation in European initiatives such as AAL (Active and Assisted Living), ECSEL (Electronic Components and Systems for European Leadership), ERA-Nets, EUREKA and Eurostars; active involvement of Austria in the creation of the European Open Science Cloud
The digital revolution will have a direct or indirect impact on all areas of business. Digital technologies make new business models, products and services possible. Industry has long been concerned with the question of how to link existing manufacturing and business processes along the value chain with information and communication technology and has coined the term Industry 4.0. Increasing the degree of customization and flexibility in production offers new business opportunities for existing and new providers. The key factor here is to ensure fair competition for all economic operators. To be competitive in the digital age, we need to ensure that the whole economy benefits from the advantages of digitization.

To achieve this in Austria, we need a lively startup scene, greater awareness among SMEs of digital development opportunities, and an optimal framework for innovations and funding. Networking and collaborations between companies in different industries and of different sizes will be crucial success factors, with the Austrian economy being able to build on its existing fields of expertise. While the productivity of the workforce increases as a result of digitization, people with new qualifications are in demand – and we are responsible for ensuring that these qualifications are acquired.

MEASURES:

- Implement the measures adopted as part of the startup package to improve general conditions for startup companies:
  - Risk capital bonus of 20 per cent 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 labour costs for the first three employees of innovative startups
  - Introduction of startup fellowships for academic spin-offs
- Flexible development of the Austrian business financing system as required, in particular for fast-growing innovative companies
- Develop and expand networks for Austrian companies via OPEN AUSTRIA, Austria's official presence in Silicon Valley, as an interface between innovative companies, applied research and public stakeholders
- Expand the Global Incubator Network (GIN) as a single contact point for the international networking of startups, investors and incubators
- Introduce a patent check to assist SMEs in the patent application process and to strengthen contact between businesses and the patent office
- Set up an electronic one-stop shop for business startups to simplify the process of establishing a business and reduce the amount of time needed to do so
- Create a convenient digital platform interface for public procurement
- Strengthen the creative industries as a central “translator” of digital progress into customer- and user-friendly end products
- Strengthen the networking and improve the access to technologies by establishing digital innovation hubs
- Support the digital transformation of small and medium-sized enterprises by specifically funding consultancy and training measures within the new “KMU.digital” funding programme from 2017
- Focus on SMEs and open source at AT:net, a funding programme for launching and establishing digital applications and products on the market
- Strengthen strategic sectors of the future in the digitization field, such as big data and data science, cloud computing, quantum technology and cybersecurity
- Increase specialist ICT education and vocational training, especially in the STEM subjects
- Continuously review professional roles; in particular, constantly develop and adapt
apprenticeships in line with the requirements of the digital world of work

• Include programmers in the list of shortage occupations from 2017 in order to meet the acute need for specialists with digitization expertise in the Austrian economy. This will make it quicker and easier for third-country nationals to start working in Austria.

Digitization opens up new opportunities for the service sector, in particular, through the understanding of technical processes combined with a knowledge of new business models. A clear, understandable and well-structured regulatory environment for eCommerce is a prerequisite for being able to take advantage of these opportunities. Deficits in the fields of data protection and customer data transparency must be quickly eliminated.

MEASURES:

• Create a legal framework that makes national online business models competitive and takes the needs of consumers into account
• Increase awareness-raising measures to facilitate consumers’ understanding of how modern pricing systems work
• Develop specific measures to ensure transparency and data protection in individual pricing processes in accordance with the General Data Protection Regulation

Austria’s attractiveness as a business location depends on forward-looking measures agreed within the EU. Different national markets need to grow together digitally to form a single market – only then can Europe maintain its position on the international stage. To utilize the full potential of digitization, Austria is therefore working at a European level to improve the regulations, and especially to eliminate unjustified barriers, for small businesses in particular.

Over-the-top players (OTTs): an increasing number of OTTs (Google, Facebook, etc.) are offering their services to Austrian customers. However, it is not usually possible to make these companies comply with Austrian legal standards (consumer protection, data protection, rights of use). This causes a competition problem for Austrian companies, which are of course bound by strict legal regulations. Resulting imbalances must be dealt with at pan-European level in order to eliminate distortions of competition.

MEASURES:

• Play an active role in shaping European initiatives to establish a digital single market
• Systematically reduce obstacles to trade and distortions of competition, for example by continuing to harmonize value-added tax and taking joint measures to prevent tax avoidance
• Evaluate the existing EU legal framework for online trade, including the Consumer Rights Directive, and ensure that providers from third countries comply with the guidelines
• Participate in the development of European and international norms and standards to safeguard Austrian interests
• Implement efficient Europe-wide parcel deliveries
• Continue to develop the copyright system at European level
Over the past few years, the digital revolution has had a massive impact on work and the organization of work. Many people are now working digitally, although their original education and training did not prepare them for technical innovations. The digital revolution will continue to change the structure of work in future. We therefore need to support and manage these changes. The changing conditions in the world of work require constant evaluation and a forward-looking adaptation of the existing legal framework and of the funding sources of the social security system. We now need to find solutions that take account of social and economic requirements alike and that safeguard and create jobs. The potential of digitization should be identified, while at the same time the digital skills of citizens should be improved. All social groups involved in the value-added process should be able to share in the benefits of digitization.

Professional development

Digitization is changing the work being carried out and the skills needed, although new technologies are generally just changing specific activities rather than entire workplaces. Skills upgrading is a trend that will take firm hold, which means that (re)training employees in the new requirements must be prioritized in vocational education and training. The aim is to help people – including those in second-chance education – to undergo further training and upgrade their skills. The high demand for continuing education and retraining in specialist skills, caused by the increasing requirements at all levels of education and training, calls for a modern framework. Labour market policy must help job seekers and working people to cope with the dynamically changing demands.

MEASURES:

• Support online (vocational) training courses that teach digital skills as well as retraining that focuses on the specific requirements of the labour market
• Ensure skills are upgraded as a key to new competency requirements: compulsory education or training until 18 so that every young person is educated to a level higher than compulsory schooling. The Training Guarantee for young people aged up to 25, introduced in 2017, is another key measure in this area.
• Attractive second-chance training measures are being created with the reintroduction of the skilled workers’ grant (Fachkräftestipendium) from 2017, the expansion of the workplace training programme AQUA and the increased funding and support for vocational training (in particular workplace incentive programmes).
• Develop the Recognition Act enabling non-formally and informally acquired skills to be recognized
• Continue to develop career and educational guidance in order to help people plan their employment career and associated training requirements better
• Provide more information about technical education and attractive programmes to increase the proportion of women working in science, technology, engineering and mathematics (STEM) fields
New working models and labour market policy

Digitization facilitates new working models and forms of employment. These should lead to higher income, more efficiency and flexibility, and greater satisfaction for employees. Increasing overall employment and reducing unemployment remains the central objective. Depending on the specific type of employment, up-to-date working conditions must be in place – minimum standards under labour and social law, including collective worker participation, must also apply to new forms of employment. The legal distinction between employment and self-employment is becoming increasingly important here. It is therefore necessary to regularly evaluate the changing conditions of the labour market and to proactively expand and develop the legal framework.

Modern ICT technologies can help to increase work efficiency and to improve internal cooperation. The combination of employees’ practical knowledge and their capacity for reflection and adaptability makes it easier to implement digital processes in a sustainable and appropriate way. The high level of worker participation in Austria should remain unchanged despite new forms of employment.

Employment services are also becoming increasingly digitized and new job search platforms are being added. This also requires public labour market institutions to be adapted to ensure that a publicly controlled alternative to private providers is available.

MEASURES:

- Respect the boundaries between private and working life
- Provide social security, including (collective) worker participation, for new forms of employment too
- Take employee data protection into consideration when implementing the European General Data Protection Regulation
- Involve the workforce in innovation and digitization processes at a sufficiently early stage
- Initiate dialogues and consultations at industry level as well as at enterprise level
A variety of factors, such as demographic change, increasing mobility and the depopulation of rural areas, are presenting the welfare system with new challenges. Individual requirements are changing and the traditional boundaries between health care facilities and the health and welfare system as well as other policy areas are becoming blurred. The use of new technologies supports the increased need for prevention, information and communication, particularly between medical staff. In the case of medical data in particular, it is especially important to ensure data security and protection. Individuals must also be provided with unrestricted access to their own data.

Digital technologies can be used to further improve the already high quality of health and care services provided to the population by personalizing these services to a greater extent. Innovative ambient assisted living and smart home technologies enable elderly and disabled people to lead a more independent life in familiar surroundings. This also applies to the design of working conditions for care activities in the home environment. In addition to providing state-of-the-art infrastructure, education and training programmes must be adjusted, job profiles created or further developed, and the legal framework adapted.

The creation and expansion of technology-based services enable a variety of skills to be combined. Assistive technologies, mobile applications (apps) and social media should be used alongside conventional specialist applications, taking open source solutions into consideration. Accessibility is a prerequisite here. Technological solutions should be used as a support and to improve quality and process optimization, but never as a substitute for personal communication and attention.

**MEASURES:**

- Implement and continue to develop the electronic health record scheme (ELGA) in the intramural and extramural sectors nationwide
- Design an electronic vaccination record, electronic mother-and-child medical card and electronic prescription (ePrescription)
- Set up contact and advice centres for the whole population, e.g. in the form of an electronically supported initial contact and advisory service (TEWEB)
- Develop a patient summary that contains key medical data on the patient, such as blood group, allergies and drug intolerances, and can be viewed in other countries subject to the patient’s consent
- Encourage the widespread use of assistance systems to help elderly people and people with special needs
- Prepare a framework for electronic health services in areas such as telemedicine
Environment, energy, agriculture and climate protection

Digitization helps to increase efficiency, conserve resources and minimize environmental impact, thus contributing to the sustainable development of Austria. Due to improved weather forecasts, optimization of space and more precise knowledge about production quantities, sales volumes and stock levels, digitization can play a key role in sustainable agriculture and forestry. Drones can be used to survey agricultural land from an aerial perspective, for instance, allowing the most appropriate measures to be identified, e.g. irrigation or fertilization. Environmental information should be compiled and utilized more strategically in order to simplify administrative procedures and reduce costs (e.g. EDM installation register).

Flexibility, modern technologies and smart applications are essential for a forward-looking yet stable energy system. With digital technologies being used to ensure an optimum balance between energy production, distribution, storage and consumption in terms of time and area in order to ensure security of supply and efficiency, digitization will play an important role here.

MEASURES:

- Provide broadband coverage in rural areas by implementing the Austrian broadband strategy
- Create uniform data standards for self-driving machines and food logistics, and secure data rights for the owners of self-driving vehicles in agriculture
- Guarantee electronic access to environmental information, taking into account data protection and respecting the protection of critical infrastructure
- Summarize existing environmental data to facilitate user-friendly localized data queries and cross-thematic data analysis
- Develop the spatial data infrastructure in accordance with the INSPIRE directive and increase its use in agricultural, forestry and environmental policy
- Improve the existing EDM installation register to make it more user-friendly and efficient
- Increase security of supply and grid stability through flexible control of the energy system (smart grids and the economy as a “prosumer”)
- Implement the smart meter rollout: this lets consumers and businesses see how much electricity they are using at any time, enabling them to use electricity more efficiently, save costs and at the same time contribute to the security of supply and improved integration of renewable energies
Information and communication technologies open up new opportunities for transport and mobility. The close linking of publicly accessible services in a network that includes public rail transport and public buses, taxis, (e-)car sharing services, rental cars, bicycles, footpaths, etc. plays a key role in a sustainable combination of mobility services that favours public transport. In road and rail transport and in aviation and shipping, the use of ICT creates new design options and solutions for the personal mobility, freight traffic and transport logistics of the future.

ICT-based assistance systems and automated vehicles are being increasingly used in vehicle technology. These systems will be interlinked in future. Assistance systems for vehicles increase road safety, help a wide range of people to become mobile, reduce emissions and make driving more convenient and enjoyable. For this to happen, the legal framework must be clarified and uniformly regulated throughout the EU, and data protection must be guaranteed.

Information on the use of transport networks and mobility behaviour is an essential basis for policy, planning, business and research. New and better linked ITS services expand the opportunities for mobility and improve the accessibility of the transport system, also making it more accessible for people with limited mobility.

In transport infrastructure, the entire operation is designed to be user-friendly before and during the journey using ICT systems and networking. Moreover, developments in digital building (building information modelling) are used not just for planning and construction, but also – and to an increasing extent – for maintenance and monitoring of conditions. Detailed recording of the transport infrastructure forms the basis for many legally binding administrative processes. The development of digital traffic graphs provides all levels of the public sector with an information system that can in future be expanded to include dynamic aspects through the use of big data in traffic.

Digitization will assist transport sector employees in their work, increase safety and help ensure that current regulations – relating to working hours or safety, for example – can be better reviewed and implemented, with due regard to data protection. In business, ICT will enable processes to become more efficient and cost-effective and operational procedures to be optimized. Since the ICT industry in transport is an internationally strong and export-oriented sector of the Austrian economy, measures in this area also add value to products and services.
• “Autonomous driving” action plan: establish implementation expertise and a specialized competence centre for digital infrastructures to ensure that the appropriate competences in terms of planning, financing and operation are available to all operators of road transport infrastructures in Austria and that they also take the international context into account.
• Launch test environments for automated driving from 2017 and set up a laboratory for driverless rail systems in 2018
• Implement clear legal, ethical and safety frameworks, norms and standards for automated driving and for the use of data for intelligent traffic control systems that are able to learn from experience
• Use the high level of ICT competence in Austria in vehicle electronics and control of drive systems to facilitate synergies between the automation of vehicles and emission reduction in hybrid and electric vehicles
• Exploit the potential of ICT in road, rail, pedestrian and bicycle traffic and in inland waterway transport in order to make the infrastructure, guidance systems, and traffic control and management even smarter and safer and to link them all in a network
• Promote intelligent transport systems as required in the EU ITS directive and national ITS law

• Implement the European Strategy on Cooperative Intelligent Transport Systems (C-ITS strategy) in public and private transport to connect road users and individual vehicles to traffic management systems and to the traffic infrastructure and enable them to interact directly with each other to increase safety, efficiency and sustainability
• Expand nationwide and intermodal traffic information to include real-time information in order to make mobility more public-friendly as part of an integrated mobility system, a concept known as Mobility-as-a-Service (MaaS)
• Promote/expand central digital information systems for both passengers and freight for a variety of target groups
• Continue to develop Traffic Information Austria (VAO), explore the opportunities of big data and increase the use of open data, open interface and linking-of-services approaches to create new intermodal information and payment solutions
Media, civic courage and culture

Digital technologies have not just revolutionized the creation of and access to cultural goods such as media content, but have also made social discourse more democratic. Cultural diversity and opportunities for social participation in educational, cultural, work and leisure activities have increased. This is associated with significant economic opportunities and also with the potential for developing cultural and creative skills that should be utilized. Art and culture should be made more visible and accessibility barriers reduced by using digital technologies. At the same time, traditional media must also play their democratic role in the digital environment.

The focus of digital development over the next few years will be on the reuse and further use of cultural resources, in other words copyright issues. Copyright law is currently being revised at European level since further issues have arisen and new licensing models have been developed since the last reform in 2001.

Digital games and social networks are now an integral part of children’s and young people’s lives. However, they – and their parents and teachers – must be made fully aware of the opportunities and risks associated with using the Internet. They need to be taught to take a careful and thoughtful approach to new media and their content. Society is facing new challenges as a result of the major role played by social networks as an information source for citizens and the associated spreading of reports that are not based on facts and are sometimes false. In addition, self-reinforcing mechanisms are created by search results being filtered according to the user’s previous online behaviour (known as the echo chamber effect). The issue is compounded by online hoaxes and opinions being stated as facts. Ensuring responsible media policy and promoting media literacy are particularly important here.

The restructuring of press subsidies in Austria is designed to take account of the digital revolution and the associated change in the way in which people use the media. The focus is on high-quality media products and the journalists who produce them. The favourable conditions in Austria, which is home to a wide range of press products, must be safeguarded.
MEASURES:

- Reform press subsidies to take into account the digital revolution in the media world, promote quality and diversity in journalism, and support both innovative media products and traditional media in the transition to digitization
- Strengthen the education and training of journalists and improve media literacy
- Continue to expand digital services provided in and by arts and culture facilities and improve ease of access. These facilities include museums, archives, libraries, and national and European platforms such as Kulturpool and Europeana.
- Improve opportunities for using digital cultural content for education, science, tourism and the creative sector, taking into account the interests of the rights holders
- Increase participation in cultural programmes through digital solutions such as mobile services, live streams and augmented reality
- Strengthen individual responsibility and civic courage by providing more information and networking measures, raising awareness, and promoting civil society lawsuits against the Internet hate culture (#CombattingHateSpeech initiative, No Hate Speech movement)
- Take measures against hate speech and other criminal offences in electronic media, e.g. the rapid deletion of content liable to result in criminal proceedings
Integration policy is a comprehensive approach that aims to encourage the social, linguistic and political integration of people. All institutions such as Public Employment Service Austria (AMS), educational institutions, authorities, hospitals, civil society institutions and also leisure and sports facilities are required to develop special diversity competences. Increasing use is being made in this area of digital training and information tools. German language skills are a key prerequisite for permanent residency. Digital technology can be used to provide information and services.

MEASURES:

- Expand multilingual service platforms to provide information and learning materials and to facilitate the recognition of professional qualifications
- Expand the services provided by companies and individuals within integration policy networks
- Increase the teaching of digital skills to specific target groups and their opportunities to access the necessary hardware
- Connect volunteers and NGOs through digital applications to facilitate integration and language acquisition

The aim of digital inclusion is to provide all people with the necessary tools for information and communication technologies in order to minimize digital divides in terms of access, education, income and gender. The risk of people without access to the Internet being at a significant disadvantage may increase. To provide everyone with access to digital services, nationwide implementation of ICT accessibility is required in accordance with the UN Declaration of Human Rights and the National Action Plan for People with Disabilities. In addition to the provision of similar alternative services, reducing the number of people who are offline is a top priority.

MEASURES:

- Push accessibility forward by implementing the EU directive on the accessibility of the websites and mobile applications of public sector bodies
- Promote accessibility in administration and increase the use of standard procedures to check the accessibility of IT products
- Consolidate the initiatives of businesses and NGOs to bridge the digital divide; support the acquisition of ICT and media skills for the elderly and people without ICT knowledge, while ensuring gender equality
- Combat functional illiteracy and improve foreign language skills as a basis for digital participation
- Increase the use of easier-to-read versions by public sector bodies
Digitization and the increasing level of integration are putting greater demands on both cybersecurity and data protection. To be able to develop and expand effective safety levels in the digital space, critical factors include sustainable cooperation, structured transparency and mutual trust between civil society, business, science and authorities. To achieve this, structures and frameworks must be put in place that provide protection in cyberspace at all levels. Protection from and prosecution of criminal activities is just one aspect of this. The reliability and robustness of the critical infrastructures of a state along with privacy and aspects of consumer law are also central issues here.

Cybersecurity

To increase cybersecurity, appropriate structures have been established in recent years with the numerous CERTs (Computer Emergency Response Teams, the “Internet's fire brigade”), operational coordination in cybersecurity, cybercrime and cyberdefence cases, cyber crisis management and the cybersecurity platform. Authorities, business and research are now working together to develop the established processes. These need to be incorporated into international and European activities since cybersecurity incidents cut across national boundaries. To be able to ensure security in cyberspace, an appropriate legal framework is required and is due to be put in place in 2017 with the cybersecurity law.

Furthermore, cybersecurity enhances the ability to combat disturbances in and from cyberspace and to mitigate the associated consequences. To achieve this comprehensively, citizens and businesses must be informed of the risks and necessary precautions and their awareness of these raised. Only with appropriate awareness-raising measures in place to minimize risk can shared cyberspace be adequately covered. In small and medium-sized companies in particular, it is important to increase awareness of the cybersecurity issue.

MEASURES:

- Implement and continue to develop the Austrian Cybersecurity Strategy (ÖSCS) with a comprehensive approach involving the government, business, science and society
- Draft a modern Internet and information security law (cybersecurity law): notification obligations for operators of essential services, CSIRTs, definition of international cooperation and also national and international contact points
- Establish strategic and operational NIS authorities for the national coordination of incidents
- Draw up a cybersecurity agenda for the coming years to outline all key cybersecurity themes in Austria within the cybersecurity platform
- Actively conduct cybersecurity PR work by funding awareness-raising programmes aimed at specific target groups (e.g. teachers, parents, senior citizens, children and young people and also businesses), such as saferinternet.at and onlinesicherheit.gv.at
- Intensify and expand cybertraining as part of basic military service in the armed forces
- Create appropriate management structures in cyberdefence and continue to develop cyberdefence capabilities; set up a cyberdefence situation centre, cybertraining centres and cyberdocumentation research centres
- Continue to expand the competences of the cybersecurity centre (CS): establish a national cyber situation centre
- Develop and intensify cyber investigator training at all police levels
- Establish an Austrian cybersecurity cluster with cybersecurity providers to consolidate the relevant skills and activities in order to position Austria as a location for cybersecurity providers
Data protection

Austria has many years of experience in data protection. Privacy protection is in the interests of every individual and must also be guaranteed by government action. Data ownership of consumers on the digital markets must be ensured and their trust in digital products and services must be increased. The primary objective is modern, simple and clear data protection at a high level, which at the same time safeguards the opportunities offered by digitization and new technologies and embraces the digital single market.

MEASURES:

• Implement the General Data Protection Regulation at national level by continuing to maximize data protection and at the same time opening up the opportunities offered by new digital technologies
• Capitalize on the high level of data protection in Austria as a locational advantage
• Ensure that Austria plays an active role in European and international discussions on data protection and international regulations
• Promote data centres and providers of cloud services that are solely located in the EU or EEA to ensure a high level of data protection and prevent data from being transmitted to or from third countries
• Incorporate data protection awareness and security expertise into digital education (see Education section)
• Set up information initiatives on data protection and teach media literacy and key legal skills in private and vocational training and for businesses
• Develop, evaluate and promote (IT) concepts on ‘privacy by design’ and ‘privacy by default’ (protecting data through technology and the default settings in data protection law), taking the interests of users into consideration

Consumer protection

In the digital world, consumer protection fulfils an important role in informing, assisting and supporting consumers and in transparently communicating which data is used and stored for which purpose. Strengthening the ownership of consumers and their trust in digital products and services also provides economic impetus.

MEASURES:

• Increase transparency and introduce clear rules for commercial decisions based on consumer profiles and algorithms, such as assessment of (the creditworthiness of) individuals or individual pricing in online retail, with due regard to the business and trade secrets of the companies involved
• Ensure easy and low-cost access to advice and help for consumers in law enforcement matters, in particular with respect to cross-border online retail
• Strengthen online retail by increasing consumer trust through preventing, raising awareness of and combating “online pitfalls”
Digitization also provides the basis for modern, user-friendly and efficient administrative services. Citizens and also businesses have the right to communicate and interact electronically with authorities in a convenient, simple and accessible way. eGovernment solutions and the provision of government data infrastructures should systematically take account of the trend towards mobility and the need for unrestricted availability of administrative services and information. eGovernment should help to increase efficiency in authorities, make things significantly easier for citizens and businesses, and act as an innovation driver for the economy as a whole through its use of new technologies. Austria has already played a pioneering role in eGovernment in the past and we intend to further strengthen this role in future. To do so, well-trained staff in public administration are a prerequisite.

With over 800,000 users, the electronic signature and Citizen Card or mobile phone signature are already well established in Austria. Consistently digitized processes require secure electronic proof of identity. Citizens should therefore be able to use the existing eID not just throughout the EU; it should also become an electronic identity document when it is assigned certain attributes. A future administrative registration process will provide even greater security.

Modern ICT solutions and services will encourage participation in political discussion and decision-making processes. By including new methods, the quality of administrative action and of political decisions can and should be improved and their legitimacy strengthened. This should also lead to an increase in the transparency of governance.

Open government data is a central issue here, with the administration making non-personal data available to the general public in open formats. Individuals, NGOs, enterprises, scientists and other authorities can freely use and link the data – to program apps and software, for example. This also has an added democratic value since it enables discussions to be held at a more factual and objective level. The website data.gv.at makes over 2,100 data sources available and is to be expanded.

MEASURES:
• Introduce a comprehensive right to electronic communication between citizens and the administration
• Extend the range of eGovernment services available in order to personalize and regionalize these services, e.g. at help.gv.at, further improvements to the Business Service Portal (usp.gv.at), networking and automatic information exchange between the eGovernment services offered by the Federal Government, Länder and municipalities
• Expand one-stop processes (everything in one place) and no-stop processes (application-free – no need to apply):
  – Application-free employee tax assessment: first tax credit in autumn 2017
  – Application-free extension of family allowance: proof of activity (e.g. for students) is automatically queried and entitlement is extended.
  – Change of name and address: data only needs to be changed in one place. The other authorities are informed automatically.
• In future, citizens should be able to use the existing eID not just throughout the EU; it should also become an electronic identity document when it is assigned certain attributes (e.g. driving licence, youth pass, identity card, etc.). A future administrative registration process will provide even greater security.
• Data only once: information only needs to be reported to the authorities once. This means
that documents such as proof of residence forms or birth certificates no longer need to be submitted to the authorities.

- Accelerate electronic delivery and create a common display module for all electronic deliveries
- Expand open data and open government data; provide further data sets from the authorities and incorporate important data records from the private sector
- Accelerate open source by authorities
- Position Austria as an international pioneer in eGovernment solutions and as a committed and reliable partner in the eGovernment context

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**Glossary**

**Active and Assisted Living (AAL)**
Concepts, products and services that promote active and healthy ageing in the individual’s own home, in the community or at work through the development of new technologies.

**Algorithmic and Computational Learning**
Learning support provided by artificial generation of knowledge that is introduced into the learning phase on the basis of examples and experience by deduction and generalization.

**Big data**
Large quantities of data that are increasing in terms of volume, speed and diversity and come from a variety of sources (including public sources), such as the Internet and mobile communications, the energy sector, health care and traffic.

**CERT / CSIRT**
"The Internet’s fire brigade": Computer Emergency Response Teams or Computer Security Incident Response Teams collect (industry-specific) information on cyber-threats. They publish warnings and are usually the first point of contact in the event of an incident.

**Cloud Computing**
The provision of IT infrastructure and services (e.g. storage space, computing power, application software) as a service that can be accessed via networks.

**Crowdsourcing**
The outsourcing of tasks that are traditionally performed in-house to a group of volunteers, primarily via the Internet.

**Cyberbullying**
The use of Internet and mobile telephone services to intentionally offend, embarrass, threaten or harass others over a sustained period.

**Data science**
Scientific examination of all methodological, conceptual, organizational and technical measures and processes related to data.

**Digital divide**
Differences in people’s opportunities to access information and communication technologies due to socio-economic factors such as income, background, education and place of residence.

**eGovernment**
Use of ICT to improve public services, democratic processes, and the development and implementation of public policies.

**eID systems**
Systems for identifying natural and non-natural persons (organizations) in cyberspace. The eID system used in Austria is the mobile phone signature or the Citizen Card.

**EDM**
Electronic data management for the environment (EDM) is a network of Internet applications and databases to support complex processes in the case of environmental documentation, notification and reporting requirements.
**ERP**
Enterprise resource planning (ERP) is the process of planning and managing company resources in good time and as needed.

**eSkills**
Capabilities needed by individuals (or organizations) in order to remain competitive within a global information economy.

**Information and communications technology (ICT)**
Umbrella term for all computer (IT) and network (CT) based technologies and the associated sectors of the economy.

**Industry 4.0**
The interlinking of production with ICT and thus digitization and integration of the entire value chain, the aim of which is to achieve predominantly self-organized production.

**Intellectual property rights (IPR)**
Intellectual ownership of an intangible asset, such as a technical invention.

**Internet of Things (IoT)**
Network of identified “smart” objects containing embedded technologies that enable the objects to report on their internal status or communicate and interact with the external environment.

**Intramural and extramural sectors**
Intramural = hospital sector, extramural = health care services provided outside hospitals by registered practitioners.

**MOOCs**
Massive open online courses (MOOCs) are an innovative online course format that is targeted at a large number of participants and combines various forms of teaching, a variety of media formats (e.g. videos) and communication elements (such as forums).

**NIS Directive**
EU directive on security of network and information systems to ensure common safety standards for network and information systems. Regulated in Austria by an Austrian federal law.

**No-stop-shop principle**
Administrative procedure involving no contact with the administration (“application-free”) on the basis of a particular event (e.g. family allowance upon the birth of a child).

**One-stop-shop principle**
Administrative procedure involving just one contact in a particular life or business situation (example: if an individual changes his or her name, the civil status authority informs all other authorities).

**Open data**
Data made publicly available in machine-readable form (administration: open government data).

**Open educational resources (OER)**
Free learning and teaching materials with an open licence.

**Open innovation**
Opening up of (in-house) innovation processes in organizations to third parties with the aim of increasing innovation potential.

**Over-the-top players (OTTs)**
(Usually global) companies that offer services without Internet service providers being involved in the control or distribution of the content (mainly video and audio content).

**Peer learning**
Use of multipliers (peers) to share their knowledge of a particular topic. The knowledge is passed on in the relevant peer groups due to the multiplier effect.

**Privacy by default**
Standard implementation of privacy-enhancing default settings/preconfigurations.

**Privacy by design**
Privacy-enhancing precautions are already included in the technical solutions.

**RFID**
Radio-frequency identification (RFID) is a technology that allows objects to be identified without contact using radio waves.

**Serious games**
Digital games that provide information and educational opportunities (motto: “learning is fun”).

**Smart grids**
Intelligent electricity grids that allow systems to be operated in an energy- and cost-efficient way by enabling communication between grid components, producers and consumers.

**Smart home**
Technical processes and systems in living spaces that adjust automatic processes by networking and controlling safety devices, energy supply devices, etc.

**STEM**
STEM stands for the fields or subjects of science, technology, engineering and mathematics.

**Telemedicine**
Use of ICT by a doctor to provide a patient with medical treatment, diagnosis and therapy from a distance (in terms of geography or time).

**Webinars**
Seminars conducted online, in which users can participate via the Internet independent of place and/or time.
By 2018: AT:net funding programme

By 2019: Smart meter rollout throughout Austria

By 2020: 100 Mbit/s broadband nationwide

By 2025: Open access publication of all scientific publications
Monitoring and implementation

Implementation of the measures in the Digital Roadmap is the responsibility of the competent ministries. As the digital revolution is still ongoing, the Digital Roadmap is a dynamic strategy concept. Its implementation will be constantly monitored and adapted to new developments (digital and at European level). To this end, a Digital Summit will take place once a year to assess the latest trends and developments and draw conclusions regarding the focus of activities. All government departments will work together in early 2017 to develop the structure of the monitoring process.

www.digitalroadmap.at