

Electronic Based Systems The technological heroes of the future

Figures, facts and data



The strategy for success

Austria has a highly developed electronics industry with a strong position on the global market. One important field here are Electronic Based Systems (EBS). These form the basis for current key technologies: they make machines intelligent and thus enable Industry 4.0, self-driving cars, intelligent infrastructures or the "Internet of things."

The sector is also of major significance in economic terms. More than ten percent of gross domestic product depends either directly or indirectly on products and services from the electronics industry. In Austria, the more than 60,000 people employed in the sector generated over 76 billion euros of turnover last year.

The above-average return quotas (150 percent) from the European research program Horizon 2020 also reflect just how innovative and competitive the domestic electronic industry is.

One element in the success story of this Austrian industry is that my department has been supporting modern electronic technologies for the past 15 years. Over the past four years alone, the Federal Ministry for Transport, Innovation and Technology has supported research and development projects in information and communication technologies to the tune of 56 million euros.

The present brochure on "Electronic Based Systems – Figures, facts and data", documents the impressive success of this support strategy.

Mag. Jörg Leichtfried
Federal Minister for Transport, Innovation and Technology



Technological heroes

Megatrends such as Industry 4.0 or the Internet of things remain mere catchwords and trends without a knowledge of Electronic Based Systems. Electronic Based Systems (EBS) are the technological heroes that form the basis for nano- and micro-electronics as well as cyber-physical systems in a combination of innovative materials and software integrated in the system. In this current study on "Electronic Based Systems in Austria – figures, facts and data", we have managed to lift the veil on these heroes of our digital future and to show their significance and potential. 93 R&D locations, 188 enterprises, five technology-oriented and five application-oriented research focuses are indicative of the innovative strength and added value in Austria.

Our strength lies in electronic components combined with specific software that make a machine or a product intelligent and operational. These are then used in the fields of energy efficiency, ICT, mobility or future manufacturing.

The study confirms the outstanding initial position of the Austrian Electrical and Electronics Industries in a European comparison with innovative companies and technological competences. However, we can only keep and expand this position if we work together more than ever before and exploit the synergies of EBS innovation regions. Together we can strengthen our presence in this special field and help shape the megatrends of the future.

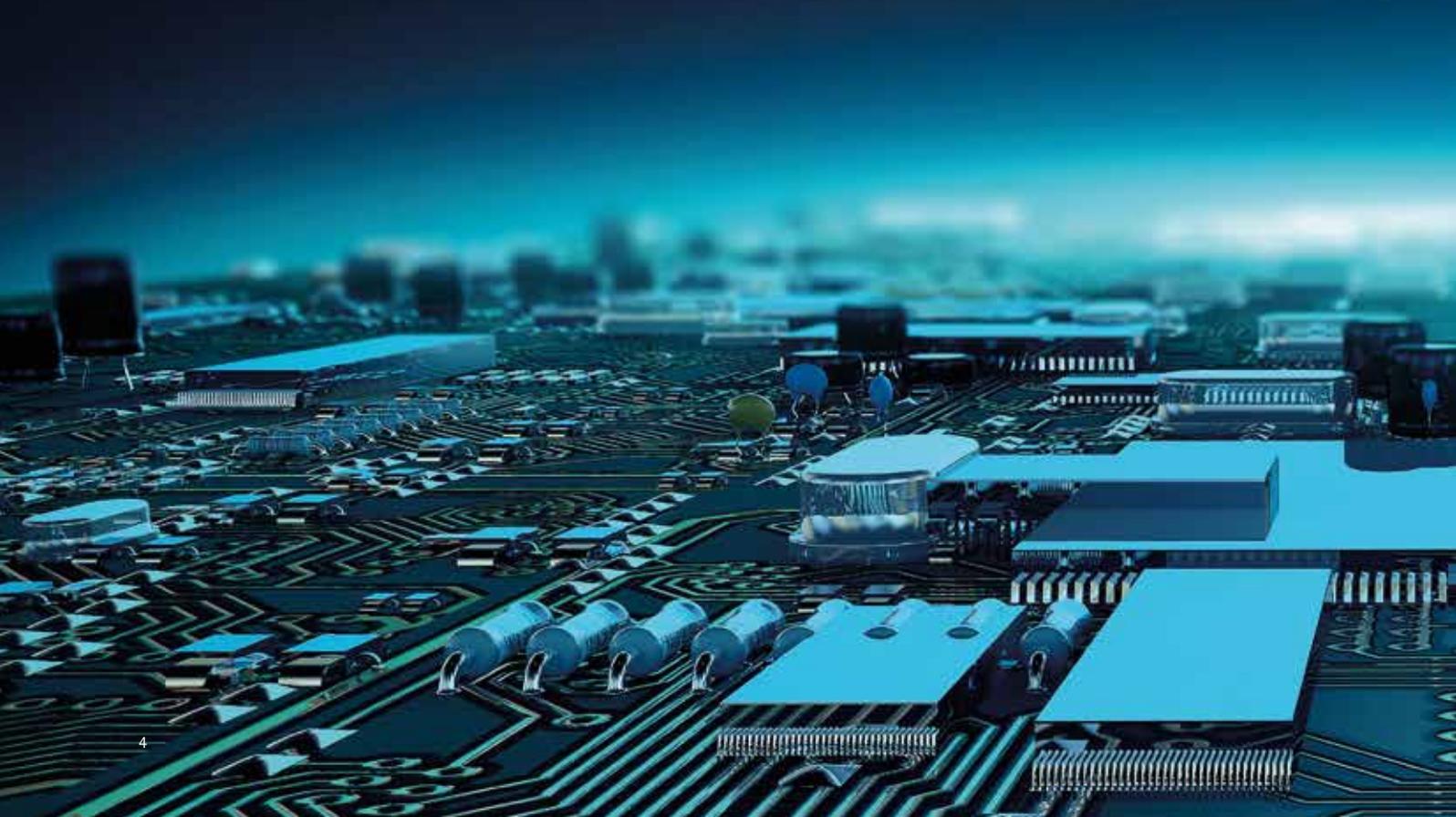
Mag. Brigitte Ederer
President of the FEEI

Introduction

Electronic Based Systems will shape our future. They are a fundamental key technology (KET) and include aspects of micro- and nano-electronics, embedded and cyber-physical as well as integrated systems. These technologies are not only indispensable for numerous digital products and services that build on these; they also form an important foundation for innovation and competitiveness in various lines of industry throughout Europe, and thus in Austria too. As a fundamental key technology, they are instrumental in growth and employment within the European Union. At least 10 percent of gross domestic product depends on electronic products and services, more than 9 million jobs have been created by services related to this line of industry and more than 1 million people are employed directly in the microelectronics industry.

The industrial location Austria easily bears comparison with the European microelectronics industry and has a highly-developed research competence and an attractive industry profile. The study "Electronic Based Systems in Austria – figures, facts and data" successfully takes stock of the fields of application and research as well as the value creation chains of Austrian companies.

This is the first time that it has been possible to present the entire portfolio of software and hardware in research and production. Previous statistics have primarily provided data on the hardware sector, but have ignored software integration. Software sectors have been made visible and measurable thanks to quantitative and qualitative analyses as well as stakeholder interviews. The strengths, weaknesses, opportunities and threats for this pulsating line of industry were demonstrated by means of a SWOT analysis. The results of the study will serve the Federal Ministry for Transport, Innovation and Technology to further develop the RTI programme portfolio (e.g. ICT of the future) and provide the community in Austria with indicators for the strategic alignment.



Electronic Based Systems (EBS) are:

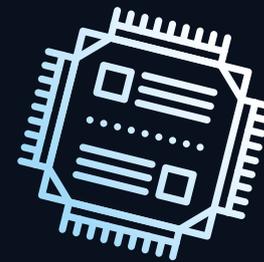
Heroes of the future

Electronic Based Systems (EBS) are the hidden heroes of the electrical and electronic industry. Without their functions, applications such as automated driving, the Internet of things, intelligent infrastructures as well as Industry 4.0 would not be possible. EBS are components, modules and devices with micro- and nano-electronics, as well as the corresponding embedded software, combined with an in-depth knowledge of integrated systems, that create the foundation for digital products and services.



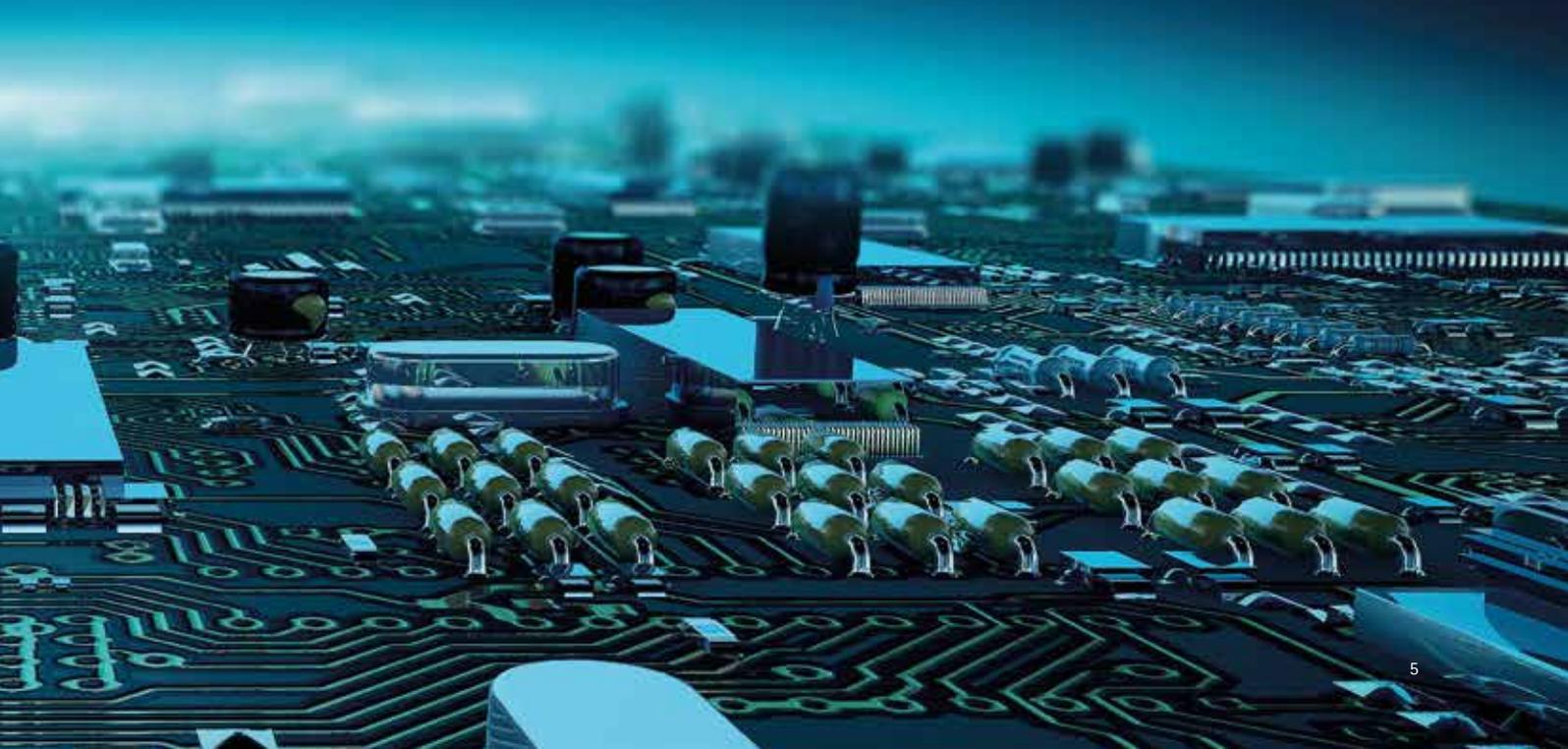
Innovative strength

Electronic Based Systems (EBS) are micro- and nano-electronics as well as information technology. They are key technologies for all modern applications and the basis for innovations. The special strengths of the Austrian electronics industry lie in the fields of embedded systems, power electronics, materials and sensor systems. The vibrant cluster of research institutions and companies are located in Carinthia, Upper Austria, Styria and Vienna.



Economic factor

Electronic Based Systems (EBS) are a motor for growth in the economy. At least 10 percent of gross domestic product throughout Europe depends on electronic products and services. EBS – the indispensable basis for every modern society. Highly-developed research competence and an attractive industry profile are the basis for domestic value creation and jobs.



Electronic Based Systems in Austria

The starting point for the development of EBS in Austria are the research and development institutions. Those companies that have EBS as core competences build on their knowledge and results.

Research and development

93 organisations at 100 locations

The research and development sector covers a total of 93 R&D organisations at 100 locations in Austria. In terms of quantity, these 93 research sites employ **3,881 people** (as per 2015).

The R&D landscape is concentrated at **three locations: Vienna, Graz and Linz with Hagenberg**. There are R&D protagonists in Carinthia at the locations Villach and Klagenfurt, though a critical mass is lacking compared to Linz or Graz. The protagonists in the three large nodes in Linz, Graz and Vienna display different characteristics. Vienna and Linz are dominated by the academic sector, along with a few extramural R&D institutions. Graz, on the other hand, offers a balanced mixture with two university of applied sciences courses. In Carinthia, the extramural R&D institutions prevail at both the Villach location as well as in Klagenfurt.

3,881 RESEARCHERS
working at
93 LOCATIONS



Companies with EBS as a core process

188 companies at 198 locations

There are 188 EBS-relevant companies that are active at 198 locations in Austria and that employ **62,905 people**. The total turnover amounts to **76,764 million euros**, 17,257 million euros of which inside Austria.

The **spatial distribution** shows a **pattern similar** to that of the **research and development institutions**. The **spatial distribution of the segments** displays a **heterogeneous picture** for the **individual locations**. Whereas **Vienna** is clearly dominated by equipment manufacturers, **Linz** has more component producers. In **Graz**, almost half of the companies can be assigned to the equipment segment. Around one quarter of the enterprises are involved in the software segment. In **Klagenfurt**, the equipment manufacturers are clearly predominant, and they also account for around half of the companies in Villach. A total of 29 companies can be classified in the category Hidden Champion. These are newcomers in the EBS sector. The Hidden Champions are a very heterogeneous group with respect to their size – measured by the number of employees.

The figures range from one to 1,100 employees, whereby five of the 29 companies can be classified as micro-businesses. They are located primarily in Graz and Vienna, followed by Salzburg and Linz.



The companies and research institutions together protect and develop the knowledge about the manufacture and operation of all modern infrastructures and products that are based on electronics and the requisite business software.

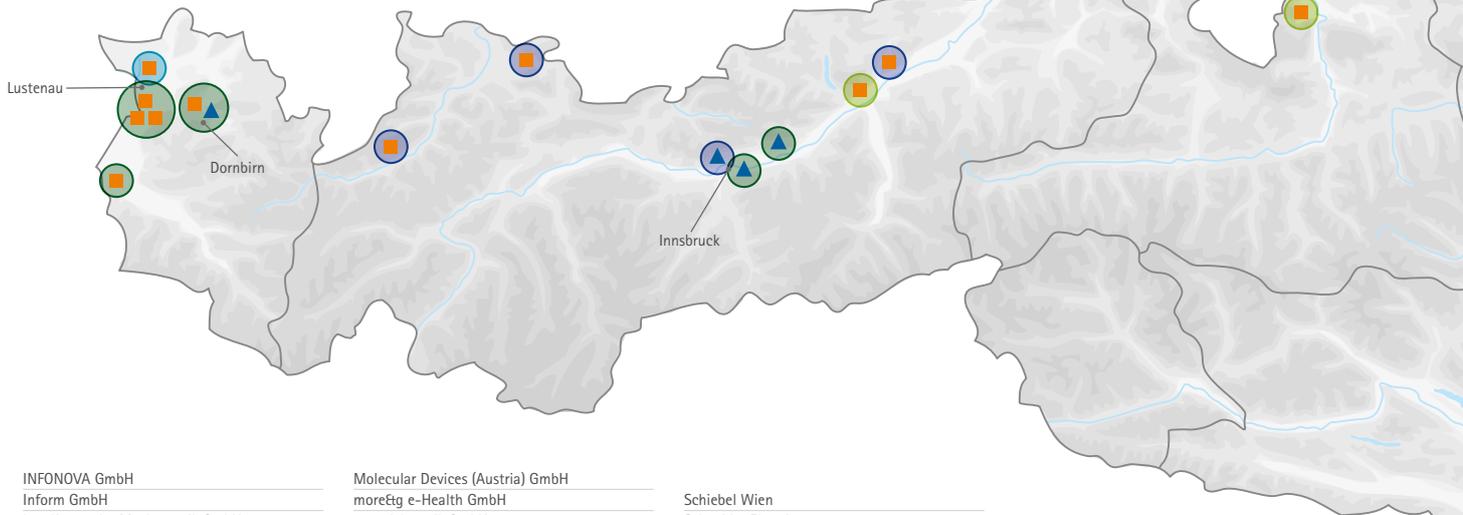
Companies with EBS as a core process

- 3berg GmbH
- 7iD Technologies GmbH
- AB MIKROELEKTRONIK
- ABB AG Österreich
- ACAM Systemautomation GmbH
- ACP IT Holding AG
- Active Photonics GmbH
- activeIT Software & Consulting GmbH
- AJP Tech
- AKG Acoustics GmbH
- Alcatel-Lucent Austria AG
- Alge Elektronik GmbH
- Alicona Imaging GmbH
- AMATIC Industries GmbH
- ams AG
- AMS-ENGINEERING
- Anton Paar GmbH
- Artesyn Austria
- ASIC – Austria Solar Innovation Center
- ASTA Elektrodraht GmbH
- Astron Electronic GmbH
- AT & S Austria Technologie & Systemtechnik AG
- ATENSOR Engineering and Technology Systems GmbH
- Atos IT Solutions and ServicesGmbH
- Attophotonics
- ATV-Elektronik GmbH
- AUER Signal GmbH

- AutomationX GmbH
- AVL List GmbH
- Axtesys OG
- Bachmann
- BECOM Electronics GmbH
- Bernecker + Rainer Industrie-Elektronik GmbH
- Besi Datacon
- Bluetechnik Group GmbH
- BOC Information Technologies Consulting AG c.c.com
- CISC Semiconductor Design & Consulting GmbH
- Citycom Telekommunikation GmbH
- cms electronics gmbh
- COLENTA Labortechnik GmbH & Co KG
- comprei Reinraum-Handel- und Schulungs GesmbH
- Convergent Information Technologies GmbH
- Copa-data
- Danube Mobile Communications Engineering GmbH & Co KG
- Dau GmbH & Co KG
- DEWETRON elektr. Messgeräte GmbH
- Dialog Semiconductor
- DICE GmbH & Co KG
- Durst Phototechnik Digital Technology GmbH
- E.C.E Wurmitzer GmbH
- E+E ELEKTRONIK
- Eaton Industries (Austria) GmbH
- EBG RESISTORS
- EGSTON

- ekey biometric systems GmbH
- Electrovac Metall Glaseinschmelzungs GmbH
- Elektrobit Austria GmbH
- EMC Computer Systems Austria GmbH
- EMPORIA Telecom Produktions- und Vertriebs-GmbH&Co KG
- Enso Detego GmbH
- EPCOS OHG
- Ericsson
- ETU GmbH
- EUMIG ANIF
- EV Group Europe & Asia/Pacific GmbH
- EVK DI Kerschhagl GmbH
- expressF low GmbH
- FerRobotics Compliant Robot Technology GmbH
- Flextronics International GmbH
- Frauscher Sensortechnik GmbH
- Frequent Froscellectronics GmbH
- Frequentis AG
- Fronius International GmbH – Solarelektronik
- G. Bachmann Electronic GmbH
- g.tec Guger Technologies OG
- GE Healthcare
- GFI-INDUSTRIELEKTRONIK
- Gigatronik Austria GmbH
- GRINTEC Gesellschaft für graphische Informationstechnologie mbH
- GUEP Software GmbH
- HALE electronic GmbH

- Harting GesmbH
- HÄUSERMANN
- HEI Eco Technology GmbH
- Hewlett-Packard GmbH
- HIQUEL
- Hirschmann Automotive GmbH
- HPG Informationstechnologie GmbH
- HPI Gesellschaft für Messtechnik mbH
- HTP Electronics
- Hutchison Drei Austria GmbH
- Hyperwave
- IBM Österreich Internationale Büromaschinen GmbH
- IMENDO – WISSENSMANAGEMENTSOFTWARE
- IMPEX
- Infineon Technologies Austria AG

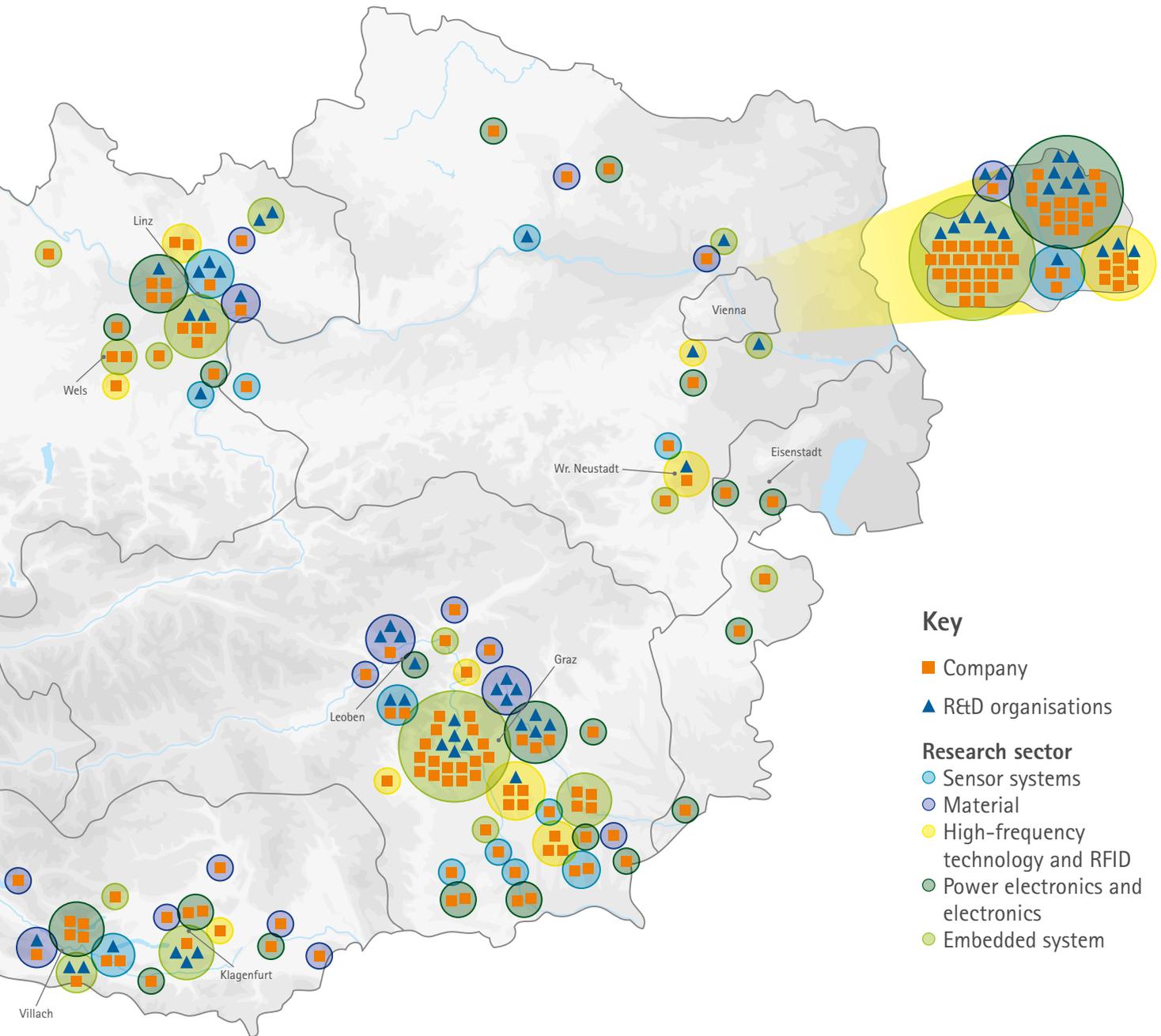


- INFONOVA GmbH
- Inform GmbH
- Ing. Knauseder Mechatronik GmbH
- Ingenieurbüro Dr. Alexander Lechner
- Intel Austria GmbH
- IPM PAY PHONE
- IST Elektronik GmbH
- Kapsch Group
- KATHREIN-AUSTRIA
- Katronik H. Steindl GmbH
- kdg Holding GmbH
- KNOWLES ELECTRONICS
- Kronegger GmbH
- Lam Research AG
- Landis+Gyr GmbH
- LANG SKINTACT ELECTRODES
- LEDON LAMP
- LineMetrics GmbH
- Logicdata
- LOYTE C electronics GmbH
- Lumitech
- M&R Automation GmbH
- MarineXchange Software GmbH
- Maxim Integrated (Sensordynamics)
- Mechatronic Systemtechnik GmbH
- MEDS Micro Electronic Design KEG
- Melecs Holding GmbH
- MICRONAS Halbleiterentwicklungs GmbH
- Microsoft Österreich GmbH

- Molecular Devices (Austria) GmbH
- more&g e-Health GmbH
- mse elektronik GmbH
- New Frontier Investment GmbH
- Nokia Solutions and Networks Österreich GmbH
- Novomatic /Austrian Gaming Industrie
- NTS Netzwerk Telekom Service AG
- NXP Semiconductors Austria GmbH
- OnTec Software Solutions AG
- Orderman GmbH (NEC)
- Payer International Technologies GmbH
- PDTS GmbH Prozessdatentechnik und Systeme
- Philips Austria GmbH
- Photeon
- PIEPS GmbH
- PL-O-T EDV-Planungs- und Handels GmbH
- Plansee SE
- plastic electronic GmbH
- prelonic technologies
- Raiffeisen Informatik GmbH
- RUAG Space GmbH
- RUWIDO
- s IT Solutions AT Spardat GmbH
- S&T AG
- SAA Engineering GmbH
- SAP Österreich GmbH
- SBA Research GmbH
- SC&C Software, Communication & Consulting GmbH & CO KG

- Schiebel Wien
- Schneider Electric
- Schrack Technik Holding AG
- Scotty Group
- SDK – Software Development Kopf GmbH
- SEC Consult Unternehmensberatung GmbH
- Seidel Electronic
- Semantic Web Company GmbH (SWC)
- Senseproduct GmbH
- sensideon GmbH
- Sico Technology GmbH
- Siemens AG Österreich
- SIMTOOLS GmbH
- SITT GmbH
- Skidata AG
- SOFT-HARD-WARE Ing. Johann Margreiter
- Solvion information management GmbH
- SONY DADC
- Spath Micro Electronic Design GmbH
- Speech Processing Solutions GmbH
- Sprecher Automation
- SWARCO FUTURIT Verkehrssignalsysteme GmbH
- System Industrie Electronic GmbH
- T-Mobile Austria GmbH
- T-Systems Austria GmbH
- T.I.P.S. Messtechnik GmbH
- TAGnology RFID GmbH
- Tecan Austria GmbH

- TECHNOSERT
- TecSense
- Telecomservice GmbH
- Telekom Austria AG
- Telematica Internet Service Provider GmbH
- test fuchs
- Thales Austria GmbH
- Theobroma Systems Design and Consulting GmbH
- THIEN eDrives GmbH
- TREVENTUS Mechatronics GmbH
- Tridonic GmbH & Co KG
- TTTech Computertechnik AG
- UP2GO GmbH
- UPC Austria GmbH
- UseNet Software GmbH
- Vescon
- VISHAY BCCOMPONENTS
- WILD Elektronik und Kunststoff GmbH & Co KG
- Wind River Systems
- Wirecard Central Eastern Europe GmbH
- WolfVision GmbH
- wtronic
- ZKW Lichtsysteme GmbH
- ZT-Büro DI Werner Schwab
- Zumtobel AG



Key

- Company
- ▲ R&D organisations

Research sector

- Sensor systems
- Material
- High-frequency technology and RFID
- Power electronics and electronics
- Embedded system

**R&D organisations
Focus on EBS research**

- AIT Austrian Institute of Technology GmbH
- Alpen-Adria-Universität Klagenfurt
- Arcosic Research e.U.
- CAMPUS 02 Fachhochschule der Wirtschaft GmbH
- CEIT Central European Institute of Technology gemeinnützige GmbH
- CEST Kompetenzzentrum für elektrochemische Oberflächentechnologie GmbH
- CTR Carinthian Tech Research AG
- Donau Universität Krems – Zentrum für Integrierte Sensorsysteme evolaris
- Fachhochschule Kärnten
- FH Campus Wien

- FH Joanneum GmbH
- FH Oberösterreich
- FH Technikum Wien
- Forschungszentrum Telekommunikation Wien
- Fraunhofer Austria Research GmbH
- Institute of Science and Technology (IST) Austria
- IT-Technology
- JKU Linz
- Joanneum Research Forschungsgesellschaft mbH DIGITAL Institut für Informations- und Kommunikationstechnologien
- Joanneum Research Forschungsgesellschaft mbH Materials – Institut für Oberflächentechnologien und Photonik
- KAI-Kompetenzzentrum Automobil- und Industrieelektronik GmbH
- KFUni Graz Institut für Physik
- Kompetenzzentrum das Virtuelle Fahrzeug (VIF)

- Lakeside Labs GmbH
- LCM Linz Center of Mechatronics GmbH
- Material Center Leoben GmbH
- MedUni Graz Institut für Physiologie
- MedUni Wien Zentrum für medizinische Physik und biomedizinische Technik
- Montan Uni Leoben
- NanoTecCenter Weiz Forschungsgesellschaft
- Österreichische Akademie der Wissenschaften
- Österreichische Computer Gesellschaft (OCG)
- Österreichische Gesellschaft für System- und Automatisierungstechnik
- Polymer Competence Center Leoben GmbH (PCCCL)
- Practical Robotics Institute Austria (PRIA), Verein zur Förderung des wissenschaftlich-technischen Nachwuchses durch Robotik
- PROFACTOR GmbH
- Research Center for Non Destructive Testing GmbH (RECENDT GmbH)

- Research Studios Austria
- RISC software GmbH
- Salzburg Research Forschungsgesellschaft mbH
- Software Competence Center Hagenberg (scch)
- Technikon Forschungs- und Planungsgesellschaft mbH
- TU Graz
- TU Wien
- UMIT – Private Universität für Gesundheitswissenschaften, Medizinische Informatik und Technik GmbH
- Universität für angewandte Kunst Wien
- Universität Innsbruck
- Universität Salzburg – Embedded Software & Systems Research Center
- Universität Wien
- V-Research GmbH Industrielle Forschung und Entwicklung
- VRVIS Wien
- Zentrum für Elektronenmikroskopie Graz
- znt Zentren für neue Technologien GmbH

Electronic Based Systems: the broad field of research

A differentiation is made between technology-oriented and application-oriented research.

Technology-oriented research:

Technology-oriented research relates to those components needed to produce an Electronic Based System. This makes megatrends such as the Internet of things or Industry 4.0 possible.

The fields of research are split into five areas:

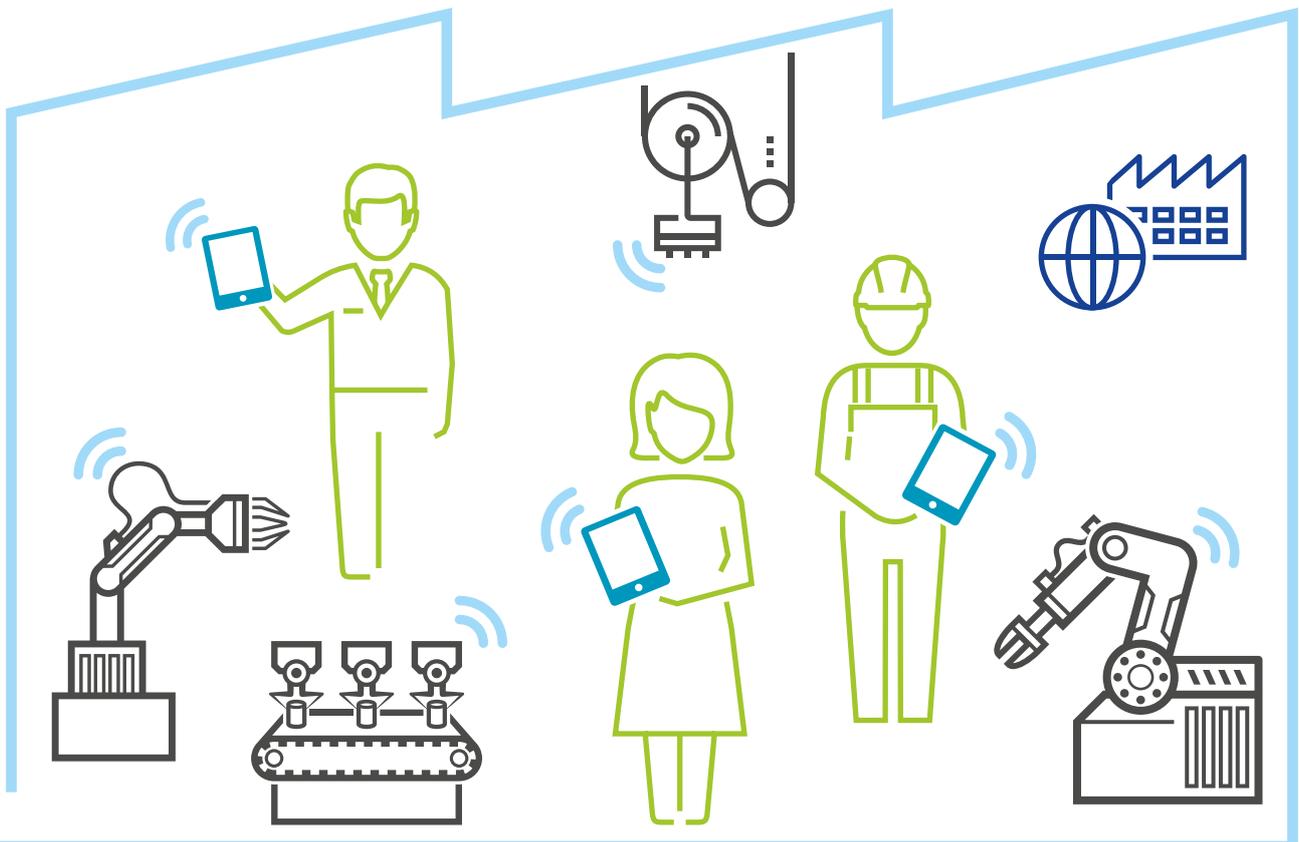
- **Material science or technology** is an interdisciplinary field dealing with the research and development of materials. Technically relevant components are manufactured from these materials.
- **Embedded systems** are the combination of hardware and software as components of an overriding system. This definition covers not only embedded systems per se but also neighbouring fields of research such as computer sciences, security and privacy as well as application software ("man-machine interface").
- **Power electronics and electronics** deal with electronics, micro- and nano-electronics as well as electrical engineering.
- **High-frequency technology and RFID** (radio-frequency identification) are concerned with research into transmitter and receiver systems for the automatic and non-contact identification and localisation of objects.
- **Sensor systems** deal with the development of new processes and methods for EBS sensor systems.



Application-oriented research

The focus of application-oriented research is on five main fields of use: production, mobility, information and communication technologies (ICT), energy efficiency and ambient assisted living.

- **Production** refers to the use of EBS for the production facilities of the future.
- **Mobility** relates to mobility research, such as driving control systems and corresponding assistance systems as well as automated vehicles.
- **ICT** stands for research into future information and communication systems.
- **Energy efficiency** deals on the one hand with the reduction of energy demand, though also with the sustainable integration of renewable energy sources.
- **Ambient assisted living** covers research into the use of EBS to develop intelligent assistance systems that make everyday life easier for older people and improves their quality of life.



Electronic Based Systems companies: from research to realisation

The EBS companies that take up the results of the research departments implement this know-how in five key segments: components, equipment, infrastructure, services and software.

Components are active and passive modules such as chips, PCBs, cables, connectors, sensors, power semiconductors, resistors, capacitors or magnetic parts. These components are the elementary constituents of EBS, they represent the lowest level of these systems, as it were.

Equipment are sub-assemblies, units, modules and devices. They are made up of components and, wherever necessary, the requisite software.

Infrastructure covers the provision of the EBS infrastructure and EBS systems such as server farms or communication networks.

Services include, for example, installations, maintenance, network building etc.

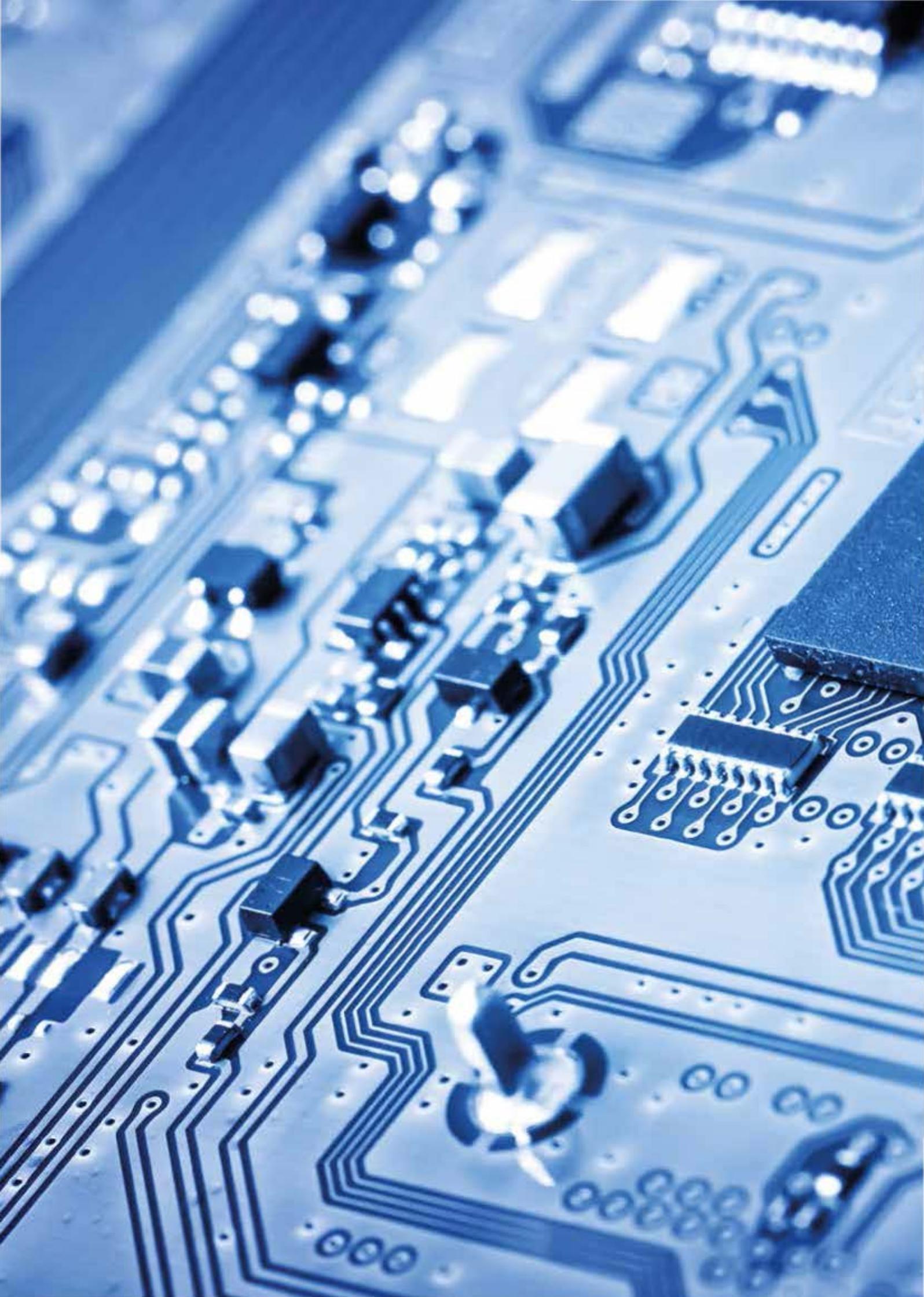
Software covers embedded software, application software and middleware. This includes companies whose core process is mainly or exclusively the programming and sale of software.

The protagonists have to be structured in technology and application to establish the relationship between the research institutions and enterprises.

TAB 1: EBS technologies and their fields of application



Source: Caldera Peter, Hartmann Christian, Rollet Herwig, Zerobin Franz (2016): Electronic Based Systems in Austria – Facts and figures. Graz.



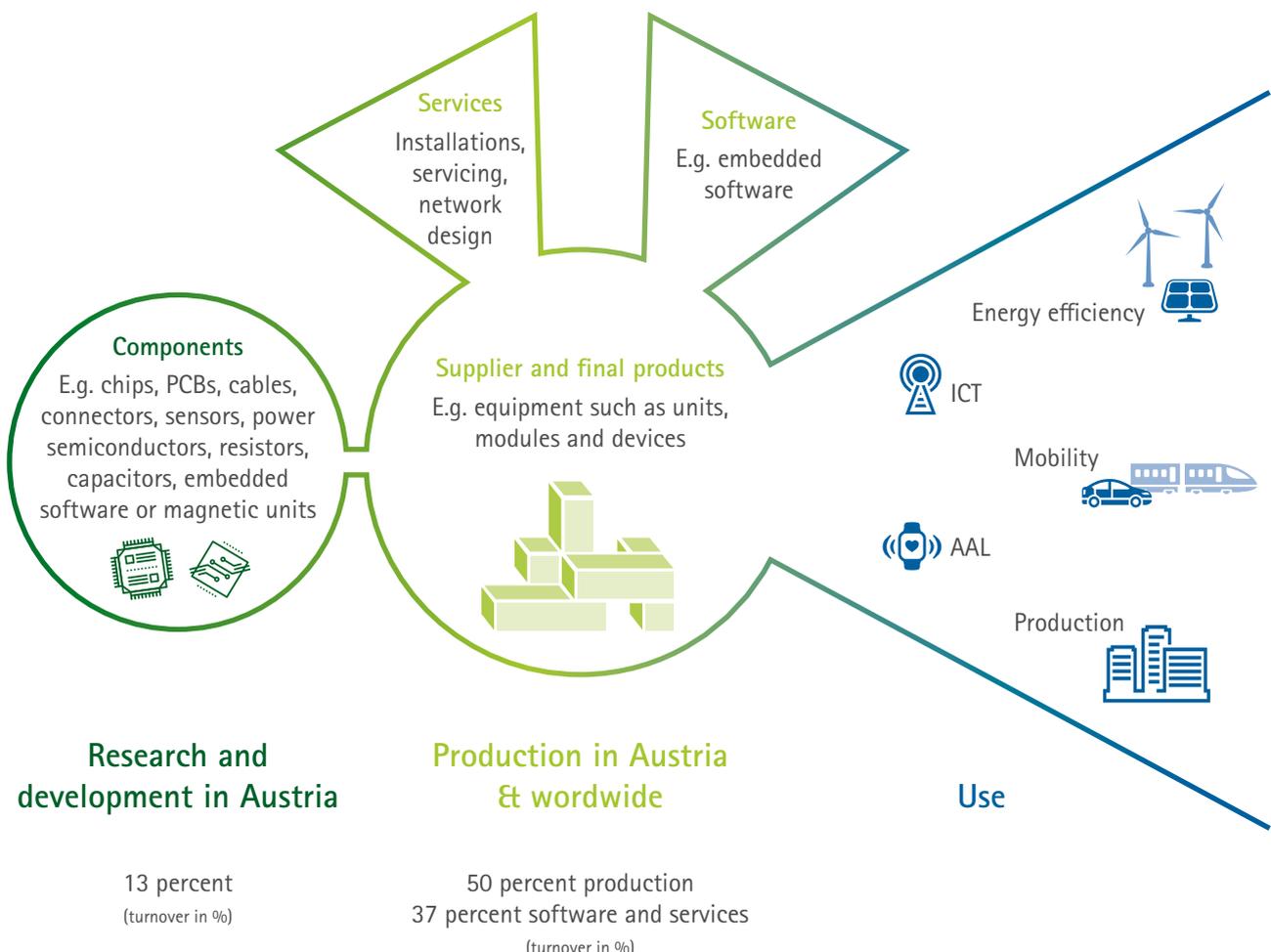
Value creation chain in Austria

The economic performance of the EBS sector lies in the strength of its value creation chain. The following model shows the correlation and leverage effect of the research and development institutions with the manufacturing companies. The focus here is on research, development and production to use and deliberately excludes trade.

Austria has a particular strength, namely the density and quality of the value creation chain.

Electronic Based Systems value creation chain

The close ties with a highly-specialised supplier industry that combines system know-how with ICT expertise defines Austria's pioneering role. ICT know-how is the catalyst along the value creation chain.



Source: Caldera Peter, Hartmann Christian, Rollet Herwig, Zerobin Franz (2016): Electronic Based Systems in Austria – Facts and figures. Graz.

The pure research institutions provide the basic knowledge for the manufacturing companies. The next step is the development, manufacturing and sale of products such as hardware, software and systems along the value creation chain.

For the companies, the shares for R&D, production and service are determined as a percentage of the Austria-related turnover.

The illustration shows the most realistic picture possible of EBS along the value creation chain.

13 percent: strong research

Research dominates in the overall field of micro- and nano-electronics with an R&D quota of 13 percent, in sub-segments of Electronic Based Systems, the R&D quota achieves up to 25 percent. By comparison: the research quota in Austria (research and experimental development is estimated to be 3 percent in 2015.)

37 percent: software and services

37 percent of the total turnover in Austria is accounted for by the field of software and services. At the same time, this means for the location that at present, there are no big producers of software on an industrial scale, but there are a large number of companies in Austria who use the highly-specialised software, in niche areas too.

50 percent: production

With more than 50 percent of the total turnover, the focus is on manufacturing and production within the EBS value creation chain.

Electronic Based Systems in Austria: strengths, weaknesses, opportunities and threats

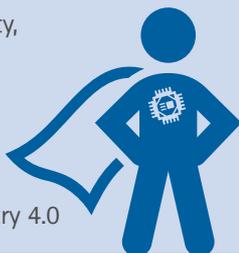
Where does Austria stand in the global EBS environment? The SWOT analysis provides answers for Austria as a location. The large number of protagonists and the extensive technological competences show the strengths and opportunities. In view of global trends and social challenges, the Austrian research institutions and companies have the chance to be up there at the top of the list. This is possible if the domestic protagonists come together in an innovation cluster and concentrate their resources. The threats and weaknesses clearly indicate the lack of any networking and the existing shortage of experts.

Strengths of Austria as a location

- Leading businesses and competitive advantages in the field of MEMS and sensor systems. MEMS are micro-electromechanical systems, e.g.: microphones in Smartphones, airbag sensors
- Innovative leading companies in the fields of RFID/ NFC, power electronics, automotive, mechanical engineering
- Hardware in the field of chips and components
- A large number of protagonists
- Embedded software: a combination of hardware and software as components
- High R&D competences

Competences in technologies and fields of application

- Vehicle electronics
- Mobility systems (smart mobility, autonomous driving)
- Measurement and control engineering, automation
- Mechanical engineering, Industry 4.0

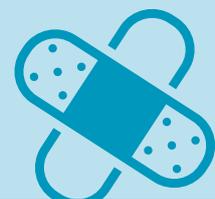


Strengths

S

Weaknesses of the research and innovation culture

- Lack of critical mass and networking in the research landscape
- Innovation culture to transform new knowledge into innovations
- Next generation of students in MINT subjects
- Shortage of experts
- Austria occupies a lower middle ranking in a European comparison, but has the potential to catch up



Weaknesses

W



Opportunities for Electronic Based Systems

- Social challenges promise a growing market potential in the megatrends towards extensive automation with the Internet of things and
- cyber-physical systems (CPS), mobility, energy, smart cities and health
- The demand for EBS will grow: networked systems, the Internet of things and Industry 4.0
- Autonomous systems: self-driving cars and smart products
- Combination of hardware and software into overall systems/development of CPS.
- Innovation micro-electronics cluster: networking of protagonists in Austria within the scope of a national cluster, strengthening of the innovation ecosystem.
- Increasing complexity of the systems: Austrian protagonists have the know-how to find the solutions.



Opportunities

O

Threats and gaps

- Clearly disadvantageous general conditions in terms of competition law compared to international competitors
- Gaps in the existing value creation chains: original equipment manufacturers (OEM) and system integrators
- **Lack of research offers**
 - › System view and system integration
 - › Chip design
 - › Gaps in the field of (university) training
 - › Security and trust
- Fragmented regulatory landscape in Europe: inhibits rapid sales opportunities and market developments



Threats

T

Statements



AVL List GmbH

Josef Affenzeller

Coordinator of national and international research, AVL List GmbH Chairman of ECSEL-Austria

One field in which AVL is involved is measurement technology and test systems for overall vehicles and their components. The integration of simulations and tests is a key factor here. One requirement are correspondingly high accuracies for a fast data acquisition and its integration in a software environment. We therefore welcome the activities of the Federal Ministry for Transport, Innovation and Technology to strengthen the field of cyber-physical systems in Austria.

EPCOS OHG

Georg Kügerl

Executive Vice President & Chief Technology Officer

The study is a good reflection of the demands on the Austrian electronics sector. We have a number of powerful, innovative enterprises and research institutions. However, what we lack are common key customers who specify technological focuses and act as system integrators. We thus support the proposed creation of a nationwide electronics cluster.



Infineon Technologies Austria AG

Sabine Herlitschka

CEO of Infineon Technologies Austria AG

As a strong protagonist in the field of "Electronic Based Systems", Infineon Austria concentrates on the central global challenges such as energy efficiency, mobility and safety. Industry 4.0 in particular is a big opportunity for Austria that can be effectively developed with EBS. The focus for the future must clearly be on training experts as well as system-oriented solutions.



AIT Austrian Institute of Technology

Anton Plimon
Managing Director

Electronic Based Systems (EBS) are a key motor for innovation in industry and are essential for Austria as a location. In the fields of mobility and energy, the trend is towards complex systems based on power electronics and digital control engineering, right through to integration into an intelligent surrounding. AIT hereby accompanies industry from the concept, through development, right down to validation in the laboratory.

JOANNEUM RESEARCH

Wolfgang Pribyl
Managing Director

JOANNEUM RESEARCH (JR) carries out a wide range of research into and with EBS. The use of EBS is a strength of JR and of great importance for all fields of research. An intelligent combination of sensors, actuators and control electronics based on programmable computing units can reliably control complex processes and collect measurement data. Apart from using EBS, JR develops its own EBS for acoustics, image and video processing, sensor systems as well as communication (IoT and RFID; satellites).



Graz University of Technology

Harald Kainz
Rector of the Graz University of Technology

The continuous collection and analysis of data from numerous sensors as well as a real-time control of actuators based on this determine Electronic Based Systems. Together with award-winning re-search partners from commerce and industry, the TU Graz makes a crucial contribution to the further development of the Austrian electronics sector in its interdisciplinary fields of research, the "Fields of Expertise". We are deeply committed to establishing a cluster for this sector that will be decisive for the success of the EBS sector and the whole of Austrian industry.

Outlook

Electronic Based Systems are a strength of the Austrian electronics industry. The large number of active protagonists with 93 R&D locations, 188 enterprises, five technology-oriented and five application-oriented research focuses are a good starting point for Austria as a location.

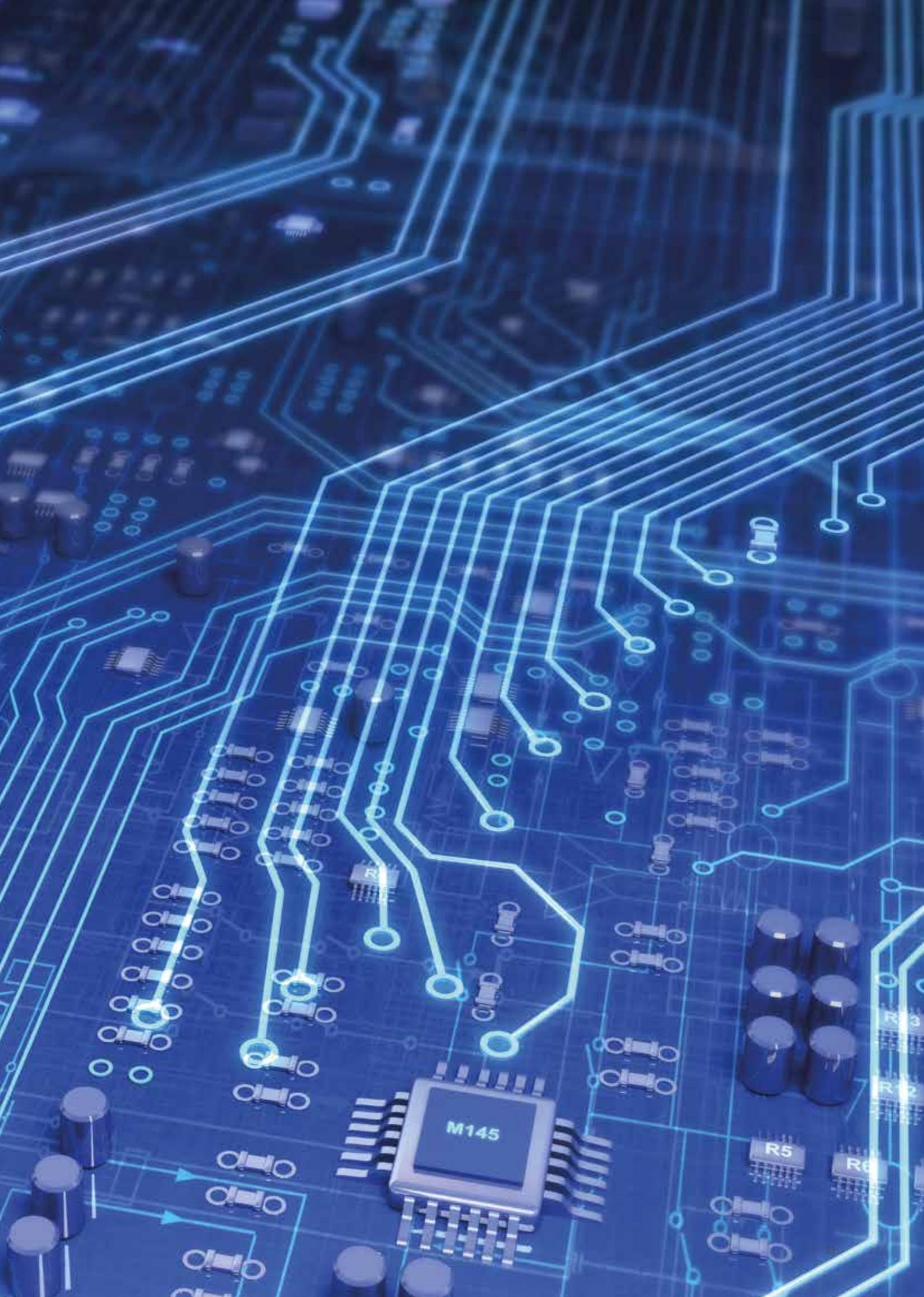
Austria's technological strength lies in developing electronic components with specific software that make a machine or product intelligent and operational. This is a basic requirement to realise applications for the trends of the future such as Industry 4.0 or the Internet of things. This is the reason for the high strategic significance of developing and producing these technologies as a forerunner.

The value creation chain shows the close ties between research and application-oriented implementation in companies. This interaction is the key for the innovative power and strengthening of the domestic business location with highly-qualified jobs and local value creation.

The EBS location Austria is in a respectable starting position for the European race for a technological future. But it should not be lone wolves who line up at the start, rather the EBS innovators as a team.

Download the entire EBS study at:
<http://www.bmvit.gv.at/service/publikationen/innovation/ikt/index.html>





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List of abbreviations

AAL:	Ambient Assisted Living
CPS:	Cyber-Physical Systems
EBS:	Electronic Based Systems
FTI:	Forschung, Technologie und Innovation (research, technology and innovation)
ICT:	Information and Communication Technologies
KET:	Key Enabling Technologies
MEMS:	Micro-Electro-Mechanical Systems
MINT disciplines:	Generic term for the disciplines mathematics, information sciences, natural sciences and technology
NFC:	Near field communication
PCB:	Printed Circuit Board
RFID:	Radio-Frequency Identification (identification by means of electromagnetic waves)
RTI:	Research, technology and innovation

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