t.
TRAUNER VERLAG
UNIVERSITÄT

IDIMT-2025
ICT in Business: AI Everywhere? Glory and Disgrace of AI

33rd Interdisciplinary Information Management Talks

With pride we present the proceedings of the 33rd annual IDIMT Conference.

Artificial Intelligence continues to make impressive advances and almost every month a new system is presented. But does this translate into a proportionate use in business – and as a second step, business advantages? In this conference we investigate various aspects of new developments to ICT itself as well as its use for management and business processes and their transformation. Ethical and security aspects as well as specific application areas (teaching, autonomous vehicles, supply chain management, social media) are touched too, to obtain an encompassing view of the topic.

We have chosen the following 10 topics for 2025:
- Early Career & Student Showcase (Sonntag)
- AI in Crisis Management (Neubauer, Rainer)
- Cyber Security vs AI (Sonntag)
- Ethical Aspects of AI: Research and Usage (Lisnik)
- Data, AI and Digital-Driven Transformation: Shaping Sustainable Digital Futures (Pucihar)
- AI and Autonomous Systems (Schoitsch, Abdelkader)
- Business Information Systems and Digitalization (Doucek, Maryška)
- Social Media and AI: Contributor, Selector, ...? (Pavlíček)
- AI in Supply Chain Management (Delina)
- University-Industry Collaboration (Pitner)

Based on a double-blind two-step review process we have selected 43 of the submitted papers with a totality of more than 107 co-authors. The program ran in two parallel streams.

The authors come from 11 different countries: Armenia, Austria, Czech Republic, Germany, Greece, Israel, Poland, Slovakia, Slovenia, Spain and Ukraine.

DOI:10.35011/IDIMT-2025

9 783991 518563
ISBN 978-3-99151-856-3

www.trauner.at

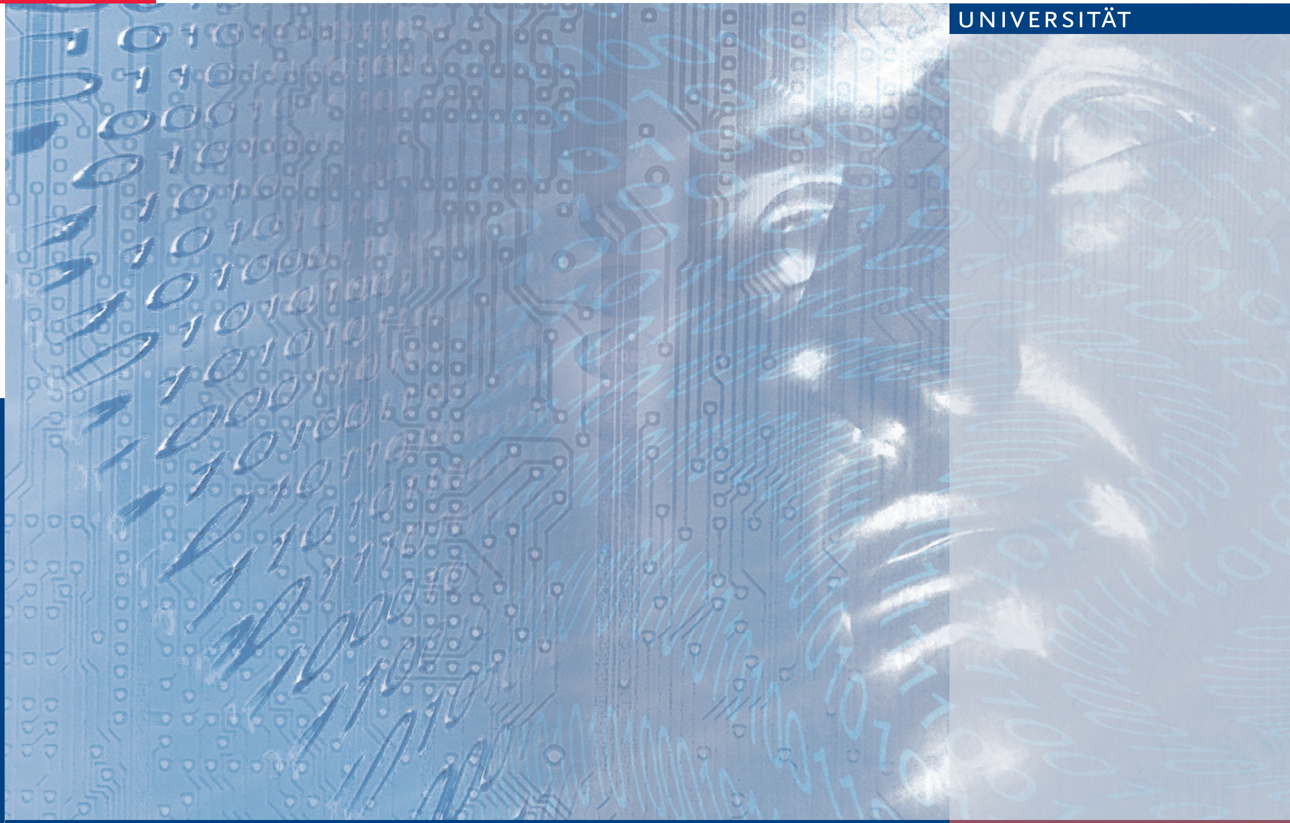
t.
TRAUNER

IDIMT-2025

Doucek ■ Sonntag ■ Nedomova (Editors)

Band 54

t.
TRAUNER VERLAG
UNIVERSITÄT



Schriftenreihe Informatik

54

Doucek Petr ■ Sonntag Michael ■
Nedomova Lea (Editors)

IDIMT-2025
ICT in Business: AI Everywhere? Glory and Disgrace of AI

33rd Interdisciplinary
Information Management Talks
Sept. 3–5, 2025
Hradec Králové, Czech Republic

JKU
JOHANNES KEPLER
UNIVERSITÄT LINZ

TRAUNER VERLAG
UNIVERSITÄT

Schriftenreihe
Informatik

54

DOUCEK PETR ■ SONNTAG MICHAEL ■
NEDOMOVA LEA (EDITORS)

IDIMT-2025

ICT in Business: AI Everywhere?
Glory and Disgrace of AI

33rd Interdisciplinary
Information Management Talks
Sept. 3–5, 2025
Hradec Králové, Czech Republic

Impressum

Schriftenreihe Informatik

Doucek Petr ■ Sonntag Michael ■
Nedomova Lea (Editors)
IDIMT-2025
ICT in Business: AI Everywhere?
Glory and Disgrace of AI
33rd Interdisciplinary Information Management Talks

This publication was partially supported by the Prague University of Economics, Business – project IG409035 and institutional support for the long-term conceptual development of science and research at Faculty of Informatics and Statistics (IP400040), and the Johannes Kepler University Linz.

The Conference IDIMT-2025
took place September 3–5, 2025
in Hradec Králové, Czech Republic

Herausgeber:
Prague University of Economics
and Business
nám. W. Churchilla 1938/4
130 67 Praha 3
Czech Republic

Kommisionsverlag:
TRAUNER Verlag + Buchservice
GmbH
Köglstraße 14, 4020 Linz
Österreich/Austria

Herstellung:
paco Medienwerkstatt,
1160 Wien, Österreich/Austria

PRINTED IN
AUSTRIA

DOI: 10.35011/IDIMT-2025

ISBN 978-3-99151-856-3
www.trauner.at

TABLE OF CONTENS

AI IN CRISIS MANAGEMENT

CYBER SECURITY VS AI

ETHICAL ASPECTS OF AI: RESEARCH AND USAGE

DATA, AI AND DIGITAL-DRIVEN TRANSFORMATION: SHAPING SUSTAINABLE DIGITAL FUTURES

AI AND AUTONOMOUS SYSTEMS

BUSINESS INFORMATION SYSTEMS AND DIGITALIZATION

SOCIAL MEDIA AND AI: CONTRIBUTOR, SELECTOR, …?

AI IN SUPPLY CHAIN MANAGEMENT

UNIVERSITY-INDUSTRY COLLABORATION

EARLY CAREER & STUDENT SHOWCASE

ANNEX

ROLE OF ACADEMIA IN SEMICONDUCTOR INNOVATIONS: BETWEEN FREEDOM AND RESILIENCE

Jan Ministr

Technical University of Ostrava
Faculty of Economics
jan.ministr@vsb.cz

Tomáš Pitner

Mendel University
Faculty of Business and Economics
tomas.pitner@mendelu.cz

CyberSecurity Hub, z.ú.
pitner@cshub.cz

DOI: 10.35011/IDIMT-2025-373

Keywords

Semiconductor industry; integrated circuits; supply chain resilience; national semiconductor strategies; institutional innovation models

Abstract

The goal is to provide a comprehensive overview of semiconductor products, production processes, and strategic positioning of Central Europe, and the policies and institutional frameworks that shape global competitiveness in this critical industry. It examines national and regional strategies from major global players including the US, EU, China, Japan, Korea, and Taiwan. Finally, it identifies institutional models facilitating the transition from research to innovation and the significance of university-led contributions to talent and innovation. The ultimate goal is to provide advices what study programs are vital for further scalable development of this industry and its applications, and what institutional instruments can the policymakers use to foster the semiconductor industry and innovation growth in Czechia and Europe.

1. Introduction

Semiconductors are essential components that drive modern technology. Their importance extends beyond computing into other strategic sectors such as energy industry, defense, where they enable sophisticated systems for surveillance, data processing, and autonomous control. They also increasingly shape the globalization (Lamsal, Devkota, & Bhusal, 2023). In this setting, academia plays a dual role – as a source of foundational research and as a partner in innovation ecosystems.

1.1 Goal and Structure of the Paper

Chapter 2 brings an overview of semiconductor products and production processes, followed by Chapter 3 describing strategic positioning of Central Europe. Then in 4, it analyses the R&D intensity, Chapter 5 examines of national and regional strategies from major players such as the US, EU, China, Japan, Korea, and Taiwan. Finally, it identifies institutional models – such as ITRI, IMEC, and KAIST – that facilitate the transition from research to industrial innovation.

2. Semiconductor Products

2.1 What are Semiconductor Elements?

Semiconductor elements primarily refer to "chips" – that is, integrated circuits (ICs) composed of up to billions of transistors. These chips are found in a wide variety of applications, such as central processing units (CPUs), graphics processing units (GPUs), and other processors used across computing and communication systems. A specialized category includes *ASICs (Application-Specific Integrated Circuits)*, which are designed for specific tasks in fields like automotive systems, military hardware, and consumer electronics. Semiconductor chips serve essential roles in both *computational processing* and *data storage*.

2.2 Logic and Memory Semiconductor Devices

They are what we mostly colloquially understand as chips – integrated circuits of high complexity serving as the "hearts and brains" of today's computers, smartphones, and drive the global online services running in large datacenters, as well as banking, governments, telcos, and many more. They are by far the most complex semiconductor devices manufactured using high-tech production processes in a limited number of fabs. The most advanced manufacturers are Samsung (memory chips) and TSMC (logic chips). Apart of final production, there is a strong position of so-called fabless industries based on chip-design rather then manufacturing, such as NVIDIA or Apple that not only design their custom chips but also deliver products to end customers.

2.3 Power Semiconductor Devices

Power semiconductor devices are crucial for transmission, distribution, and conversion of electrical energy. They are commonly used in *photovoltaic systems* and *distributed energy resources (DER)* to control and optimize energy flow. In transportation, they are central to *traction systems* such as those in electric vehicles, locomotives, and e-bikes. Power semiconductors also play a vital role in *high-voltage direct current (HVDC)* power transmission and are based on wide-band gap materials such as silicon carbide (SiC). OnSemi and Infineon belong to the top vendors.

2.4 Analog-Digital Chips

Analog-digital chips (Martins et al, 2021) are fundamental for *telecommunications devices*, including *transmitters and receivers* for various RF (Radio Frequency) purposes. These chips are also included in *positioning system receivers*, such as GPS, Baidou, or Glonass, where they receive satellite signals to determine location. Analog-digital chips are frequently used as *amplifiers*. They are also vital for *medical devices* as sensors. In general, these chips are indispensable in systems where analog input must be converted to digital form or vice versa.

2.5 Special Semiconductor Devices

Notably, the current era opens the future for quantum communication and computing employing completely different physical principles such as silicon spin qubits, donor qubits, or quantum dots, and allowing quantum computing as a new paradigm. Other classes of special devices include organic semiconductors where some of them are already in use, such as organic LED (OLED) in displays. Organic photovoltaics is another promising field, capable of producing flexible, light, and cheap photovoltaic cells.

3. Position of Semiconductor Industry

3.1 Semiconductors in Central Europe

Central European countries – particularly CZ, DE, SK, and PL – are recognized for their diverse contributions to the semiconductor value chain, especially since the *EU Chips Act*. The next table provides an overview of semiconductor sector share of GDP as a proxy for its economic significance.

Table 1. Estimated Share of Semiconductor Industry GDP for Selected Central European Countries

Country	Estimated Share of GDP	Context / Notes
Czech Republic	0.5% – 1%	Established microelectronics sector with design and manufacturing presence. OnSemi and South Moravia are notable contributors, see Czech Strategy (2024).
Germany	1% – 1.5%	Leading European semiconductor producer with focus on automotive and industrial chips (Infineon, Bosch). Major investments in scaling production (new fab in Dresden), see (German Trade and Invest, 2024).
Slovakia	0.5% – 1%	Electronics sector closely tied to automotive industry. Notable contribution to GDP through sensors and microelectronics, see Statista (2025).
Poland	0.2% – 0.5%	Emerging player focused on semiconductor design and software. Increasing investments in packaging capabilities as of Grzegorczyk (2024)

3.2 Semiconductors in Czech Economy

For further analysis, five sectors and three key technologies that can benefit from the development of integrated circuit design in the Czech Republic were identified in the *National Semiconductor Strategy* (Czech Strategy, 2024) based on the *National RIS3 Strategy*:

- *Industries:* 1. Automotive, namely electric vehicles; 2. Railways and rolling stock; 3. Aerospace, in particular the space sector; 4. Energy; 5. Electronics and Electrical Engineering.

- *Key technologies under the Czech National Semiconductor Strategy are:* 1) *Cybersecurity* (thematic area Digital Technologies and Electrical Engineering, key technology Digital Security and Connectivity); 2) *Artificial Intelligence* (thematic area Digital Technologies and Electrical Engineering, key technology Artificial Intelligence); 3) *Photonics and Micro/Nanoelectronics* (thematic area Digital Technologies and Electrical Engineering, key technology Photonics and Micro/Nanoelectronics). 4) Innovations in Semiconductor Production Key Steps

Innovations in semiconductor production reflects the R&D intensity in each phase. As a prerequisite, qualified personnel must be trained in specific study programs.

4.1 R&D Intensity

Design: its goal is to create custom systems on chips (SoCs), HW accelerators, analog-digital devices. This phase requires complex EDA tools featuring formal verification, simulations, high-level abstraction, logical complexity, and increasing integration of AI methods. Vendors like Synopsys, Cadence, or Codasip develop highly advanced tools while Apple, NVIDIA, Qualcomm, and others construct their own designs, such as Apple Silicon Mx SoC series. The R&D intensity is very high, with innovation focusing on design automation, HW-SW optimization, and RISC-V adoption.

Raw Materials. The initial stage of materials acquisition centers on obtaining and conditioning critical substances like ultra-pure silicon, rare-earth metals, and specialized gases integral to semiconductor manufacturing (Piotrowski, 2023; Mei, 2024). Research and development efforts in this phase are generally moderate to limited with gradual, stepwise enhancements.

Instrumentation: This phase involves the development of cutting-edge equipment such as photolithography machines including leading-edge Extreme Ultraviolet (EUV) lithography, and wafer inspection tools based on advanced (light- and electron) microscopy being essential to the manufacturing process. Companies like ASML and ThermoFisher lead in delivering tools capable of operating up to the atomic-scale precision. R&D intensity is very high.

Chemicals: Semiconductor materials are developed in steps encompassing ingot growth, wafer slicing, cleaning, and chemical-mechanical polishing. It requires ultra-high-purity chemicals and formulations. It needs medium to high R&D intensity, particularly in refining materials that support next-generation lithography and minimizing contamination at nanoscales.

Wafer Fabrication: is the key step in semiconductor production, where chips are manufactured in fabs operated by companies like TSMC, Samsung, OnSemi, Infineon and others. This phase includes photolithography, etching, deposition, and doping. The R&D intensity is very high, as this area drives process scaling to 3 nm and beyond, enabling advanced device architectures such as FinFETs.

Assembly & Packaging involve physically inserting chips into final packages using techniques that become increasing complex through use of 2.5D/3D stacking and chiplets. Traditional outlet for packaging where cheaper yet nearshore to production facilities. However, this phase has grown increasingly strategic. The R&D intensity is medium to high, with a strong focus on thermal management, signal integrity, and miniaturization to meet performance and size demands.

Distribution: the finished semiconductor devices must be handed over to OEMs and integrators which involves logistics and warehousing. This stage typically involves low R&D intensity, as it focuses more on operational efficiency through modern logistics tools and supply chain optimization, rather than technological innovation.

Integration: the previous steps would miss a purpose unless the integration phase follows: using semiconductor components into final products such as cars, smartphones, machinery, or telecommunication devices. It involves design and manufacturing of hardware devices using chips and typically requiring some firmware and/or its adaptation. The R&D intensity is medium, as it enables performance tuning, energy efficiency enhancements, and differentiation of products through system-level innovation.

4.2 Skills and Study Programs

Table 2 depicts relevant skills and study programs for each semiconductor production step.

Table 2. Study Programs and Skills in Semiconductor Production

Stage	Relevant Study Programs
1. Design	Computer Engineering, Chip Design, Embedded Systems, EDA Tools, SoC Architecture, Analog-Digital Systems
2. Raw Materials	Materials Engineering, Chemistry, Geology, Environmental Engineering
3. Instrumentation	Applied Physics, Optoelectronics, Instrumentation & Control, Mechatronics
4. Chemicals	Chemical Engineering, Physical Chemistry, Surface Chemistry, Nano-chemistry
5. Wafer Fabrication	Microelectronics, Nanotechnology, Semiconductor Physics, Cleanroom Technology, Optics
6. Packaging	Mechanical Engineering, Packaging, Thermal Simulation, Microsystems
7. Distribution	Supply Chain Management, Industrial Engineering, ERP Systems, Logistics
8. Integration	Systems Engineering, Embedded Systems, Automotive, IoT Systems

Source: (author)

5. Strategies for Innovations

We used a bottom-up approach to find semiconductor production phases with their respective R&D intensity. The strategies to achieve and maintain competitiveness in research and industry are often underpinned by national/EU policy documents, see also (Diamond, 2023).

5.1 Policy Documents

United States CHIPS and Science Act (2022) aims to foster the domestic manufacturing and R&D by $52.7 billion in semiconductor incentives, including $39 billion for manufacturing. The National Semiconductor Technology Center (Natcast) was founded and the program stimulated private investment in semiconductor facilities.

European Chips Act (2023) wants the EU semiconductor market share to reach 20% by 2030. The policy seeks to enhance supply chain resilience and promote technological sovereignty through public and private investments of over €43 billion. However, the latest report from the EC Court of Auditors does not see the original targets as achievable without major changes, see Inside EU (2025).

China Semiconductor Self-Sufficiency Strategy focuses on technological self-sufficiency even under foreign export controls and geopolitical limitations, see (Lee & Malerba, 2022). The government commits large subsidies to Chinese firms such as SMIC and Huawei.

Japan Semiconductor Revitalization Strategy strives to regain competitiveness on the global scale. A major tool is the establishment of Rapidus Corporation, which tries to create next-generation chips in an international collaboration.

Korea K-Chips Act and Strategic Industry Support provides significant tax incentives and government support for semiconductor companies. The country aims to maintain its dominance in memory chips while expanding into non-memory and AI-related semiconductor markets.

Taiwan Semiconductor Strategic Policy 2025 is aimed to ensure the country's global leadership in semiconductor manufacturing. Taiwan seeks to bolster its technological sovereignty and protect against geopolitical disruptions.

5.2 Institutional Instruments

A successful semiconductor strategy does not rely solely on large-scale financial subsidies also an establishment of specialized institutions as mediators between scientific innovation and commercial application:

Rapidus Corporation in Japan (see Rapidus, 2025) is a Japanese semiconductor initiative established in 2022 to develop next-generation logic semiconductors, including the 2nm scale and lower. It collaborates with international partners, including IBM and Europe, to adoption the cutting-edge chip architectures being supported by the Japanese government and leading domestic firms.

Semiconductor Research Institutions in China are combination of state-directed initiatives and the emergence of specialized research institutions. Among the most prominent is the Institute of Microelectronics of the Chinese Academy of Sciences (IMECAS, 2025).

Semiconductor Research Institutions in Korea contribute to the strong collaborative model of industry, academia, and government sectors. Namely, Korea Advanced Institute of Science and Technology, is famous in semiconductor materials, nanoscale electronics, and AI-focused hardware (KAIST, 2025), and the Electronics and Telecommunications Research Institute (ETRI) plays a key role in memory systems, logic chip development, and foundry-related technologies. The government facilitates programs by the Ministry of Trade, Industry and Energy and by directing targeted R&D investments that align with the K-Semiconductor Strategy.

Taiwan semiconductor research institutions are dominated by the National Institutes of Applied Research (NIAR, 2025), this organization is Taiwan's central point for publicly funded national laboratories. Its role is critical in supporting academia—industry collaboration, particularly in pre-commercial experimentation including semiconductors in Taiwan Semiconductor Research Institute (TSRI). Industrial Technology Research Institute (ITRI) supports both established firms and startups in semiconductor design, packaging, and AI chip development.

Fraunhofer in Germany focuses on *incremental innovation* with *direct industrial application*. Its typical project cycles range from 6 to 24 months, allowing for rapid, industry-relevant outcomes. The institute's strength lies in achieving cumulative small advances that gradually build national technological capability. (Fraunhofer, 2025)

IMEC in Belgium concentrates on exploring fundamental scientific themes that maintain strong industrial relevance, as recently shown in its participation in IPCEI projects (IMEC, 2024). Its primary goal is to sustain long-term research excellence and readiness for future technology scaling, making it a critical part of Europe's semiconductor R&D infrastructure.

5.3 University-Led Innovation in Asia

China between 2018 to 2023 published approximately 160,000 studies related to chip technology, accounting for 34% of all global research in the field, according to recent reports from ETO (MSN, 2025). University-linked research platforms such as University of Chinese Academy of Sciences (UCAS) and Tsinghua University's School of Integrated Circuits are central to China's research and talent cultivation.

Korean top universities such as KAIST, POSTECH, and Seoul National University operate advanced semiconductor labs that produce world-class research and skilled engineers, particularly in 3D integration, EUV lithography, and process automation, see KAIST(2025).

Taiwan top universities – namely National Taiwan University (NTU), National Tsing Hua University (NTHU), and National Chiao Tung University (NCTU) – operate advanced semiconductor research centers that produce skilled engineers and generate foundational research in device physics, system-on-chip (SoC) architecture, and power electronics. These academic institutions often collaborate with ITRI and NIAR and participate in national programs such as the Semiconductor Moonshot Project, which aligns research objectives with national industrial policy and talent development strategies.

6. Conclusion

We could see several necessary preconditions for establishing robust innovative ecosystem for semiconductors in regions, countries, and beyond. These findings can serve as both overview and high-level advice for policy-making and strategic considerations.

Alignment of Interests: Success is maximized when public funding and private capability align—through co-investment, shared infrastructure, and policy.

Institutional Diversity: Breakthroughs come from both short-term applied research (Fraunhofer) and long-horizon exploration (ARPA-E, imec).

Ecosystem Building: Ecosystems (e.g., Hsinchu Science Park in Taiwan) amplify innovation via talent clustering, shared infrastructure, and SME integration.

Geopolitical Adaptability: Shocks (e.g., Covid or U.S. sanctions on China) can catalyze restructuring and convergence of innovation actors. However, recent EU analysis on advancement in EU Chips Act do not give convincing evidence that the EU fills the gap (IEM, 2025).

Strategic Sovereignty: Nations are increasingly pursuing "technology sovereignty" reducing reliance on foreign sourcing: raw materials, IP, and production capacities while integrating into global supply chains.

Acknowledgement

The research has been supported by the *Advanced Chip Design Research Center (ACDRC)* which is established under the Taiwan-Czech Democratic Partners Supply Chain Resilience and Capacity Building Cooperation Plan for 2022-2026.

References

Baliga, B. J. (2018). *Fundamentals of power semiconductor devices*. Springer.

Czech Strategy (2024). Ministry of Industry and Trade of the Czech Republic: *National Semiconductor Strategy*, Prague 2024

Diamond, L., Ellis, J. O., & Schell, O. (Eds.). (2023). *Silicon Triangle: The United States, Taiwan, China, and Global Semiconductor Security*. Hoover Press.

Fraunhofer-Gesellschaft (2025). *Fraunhofer Group for Microelectronics*. https://www.fraunhofer.de/en/institutes/institutes-and-research-establishments-in-germany/fraunhofer-groups/microelectronics.html

German Trade and Invest (2024). *The German Semiconductor Market 2024-2025.* https://www.gtai.de/resource/blob/934980/e3c8f5128cdb3e7eac279522164bd773/20241211_FS_Semiconductor_WEB.pdf

Grzegorczyk, M. (2024). How Poland became key to Europe’s semiconductor sovereignty. *Emerging Europe.* 2024 (Oct 9). https://emerging-europe.com/analysis/how-poland-became-key-to-europes-semiconductor-sovereignty/

High Tech NL (2024). *Austria*: https://www.hightechnl.nl/austria

IMEC (2024). *Crucial role for imec in EU Chips Act.* https://www.imec-int.com/en/press/crucial-role-imec-eu-chips-act

Inside EU Monitoring (2025). *EU Auditors criticize EU Chips Act targets amid EU Commission progress update*. https://ieu-monitoring.com/editorial/european-chips-act-eu-commission-update-on-the-latest-milestones/614420?utm_source=ieu-portal/feed

IMECAS (2025). *Institute of Microelectronics of the Chinese Academy of Sciences*. http://english.ime.cas.cn

KAIST Korea Institute of Science and Technology (2025). *Center for Semiconductor Technology.* https://www.kist.re.kr/eng/research/center-Introduction.do

Lamsal, R.R., Devkota, A. & Bhusal, M.S. (2023) Navigating Global Challenges: The Crucial Role of Semiconductors in Advancing Globalization. *J. Inst. Eng. India Ser. B* 104, 1389–1399 (2023). https://doi.org/10.1007/s40031-023-00938-4

Lee, H. & Malerba, F. (2022). An Innovation Systems Approach to Decoding China’s Technological Catch-Up: The Case of the Semiconductor Industry.

Martins, R. P., Mak, P. I., Chan, C. H., Yin, J., Zhu, Y., Chen, Y., ... & Sin, S. W. (2021). Bird's-eye view of analog and mixed-signal chips for the 21st century. *International Journal of Circuit Theory and Applications*, 49(3), 746-761.

Martinis, J. & Boixo, S. (2019). *Quantum Supremacy Using a Programmable Superconducting Processor*, Google AI Quantum, https://research.google/blog/quantum-supremacy-using-a-programmable-superconducting-processor/

Mei, Y., Geng, Y., Chen, Z., Xiao, S., & Gao, Z. (2024). Ensuring the sustainable supply of semiconductor material: a case of germanium in China. *International Journal of Production Economics*, 271, 109231.

Phan, A. (2025). *China doubles US in chip research studies, claims 9 of world's top 10 institutions*, MSN.com, https://www.msn.com/en-xl/technology/tech-companies/china-doubles-us-in-chip-research-studies-claims-9-of-world-s-top-10-institutions/ar-AA1Dx5l8

Piotrowski, S. (2023). Critical raw materials in the semiconductor industry: Current challenges and perspectives. In The *Third International Scientific Conference: Studies in Changing Bussiness Environment*.

National Institutes of Applied Research (2025). About us. https://www.niar.org.tw/en/xmdoc/cont?xsmsid=0I160794819089056955

National Science and Technology Council of Taiwan (2018). *Semiconductor moonshot program.* https://www.digitimes.com/topic/semiconductor_moonshot_project/a001509.html

Rapidus (2025). Rapidus Corporation. https://www.rapidus.inc/en/about/

Shivakumar, S., Wessner, C., & Howell, T. (2022). *The Pillars Necessary for a Strong Domestic Semiconductor Industry*. Center for Strategic and International Studies (CSIS).

Statista (2025). *Semiconductors – Slovakia.* https://www.statista.com/outlook/tmo/semiconductors/slovakia