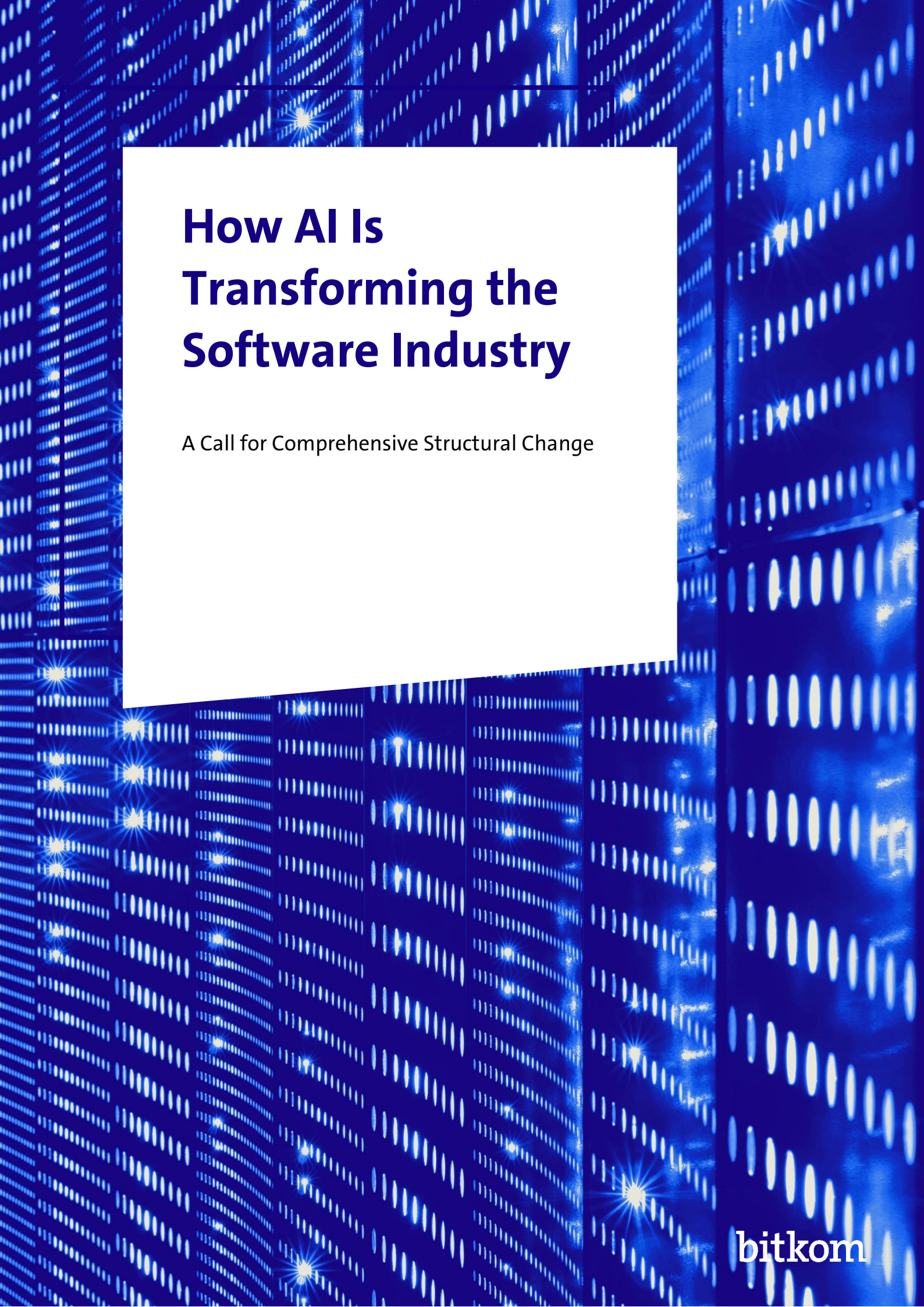

How AI Is Transforming the Software Industry

A Call for Comprehensive Structural Change

bitkom

Overview

How AI Is Transforming the Software Industry

Software as an Economic and Societal Operating System

The software industry is the key driver of economic growth and prosperity in Germany. It shapes the operating system of the economy and society and is crucial for competitiveness, innovation and digital sovereignty.

Structural Transformation Through AI: The Software Industry's Dual Role

With major advancements of AI, development processes, products, as well as value creation and business models of the software industry are undergoing profound change. This structural transformation affects the core of the industry and must be actively shaped. In this context, the software industry assumes a critical dual role: it is a key driver of digital transformation across almost all sectors of the economy and, at the same time, is itself directly affected by the AI transformation. This structural transformation must be successfully managed to ensure that the software industry can continue to serve as a central engine of economic growth and as a catalyst for a sustainable AI transformation of the economy.

Fields of Action for a Successful Structural Transformation

To ensure a successful structural transformation, it is necessary to set the course today. Key fields of action include:

- **Political Strategy for the Software Industry**
  Recognition of the industry as a critical economic sector; continuation of the National Digital Summit with a dedicated software focus; and coherent, innovation-friendly regulatory frameworks.
- **Transformation of the Industry itself**
  Proactive realignment of development processes, business models, and organizational structures, alongside the systematic integration of AI.
- **Transformation of Skills Development and Talent Acquisition**
  Modernisation of higher education, continuing professional education and training, dual vocational training, as well as targeted skilled labour immigration, to actively manage shifts in tasks and competency requirements.

Objective

The objective is a competitive, innovative, and responsible software industry that deploys AI in a sovereign manner, continuously upskills and retains skilled professionals, and sustainably secures Germany's role as a leading digital economy in the long term.

Content

1 Operating System of the Economy and Society

The Software Industry as a Critical Economic Factor

The signs of the times point to transformation. Artificial intelligence (AI) is accelerating the digital transformation of our economy and society like no other technology before. The software industry, with its product houses, service providers and consulting firms, plays a key role in this process. It is increasingly shaping the operating system of our economy and society and producing the basic material for digital transformation. How the software industry can shape digital transformation in a self-determined and economically sustainable manner is therefore a central economic and political question for the future.

The software industry is a critical growth factor for Germany's success. In 2025, the software industry in Germany is projected to generate total revenues of EUR 52.7 billion[1]. This corresponds to growth of 9.56 per cent compared to the previous year. Since 2021, the software industry in Germany has recorded a compound annual growth rate of 9.88 per cent and total growth of 60.18 per cent. Compared with the overall economy, the software industry is therefore developing steadily and at a rapid pace. At the same time, software is no longer just a standalone product, but an integral part of the value chain in every sector of the economy — from the automotive industry to healthcare and industrial manufacturing.

To secure sustainable economic growth and prosperity for Germany as a business location, and to ensure the ability to act and make decisions autonomously in the digital space, the skills and capabilities of a globally connected, international software industry based in Germany are essential. Only in this way can companies and public administrations in Germany make self-determined and confident choices among high-performing and trustworthy partners in the critical field of software, deploy software deliberately and responsibly, and further develop and optimise it as needed.

[1] Source: Bitkom. (↗ Time Series on ICT Expenditure in Germany | Bitkom Dataverse – Bitkom's Data Portal)

2 AI-Transformation as Structural Change

The software industry is facing its first major structural transformation. In a context shaped by geopolitical transformations, AI is fundamentally reshaping the industry's structures and processes.

AI is transforming software development processes in three key ways. First, roles and profiles are shifting away from implementation toward digital design and architecture, while tasks are increasingly being automated or supported by AI. As a result, the planning, orchestration, evaluation, and assurance of AI-enabled development processes are becoming ever more important, and requirements for governance, quality assurance, security, and process traceability are undergoing fundamental change. Second, AI is changing the characteristics of the software itself: software is becoming more data-dependent, more adaptive, and increasingly dynamic in nature. Third, AI is driving a realignment of value creation and business models within the software industry, as platform and ecosystem logics gain importance and new actors and publisher structures reshape market roles and forms of cooperation. Software companies must adapt their business models, develop new revenue logics, and strategically leverage partnerships to unlock innovation potential. Consequently, the industry's economic and social structure—including the distribution of jobs, modes of production for products and services, business models, and value chains—is changing at an unprecedented pace under the influence of AI.

While the German economy broadly agrees that AI is the most important future technology (81 per cent) and primarily views AI as an opportunity (83 per cent),[2] a more complex picture emerges within the software industry. To date, only 29 per cent of companies use AI in software development, while 38 per cent do not plan to use AI in the future.[3] The use of AI-generated code is regarded as a risk by 56 per cent.[4] This defensive stance represents a significant risk for the industry and a competitive disadvantage, as AI has long arrived in practice and will permanently shape software development.

[2] Source: Bitkom Research. (↗ Companies on the Use of Artificial Intelligence | Bitkom Dataverse – Bitkom's Data Portal)
[3] Source: Bitkom Research. Open-Source-Monitor 2025.
[4] Ibid.

3 The Software Industry in a Critical Dual Role

Driving Digital Transformation While Undergoing Structural Change

For the software industry, structural transformation entails assuming a critical dual role. While the industry has historically been a driver of digitalisation and automation, it is now itself undergoing transformation. In particular, the innovation-oriented and technology-driven software industry is being profoundly reshaped by new technological capabilities. The industry must transform proactively to harness these new technological opportunities and to ensure that the German software industry does not fall behind the rest of the world.

At the same time, the software industry remains a driving force and must live up to its responsibility as a key sector of the digital transformation. Germany urgently needs this industry and its capabilities to shape the digital transformation actively, autonomously, and responsibly.

In light of rapid technological progress, the software industry cannot afford to wait. At the same time, many developments remain difficult to predict in detail, as no end to technological progress in the field of AI is in sight. Business, policymakers, and higher education institutions must therefore set the right course today, leverage strong partnerships, and mobilise the necessary momentum to successfully implement the structural transformation of the software industry and secure a future-proof digital economy.

4 Fields of Action for an Active Structural Transformation

The software industry must live up to its responsibility as a shaping force of digital transformation while simultaneously transforming itself into a future-ready economic actor. This structural transformation requires a coherent political strategy, realignment of the industry's own structures and processes, and a fundamental transformation of skills development and talent acquisition.

Political Strategy for the Software Industry

To ensure a successful digital transformation, the software industry must be recognised at the political level as an integral and critical economic sector for Germany. To activate the industry's innovative and shaping capacity in a targeted and future-oriented manner, a political strategy is required that approaches the software industry in a connected and collaborative way, alongside regulatory frameworks that foster innovation.

The continuation of the National Digital Summit, placing the structural transformation of the software industry at its core, represents an important next step in establishing a targeted dialogue between policymakers and the software industry operating in Germany. This Digital Summit must serve as the impetus for a dedicated, long-term strategy to secure innovation, collaboration, and economic sustainability of the industry, and to position the industry to compete successfully at the international level.

To actively advance the AI transformation, the software industry also requires clear and reliable regulatory frameworks that foster innovation and economic activity rather than restraining them. Software is a key driver of economic growth. Safeguards such as responsibility, trust, data protection, and security are essential. At the same time, regulation must not become a barrier to innovation; instead, it should function as a driver of growth and a pillar of trust, positioning Germany as a trusted provider of internationally competitive technologies.

Currently, however, regulation has become an obstacle for the software industry: overlapping provisions, unclear requirements, and the risk of a fragmented regulatory landscape complicate planning and development. Instead of an ever-growing number of individual regulations, what is needed is a coherent and comprehensible framework that clearly defines which requirements and standards are to be met through software and how regulatory components affect the industry.

To ensure that requirements and responsibilities are transparent, clearly structured, and well defined, software professionals must be actively involved in the development

of regulatory frameworks. Such a consistent regulatory framework would not only provide legal certainty but also support the industry's growth.

Transformation of the Industry Itself

The software industry requires future-oriented companies that proactively address structural transformation across their structures, processes, and business models. Achieving future readiness through transformation must become an integral part of the industry's self-conception: companies must actively transform themselves.

Artificial intelligence must not be understood merely as a tool for efficiency gains or as an add-on. Instead, AI must become an integral component of software development and be systematically embedded across all phases—from planning and digital design to implementation and quality assurance, as well as deployment, operation, and further development. This requires not only new technical capabilities but also fundamentally new governance and regulatory systems across all stages of the process, particularly regarding design, quality assurance, security, traceability, responsibilities, and the handling of AI-generated code.

As a result of this development, role profiles, ways of working, and competency requirements within the industry are also changing. Design and implementation are shifting away from purely manual implementation toward the orchestration, architecture, evaluation, and assurance of AI-enabled development processes. Examples such as so-called »Vibe Coding« or »Agentic Software Engineering« illustrate that requirements for software developers are already undergoing noticeable change today. Companies must actively address these developments rather than merely responding to them reactively to remain competitive in the long term.

Software companies must also increasingly understand themselves as shaping large-scale transformation and as part of a connected ecosystem. The structural transformation of the industry will not succeed in isolation; it requires a shift in thinking toward platform and ecosystem strategies. Rather than pursuing innovation exclusively on their own, strategic partnerships, the integration of external platforms, and collaboration with specialised actors are becoming ever more important. The ability to navigate a rapidly evolving landscape of new providers, publishers, and platforms and to integrate them strategically into one's own value creation will become a key competitive factor. The sharing of experiential knowledge and best practices related to the use of AI in software development remains of central importance in this context. Such exchange is not a competitive disadvantage, but rather a prerequisite for securing the long-term success of the industry.

High-quality, structured, and accessible data form the foundation for the effective use of AI—both within existing software products and in the development of new AI-based solutions and business models. Investments in data infrastructures, data management, and data literacy are therefore an essential component of corporate transformation.

Beyond this, the continuous upskilling of employees is not an optional add-on, but a core component of successful transformation. Companies must invest on an ongoing basis in the qualification of their workforce and foster a learning culture that enables openness to new technologies, methods, and market requirements. Such a »Growth

Mindset« is crucial to rapidly embracing new technological opportunities in development, responding to changing customer needs, and, ideally, actively shaping these developments through innovation.

To remain a relevant economic factor, the software industry must also continue to evolve by establishing clear role profiles, professional development pathways, and attractive career trajectories. Only if companies provide their employees with clear perspectives in a changing world of work will they be able to retain skilled professionals over the long term, attract new talent, and sustainably support the structural transformation of the industry.

Transformation of Skills Development and Talent Acquisition

At present, the specific impacts that artificial intelligence will have on the labour market can only be predicted to a limited extent. However, studies and company surveys paint a consistent picture: AI will lead to significant shifts in tasks, qualification requirements, and competency profiles. Around one in four companies (27 per cent) expect AI to result in job reductions, while 16 per cent anticipate that positions will become obsolete due to AI that cannot be filled in any case. At the same time, 42 per cent expect AI to generate additional demand for IT professionals within their organisations.[5] According to a 2025 research report by the Institute for Employment Research, around 1.6 million jobs could be lost or newly created over the next 15 years, while the overall number of jobs would remain largely stable.[6]

What matters is not whether jobs disappear, but how to prepare employees and future skilled professionals for new requirements. Continuous upskilling thus becomes the central lever for safeguarding employment, attracting skilled workers, and maintaining the long-term competitiveness of Germany as a business location.

Higher education is a key enabler of this transformation. For many young people, university studies provide the entry point into a professional career in the software industry, while higher education institutions also play a decisive role in shaping the skills that will be available to the economy and society in the future. To successfully support the structural transformation of the software industry, degree programmes and qualifications must systematically consider the new opportunities and requirements arising from artificial intelligence. The objective must be to prepare students in a targeted manner for changing occupational profiles while simultaneously accelerating the transfer of new technological developments into companies.

To achieve this, universities need adequate financial and human resources as well as significantly more flexibility. In particular, the accreditation of degree programmes must be developed in such a way that faster innovation cycles are possible, and new content can be integrated into existing curricula without lengthy procedures. Future skills such as AI competence, data literacy, digital design, modern software development with AI support, and ethical and legal foundations should become an

[5] Source: ↗ Bitkom Research.
[6] Source: Institute for Employment Research (2025): Künstliche Intelligenz: Potenzielle Effekte für den deutschen Arbeitsmarkt.

integral part of the range of courses on offer. This requires context-specific AI basic modules in every degree programme. At the same time, universities must increasingly be thought of as places of professional and lifelong learning. The modularisation of degree programmes and the possibility of using individual modules as continuing professional development courses can help to better align academic education with the dynamic qualification requirements of the workplace.

In addition to higher education, shorter-term measures are also required across the wider education and training ecosystem to address the growing demand for skilled professionals. Within the dual vocational training system, this primarily means adapting training regulations more rapidly to technological developments and strengthening the digital infrastructure of vocational schools. In continuing professional education and training, funding conditions are needed that are more closely aligned with operational realities and that facilitate part-time, work-based upskilling. Skilled labour immigration also plays an important role, making simplified, digitalised, and accelerated application and visa procedures necessary. In addition, targeted career transitions into the software industry can make a valuable contribution if companies are supported in developing appropriate programmes and greater efforts are made to attract more women into technical professions and the software industry.

Overall, it becomes clear that the structural transformation of the software industry can only succeed if skills development is approached holistically. Higher education forms the central foundation, but must be complemented by flexible framework conditions, permeable education pathways, and close integration with continuing education and training, vocational education, and immigration. This approach makes it possible to harness the opportunities of the AI transformation, safeguard employment, and sustainably meet the demand for future-ready skilled professionals.

5 The Future of the Software Industry

Pioneering Responsible and Sustainable AI Transformation

If the structural transformation succeeds, the software industry will continue to serve as a driving force for economic growth in the future. Through continuous innovation in future technologies such as quantum computing, software-defined vehicles, connected IoT ecosystems, and artificial intelligence, the potential and significance of innovative, capable, and secure software for our economy and society will continue to grow in the years ahead.

At the same time, the software industry is not the only sector whose ways of working are being fundamentally transformed by AI. Similar challenges are also emerging in other industries, such as the automotive industry and the services sector. Owing to its dynamism and close proximity to cutting-edge technologies, the software industry can serve as a role model and catalyst for other sectors of the economy. If close cooperation between business and the education system, combined with smart political framework conditions, succeeds to sustainably manage the AI transformation, a model example of successful structural transformation will be set. The concepts developed in this process—from modern curricula to innovative continuing education models—can be readily transferred to other sectors.

A successful structural transformation of the software industry thus becomes the foundation for Germany's future competitiveness. If decisive action is taken now and the necessary investments are made, Germany can consolidate and further expand its position as a leading digital economy and a global frontrunner in software excellence.

Our vision is a software industry in which skilled professionals are not replaced by AI. Instead, they have evolved into »Digital Designers« and »Digital Engineers« who master AI as a powerful tool and design and deliver complex systems through a unique combination of design expertise, technical excellence, domain knowledge, and ethical reflection. German and European software companies export products that not only function reliably, but are also trustworthy, transparent, and human-centred, as well as best practices for AI-enabled digital design and digital engineering to markets around the world. Our dual vocational training systems and practice-oriented degree programmes produce graduates who not only command the use of AI tools but also understand their limitations and can engage critically with automatically generated code.

This transformation enables us not only to manage digital change, but to shape it: we secure employment, strengthen our competitiveness, and create products and services that set global benchmarks. This vision is not a utopia—it is within reach if we set the

right course now. The foundations are already in place: excellent educational institutions, innovative companies, and a framework that balances people and technology. What is required now is the political will and the necessary resources to actively shape this transformation.

Bitkom represents more than 2,300 member companies from the digital economy. Together, they generate over two hundred billion euros in revenue from digital technologies and solutions in Germany and employ more than two million people. The members include more than 1,000 medium-sized enterprises, over 700 start-ups and almost all global players. They provide software, IT services, telecommunications or internet services, manufacture devices and components, operate in the field of digital media, create content, offer platforms or are otherwise part of the digital economy. Eighty-two per cent of companies engaged in Bitkom are headquartered in Germany, a further 8 per cent come from the rest of Europe and 7 per cent from the United States, while 3 per cent are based in other regions of the world. Bitkom promotes and drives the digital transformation of the German economy and advocates broad societal participation in digital developments. Its aim is to make Germany a strong and sovereign digital location.

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