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INFRASTRUCTURES

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SPILOVER EFFECTS OF DATA CENTRES: THE BACKBONE OF THE AI REVOLUTION IN GERMANY

Executive Summary

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EXECUTIVE SUMMARY

Digital transformation is one of the greatest challenges and concurrently one of the greatest opportunities of the 21st century. Products, processes and business models are changing rapidly and radically, leading to the emergence of new markets, but also making old markets disappear into insignificance. Data centres are at the heart of this development, as they enable the processing and storage of large amounts of data that are generated by the advance of digitalisation in all fields of society.

Nevertheless, the importance of data centres is often not adequately recognised by the public – the concept does not initially evoke the association of contributing significantly to Germany's future viability. However, the role of a high-performance ecosystem of digital infrastructures cannot be overstated. It is not only a technical necessity, but also an essential factor for economic growth and international competitiveness. In the age of digitalisation, the adoption of new technologies and the associated potential for productivity growth and innovation – and ultimately the material quality of life – depend on whether the technical infrastructure and therefore the provision of data centre capacities can meet the demands. Not least for this reason, an increase in investment in data centres and other digital hardware to the level of the USA would unlock a potential space in Germany that would mean an additional value creation of around 410 billion euros.¹

As international comparisons clearly demonstrate, Germany and Europe as a whole have some catching up to do in the

expansion of infrastructure, given that the computing and data centre capacities are insufficient in light of the growing demand.² Consequently, many European companies, for example, utilise computing capacities in the USA. The resulting need for catch-up in Germany and Europe is concerning, firstly due to the strategic importance of data sovereignty: Almost half of the companies surveyed in this study stated that the data centres they use should be located in Germany. Secondly, geopolitical challenges (keyword: Deglobalisation) must also be taken into account, making it more difficult to rely on international capacities. This is purely about the location of the data centres, not about the operator itself. Responding to this requires enormous investments – although the willingness of private providers to invest is a given. Recently, Microsoft, Google and AWS as the cloud division of Amazon announced investments of over 14 billion Euro in Germany, a large part of which is to flow into data centres.³

¹ Cf. IW Consult GmbH, 2024, What if? – An Analysis of Growth Potentials for Germany, study commissioned by META, Cologne

² Cf. e.g., <https://www.faz.net/aktuell/wirtschaft/schneller-schlau/der-ki-fehlt-die-infrastruktur-wo-stehen-die-meisten-supercomputer-19936335.html>

³ Cf. e.g., <https://www.faz.net/aktuell/wirtschaft/schneller-schlau/der-ki-fehlt-die-infrastruktur-wo-stehen-die-meisten-supercomputer-19936335.html>

DATA CENTRES OPEN UP BILLIONS IN POTENTIAL THROUGH AI VALUE CREATION

Investments in data centres are investments in the technological future. A high-performance ecosystem of digital infrastructure is the backbone for the use of new technologies – especially artificial intelligence (AI). In the coming years, the use of AI is of crucial importance for an industry-driven nation to make the leap into a new era. Combining Germany's excellent engineering know-how with new digital know-how can help to reverse the trend of declining productivity growth. New digital business models open up dynamic growth opportunities across all sectors, with autonomous driving being just one of many examples.

These opportunities must be seized because Germany is currently living off its substance. In the years from 2001 to 2020, the annual growth rate of labour productivity was just over 0 per cent, and between 2021 and 2023 it was 0.8 per cent.⁴ AI has the potential to increase productivity growth by around 1.3 per cent per year at its peak – this would increase gross value added in Germany by 330 billion euros.⁵ In this context, data centres are the backbone of AI: According to the company survey conducted as part of

this study, 34 per cent of companies that use data centres deploy AI, while only 10 per cent of companies not using data centres are doing so. In this study, data centre users are defined as companies that utilise public cloud, private cloud, or colocation services. At the company level, modelled productivity potential is already being leveraged today: 82 per cent of companies report that they are registering productivity-enhancing effects through AI. On average, these effects are around 13 per cent, with small companies in particular reporting high effects, while large companies estimate productivity growth at around 3 per cent. While small companies are at the beginning of the curve and can still tap into relatively large potentials, large companies are apparently further along the adoption path.

⁴ Cf. International Labour Organization (ILO), 2024, ILOSTAT Explorer, https://rshiny.ilo.org/dataexplorer7/?lang=en&id=DEU_A

⁵ Cf. IW Consult GmbH, 2023, The Digital Factor - How Germany Benefits from Intelligent Technologies, report commissioned by Google Germany, Cologne

DATA CENTRES PROMOTE AI INNOVATION - ALSO IN RURAL AREAS

AI has a positive impact on productivity through two pathways:

- Companies use generative AI to gain efficiency. The saved work time can be used productively elsewhere.
- Companies use AI to increase their innovation activities – for example, developing new business models based on large data sets, such as predictive maintenance, or improving internal processes through AI-driven analysis and decision-making.

Sixty-six per cent of companies using AI are primarily pursuing the first path, while 42 per cent are focusing on the second path. In this way, innovative companies that use AI generate 32 per cent of their revenue from new products or services. For innovative companies that do not use AI, the share is 25 per cent. The digital infrastructure ecosystem serves as a particular driver: when the AI tools are used in the cloud, the share of new products and services account for around 40 per cent of revenue.

The greater innovative power through AI also has an important effect regarding the competitiveness of rural companies. On average, companies in rural areas exhibit lower digital maturity,⁶ use the cloud less often⁷ and, according to our survey, use AI less frequently. While 24 per cent of companies in cities deploy generative AI, only 17 per cent of companies in rural areas do the same. However, when rural companies make use of the services of data centres, they use AI at a similar rate (35 per cent) to companies in cities that use data centres. Consequently, rural companies can offset their competitive advantages compared to urban areas by leveraging data centres.

⁶ Cf. IW / IW Consult GmbH / DIW / FIR / ZEW Mannheim, 2022, Measurement of the Digitalisation of the German Economy on behalf of the German Federal Ministry for Economic Affairs and Climate Action (BMWK)

⁷ Cf. IW Consult GmbH, 2022, The Economic Significance of AWS in Germany, study commissioned by Amazon Web Services EMEA SARL Branch Germany

DEMAND FOR DATA CENTRES: CLOUD & CO FUEL MARKET GROWTH

Data centres not only play a central role for the economy in terms of completely new technologies such as AI, but they are also increasingly significant for the fundamental advantages of IT infrastructure, which is located not only on-site within the company, but also in external data centres. In today's times of high volatility, uncertainty, complexity and ambiguity (so-called VUCA), companies must ensure that they maintain a high level of resilience. Over 40 per cent of data centre users believe that their cloud engagement enhances their resilience to external shocks. A high level of resilience reflects a combination of higher scalability, greater cost and energy efficiency, heightened innovative capacity, and more high-performance data security.

These advantages lead to a further strong growth in the use of data centres: currently, 51 per cent of companies are data centre users. Compared to the values from two years ago, this is an increase of around 25 per cent. Overall, 48 per cent of companies use either a public cloud, a private cloud or both. Colocation services are currently directly used by 11 per cent of all companies. The importance of colocation data centres for the entire digital infrastructure ecosystem goes far beyond this, as cloud services are currently provided almost exclusively in colocation data centres.

Many companies are simultaneously using the entire spectrum of the digital infrastructure ecosystem. At all levels, there is an increase in adoption rates with the size of the companies. Sixty-nine per cent of all large companies with more than 250 employees use the cloud, and 22 per cent of these companies already use colocation services. For small companies, these figures are currently 47 and 10 per cent, respectively.

All three mentioned forms of IT infrastructure offer suitable solutions for the needs of companies. The spectrum of technologies and applications used by companies in the cloud and colocation infrastructure is broad. Data centres are most frequently used as virtual storage (78 per cent), for office software (68 per cent), as a database (65 per cent), and for conducting video conferences (60 per cent). In addition, the use of the cloud is significant for security software (48 per cent of companies), virtual computing power (32 per cent), process automation (26 per cent), and AI (18 per cent).

⁸ Cf. IW Consult GmbH, 2022, The Economic Significance of AWS in Germany, study commissioned by Amazon Web Services EMEA SARL Branch Germany

DATA CENTRE USERS ARE MORE INNOVATIVE

These diverse usage possibilities of the digital infrastructure ecosystem enable companies to be more innovative and successful: data centre users were able to generate 18 per cent of their sales in 2023 with new products or services that did not previously exist. In contrast, for the companies that do not use data centre infrastructure, this figure is just under 8 per cent. Furthermore, compared to two years ago, it can be seen that data centre users have been able to increase the share of revenue from new products and services by over four percentage points, whereas the value for companies that do not use data centre infrastructure remains almost unchanged.

For Germany, whose success largely depends on the innovative strength of its companies, data centres are a central enabler for digital innovations:

- In total, 55 per cent of companies that use data centres report that the use of cloud technology has a positive impact on their innovation activities for new products and services.
- Fifty-eight per cent see a positive impact of cloud usage on innovation activities concerning processes and standards.
- Thirty-five per cent of companies that use data centres have been able to generate innovation impetus regarding digital business models

DIGITAL INFRASTRUCTURES BOOST THE ECONOMY AND JOB MARKET

This higher level of innovation also makes data centre users more economically successful: 72 per cent of these companies state that improved processes through cloud use lead to additional sales. Fifty-seven per cent of companies are in a better position to serve customer requirements, while 42 per cent report that they are more competitive due to the cloud.

These improvements at the company level are also reflected from a macroeconomic perspective. According to the survey results and taking into account the indirect effects on other

companies, data centre usage generates an additional gross value added of around 250 billion euros for the German economy. This is also reflected in the high significance of data centres for employment in Germany: In 2024, a total of around 5.9 million people are employed in companies whose business model would not be possible without the cloud. Two years ago, this figure was just over 2.8 million employees. This represents a monthly increase of 126,000 employees in companies whose business model would not function without the cloud.

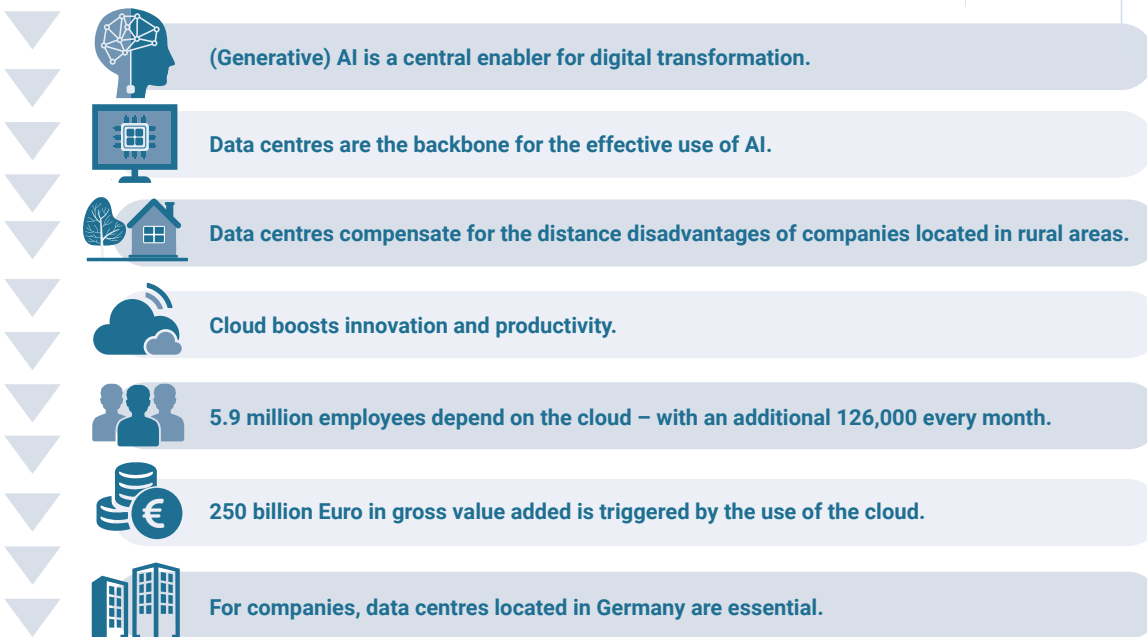
LOCATION MATTERS: NEARLY HALF OF USERS APPRECIATE DATA CENTERS IN GERMANY

At the same time, companies do care about the location of the data centres whose services they use. Forty-five per cent of companies consider it important that the data centres are located in Germany. This figure is particularly high among large companies, respectively at 59 per cent (for

those with 50-249 employees) and 54 per cent (for those with more than 249 employees). Establishments within Germany also address the data protection concerns that nearly half of all companies cite as a reason for not using cloud technology.

Figure 1-1: Key Findings of the Study

Data centres are the backbone of the technological future



Source: own illustration

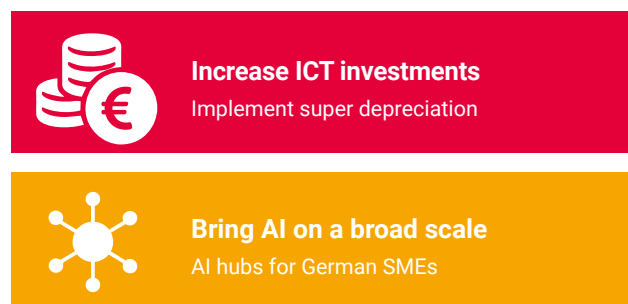
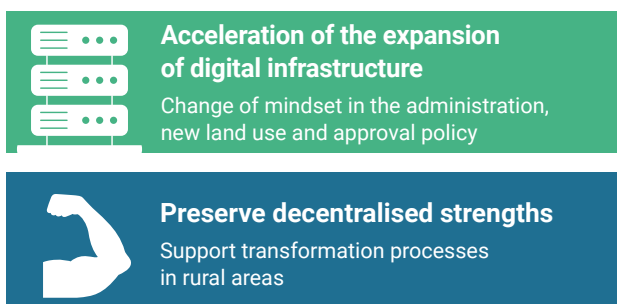
To unleash the full positive impact of a high-performance ecosystem of digital infrastructures and thereby to realise the necessary productivity effects for the national economy, the following fields of action should be addressed:

- Accelerate the expansion of digital infrastructure: In order to create the necessary data centre capacities, a new land use and approval policy is required that has a supportive rather than hindering effect on this process. A change of mindset is needed among some decision-makers so that the required data centre capacities can be established at the necessary speed – for example, with regard to planning and approval processes.
- Increase ICT investments: The basis for technological progress is appropriate capitalisation. The prerequisite for this is appropriate investments in information and communication technologies (ICT). The “super depreciation” of investments announced but not implemented by the German federal government should therefore be swiftly implemented.

- Preserve decentralised strengths: Germany’s decentralised structure of economic activity is one of the strengths that must be preserved. To counteract the distance disadvantages of rural areas, digital infrastructure needs to be quickly expanded, particularly in areas where economic activities are concentrated. Regional actors such as the “Mittelstand-4.0” competence centres should in particular draw the attention of small and medium-sized enterprises (SMEs) to the advantages of using data centres and work to dispel any reservations.
- Bring AI on a broad scale: Artificial intelligence is the technology that can generate a macroeconomic leap in productivity. To maximise its impact, the technology must be applied across a wide range of companies. AI hubs that primarily support SMEs in developing use cases and implementing AI can make an important contribution in this regard.

Abbildung 1-2: Recommendations for Action

Four ways to accelerate the AI transformation



Source: own illustration

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