POLICY ESSAY

# The Renaissance of the Economics of Location in the Age of Artificial Intelligence

*Why Location Decisions Are Becoming Geoeconomic Decisions*

**Astrid Krenz**
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## Summary

Artificial intelligence is often portrayed as a technology that is largely independent of geography. In reality, however, it relies on extensive physical infrastructure. Data centres require energy, robust electricity grids, high-capacity digital networks, suitable land, and stable institutional conditions. The essay argues that the economics of location provides a valuable framework for understanding the geography of AI investment. Alongside traditional location factors, access to industrial data, sector-specific knowledge and regional innovation ecosystems is becoming increasingly important. Corporate location decisions are therefore also acquiring a geoeconomic dimension.

## Core Arguments

- Artificial intelligence is not placeless: data centres and cloud infrastructure depend on energy, networks, land and reliable institutional conditions.
- Classical location factors remain relevant, even as technological change alters the way firms organise production and innovation.
- Industrial data, sector-specific knowledge and regional innovation ecosystems are becoming strategic location factors, constituting a geoeconomic dimension.
- Europe could connect its different regional strengths rather than pursue a single, uniform model of AI development.
- Europe could become an integrated innovation ecosystem in which regions specialise according to their comparative location advantages in hyperscale data centres, customer-proximate data centres, cloud and AI infrastructure, and AI applications.

## Introduction

Why are new AI data centres being built in Germany's Rhenish mining region? Why are international technology companies investing billions of euros in North Rhine-Westphalia rather than exclusively in established innovation hubs such as Munich or Berlin? And why not in other regions offering similar policy ambitions or financial incentives?

At first glance, these appear to be questions of technology policy. In reality, however, they point towards one of the oldest fields of economic inquiry: the economics of location.

Few developments currently shape economic policy debates more profoundly than artificial intelligence. Across Europe, the construction of new data centres, cloud infrastructure and large-scale investments by global technology companies are attracting considerable political attention. Such investments are often celebrated as evidence of a region's competitiveness and economic attractiveness.

From an economic perspective, however, they represent much more than that. They demonstrate that even in the age of artificial intelligence, location has lost none of its importance. On the contrary, the spatial distribution of economic activity is once again becoming a strategic issue.

For precisely this reason, the economics of location is experiencing a remarkable renaissance in the age of artificial intelligence.

## An Old Theory for a New Technology

More than two centuries ago, Johann Heinrich von Thünen developed one of the first systematic theories explaining the spatial organisation of economic activity. Alfred Weber analysed the optimal location of industrial production. Alfred Marshall explained the advantages of industrial agglomerations through knowledge spillovers, specialised labour markets and supplier networks. Paul Krugman later extended these ideas in New Economic Geography, demonstrating how economic activity becomes spatially concentrated and mutually reinforcing.

The technologies have changed fundamentally since then.

The underlying economic question, however, has remained remarkably constant.

In the past, firms decided where to locate steel mills, chemical plants or automobile factories. Today, they decide where to build data centres, cloud infrastructure, semiconductor facilities or artificial intelligence businesses.

Companies must still decide where to invest.

The answer follows the same fundamental logic of the economics of location today as it did then.

## Artificial Intelligence is not Placeless

Digital technologies are often associated with the idea that economic activity is becoming increasingly independent of geography. Data can be processed anywhere, and digital services can, in principle, be delivered globally regardless of physical distance.

Artificial intelligence, however, tells a rather different story.

Large language models require enormous computing capacity. That capacity does not exist in a virtual world. It is housed in physical data centres that require vast amounts of electricity, robust power grids, high-capacity fibre-optic networks, suitable land and stable institutional conditions.

The decision by international technology companies to invest in particular regions is therefore far from random. Microsoft's expansion of AI infrastructure in Germany's Rhenish mining region, for example, cannot be explained solely by government support or public incentives. From the perspective of the economics of location, there are strong reasons to believe that the combination of classical location factors remains decisive: reliable energy and digital infrastructure, available land, a strong industrial base and proximity to one of Europe's largest industrial clusters. At the same time, AI companies are likely to benefit from close connections to universities, research institutions, industrial customers and highly skilled workers.

Even in the age of artificial intelligence, economic activity remains firmly anchored in physical space.

Location decisions are not disappearing - they are becoming more important than ever.

## New Technologies, Classical Location Factors

Many questions remain unanswered regarding the location decisions of AI data centres, cloud providers and operators of AI infrastructure. Research has only begun to explore which factors will ultimately prove most important. Much remains to be learned.

Based on established theories of the economics of location, together with the first observable investment decisions, there are good reasons to believe that several factors are likely to play a particularly important role:

- competitive energy prices,
- secure and reliable electricity supply,
- advanced digital infrastructure,
- a highly skilled workforce,
- efficient planning and permitting procedures,
- stable and predictable institutions, and
- proximity to customers and industrial users.

Taken together, these factors shape the economic environment within which firms make their investment decisions.

Technological innovation does not render the economics of location obsolete.

It makes its relevance visible once again.

## Location Decisions and Geoeconomics: Access to Data, Knowledge and Regional Innovation Ecosystems

Corporate location decisions extend well beyond traditional cost-benefit calculations. In the age of artificial intelligence, they are increasingly acquiring a geoeconomic dimension.

Major cloud providers do not invest solely where electricity prices are low or permitting procedures are efficient. Equally important is proximity to those industries in which the most economically valuable applications of artificial intelligence are likely to emerge.

Germany, in particular, possesses exceptional strengths in this regard. Its manufacturing sector, automotive industry, chemical industry and extensive network of Hidden Champions generate vast industrial data and deep, sector-specific process knowledge. These industrial data differ fundamentally from publicly available internet data. They are created within production processes, supply chains and industrial applications, providing an essential foundation for the development of specialised AI systems.

For international cloud providers and AI companies, proximity to such industrial clusters may therefore represent an additional strategic advantage. It facilitates collaboration with firms, deepens understanding of sector-specific requirements and accelerates the development of new AI applications.

Equally important is integration into regional innovation ecosystems. It is within these ecosystems that learning processes, knowledge spillovers and network effects emerge, creating long-term competitive advantages.

Location decisions are therefore no longer driven solely by the question of where production can be organised most efficiently.

Increasingly, they are also shaped by where new knowledge is created.

The more artificial intelligence depends on industry-specific knowledge, the greater the economic value of regional innovation ecosystems becomes.

Against this background, Microsoft's investment in Germany's Rhenish mining region can be understood as more than an investment in digital infrastructure alone. It may equally be interpreted as an investment in proximity to one of Europe's most important industrial innovation regions.

## Europe’s Diversity: A Network of Comparative Location Advantages, and an Integrated Innovation Ecosystem

This perspective also changes how we should think about Europe's AI strategy.

European debates often focus on technological sovereignty and on how Europe can compete with the United States and China. In doing so, they sometimes create the impression that Europe should seek to develop a single, unified AI location.

From an economic perspective, however, a different trajectory appears more plausible.

Europe's greatest strength lies precisely in its diversity.

Regions with comparatively low electricity prices, abundant renewable energy and favourable climatic conditions - such as parts of Scandinavia - offer attractive conditions for large-scale, energy-intensive hyperscale data centres.

Germany, by contrast, possesses an exceptional industrial base, a dense network of Hidden Champions and extensive industrial data. Together, these provide favourable conditions for customer-oriented data centres and the development of industrial AI applications.

Other European regions possess different comparative strengths - for example in frontier scientific research, software development or digital services.

A successful European AI strategy should therefore not seek to homogenise these diverse comparative advantages. Instead, it should connect them more effectively.

Europe's future competitiveness will depend less on building identical capabilities everywhere than on integrating its diverse regional strengths into a single, interconnected innovation ecosystem.

## Digital Infrastructure as a Critical Location Factor

Alongside energy, another important location factor is digital infrastructure. Transport infrastructure has long been recognised as one of the fundamental determinants of economic development. In much the same way, high-capacity gigabit broadband is becoming an essential prerequisite for modern business locations.

My recent research shows that regions with more advanced gigabit infrastructure attract a greater number of new business start-ups. A ten-percentage-point increase in gigabit broadband availability is associated with an increase of approximately 2.8 per cent in new firm creation.

Digital infrastructure therefore has a direct influence on where new economic activity emerges.

In the age of artificial intelligence, it is becoming what railways, motorways and ports were during the industrial era: a critical prerequisite for where firms choose to invest and where innovation takes place.

At the same time, the evidence paints a more nuanced picture. The positive effects of high-quality digital infrastructure are particularly pronounced in larger cities and metropolitan regions, while they are considerably weaker in rural areas.

Digital infrastructure therefore does not replace the advantages of agglomeration.

Instead, it reinforces those locations where firms, research institutions, skilled workers and industrial networks are already closely interconnected.

## AI Policy is also Location Policy – and Increasingly Geoeconomic Policy

These insights have important implications for Europe's AI strategy.

Data centres should not be viewed in isolation. They form part of broader regional innovation ecosystems.

From the perspective of the economics of location, there are good reasons to expect that self-reinforcing development processes are most likely to emerge where advanced digital and energy infrastructure coincides with industrial demand, scientific excellence, highly skilled labour and well-functioning innovation networks.

For companies, the availability of computing capacity alone is therefore unlikely to determine investment decisions. Equally important is likely to be where markets, knowledge, talent, capital and industrial partners come together.

AI policy should therefore not be understood merely as technology policy.

It is equally location policy.

And increasingly, it is also geoeconomic policy. In the global race for artificial intelligence, countries and regions are competing not only for data centres, but also for innovation ecosystems, industrial knowledge assets and the capacity to anchor future value creation within their own economies.

## The Paradox of Artificial Intelligence – and the Renaissance of the Economics of Location

Public debate on artificial intelligence is often dominated by algorithms, semiconductors and large language models. In the process, it is easy to overlook a fundamental fact: these technologies, too, emerge in specific places.

Companies must still decide where to invest, where to build data centres and where to develop new innovations.

Artificial intelligence is transforming many aspects of the economy. Yet it does not overturn the fundamental economic logic of spatial investment decisions. On the contrary, the more digital the economy becomes, the more important the question may become of where energy, data, talent, research and industrial demand converge.

For precisely this reason, the economics of location is experiencing a renaissance.

It explains not only why firms choose particular locations. It also helps us understand why those locations are becoming increasingly important in an era of geoeconomic competition.

Anyone seeking to understand Germany's and Europe's position in the global race for artificial intelligence should therefore look beyond algorithms, computing power and technological sovereignty.

They should once again pay greater attention to location.

The digital economy is global. Yet innovation continues to emerge in specific places. It is precisely in this paradox that the renaissance of the economics of location finds its strongest expression.

## Suggested Citation

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