

Germany Does Not Need to Guess the Next Big Industry

How Existing Capabilities Can Become the Comparative Advantages of Tomorrow

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Summary

Germany is facing several profound transformations at the same time: artificial intelligence, geoeconomic tensions, technological competition with China, the energy transition and demographic change are altering technologies, relative prices, scarcities, demand and competition. This essay argues that Germany therefore does not primarily need to guess the next major industry of the future. What matters is whether existing industrial, technological and organizational capabilities can be combined with new knowledge and technologies and transferred into new uses. Future comparative advantages may emerge at the intersection of existing capabilities, new technological opportunities and changing global demand.

Core Arguments

- **Structural change is also recombination:** existing capabilities can be combined with new technologies and transferred into new economic uses.
- **Comparative advantages evolve:** the crucial question is not only where Germany is strong today, but which existing capabilities can give rise to the comparative advantages of tomorrow.
- **Five transformations are changing the value of existing capabilities:** AI, geoeconomics, China, the energy transition and demographic change are altering scarcities, relative prices, technological opportunities and demand.
- **Global demand is part of the equation:** new specialization opportunities can emerge when German capabilities meet new problems and willingness to pay in other economies.
- **Entrepreneurial discovery remains central:** which combinations will succeed cannot be known in advance. Competition and experimentation help discover viable new products and business models.
- **Recombination requires absorptive capacity and reallocation:** firms must be able to absorb external knowledge, while knowledge, labour and capital must be able to move into new, more productive uses.
- **Industrial policy should think more in terms of capabilities:** alongside targeted technology policy, it should strengthen knowledge diffusion, recombination, reallocation, competition, entrepreneurship and the ability of successful firms to scale.

Introduction

Europe is not undergoing one transformation, but several at the same time. Artificial intelligence is changing technologies and production processes. Geoeconomic tensions are changing markets and supply chains. China is changing global competition. The energy transition is changing cost structures. And demographic change and skills shortages are changing the scarcity of labour.

These developments are often discussed separately. For firms, however, they are occurring simultaneously. They are changing relative prices, technological opportunities, competitive conditions and demand - and thus the conditions under which economic value is created.

Economic policy debates often respond by searching for the industries of the future: artificial intelligence, semiconductors, batteries, quantum technologies or hydrogen. Behind this lies an understandable question: Which technologies does Germany need to invest in today in order to remain competitive tomorrow?

But another question may be at least as important:

What happens to the capabilities that already exist?

Germany does not necessarily need to "guess the next big industry." What also matters is whether firms can recombine existing capabilities in response to new scarcities and technological opportunities.

Innovation as New Combination

This perspective leads directly to Joseph Schumpeter. In his theory of economic development, new combinations are at the heart of the innovation process. Innovation, in this view, does not exclusively mean inventing something technologically entirely new. Economic development can also arise when existing knowledge, means of production and capabilities are combined in new ways ([Schumpeter, 1934; 2005](#)).

This idea is particularly relevant for an advanced industrial economy such as Germany. Over decades, extensive capabilities have developed in mechanical engineering, the automotive industry, chemicals, electrical engineering and industrial production. Here, capabilities do not refer only to individual qualifications, but to the technological, industrial and organizational competences embedded in firms and in an economy. They include engineering knowledge, production experience, industrial data, specialized workers, supplier networks and knowledge of production processes.

Germany possesses substantial industrial and technological capabilities. The crucial question, however, is how flexibly they can be deployed. Competences and knowledge may be tied to existing products, firms and business models even though their economic value could increase in other uses.

An automotive engineer does not have to spend an entire career developing cars. Manufacturing expertise does not have to be used exclusively in the traditional automotive industry. Mechanical-engineering knowledge can be combined with AI. Chemical expertise can contribute to new materials. Robotics can move from automotive plants into logistics, care or skilled trades.

From this perspective, structural change does not only mean that old industries shrink and new ones emerge. It also means that existing capabilities find new uses.

An economy may possess substantial industrial capabilities and still lose competitiveness if those capabilities remain permanently tied to uses whose economic value is declining.

From an economic perspective, this also raises the question of how comparative advantages change over time. When knowledge, technologies and capabilities are transferred into new economic activities, productivity differences and patterns of specialization can shift. The literature on related diversification likewise shows that new economic activities often do not emerge independently of existing capabilities. Economies are more likely to diversify into activities that build on existing productive capabilities and stocks of knowledge ([Hidalgo et al., 2007](#); [Neffke et al., 2011](#)). The crucial question is therefore not only where Germany has a comparative advantage today, **but which existing capabilities can give rise to the comparative advantages of tomorrow.**

When Capabilities Find a New Use

I encountered a small example of this process this summer. I met an entrepreneur from Baden-Württemberg whose company is developing a modular platform for pedal-powered vehicles. Depending on the configuration, it can transport people or goods. The concept combines, among other things, pedal power, solar energy and lightweight construction; according to the company, joining techniques from the automotive industry are used in the aluminium structure.

In our conversation, the entrepreneur told me about his background in the automotive supplier industry. Changes in demand had prompted him to think about new products and applications.

What is economically interesting about this example is the underlying adjustment process. **Existing industrial capabilities are being combined with other technologies and transferred to a new use.**

Whether such a combination will develop into a successful business model in the long run cannot be known in advance. A firm has to discover which problem it solves for its customers and whether there is sufficient willingness to pay. In this context, the business-model literature distinguishes between value creation and value capture: firms must create value, but they must also find a way to capture part of that value economically ([Teece, 2010](#)).

This turns the question of technological capabilities into a market question:

What will firms be able to produce with their capabilities in the future - and what will customers be willing to pay for?

Five Transformations Are Changing the Value of Existing Capabilities

The five transformations matter for this question because they change which combinations become economically attractive.

AI expands the possibilities for combining existing industrial knowledge with data and new forms of automation. A German mechanical-engineering company does not need to develop the world's leading AI model itself. What may matter economically is its ability to combine available AI with its specific knowledge of machines, production processes and customer problems.

Demographic change is altering the scarcity of labour. This can increase the value of technologies that make workers more productive or automate tasks. Robotics and AI may therefore become economically attractive in applications in which their use was previously not profitable.

The energy transition is changing relative prices and investment incentives. Knowledge from mechanical engineering, chemistry or electrical engineering can therefore be deployed in new combinations for energy efficiency, electrification, the circular economy or new materials.

Geoeconomic tensions, in turn, can increase the value of resilience, security and flexibility.

And growing technological competition with China is increasing the pressure on business models that rely primarily on existing products and past competitive advantages.

The transformations therefore do not necessarily make existing capabilities obsolete. Rather, they can change their relative value and open up new possibilities for combination.

Tomorrow's Customers Are Not Only in Germany

For an export-oriented economy such as Germany, however, it is not enough to look only at scarcities and changes at home. Future comparative advantages may also emerge where existing capabilities meet new problems and willingness to pay in other economies.

These problems will differ. In China, demographic ageing, rising labour costs and productivity pressures could increase demand for highly specialized automation, robotics, medical technology or energy-efficient production processes. At the same time, the technological rise of Chinese firms means that German suppliers in many areas can no longer rely on earlier technological leads.

In India, industrialization and urbanization coincide with substantial needs for energy, infrastructure, water, mobility and healthcare. An interesting recombination there might consist precisely in using German engineering expertise not exclusively for ever more complex premium products, but combining it with digitalization and local production to develop robust, scalable and affordable solutions.

In African economies as well - whose economic conditions differ considerably - other combinations may become relevant. Decentralized energy supply, water treatment, cold chains, food processing or mobility could, for example, connect knowledge from mechanical engineering, electrical engineering, energy and manufacturing technologies with concrete local problems. Value creation need not arise exclusively from exporting finished German products. Cooperation with local firms, local production and adaptation to local conditions can themselves be part of the business model.

In the United States and Europe, in turn, high labour costs and shortages of skilled workers could increase willingness to pay for automation and productivity-enhancing technologies.

In Europe, high energy and CO2 costs, decarbonization and demographic ageing add further pressures. What initially appears to be a location disadvantage can therefore also become an incentive for innovation.

These examples are not a forecast of which products Germany will export to which countries in ten years. They illustrate a more general mechanism: **the economic value of existing capabilities also depends on the new scarcities and customer problems to which they can be applied.**

The crucial question is therefore not only:

What is Germany particularly good at producing?

But rather:

Which problems will firms and people around the world have to solve in the future - and which existing German capabilities can be combined with new knowledge and new technologies to offer better solutions?

A mechanical-engineering company does not necessarily have to decide first which new machine it wants to build and then search for a market for it. A changing customer problem can equally be the starting point. Mechanical-engineering knowledge could be combined with AI and robotics when labour becomes scarcer; electrical engineering with solar, storage and digital technologies when reliable energy supply becomes a bottleneck; chemical knowledge with materials science when decarbonization requires new materials; automotive and manufacturing knowledge with lightweight construction and new propulsion technologies when mobility needs change.

Future comparative advantages may therefore emerge at the intersection of existing capabilities, new technologies and changing global demand.

Which of these combinations will be economically successful cannot, however, be determined in advance. Technological recombination itself is subject to considerable uncertainty, especially when new components and combinations are being tested ([Fleming, 2001](#)). Today, we know neither exactly which problems will be particularly urgent in ten years nor how high the willingness to pay for individual solutions will be, or which competing technologies will have emerged by then.

But Who Finds the Right Combinations?

This is precisely where entrepreneurial discovery begins ([Kirzner, 1997](#)).

New products and business models are also hypotheses about future markets. Firms experiment with products and services; customers decide which offerings they value; competitors respond, imitate successful ideas or develop alternatives. Some experiments succeed, others do not.

Competition is therefore not only a mechanism that disciplines prices. **It is also a process of discovery and selection** ([Hayek, 1978](#); [Kirzner, 1997](#)).

The five transformations therefore do not predict which firms, technologies and business models will succeed. Rather, they change the conditions under which firms search for new opportunities to create value.

Firms differ in their capacity to adapt. The literature on dynamic capabilities accordingly asks to what extent firms can sense change, seize opportunities and reconfigure their resources and competences ([Teece et al., 1997](#)).

This also creates a link to my previous Policy Essay on absorptive capacity. Firms do not have to generate all the knowledge relevant to them themselves. They can identify external knowledge, absorb it and combine it with their own capabilities ([Cohen und Levinthal, 1990](#); [Harris, Krenz und Moffat, 2021](#)).

A mechanical-engineering firm does not have to invent AI itself. But it may need to be able to understand AI and combine it with its process knowledge, industrial data and understanding of concrete customer problems.

Absorptive capacity thus becomes a prerequisite for recombination.

Recombination Requires Reallocation

Recombination does not have to take place within existing firms. Not every firm that possesses certain capabilities today will successfully translate them into new products and business models itself ([Neffke et al., 2018](#)).

Structural change can also mean that workers move between firms and industries, knowledge is applied in new contexts, capital flows into new activities, or new firms emerge that combine existing technologies and capabilities differently from established suppliers.

The adaptability of individual firms thus becomes an economy-wide question. What matters is not only whether existing firms possess dynamic capabilities, **but also how capable an economy as a whole is of reallocating resources.**

Can workers use their capabilities productively in other activities? Can capital move from shrinking activities into new firms and business models? Can new firms gain access to existing knowledge and skilled workers? Can successful new combinations scale?

The comparative advantages of tomorrow therefore do not have to emerge in the same firms that created the comparative advantages of today.

What Does This Mean for Economic Policy?

This leads to a somewhat different perspective on industrial and innovation policy.

There may be good reasons to support particular technologies in a targeted way - for example because of knowledge externalities, strategic dependencies or coordination problems. The direction of technological progress is not necessarily socially optimal either. If firms do not take all social

costs and benefits of their innovation decisions into account, it may make sense for economic policy to alter innovation incentives deliberately. The literature on directed technical change shows, for example, how externalities influence the direction of technological development and how policy instruments can redirect innovation ([Acemoglu, 2002](#); [Acemoglu et al., 2012](#); [Acemoglu, 2023](#)).

This does not mean, however, that policymakers can reliably determine which specific firms, products and business models will be successful in ten or twenty years. There is an important distinction between influencing innovation incentives through economic policy and selecting future winners.

The economic-policy question should therefore not only be:

Which industry of the future do we want to build in Germany?

At least as important is:

Which capabilities does our economy possess - and how easily can these capabilities find new uses?

The implication is therefore not simply less industrial policy and more education policy. Rather, it broadens the perspective on industrial policy. Alongside targeted support for research and technologies, what matters is whether firms can absorb knowledge, recombine capabilities and scale successful new activities, and whether labour, knowledge and capital can move into more productive uses.

This requires research and education, access to capital, functioning competition, opportunities for entrepreneurship and experimentation, and conditions under which successful firms can scale. The mobility of knowledge, workers and capital is equally important.

International openness is part of this as well. Access to knowledge, foreign markets, skilled workers and cross-border corporate networks can expand the opportunities to absorb new knowledge and combine it with existing capabilities.

Industrial policy should therefore neither focus exclusively on preserving existing structures nor attempt to prescribe the future structure of the economy in detail. It should address market failures and social externalities while at the same time **strengthening an economy's capacity for recombination and reallocation.**

Industrial policy should think less exclusively in terms of industries and more also in terms of capabilities, knowledge diffusion, recombination and reallocation.

Concluding Remarks

AI, geoeconomics, China, the energy transition and demographic change pose major challenges for Germany. They are changing technologies, relative prices, scarcities, demand and competition - and with them the economic value of existing products and capabilities.

The response cannot consist solely in identifying the next major industry of the future.

Germany already possesses a substantial stock of industrial, technological and scientific knowledge. What matters is how mobile this knowledge is.

Can firms combine existing capabilities with new technologies? Can they absorb knowledge from other firms, regions and countries? Can workers transfer their competences to new activities? Can new firms combine resources differently from established firms? And can these capabilities be used to develop solutions to problems for which customers in Germany and around the world are willing to pay?

We do not know today which of these combinations will succeed. That is precisely why entrepreneurial discovery, competition and experimentation are so important.

Germany does not necessarily need to guess the next big industry. What matters is whether firms can combine existing capabilities with new knowledge and new technologies in order to respond to changing scarcities and new customer problems. Such recombinations can give rise to the comparative advantages of tomorrow.

Existing capabilities alone do not determine the comparative advantages of tomorrow. Nor do new technologies alone. And neither does demand alone. New opportunities for specialization emerge at the intersection of existing capabilities, new technological possibilities and changing problems and willingness to pay.

Successful structural change does not only mean that something new emerges and something old disappears. It also means that existing knowledge finds new uses.

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