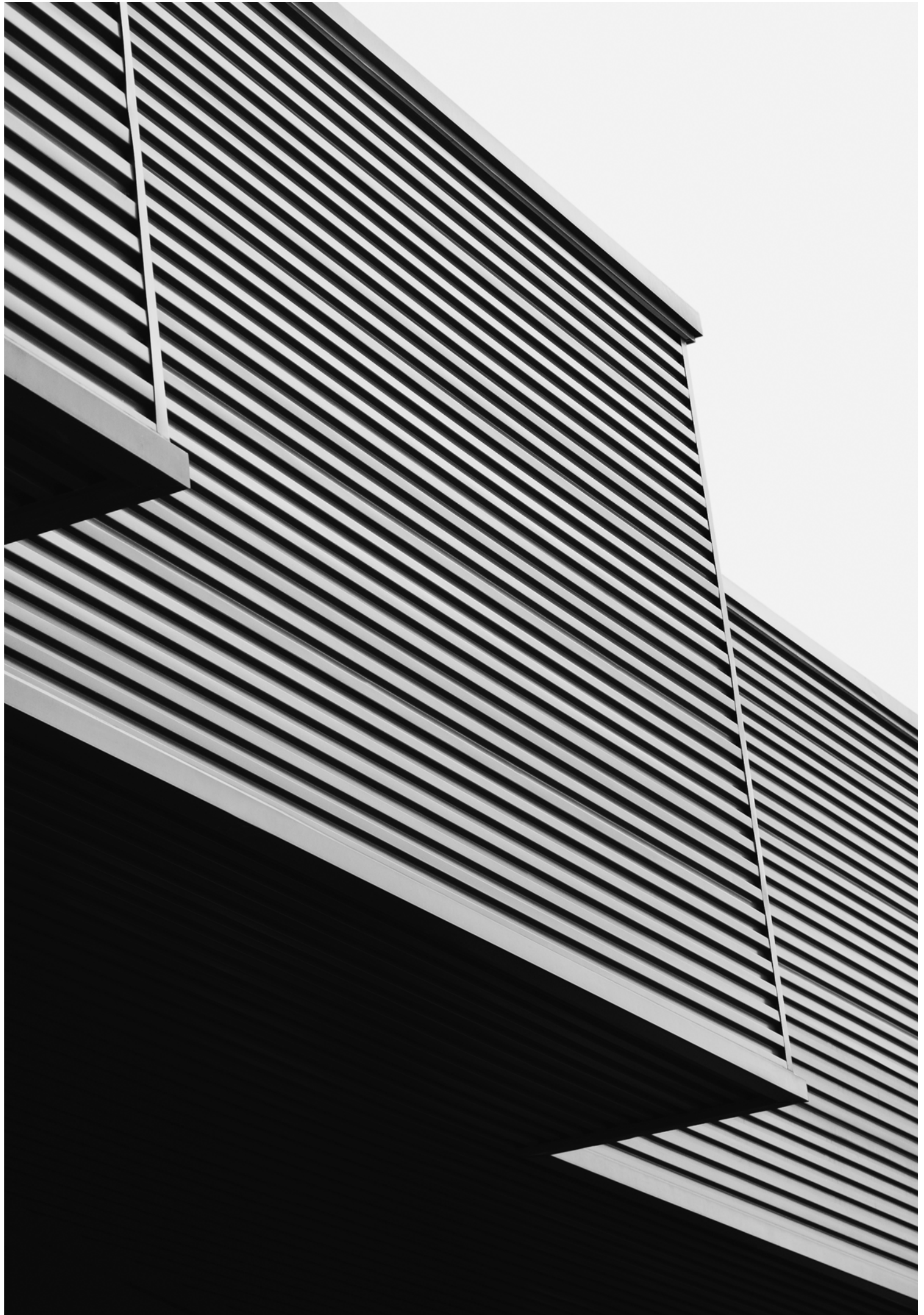


Supply chains and margins
under pressure – technology
as a beacon of hope
Supply Chain Pulse Check

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Foreword

Dear Readers,

while supply chain issues have changed and, in some instances, improved, the pressure remains high. Currently, it is not so much the bottlenecks in global supply chains that are putting pressure on companies but rather the risk of supply chain failure. This risk remains even though since the end of the COVID-19 pandemic, most raw materials and intermediate products have become more available again.

Supply chains are increasingly characterized by global upheavals and overlapping crises that make permanent uncertainty the new normal. Those supply chains that have proven themselves so far are becoming more fragile and must be made crisis-proof for the future. The comprehensive safeguarding of value creation and, above all, the development of long-term resilience are key priorities.

With this edition of the Supply Chain Pulse Check by Deloitte and the Federation of German Industries (BDI) together with the International Service Logistics Association (ISLA), we shed light on the future of value creation. The focus is on four areas: supply chain, Germany as a business location, production, as well as sustainability and circularity. In addition, we have asked companies in the manufacturing industry about their assessments of the situation, and we share promising solutions.

The results show quite a tense situation. The competitiveness of the German industry must be better secured against future crises and risks so that value creation remains in the country. The supply chain situation remains tense and there is a great need for action. However, it is also clear that there is still a lot of potential to be exploited. Concrete recommendations for action and good practices provide new impetus, encourage and point out possi-

ble solutions. It is therefore important to further intensify efforts to strengthen the industrial location to lead Germany back to an international pole position, where it had been for decades.

We are delighted to present to you the third edition of the Deloitte Supply Chain Pulse Check and would like to thank all the supply chain managers who participated in this survey and shared their views on these important questions.

We trust that the Deloitte Supply Chain Pulse Check will continue to contribute to the discussion and help companies manage current or future uncertainties and complexities in supply chains.

We hope you enjoy reading the survey and look forward to your feedback and suggestions.



Oliver Bendig

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Matthias Krämer

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Executive Summary



83%

anticipate long-term pressure on their margins due to risks in the supply chain.



72%

see Germany's energy policy measures as the greatest barrier to their supply chain strategy.

Supply chain – Momentary relief while concerns about further crises remain

While supply chain issues have eased to a certain degree since the COVID-19 pandemic, the risk of supply chain failure remains as high as last year. In the long term, the companies surveyed expect an even greater deterioration of the supply chain than in fall 2023. A large majority expects additional costs and lower margins due to unpredictable risks in global supply chains.

Companies should further exploit cost savings potential along the entire supply chain, carry out regular risk analysis and forward planning in the supply chain and consider friendshoring/nearshoring to boost resilience.

Germany as a business location – More investment and innovation required to ease pressure

There is continuing concern about the attractiveness and business-friendliness of Germany as a business location, mainly because of the perceived high level of regulation, the current energy policy and the shortage of skilled professionals. In addition, the effects on the economy of a potential escalation of the conflict between China and Taiwan are cause for growing unease.

Many of these developments have been ongoing for some time and are difficult to influence. Instead, companies need to shift their focus to themselves. They should scrutinize and reduce internal complexities, use new regulation for their own benefit, explore innovative energy strategies for production in Germany and leverage the company's appeal to attract new talent.



63%

want to increase productivity with the help of AI in order to survive in Germany.

Production – Even more important parts of value creation are now being relocated, but automation and AI offer great potential

In view of the diminishing attractiveness of Germany as a business location, just over half of the companies are planning additional relocations with an increased focus on more important parts of the value chain. Nevertheless, a large majority still wants to employ targeted digitalization and automation to continue successful production in Germany.

Companies should take a more long-term view when considering relocation, adopt a more comprehensive approach to digitalization and automation and use AI ecosystems as an opportunity for differentiation and scaling.



69%

believe the circular economy reduces dependence on raw materials.

Sustainability and circularity – High initial investment needed for a long-term competitive advantage

The majority of companies surveyed (76%) have so far avoided fully implementing circularity due to the significant initial investment costs. Adoption is further hindered by customers' unwillingness to pay a premium for sustainable products. Two-thirds of respondents recognize the potential of the circular economy for increasing resilience and reducing dependency and see it as an opportunity for Germany as a business location.

Companies should sharpen their focus on critical raw materials and achieving material savings along the entire value chain, utilize digitalization and new technology for increased sustainability and embark on partnerships for circularity.

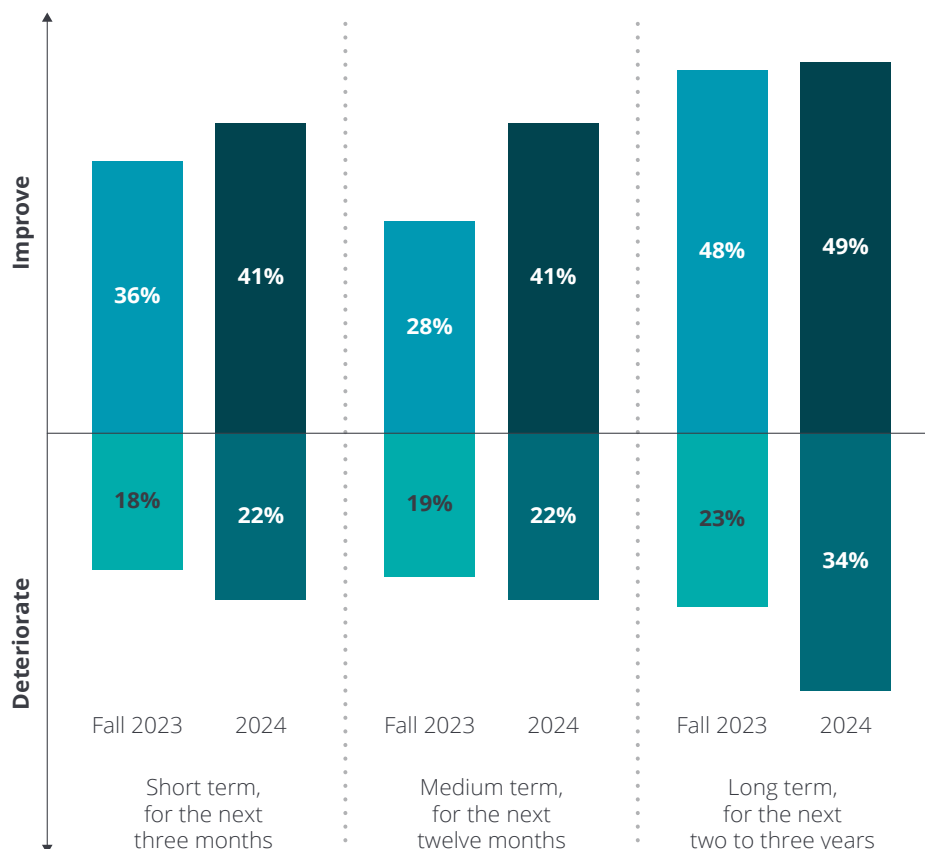
Supply chain – Momentary relief while concerns about further crises remain

While supply chain issues have eased to a certain extent since the COVID-19 pandemic, the current pressure remains high. Just under a quarter (22%) of companies expect the supply chain situation to deteriorate further in the short and medium term. The share of respondents anticipating greater difficulties in the long term has increased to 34 percent over 23 percent in fall 2023 (see Fig. 1).

This implies a consolidation of crisis mode, which is marked by consistent uncertainty in a permanent VUCA (volatile, uncertain, complex and ambiguous) environment. The current supply chain risk has remained roughly the same compared to last year. 42 percent of companies surveyed believe that the risk of a total or partial failure of their supply chain is rising (fall survey 2023: 38%).

Fig. 1 – Supply chain issues: future outlook

Question: How do you expect the supply chain issues to evolve?



Note: The remaining percentages that add up to a hundred are made up of neutral answers that don't expect a change.

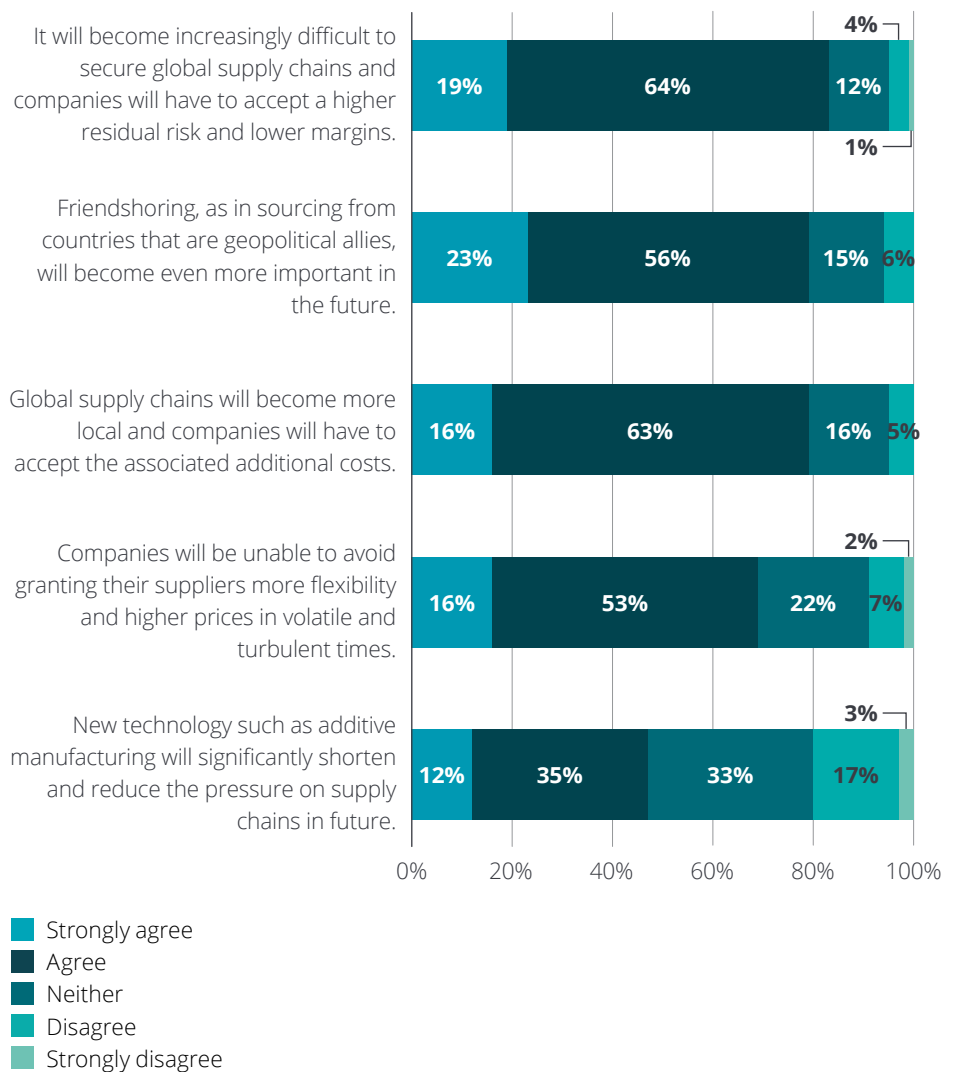
In light of this, 83 percent of respondents expect lasting pressure on their margins due to risks in the supply chain that cannot be mitigated. Another four-fifths believe they will have to accept additional costs for localizing global supply chains (see Fig. 2).

More than half accept the need to grant their suppliers more flexibility and higher prices.

Friendshoring and the use of new technology is already on the rise as a means to reduce the pressure on supply chains. A good four-fifths of respondents believe that sourcing from countries that are geopolitical allies and/or have similar values (friendshoring) could increase the resilience of the supply chain in future. Additive manufacturing, widely referred to as 3D printing, is considered a solution to further relieving the supply chain by almost half of respondents. This is particularly important given that 41 percent of respondents are seeing a continued shortage of components or component groups (fall survey 2023: 36%).

Fig. 2 – Future of supply chains

Question: To what extent do you agree or disagree with the following statements about the future of supply chains?



“We believe that just because a very large share of respondents expect to see additional costs and lower margins does not mean this is carved in stone. Given the many external factors that cannot be influenced – such as the continued formation of blocks along geopolitical lines or concerns about future election results and further political conflicts – it is particularly important for companies in Germany to utilize unused and largely internal savings potential, but also to rely more strongly on the incomparable innovative power of our unique engineers. It's worth casting an analytical eye inwards, in order to position oneself as economically successful and more resilient overall.”

Oliver Bendig, Partner, Lead Industrial Products & Construction, Deloitte





Recommended actions for companies

- Utilizing cost savings potential along the entire supply chain:** Companies should focus on improving efficiency and cost management in the supply chain in anticipation of future crises. Cost reduction is a continuous process and there is still much potential for savings. AI in particular can be used as a tool for managing cost transparency and decision-making or for optimizing transportation and managing procurement.
- Implementing regular risk analysis and forward planning in the supply chain:** In a permanent VUCA environment, risk analysis and supply chain transparency are indispensable. Targeted risk profiles should be compiled in view of geopolitical developments to facilitate better forward planning. Planning can include establishing alternative supply chain strategies (e.g. a broader strategy for Asia along the lines of the China Plus One strategy), identifying complementary partners to increase resilience through diversity or significantly increasing the use and monetization of additive manufacturing for critical components and spare parts.
- Considering friendshoring/nearshoring to increase resilience:** The global upheavals and ongoing crises call for an increased adjustment of global value chain strategies. Friendshoring allows companies to diversify their risks. An alternative strategy for Asia could include considering neighboring countries with production capabilities, such as Vietnam, Indonesia or Malaysia, in addition to China. India is also becoming increasingly relevant due to its relatively high political stability, low labor costs and its demographically attractive sales market. Nearshoring to Europe also offers capacity buffers for times of crisis.

Supply chain resilience with 3D printing

Good practice example – Pump manufacturer KSB achieves speed and efficiency with 3D printing

During the COVID-19 pandemic, sourcing urgently needed components and spare parts became a significant challenge. Continued curfews, closed borders and furlough often made the timely delivery of parts impossible. In future, however, supply chain interruptions and bottlenecks can be bridged with the help of additive manufacturing (3D printing). The printed parts offer the same reliable and certifiable quality as conventionally manufactured products.¹

Pump manufacturer KSB operates a foundry in Pegnitz where spare parts are assessed to determine their suitability for production using certified 3D printers. Only where production using additive manufacturing is impossible are the spare parts cast the traditional way, sixty feet below ground. Additive manufacturing not only allows companies to respond to individual customer requests and create complex custom-made products. Because it is fast and efficient, it can also protect against fragile supply chains and geopolitical uncertainties and encourage circularity: Additive manufacturing allows parts to be manufactured on site and on demand and can produce spare parts for old machines that would otherwise have to be decommissioned.²

Germany as a business location – More investment and innovation required to ease pressure

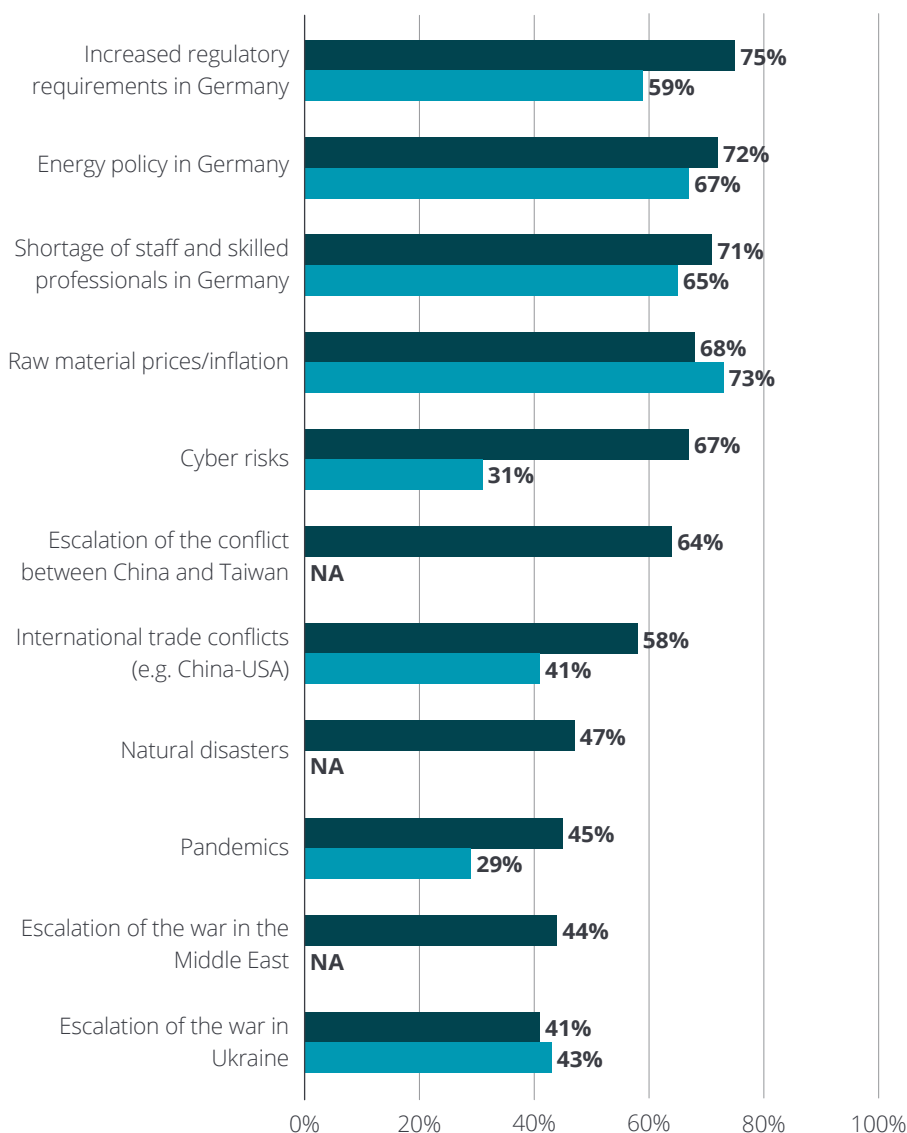
Practically all issues and developments that could increase risk in the supply chain have further intensified according to respondents, with Germany experiencing almost no signs of relief.

Aspects respondents are finding more burdensome than in fall 2023 include the regulatory situation (75%), energy policy (72%) and the shortage of skilled professionals in Germany (71%) (see Fig. 3). The struggle faced by some in implementing new regulatory requirements such as CBAM (Carbon Border Adjustment Mechanism), the EU Taxonomy and the Supply Chain Due Diligence Act may also be contributing to the increased discontent about bureaucracy.

Companies seem to have come to terms with the two ongoing wars in Ukraine and the Middle East. Concern regarding an escalation of the conflict between China and Taiwan and its impacts on the economy, meanwhile, is high (64% of respondents). Out of all international topics/developments, respondents currently view cyber risks as the greatest danger to their supply chain strategy.

Fig. 3 – Adverse effects of current developments

Question: Which of the following topics/developments bear the greatest risk for your supply chain strategy?



Note: The responses for both "strong impact" and "very strong impact" have been merged for each topic.

■ 2024 ■ Fall 2023

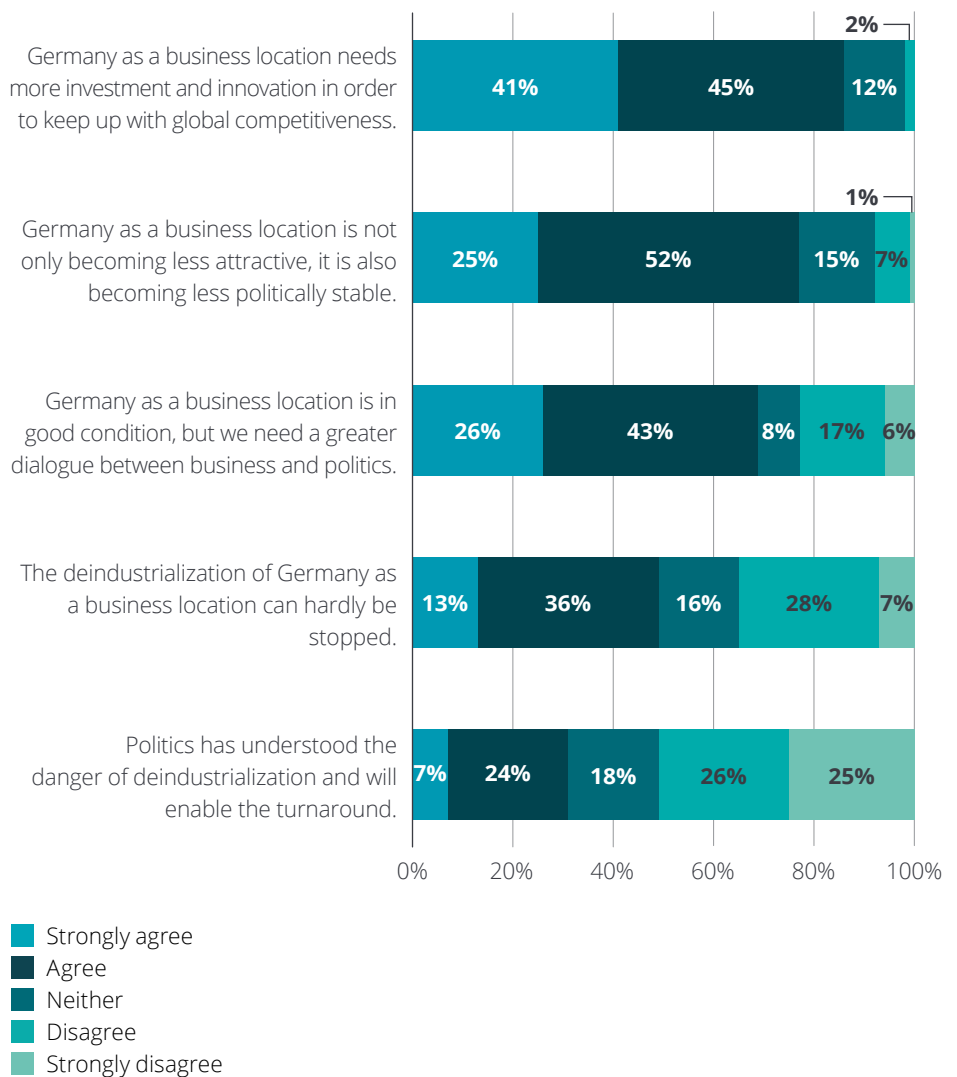
Overall concern about the attractiveness and stability of Germany as a business location is very high (77% of respondents) and around half of the respondents invoke the danger of deindustrialization (see Fig. 4).

While only around a third of respondents believe that the (current) government will enable the turnaround, the majority of companies have not given up all hope and are demanding better conditions for investment and innovation (86%) as well as a greater exchange between business and politics (69%). The location still appears to be viable for many companies, but the political decisions necessary to achieve this seem urgently needed.

Many of these developments have been ongoing for several years and are often difficult to influence (such as political decisions, the geopolitical situation, etc.). Companies need to act in a way that is less dependent on external factors and, above all, have to launch their own initiatives.

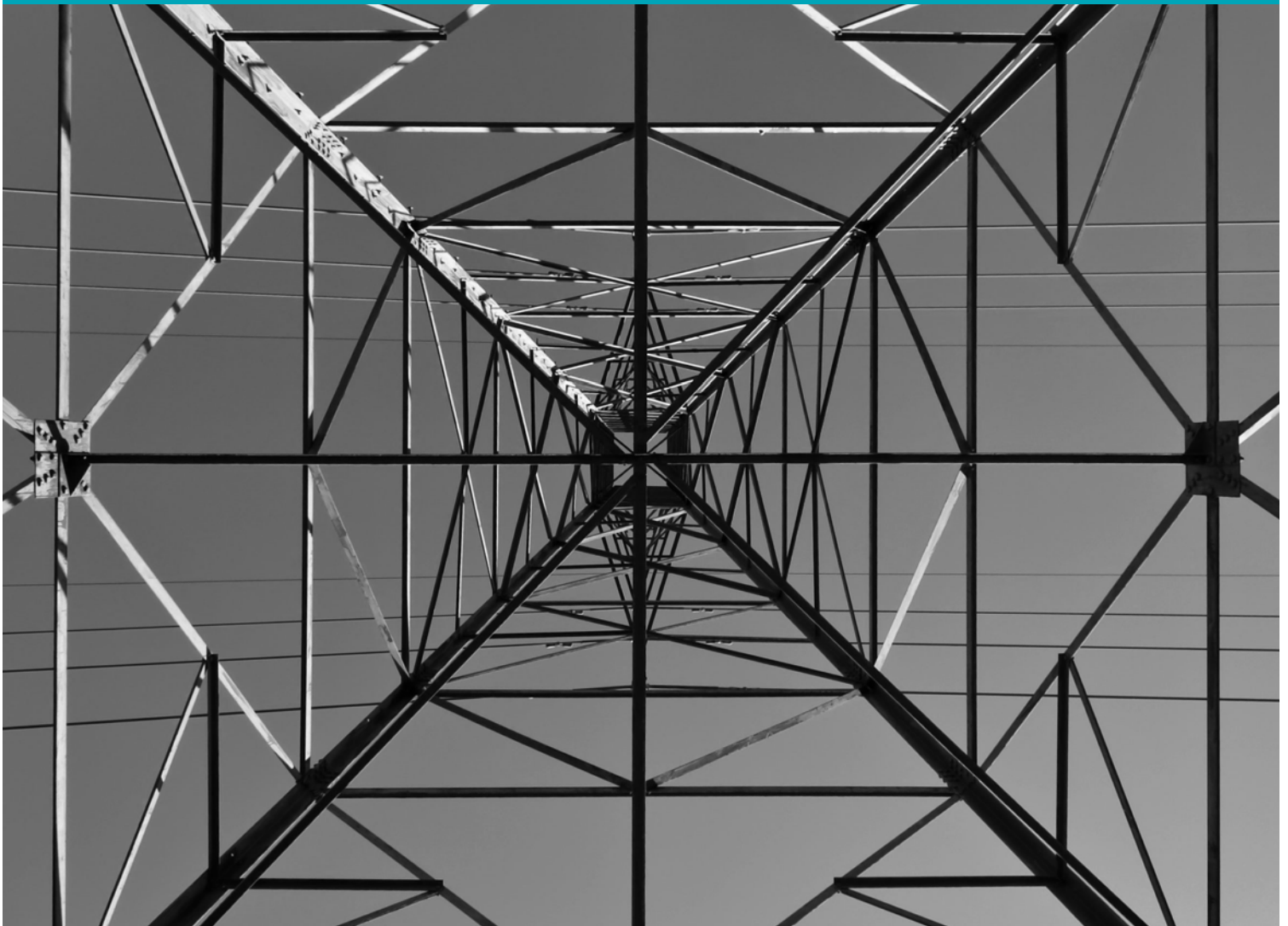
Fig. 4 – Future of Germany as a business location

Question: To what extent do you agree with the following statements about Germany as a business location?



“Overall, it remains to be said that Germany still offers excellent know-how and legal certainty for the economy. Given the very bureaucratic environment with uncertain prospects for competitive energy costs, willingness to invest in projects is limited. This explains why fewer expansion investments have been made in Germany compared to other countries (such as the US) in recent times.”

Dr. Jürgen Sandau, Partner, Lead Supply Chain & Network Operations, Deloitte





Recommended actions for companies

- Reducing internal bureaucracy and using new regulation to your own benefit:** Many companies have unnecessarily complex or bureaucratic internal procedures that are time-consuming and can hinder innovation. When bureaucratic measures do not achieve the desired effect after several years, they should probably be removed. This would also create space to better deal with new (external) regulatory demands or use them as impetus for a necessary transformation and promising innovations (e.g. new circular business models).
- Evaluating innovative energy strategies for production in Germany:** To better manage the high energy costs in Germany, companies should increasingly explore investments in alternative energy strategies and targeted digitalization/automation projects to improve energy efficiency: e.g., direct current power supply for production systems, in-house generation of renewable energy (such as solar or wind), batteries and storage capacities, energy-efficient production processes, etc.
- Leveraging the company's appeal to attract new talent:** Companies can do much to reduce their own talent shortage. High employer attractiveness makes finding and keeping employees easier. This requires companies to adapt their personnel strategy, respond better to changing employee expectations, develop innovative and flexible offers for employees, use untapped potential (e.g. by creating attractive offers for women and older employees to keep more of them in the labor market) and selectively attract international talent.

Efficiently through the energy crisis

Good practice example – Schaltbau and KUKA teach robots to save energy

Despite the high energy prices in Germany, investments in production systems can be particularly profitable when digitalization and high automation meet a progressive, decentralized energy strategy based on direct current. The industrial enterprise Schaltbau opened the world's first factory operating on direct current in Velden bei Landshut in 2023, enabling it to cut energy costs by a third. The electricity to operate the machine's speed-controlled motors in the workshop is generated by a PV plant on-site. This avoids the need to transform the alternating current from the public grid into direct current and saves energy that would otherwise be lost in the process. Battery systems are used to increase plant availability for very energy-intensive processes. The power input that direct current factories continue to draw from the public grid can be reduced by up to 70 percent.³

The rising energy costs in Germany also drove KUKA, a manufacturer of industrial robots, to examine the robots' potential for energy efficiency. In addition to efficiency measures in programming, robot control and transmission components, switching to a direct current power system was identified as having great savings potential. In future, direct current technology could save around 20 percent of energy needs and reduce the use of copper by up to 50 percent. Direct current also has better compatibility with renewable energy from photovoltaic and wind power plants.⁴

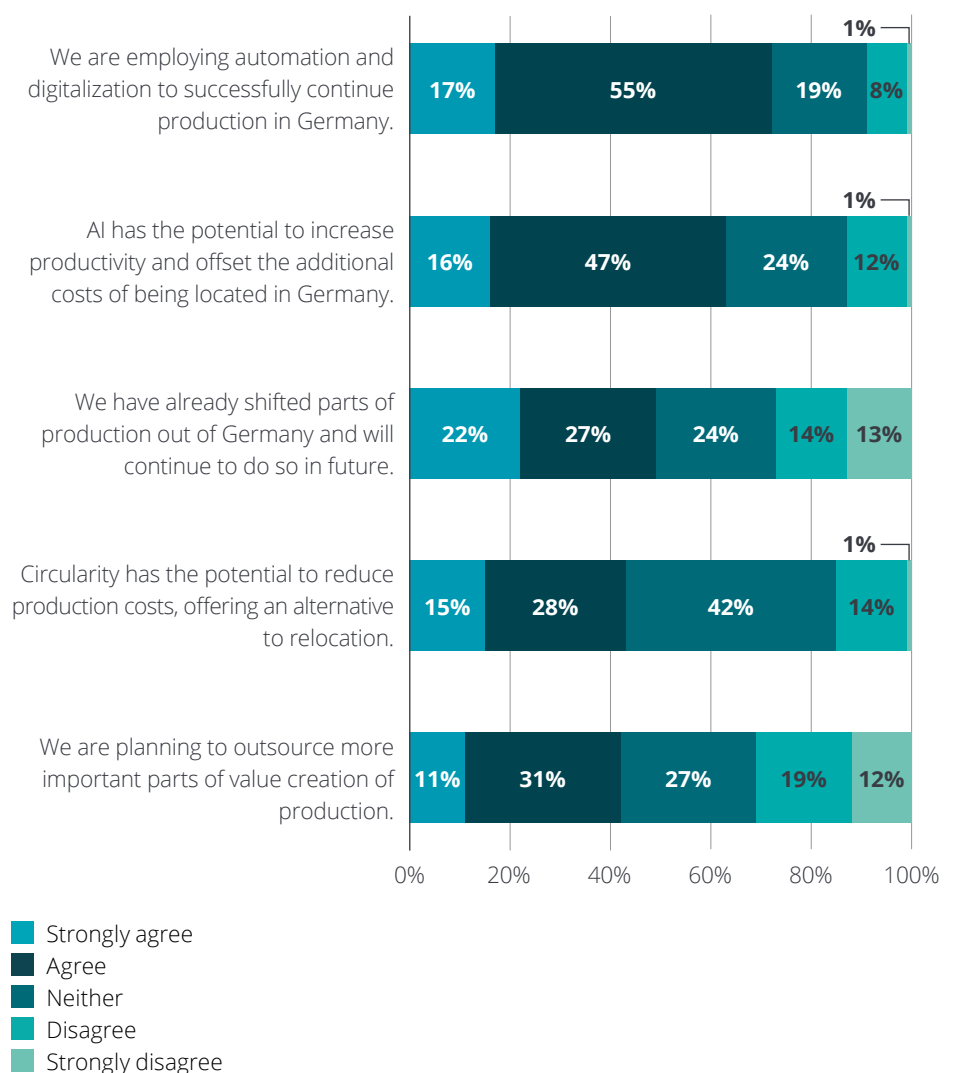
Production – Even more important parts of value creation are now being relocated, but automation and AI offer great potential

The trend of relocating production from Germany to other countries first emerged in the [Supply Chain Pulse Check Fall 2023](#) and has further consolidated. Almost half (49%) of the companies surveyed have already shifted parts of production abroad and will continue to do so in the future (see Fig. 5). Over two-fifths of respondents plan to also push the relocation of more important parts of value creation.

This means investments could experience an even greater shift from Germany to other European countries (45% of respondents), the US (34%) and Asia (excluding China) (24%) in future. In contrast, over two-fifths of companies already recognize the potential of circularity to reduce production costs and see it as an important alternative to relocation.

Fig. 5 – Future of production

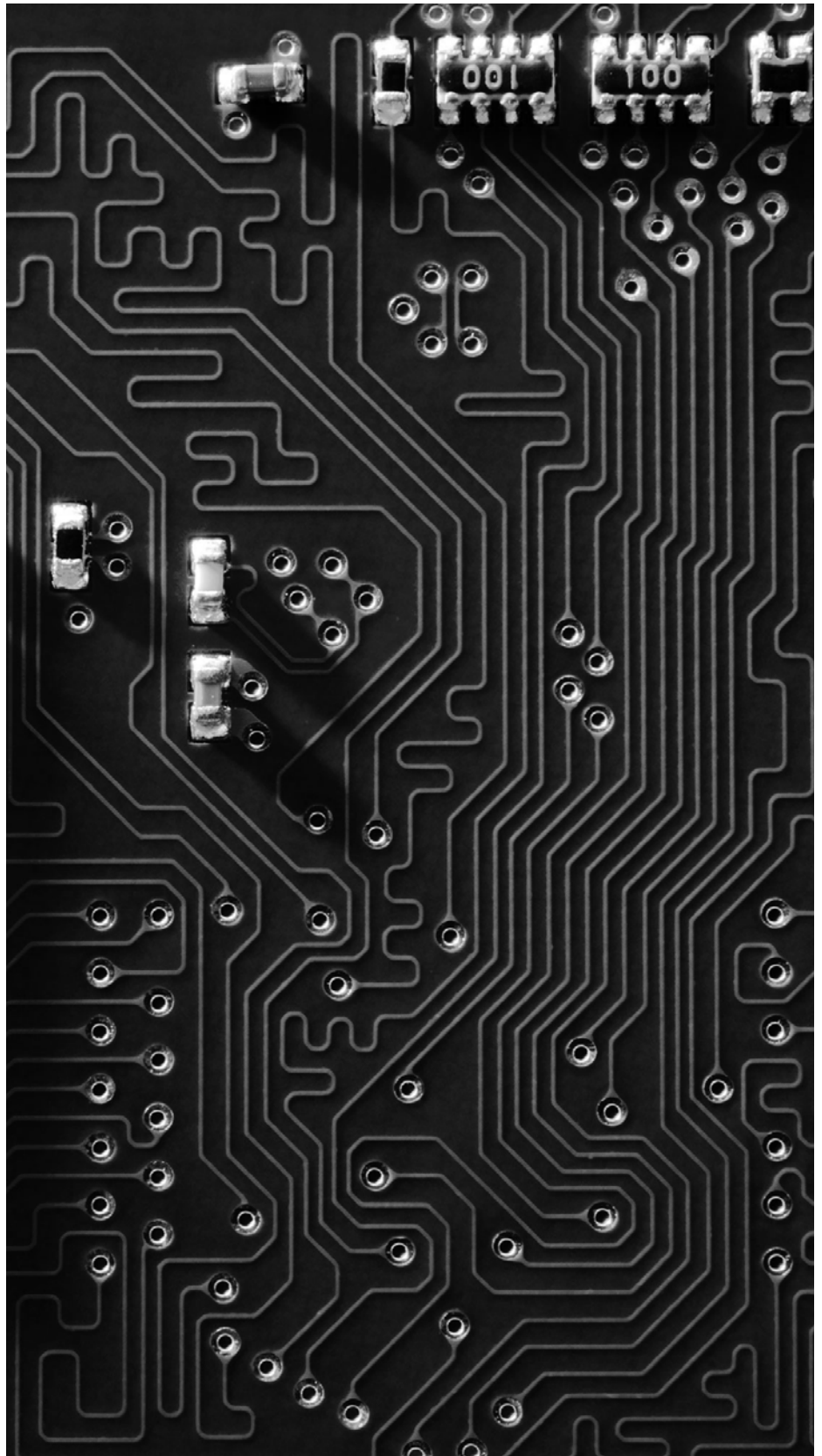
Question: To what extent do you agree or disagree with the following statements about the future of production?



Beyond the group of companies that want to continue moving abroad, a large majority of respondents say they want to leverage digitalization in Germany (or regardless of location). The participating companies are highly aware of digitalization's potential: A good three-quarters of respondents believe automation to be an important key to successfully continuing production in Germany. Over two-thirds also see great potential for AI to increase productivity and offset the additional costs of being located in Germany.

Still, the current uptake of new technology remains relatively low. 37 percent of respondents have already used AI in production and 54 percent want to do so more intensively in the future.

Investments in digitalization and AI are not trivial, but positive effects can be achieved very quickly. While established approaches exist already in industry, companies often still lack a master plan, the suitable skills, know-how and the necessary investment budget for the trend to solidify and be adopted by small and medium-sized enterprises.



“The perceived stability in some targeted countries can be deceptive, while things can change for the better more quickly than expected at home. We mustn’t underestimate companies’ engineering know-how, innovation drive and strong employee commitment to the roots of ‘their’ companies and should instead build on our strengths and believe in Germany as a location for business.”

Alexander Börsch, Director, Chief Economist & Head of Research, Deloitte





Recommended actions for companies

- **Taking a holistic perspective when assessing relocation decisions:** Relocation is not only expensive and complex, it can also have high risks. Companies need to develop a comprehensive, long-term strategy and perform a detailed evaluation that considers all relocation factors (such as costs, the market perspective, the competitive environment, etc.). Experience has shown that many companies are reluctant to leave Germany due to their roots, traditions and networks.
- **Further accelerating the digitalization and automation of production:** Many companies lack the imagination to identify potential for further digitalization/automation and do not have sufficient understanding of the required skills and necessary first steps. The scale of pilots and examples is often too small to convince them to make further investments. Instead, companies need to apply the motto “Think big, start small, scale fast”, deploy more skilled professionals and release more capital for scaling. This is the only way major digital projects such as the smart factory concept or digital twins can be successfully implemented in production.

- **Utilize AI ecosystems as opportunities for differentiation and scaling:**

AI has further amplified the potential for digitalization and automation, and the efficiencies that even small AI applications can achieve are tremendous. But companies often lack both the knowledge of what AI can really do and the skills to systematically integrate AI into operations. They have much to learn and much to gain by using AI ecosystems, partnerships and cooperations.

Bringing AI into the company

Good practice example – Schaeffler invests in AI start-up and cooperates with Siemens

Many industrial companies make targeted investments in start-ups or cooperate with technology companies to strengthen their AI know-how and prepare themselves for the future of production, which is smart, agile and sustainable. Automotive supplier Schaeffler has invested in the German software start-up up2parts in order to develop AI-based solutions for automating modern machinery and the entire manufacturing value chain. These will be implemented in an agile production environment. The main focus is on the development of an innovative system that digitalizes toolmaking through AI-generated work plans. The aim is for AI to help create even more efficient work plans in the future.⁵

By working with Siemens, Schaeffler also intends to boost the use of AI in production in general. Together, they developed the AI assistant “Siemens Industrial Copilot”, which is already running as a pilot project and has made work more efficient for employees on the shop floor. The AI assistant can create complex programming code for production processes using natural language input. It also helps employees identify possible sources of error as it has access to the relevant manuals, documentation and regulations. The system offers additional potential for machine correspondence or validation.⁶

Sustainability and circularity – High initial investment needed for a long-term competitive advantage

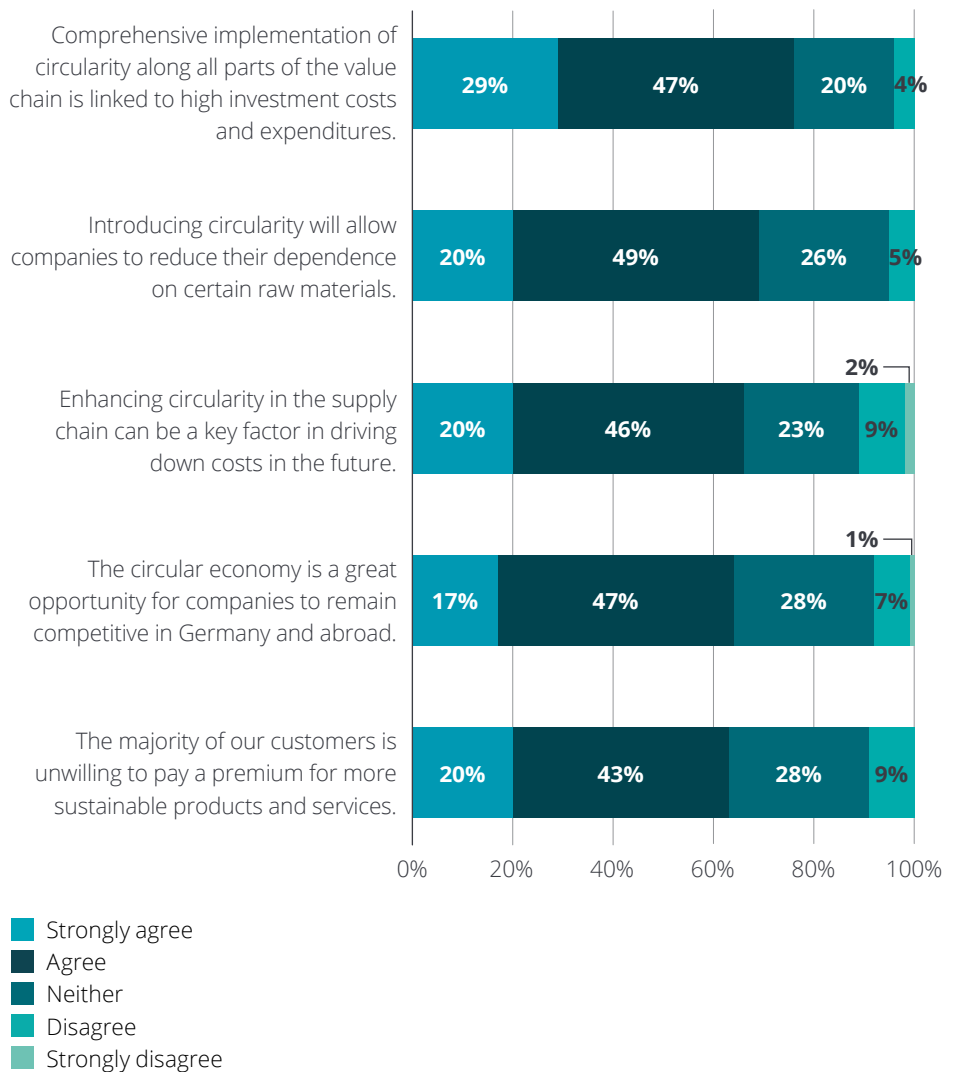
Sustainability and circularity are important fields for the future of value creation. They enable forward-looking management of the available resources and allow companies to exploit competitive advantages in the long term. Yet many companies have difficulty actually implementing circular approaches.

A large majority of companies surveyed (76%) connect circularity with high investment costs and expenditures. Most of their customers remain unwilling to pay a premium for more sustainable products and services (63%) (see Fig. 6).

Additional costs still hinder broad implementation of the circular economy. However, companies frequently overlook the fact that the high cost of transitioning from one system to the other can in some cases be amortized very quickly. Many companies today also still fail to consider different scenarios when it comes to the future of sustainability. While a use case may not appear profitable based on today's conditions, the picture may be very different when applied to a scenario ten years from now that involves rising prices for carbon and raw materials or geopolitical shifts. Customers and consumers also require better education to fully appreciate the meaning of sustainability – even if this may entail additional costs.

Fig. 6 – Future of the circular economy

Question: To what extent do you agree or disagree with the following statements about the future of the circular economy?



The circular economy also contributes significantly to resilience. 69 percent of companies believe that circularity can reduce dependency on raw materials. This is particularly important given that 42 percent of respondents fear a continued shortage of raw materials (fall survey 2023: 37%). German industry still faces a high shortage of and dependence on raw materials, as revealed by the [Supply Chain Pulse Check In-Depth-Analysis 2024](#). While circularity cannot replace all shortages, it can cushion them considerably. In a crisis that affects all manufacturers, companies that have already invested in circularity can minimize certain material shortages, thus gaining a competitive advantage.

A good two-thirds of companies also believe circularity has the potential to achieve future cost reductions in the supply chain and see it as an opportunity to remain competitive in Germany and abroad. The main challenge for surveyed companies in achieving a higher level of circularity seems to be a lack of adequate funding and customer acceptance, as well as the absence of a focused strategy and risk culture.





Recommended actions for companies

- **Sharpening the focus on critical raw materials and achieving material savings along the entire value chain:**

Successful strategies that use circularity to increase resilience should first identify all high-risk raw materials, other materials etc. and align their sustainability efforts with these findings. The focus should not only be on avoiding material losses and achieving material savings in production. It is equally important to include sustainability/resilience when designing products, by selecting materials with a high proportion of reused, reprocessed and recycled materials.

- **Leveraging digitalization and new technology for increased sustainability:** Digitalization allows companies to achieve greater sustainability along the entire value chain. Automation, sensor

technology and software can help optimize production processes while data analytics allow more efficient use of material and energy. Digital twins enable sustainable simulation and virtual prototyping conserves resources.

- **Embarking on partnerships for circularity:** Companies should also look for partners to achieve economies of scale. These partnerships and cooperations should not be limited to suppliers, universities/research institutes or customers but could potentially also include competition. This is the only way to establish a broad ecosystem that benefits not only individual companies but the entire industry and Germany as a business location, enabling it to position itself competitively in the field of sustainability and circularity, an area crucial for the future.

Circular spare parts economy

Good practice example – Resource recovery at Schindler

The manufacturer of elevators and escalators has decided to implement a circular economy for spare parts (ReX: return, repair, reuse, remanufacture, recycle). Until recently, the company scrapped returned spare parts due to a lack of repair and refurbishment processes. But policy makers and stakeholders are increasingly pressuring companies to develop closed-loop value chains that prevent the unchecked disposal of parts or waste while encouraging resource recovery. A circular economy for spare parts can also reduce long-term bottlenecks in global supply chains. Schindler is now establishing a comprehensive circular solution for spare parts with dedicated repair centers and a new KPI model as part of its Global Spare Parts Management System (GSPM).

Key elements of a successful circular economy for spare parts include the definition of ReX processes, distribution concepts, system requirements, parts characteristics and an inventory and material management logic, as well as the development of a future ecosystem with external partners (e.g. remanufacturing and recycling companies). It also includes the implementation of global standardized performance tracking and reporting and the development of a benefit calculation tool that evaluates the environmental and economical impacts of the spare part's circularity.⁷

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About the Supply Chain Pulse Check 2024

The survey was carried out from April 22 to May 22, 2024. 128 supply chain managers from large, small and medium-sized enterprises (SMEs) in Germany took part, primarily from the sectors of mechanical engineering/industrial products, automotive, chemicals, construction and transport and logistics.

73 percent of respondents are supply chain managers at large companies, and 27 percent at SMEs. Three-fifths of respondents work at companies partly dealing in services/after-sales with customer services and spare parts.

The percentages have been rounded to ensure that the sum of the answers is 100 in each case.



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