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Catalyst 2030

Growth opportunities
in Germany



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Foreword



Dear readers,

The beginning of the new decade has been defined by crisis management. The pandemic, climate change and most recently the war in Ukraine are challenging the current geopolitical and economic paradigms. Politics, business and society are rethinking and reorienting themselves. And with this, eliminating strategic dependencies, implementing consistent digitalization and accelerating green transformation are becoming increasingly important.

Challenging times also hold new opportunities. They put business models to the test and encourage us to realign our entrepreneurial strategies and rethink our economic policies. We should seize this chance to position Germany for the future: The 2020s will show whether and how we secure social and sustainable prosperity for future generations. Europe's largest economy can and should achieve more than trend growth averaging 1.2 percent per year. Better growth means jobs, more resource

efficiency and sustainable business practices. We must accelerate digital development and advance environmental and structural transformation as quickly as we can.

Such fundamental change can be achieved by binding targets, but above all by well-thought-out measures. The tasks are clearly defined: Policymakers must provide a pro-competitive framework and set the right incentives. Businesses will then pave the way for a sustainable future. There is huge potential, but we will never be able to realize it without buy-in from society and a transition to a more mindful way of life. We need new behavior patterns collective action for sustaining life on earth: How do we want to live, consume, feed ourselves and get around in the future?

Technology and innovation play a central role as drivers of future growth. Given the shrinking workforce, Germany has no

other option than to leverage digitalization to increase productivity. This will require enterprises across all sectors to embrace these innovative technologies. Data, data exchange and data use is becoming increasingly relevant across all industries. But there remains much untapped potential, particularly in terms of digital competitiveness: Germany continues to perform modestly in international rankings. We will need to put in some effort if we are to contend for a position at the top. It will require greater investment in digital infrastructure and content for the digital economy to flourish.

Artificial intelligence as well as cloud and quantum computing are opening up a wide range of opportunities – from personalized healthcare and living in sustainable cities to digital supply chains for the circular economy. New business ideas and technologies often enter the market via start-ups, yet too much red tape and inadequate funding

stand in the way of business momentum, especially in the uncertain early stages of a company. By comparison, the volume of venture capital investments in the USA, the current frontrunner, is ten times higher than in this country.

Germany's economy has a robust industrial core that is respected worldwide. To ensure that this remains the case in the future, we must strive to be at the forefront of industrial digitalization. By combining industry expertise and technological know-how, cutting-edge research and highly trained talent, we create the best conditions for finding solutions that advance the economy and our society. Many companies have embarked on a digital transformation: They are creating digital platforms around their products, integrating data-based services, automating business processes and transforming their organizations. Now it is crucial to accelerate further and reduce the time-to-market for these innovative industrial solutions. Those who share knowledge and develop solutions in cross-industry ecosystems will have the greatest chance of success. Cooperation is indispensable in our networked age.

We must empower people to help shape digitalization. And this can only be achieved by increasing our investments in education and training. This undoubtedly includes providing efficient infrastructure and technical equipment. After all, learning success should not be dependent on having a tablet or gigabit internet. And yet, digitalization is about more than technology – it is also about content. Schools need to expand their curriculum to include technology skills and media literacy, while fostering creativity and inspiring a desire to create something new. And we must enable employees to

develop their (digital) skills. The jobs of the future will be more knowledge-intensive and job profiles more specialized. Individuals who are open to lifelong learning will have access to all the opportunities the new world of work has to offer.

And let us not forget the demographic change, causing growth forces to dwindle. As the population ages, and more and more people retire from the workforce, the shortage of skilled workers will become increasingly acute in the coming years: By 2030 alone, the labor force in this country will drop by 3.5 million, an 8 percent decline from 2020. How do we adjust to this? What do we need to do? For one, the increasing employment of women, older workers and the foreign-born population will become more important. Talent management will also play an increasingly prominent role in business strategy in the future: Is the company a good place to start, advance and end a professional career?

Let us have no illusions: Nothing will require greater effort than the transition towards a carbon-neutral economy. At the same time, protecting the climate and our environment holds a great opportunity for higher value creation and social prosperity in the long term. Green-tech innovations can open up new markets and revenue streams, create additional jobs and improve people's lives. No one would want to miss all this.

Society and the economy will achieve this environmental transformation, provided we make it equitable for all. Collective action to mitigate climate change has never been more important. Still, we also depend on regulatory guidance to ensure that industrial companies remain competitive in the global market. High raw material and

energy prices are pushing society and companies to the limits, yet without sufficiently available and affordable energy, there is no future for industrialized countries. Stability and security of supply are elementary on the path to carbon neutrality.

This study aims to contribute to the economic and socio-political discussion. In it, we highlight real-world strategies for Germany to meet these challenges by 2030. A fresh start, an increased focus on the labor market, the creation of a digital and sustainable economy and innovation would more than double growth in this decade – and have a direct impact on prosperity in our country.

Let us shape this change with enthusiasm, courage and pragmatism. We have no time to lose.

Volker Krug
 Chef Executive Officer

Executive Summary

Germany faces huge macro-economic and societal challenges in the 2020s – foremost among them coping with demographic change, becoming more digitally competitive and combating climate change – even as the economy's growth potential is declining. If we ramp up our efforts and make real advances in the labor market & skills, the digital economy as well as innovation & start-ups, we can accelerate growth during the 2020s and take our economy to the next level.

As the baseline and the benchmark of this study, we extrapolate the expected growth performance in Germany based on the current environment. The baseline scenario has German economic growth at an average of 1.2 percent per year in the current decade, with significantly lower growth rates during the second half of the decade. However, there are opportunities to improve growth potential and productivity significantly.

We start with a comparison of twelve key indicators using Germany's current position among the OECD nations as a basis and then extrapolate the impact it would have on growth if Germany narrows the gap to the front-runner in each instance by a quarter (the Acceleration Scenario) or by half (the Breakthrough Scenario). These findings help us derive our five key theses.



Growth Potential

German economic growth could accelerate dramatically by 2030 relative to the baseline scenario, with growth rates almost doubling or even tripling depending on the scenario. That would mean an average pay raise of about 8,600 euros per capita.



Growth Drivers

Labor market initiatives would have the biggest impact, but advances in the digital economy and innovation & start-ups have the potential to substantially accelerate growth as well.



Labor Market and Skills

Increasing labor force participation can go a long way toward mitigating demographic change – combined with higher spending on education and lifelong learning.



Digital Economy

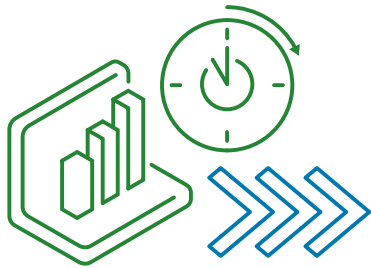
Making Germany more digitally competitive through investments in high-speed broadband and software and databases will boost productivity – as well as growth rates.



Innovation and Start-ups

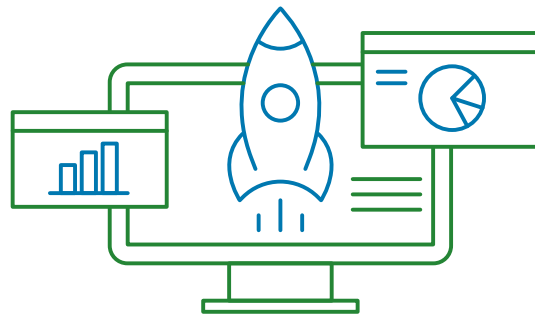
Making venture capital easier to access and removing regulatory barriers can significantly speed up the pace of innovation and growth.

Fig. 1 – Key results



2.3%

will be the Ø growth from 2022–2030
in the Acceleration Scenario.



3.4%

will be the Ø growth from 2022–2030
in the Breakthrough Scenario.



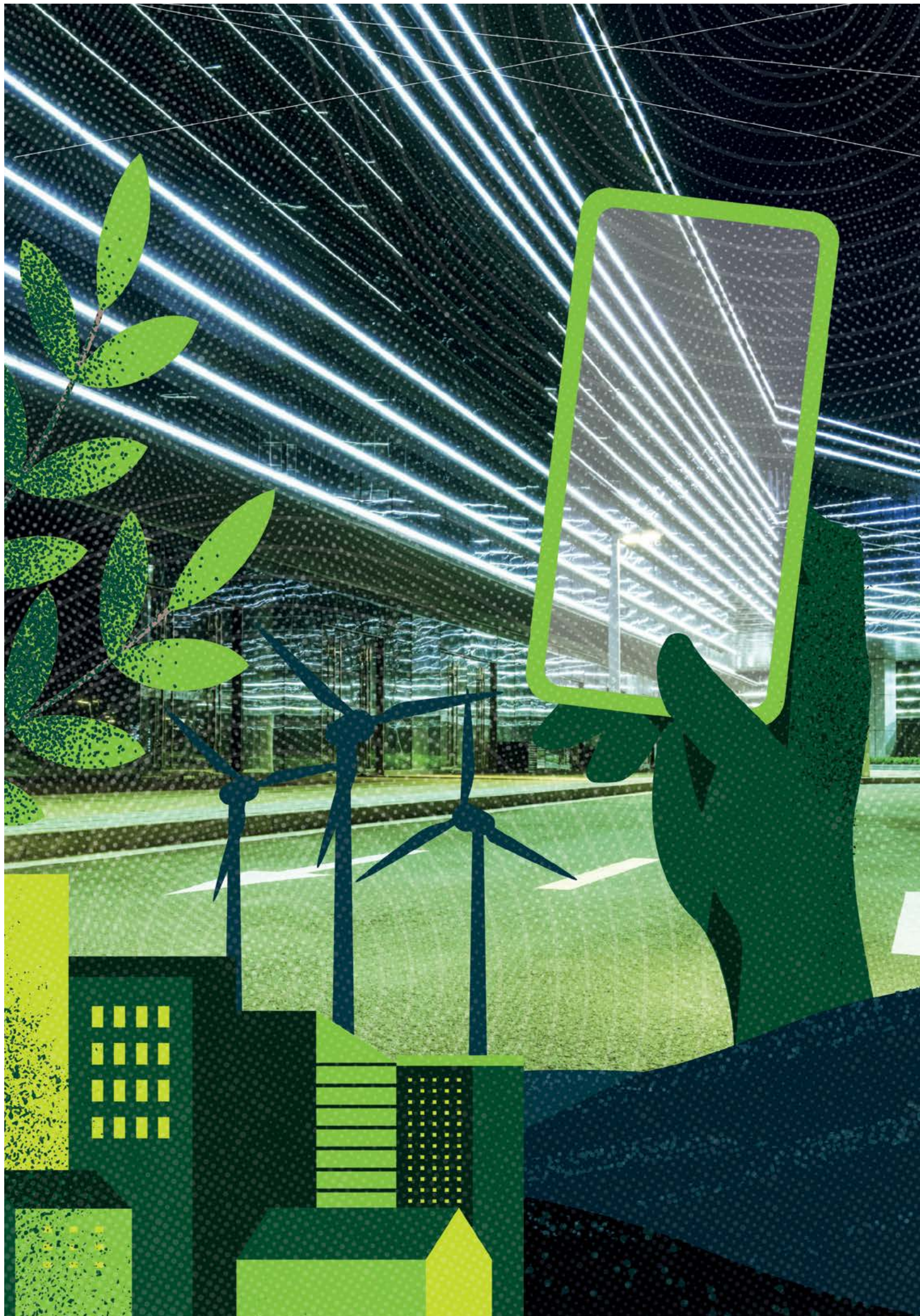
2.5 million

more employees will be on the market if we
increase labor force participation.



51,600 €

in per capita income for the Breakthrough
scenario – 8,600 euros higher than the
baseline.



Key Challenges in the 2020s

At the start of a new decade, experts always speculate about how things will develop and what major changes are in store. The early 2020s, however, have been plagued by uncertainty, with the lingering Corona pandemic and the war in Ukraine promising difficult-to-predict consequences for both business and society. As the decade progresses, we are likely to face structural challenges above and beyond these crises, which will have an impact on economic performance.

At the beginning of the last decade, the outlook was extremely uncertain and relatively bleak. The world had just emerged from the worst recession of the post-war period, and the aftershocks of the financial crisis were significantly impacting corporate strategy and economic policy during the 2010s. Yet, despite the initial prospects and contrary to most projections at the time, Germany's economy performed very well as the decade progressed. Economic growth was solid, and the labor market was close to full employment.

As we entered the 2020s, the outlook is once again very uncertain. The much-anticipated recovery from the deep pandemic-driven recession has been slowed by the war in Ukraine, and we are still uncertain how that will impact the economy. In addition to these crises, further challenges are emerging as the decade progresses, which will likely determine economic performance.

- First off, demographic change will have a very noticeable impact on the economy and particularly on the labor market. We can expect a sharp decline in labor force participation, which means economic growth will depend almost exclusively on increasing productivity; we cannot rely on higher employment rates to drive growth.
- Secondly, digital competitiveness is becoming a critical factor in overall competitiveness.
- Thirdly, climate change is forcing us to completely transform the economy.

The 2020s promise to be extremely challenging for policymakers and business leaders alike. The direction we choose to take will determine the future prosperity of the country as well as the standard of living and the career prospects of the majority of the population, but also the resources we have at our disposal to combat climate change.

Objectives of the Study

With this in mind, we explore the ways in which Germany can enhance its growth potential and increase productivity between now and 2030. This study provides food for thought, not only in terms of what we need to do to meet the challenges ahead, but also what measures we believe to be most promising. Our ability to make advances in these areas will dictate where the German economy stands at the end of the decade. In each scenario, we have quantified the growth prospects to provide a more precise picture of the macroeconomic effects.

This study focuses on the areas that are hit hardest by our present challenges as well as those that will make the greatest economic impact in the 2020s: labor market & skills, the digital economy and innovation & start-ups. We examine a total of twelve key indicators within these core themes, focusing first on Germany's present position within the OECD. Using these findings, we then simulate the growth effects based on Germany's ability to narrow the gap to the leading countries in each case.

Challenge 1: Demographic Change

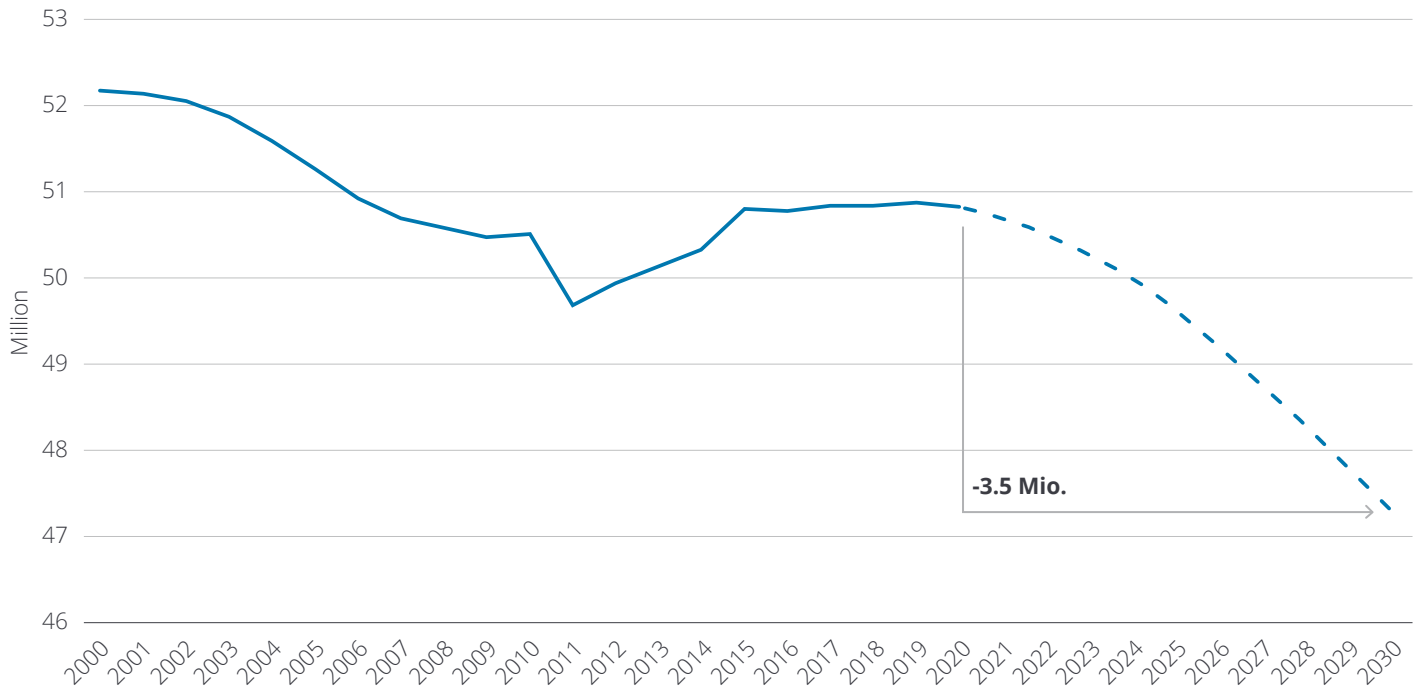
Demographic change has been a hot topic for some years now – out of all trends, demographic trends are the most reliable, because they evolve slowly and are easy to forecast. Yet they are often overlooked because they are long-term in nature and lack day-to-day relevance. That is likely to change in the current decade, as we start to feel the effects of demographic change first-hand.

This change will have wide-ranging political, societal and economic impacts, from the social security and healthcare systems to shifts in demand for real estate, consumer goods and services. Perhaps the most immediate effect, however, will be felt in the labor market. As society ages, a significant number of workers are reaching retirement age with relatively few young workers entering the labor market to replace them.

The outcome of this trend is clear: Labor force participation will drop dramatically. In its medium-term population forecast, Germany's Federal Statistical Office (Statistisches Bundesamt or Destatis) reports that the working age population will decline by 8 percent to 3.5 million workers by the end of the decade.¹ The skills shortage, which was already an issue before the pandemic hit, has become even more acute in 2021, giving us a taste of what is to come in the labor market in the 2020s.

Although automating processes and jobs will counteract this trend, it cannot fully compensate for it – because demographic change means not only fewer working age adults, but also higher demand for labor-intensive personal services, mainly in the medical and residential care sectors. Deloitte's study "The Jobs of the Future" predicts that even though we can automate about one-third of the current person-hours in employment, the net demand for workers will still grow by 1.2 million people. In addition to healthcare and residential care jobs, demand will rise particularly in the areas of teaching and training, civil service, technology and the natural sciences.²

In macroeconomic terms, there are only two factors that generate economic growth: expanding the workforce or increasing productivity. And with demographic change, we know that labor force participation will inevitably decline. Whether we can slow that decline remains a critical question in years to come. A rise in labor force participation can have a significant impact on the economy, but it cannot generate growth on its own. The more critical question is whether it will in fact stunt growth. The main factor to further growth in the coming years will be increases in productivity.³

Fig. 2 – Population between 20 and 65 years of age in Germany

Source: Destatis.

Challenge 2: Digital Competitiveness

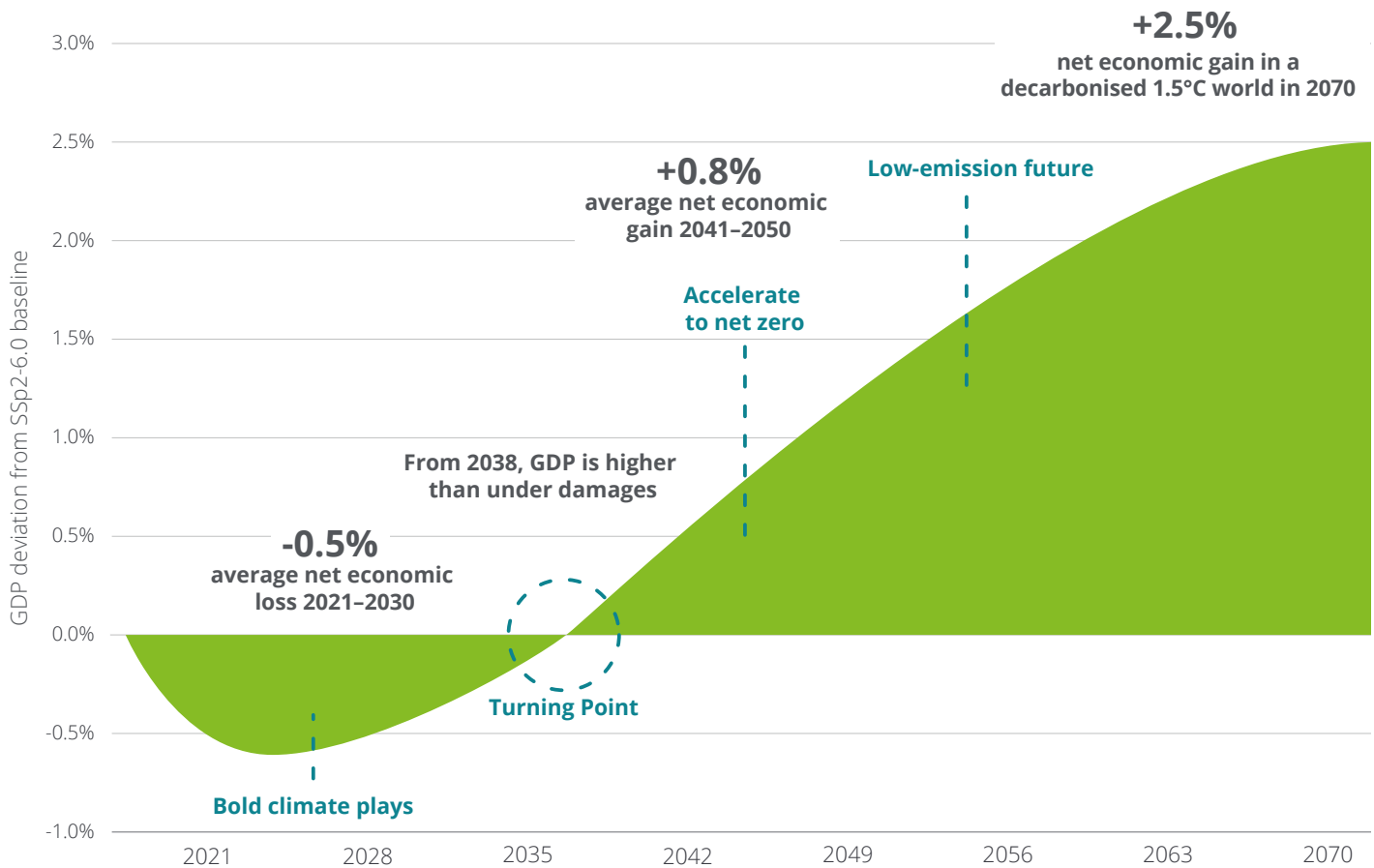
Overall competitiveness in Germany remains very high. The most recent competitiveness report from the World Economic Forum in 2019 put Germany in 7th place among 141 countries, down from 4th place in the previous year.⁴ Germany earned a top ranking in the areas of macro-economic stability, education and training as well as in research and development. Its position in the digital economy, however, is much weaker and threatens to become – or perhaps already is – a disadvantage for Germany as a location for business in terms of the digital technologies in use across all industries.

We have to distinguish here between the use of digital technologies in the public and the private sectors on the one hand and the competitive position of the digital economy itself on the other. The latter is particularly critical for digital competitiveness, and Germany has a rather mediocre position on this score. The current digital competitiveness ranking put out by IMD business school ranks Germany in 18th place out of 64 countries with a clear weakness in technological and digital expertise (54th place).⁵ Other recent studies on digital competitiveness among the 34 OECD countries see Germany's weakness primarily in investment in digital technology and venture capital.⁶

This relative weakness is evident in the lack of specialization in the high tech or digital industries in Europe in general and Germany in particular. Not just because there are hardly any European companies among the leading global players in digital business, but also because research and development spending in Europe, which is decisive for future digital competitiveness, lags far behind. According to the European Investment Bank, EU countries account for 12 percent of R&D investment in the tech sector, with the US at 52 percent.

There is therefore a risk that the added value and the growth and employment potential of the digital economy will bypass Germany. As digital technologies have a knock-on effect on many other industries, this could also negatively impact overall competitiveness in the long term. The top four out of the five most valuable global companies in terms of market capitalization in 2021 are, after all, tech companies (Apple, Microsoft, Alphabet Inc. and Amazon).⁷

Germany is in danger of being left behind in terms of digital competitiveness – largely due to a lack of technological and digital expertise.

Fig. 3 – Germany's gradual transition to a 1.5-degree world**Challenge 3: Climate Change**

Combating climate change is at the top of the political agenda in Germany, Europe and the world. One thing is clear: Meeting our carbon neutral targets means completely transforming Germany's industrial base. This affects core industries from automotive manufacturing to the chemical industry. At the same time, however, we also have to transform the energy supply if we want to achieve our 1.5-degree target. This will demand serious investment and a longer-term strategy.

Deloitte's scenario analyses show that, as the economy adapts and shifts to a low-emissions strategy, the impact of the up-front costs for the initial transition will hit Germany hard. Over time, however, the

benefits – both in terms of avoiding a climate catastrophe and accessing new business opportunities – would take hold, and the country would generate a net economic gain from decarbonization. Initially, GDP growth will underperform the baseline scenario, but there is a tipping point at which Germany can avoid the worst impacts of climate change and the economic benefits outweigh the costs of moving away from emission-intensive production. 2038 would be the turning point for Germany, after which GDP outperforms the baseline scenario and growth even starts to accelerate.⁸

For the current decade, however, there is an economic burden associated with both the effects of climate change and the efforts to combat it, which means

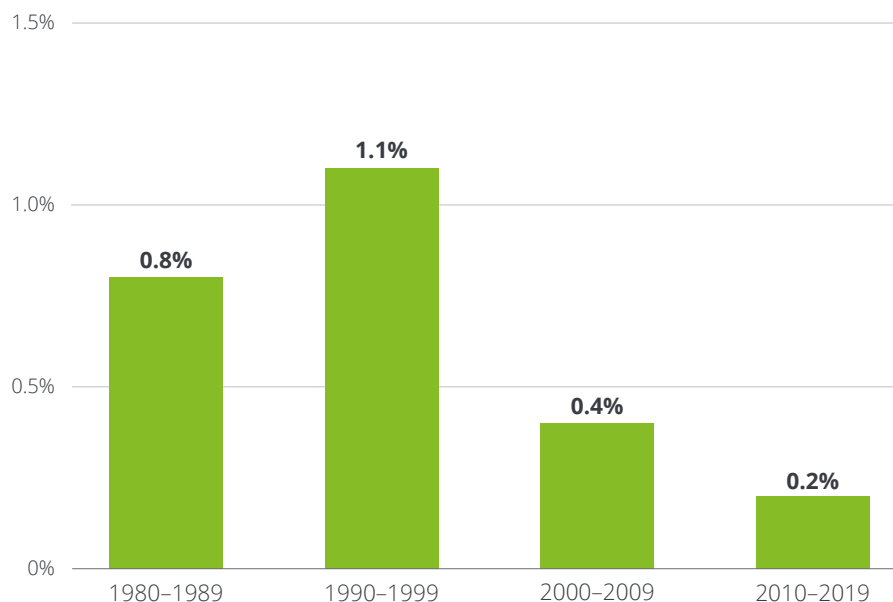
we have to generate growth by different means to secure the funds we need for climate action. We can expect to receive a return on these climate investments from the 2030s onward. As we see it, effective climate policies are not contradictory to growth policies, but rather the foundation for them. This, however, is contingent on designing a growth strategy that is climate-friendly and focused on increasing productivity.

Implications: Increasing Growth Potential and Productivity

Ultimately, the main challenge for the 2020s will be to increase our growth potential. There are two main drivers that will be decisive for our success. On the one hand, we need to increase employment among the existing working age population to counteract the overall decline in labor force participation. On the other, we need to increase productivity, despite the downward trend of recent years. Even with technological advances and digitalization, productivity growth over the past decade was only about half of what it was in the early 2000s. This trend is not limited to Germany; productivity growth has fallen sharply across all OECD countries. What makes the negative productivity trend in Germany so concerning is that demographic change will only make it worse. After all, Germany already has one of the world's oldest populations, together with countries like Italy, China, Japan or South Korea, and is one of the fastest-aging countries in this decade.⁹

To maintain prosperity in Germany as circumstances change around us, there is no way around reversing this trend. The aim of our study is to identify ways we can increase productivity and growth potential as well as to quantify the effects of the different policy measures available to us.

Fig. 4 – Productivity growth* (%)



Source: Oxford Economics, Deloitte

* Increase in productivity here is based on total factor productivity.

Methodology

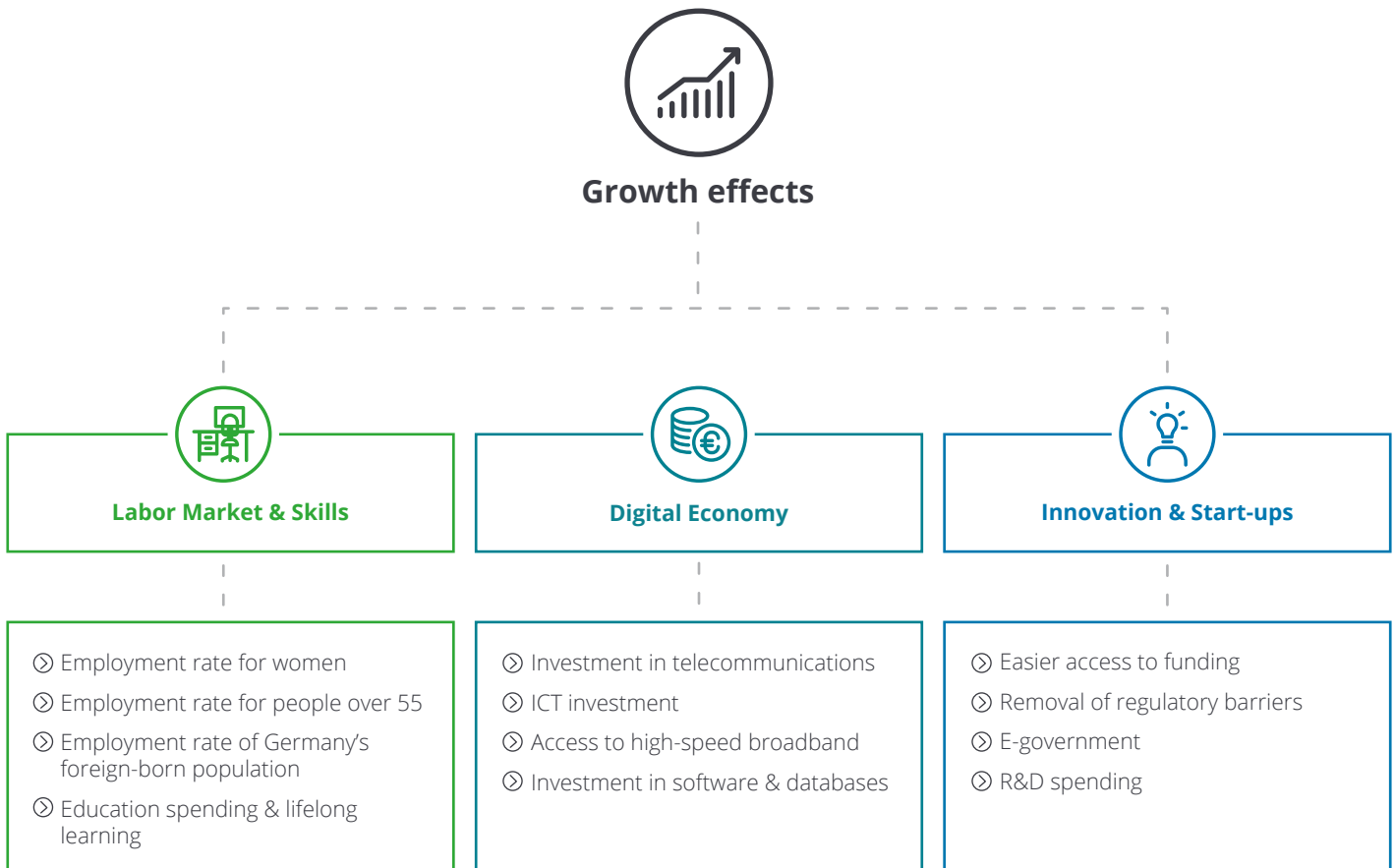
In order to extrapolate the growth effects of the most promising economic policies available to us, our study uses a three-step process. We analyze twelve indicators in the three areas labor market & skills, the digital economy and innovation & start-ups. The first step is a comparison between Germany's current position in each area compared with 27 (of the 38) OECD countries, using the data available in each case.

In the second step, we simulate the growth effects if Germany were to significantly narrow the gap between itself and the leading country in the respective area. The basis for our calculations of the growth effects is an extensive analysis of the macroeconomic literature, mainly from international organizations such as the OECD, economic research institutes and think tanks. These papers focus on an econometric analysis

of the relationships between the indicators and their growth effects, enabling us to make empirically based assumptions about the extent to which these measures can generate growth in each area.

In the third step, we then use our findings to develop two scenarios that are ambitious yet achievable. The first scenario has Germany narrowing the gap to the front-runner in the respective indicator by a quarter. The second scenario shrinks the gap by half. The main difference between the two scenarios is how far efforts in Germany go to catch up with the leaders in each area. In other words, we do not assume that Germany will become the front-runner in every area, but only that it has the potential to narrow the gap substantially.

Fig. 5 – Measures to stimulate growth



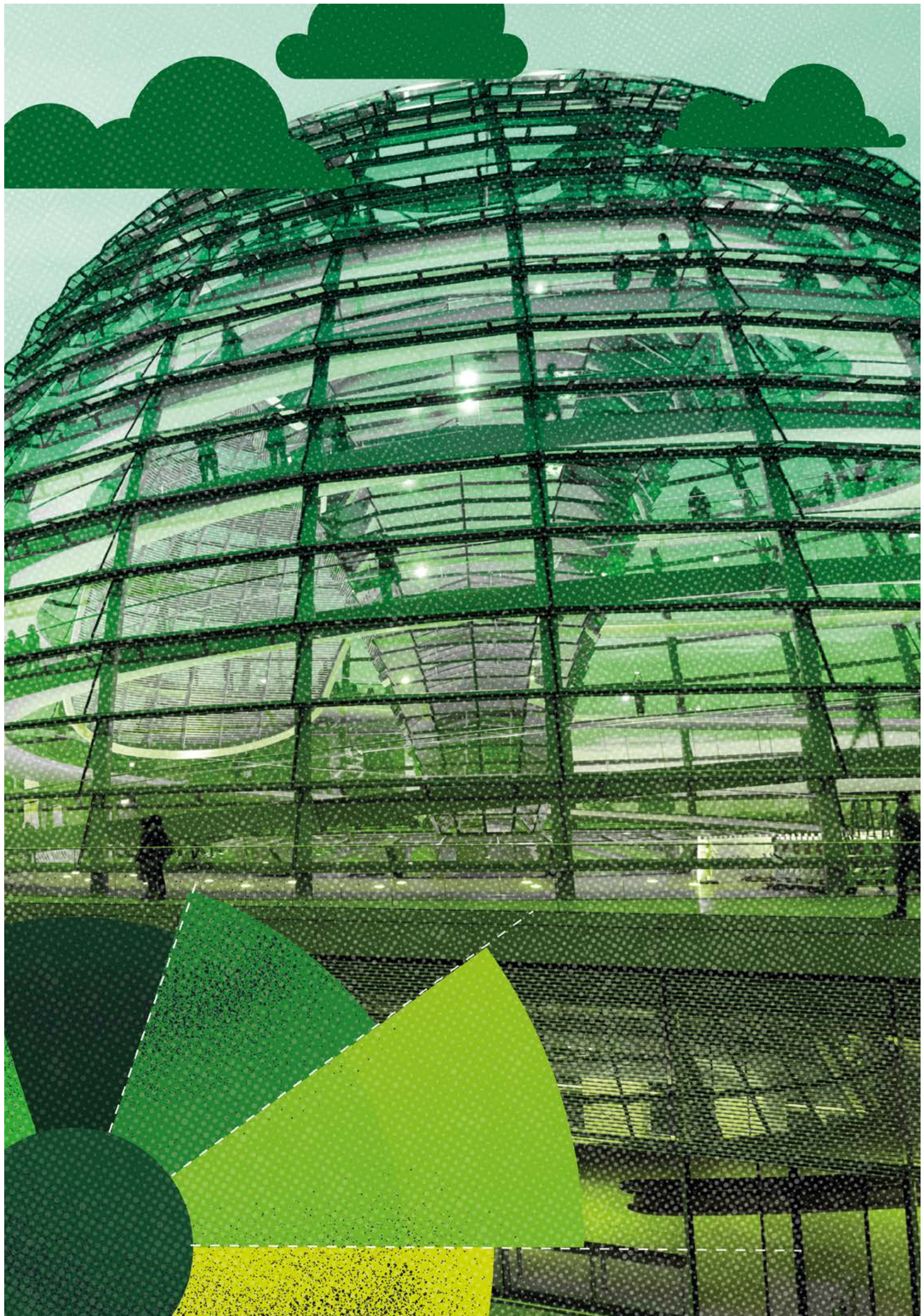
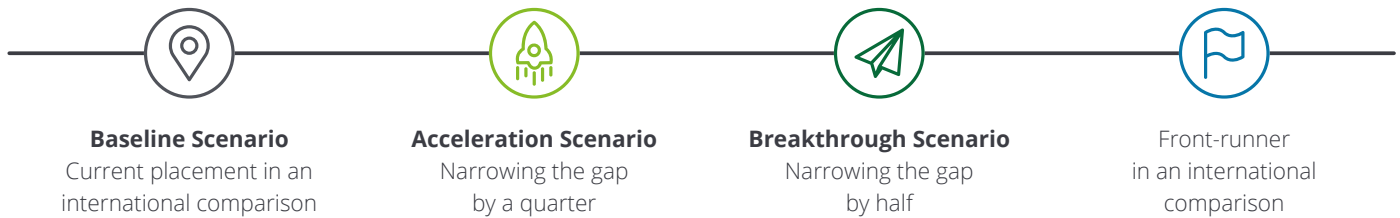


Fig. 6 – Methodology

The benchmark for both scenarios is a baseline extrapolation of Germany's current growth potential: the projected long-term growth of the economy at normal capacity utilization with no inflationary pressure.

Based on these assumptions, we use a macroeconomic model and changes in the total factor productivity per year to estimate the growth effects of measures designed to catch up with the front-runners in each area. We then aggregate the different growth effects of the various measures in the respective scenario to get a big picture view. The third step also factors in the industry perspective on the upcoming changes based on in-depth interviews with 14 industry experts and subject-area specialists.



A new dawn for Germany and its potential – five theses

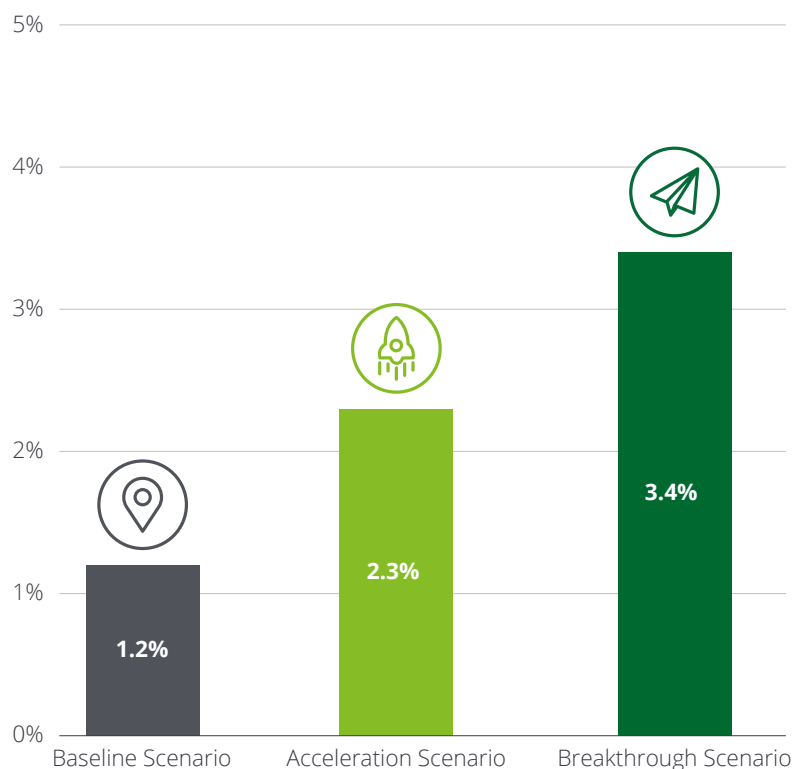
1. Growth Potential

German economic growth could accelerate dramatically by 2030 relative to the baseline scenario, with growth rates almost doubling or even tripling depending on the scenario. That would mean an average pay raise of about 8,600 euros per capita.

Our simulations show that trend growth could more than double over the course of the decade in both scenarios. If Germany succeeds in narrowing the respective gap to the leading OECD economy by close to a quarter in all of the areas we analyze in our Acceleration Scenario, average growth would almost double from 1.2 to 2.3 percent by 2030. An upswing of this magnitude would put Germany on a path to growth similar to the US during the 2010s (2.25% per year).

If, on the other hand, as simulated in the Breakthrough Scenario, Germany can narrow the gap by half in the respective areas, the effect would be even more pronounced. In this case, growth – relative to the baseline scenario – would almost triple to 3.4 percent.

Fig. 7 – Average annual growth 2022-2030



A more detailed look at the growth projections for the coming years shows that, because of the war in Ukraine, the recovery we anticipated in 2022 will likely be delayed until 2023 or even 2024. After that, there is a significant drop in the growth rate. By the end of the decade, growth in Germany will only be 0.4 percent, with demographic change playing a key role. In the Acceleration Scenario, growth rates plateau at about 1.8 percent in the second half of the decade, or at over 3 percent in the Breakthrough Scenario.

The more dynamic growth scenarios have a direct impact on Germany's overall prosperity. GDP per capita, i.e., the economic output per German citizen, is expected to be around 43,000 euros in 2030, if the German economy continues the current growth from the baseline scenario. This figure would be almost 10 percent higher under the Acceleration Scenario at around 46,700 euros. In the ambitious Breakthrough Scenario, per capita economic output increases by 20 percent to 51,600 euros. That means every German citizen would

have an extra 8,600 euros in their pocket. This average figure says little about the distribution of additional income, but it does illustrate what a difference higher growth makes at the individual income level.

Fig. 8 – Economic growth to 2030 (in %)

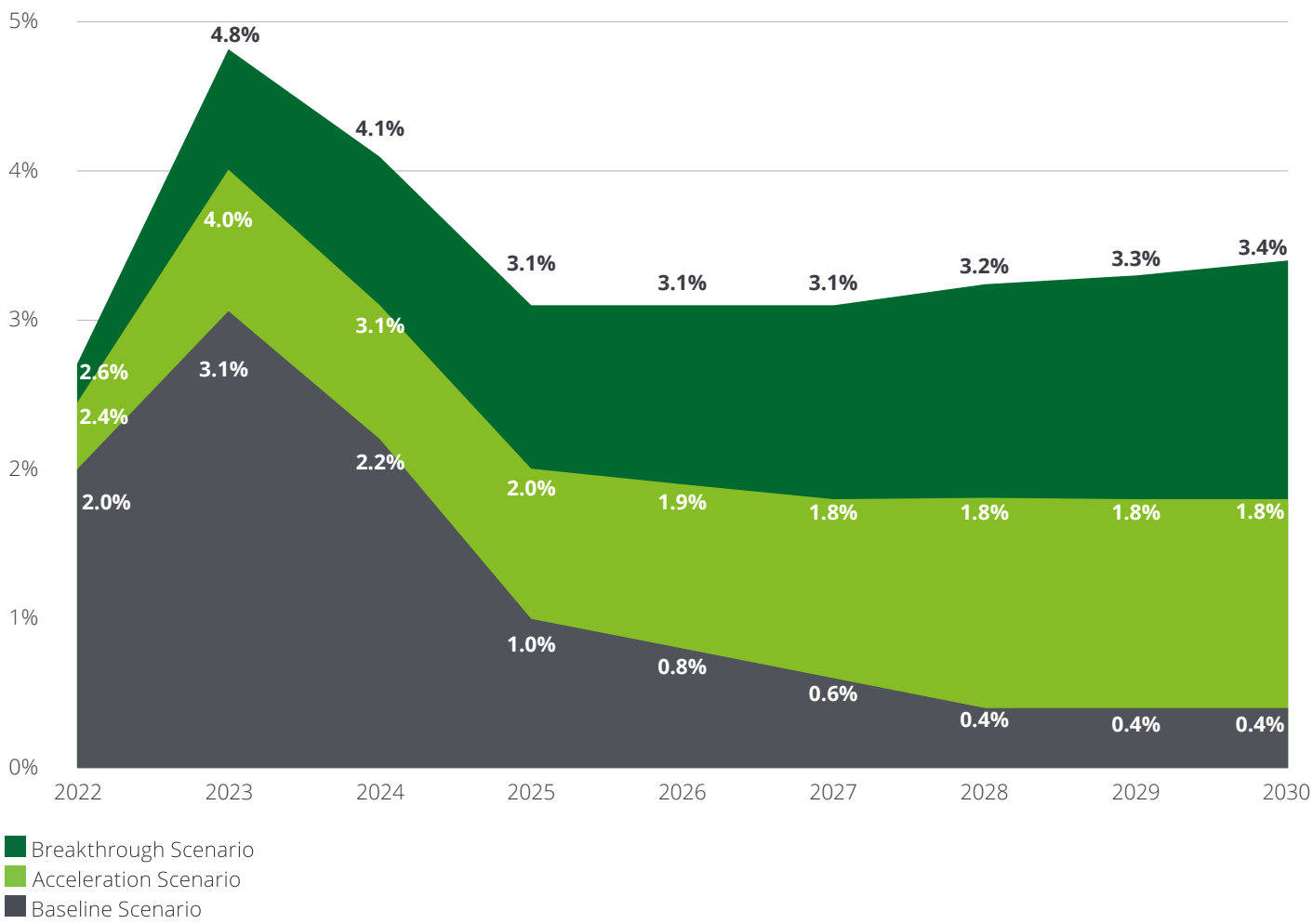
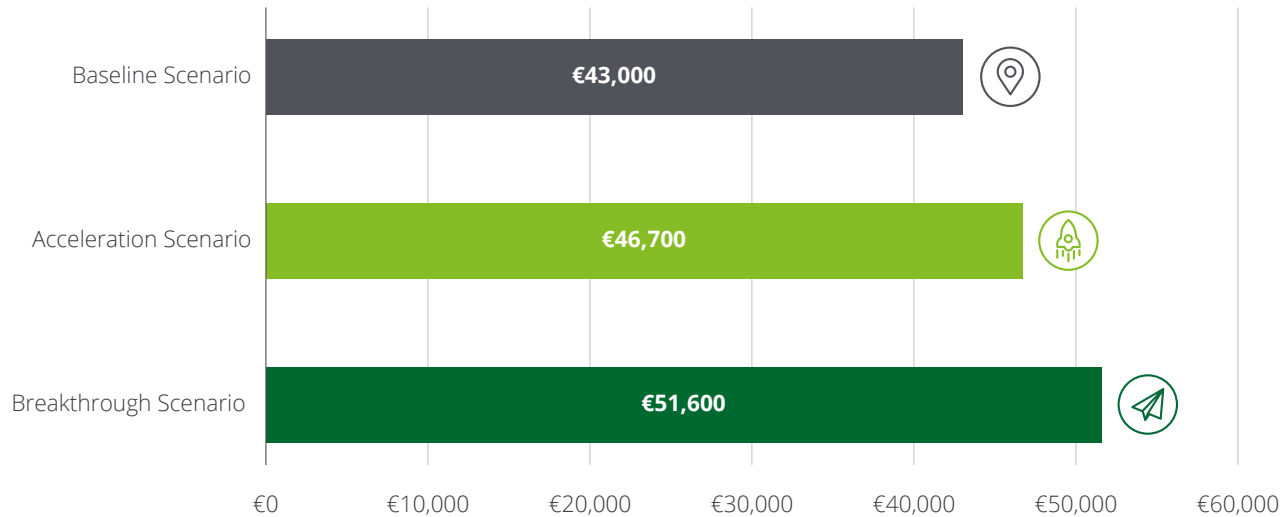


Fig. 9 – GDP per capita in 2030

CO₂ prices and growth in the 2020s

To achieve our climate targets, an increase in CO₂ prices is inevitable. Organizations like the Potsdam Institute for Climate Impact Research, the German Federal Environmental Protection Agency (Umwelt Bundesamt or UBA) or the Network for Greening the Financial System, a group of central banks, believe that CO₂ prices will have to be somewhere in the range between 130 and 200 US dollars per ton by 2030.

On its own, this would have a downward effect on growth because it would increase costs for companies. However, the effect would not be as pronounced if the government returns the money raised through these increases to households – as is the plan with most policy initiatives. Based on our model, if CO₂ prices go up as estimated above, growth would shrink by around 0.12 percent per year relative to the baseline scenario.

2. Growth Drivers

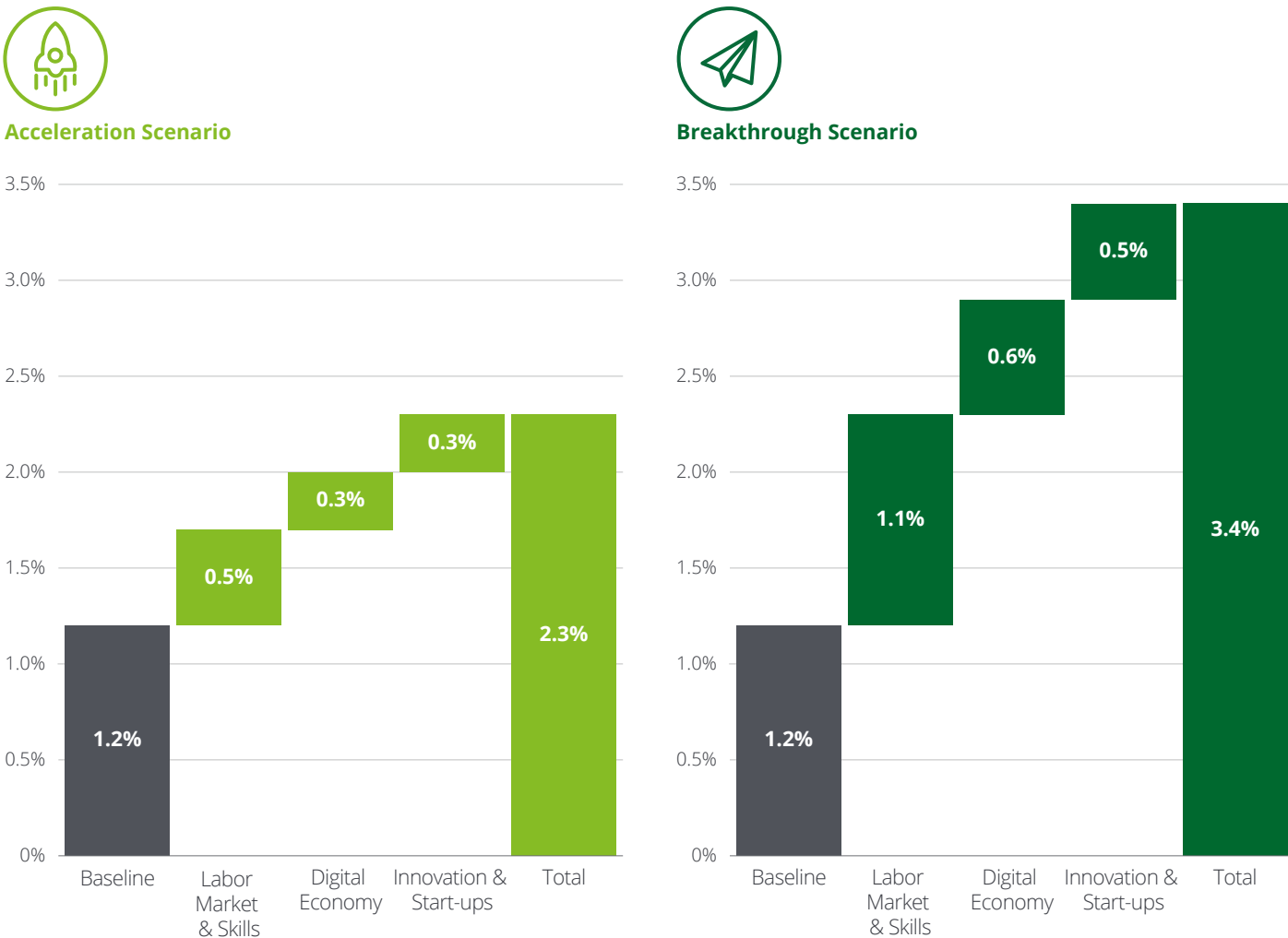
Labor market initiatives would have the most impact, but advances in the digital economy and innovation & start-ups have the potential to substantially accelerate growth as well.

Each of the three areas we analyzed – the labor market & skills, the digital economy and innovation & start-ups – has an important role to play in this decade’s growth. The most impactful measures in both of our scenarios relate to reforms in the labor market, followed by advances in the digital

economy. Labor market initiatives alone can boost growth in Germany by half a percentage point to more than one percentage point, depending on the scenario. In the latter case, this increase is almost as high as the average growth rate in the baseline scenario for the 2020s.

The huge impact that labor market measures would have – 0.5 or 1.1 percentage points higher annual growth rate on average – is mainly due to the fact that decreasing labor market participation has an immediate downside effect on growth in the baseline scenario. If we can mitigate

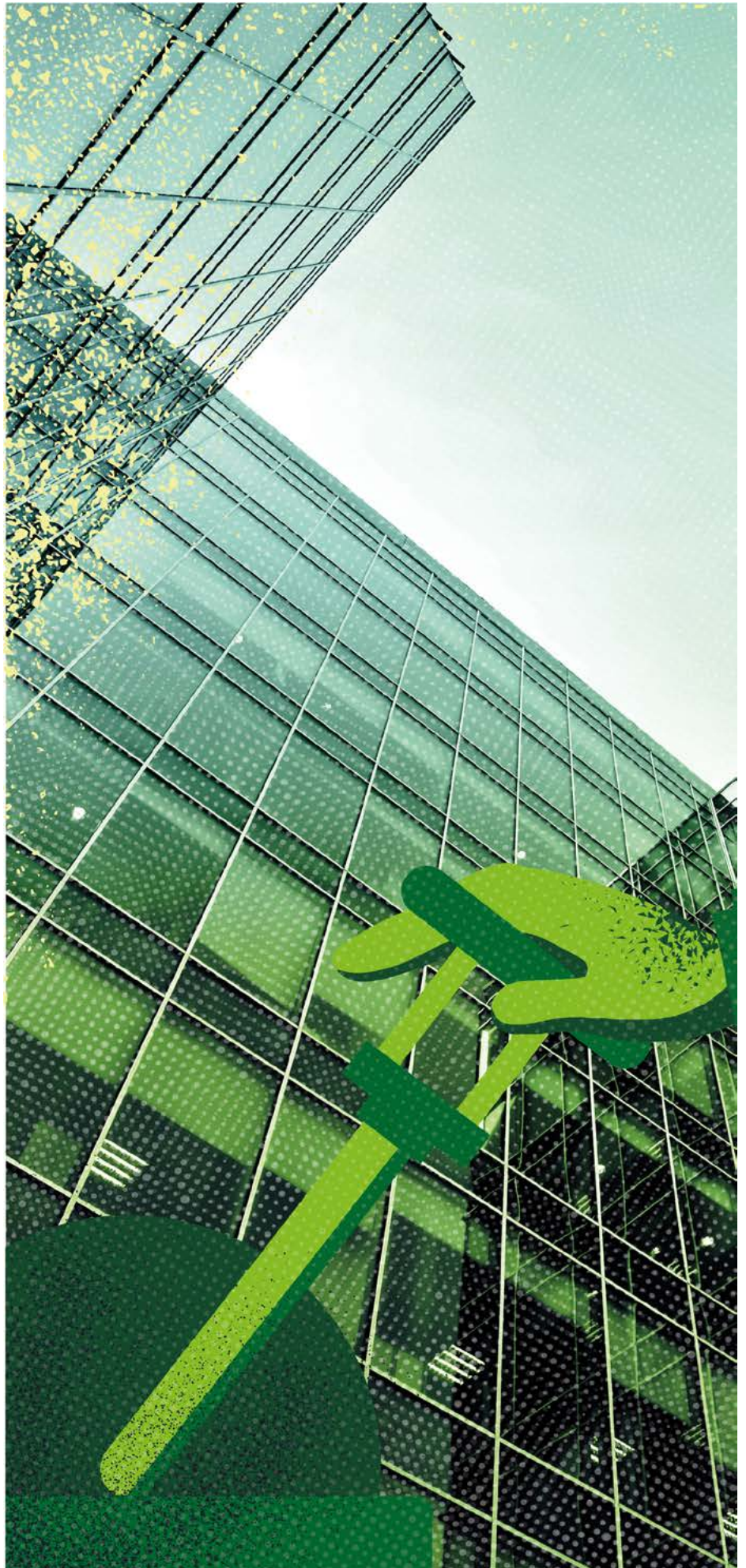
Fig. 10 – Average growth effect per year (2022–2030)



this effect by increasing the number of women and older workers in the labor force, it would have a direct impact on growth in the next decade. We can also increase the productivity of all workers through up/reskilling initiatives.

Germany has huge potential to make advances in the digital economy. In terms of both digital infrastructure and investment in digital technologies, Germany is far behind leading economies. Efforts to catch up with the front-runners in these areas would have a direct and substantial effect on economic growth, resulting in an increase of 0.3 and 0.6 percent, respectively, during the current decade.

Innovation & start-ups is the third piece of the puzzle on our path to sustainable economic growth. More dynamism through more innovation and fewer regulatory burdens will be able to make almost the same contribution to growth as the digital economy in both the Acceleration and Breakthrough Scenario. The government can incentivize a positive dynamic in the corporate sector, which in turn would drive innovation and productivity, by focusing more on funding for start-ups and research and development, as well as by reducing the regulatory burden.



3. Labor Market and Skills

Increasing labor market participation can go a long way to mitigating demographic change – combined with higher spending on education and lifelong learning.

The decline in Germany's labor supply is unavoidable due to demographic change. Nevertheless, there are ways to make better use of the potential in the existing working age population and mitigate the effects of the aging population. If Germany narrows the gap to the countries with the highest labor force participation by 2030, roughly 2.5 million more workers would be available relative to the baseline scenario. Upskilling, lifelong learning and increased spending on education also contribute to further growth.

Employment

Although there has been a sharp increase in employment in Germany in recent years,¹⁰ there is still a lot of dormant potential in various demographic groups, particularly among women, older workers and the foreign-born population.

Labor force participation among women is high in Germany, ranking among the best in an OECD comparison. However, the average number of working hours for women is relatively low due to part-time employment, which means that there is still a lot of potential within the female labor force. Compared to northern European countries such as Lithuania, women in Germany work an average of 20 percent fewer hours each week.

A similar picture emerges for the labor force participation of older workers. People aged 65 and over are less likely to work in Germany versus our OECD competitors. The employment rate of over-65s in Sweden is more than twice as high, while that in Estonia, Europe's front-runner in this context, is more than three times as high. Germany also has a great deal of catching up to do in terms of the employment rate of the foreign-born population, which is below the international average, even for immigrants with a college degree.

Lifelong learning

Given the rapid technological change in the digital era, upskilling is a critical factor for increasing workers' employability and productivity. An important indicator for lifelong learning is the share of employees who take part in in-house training programs. At 62 percent, this is significantly lower in Germany than in Finland (76.4%) and Denmark (75.9%), the first and second rated countries in this context. Low-skilled workers in particular rarely participate in further training and upskilling programs.

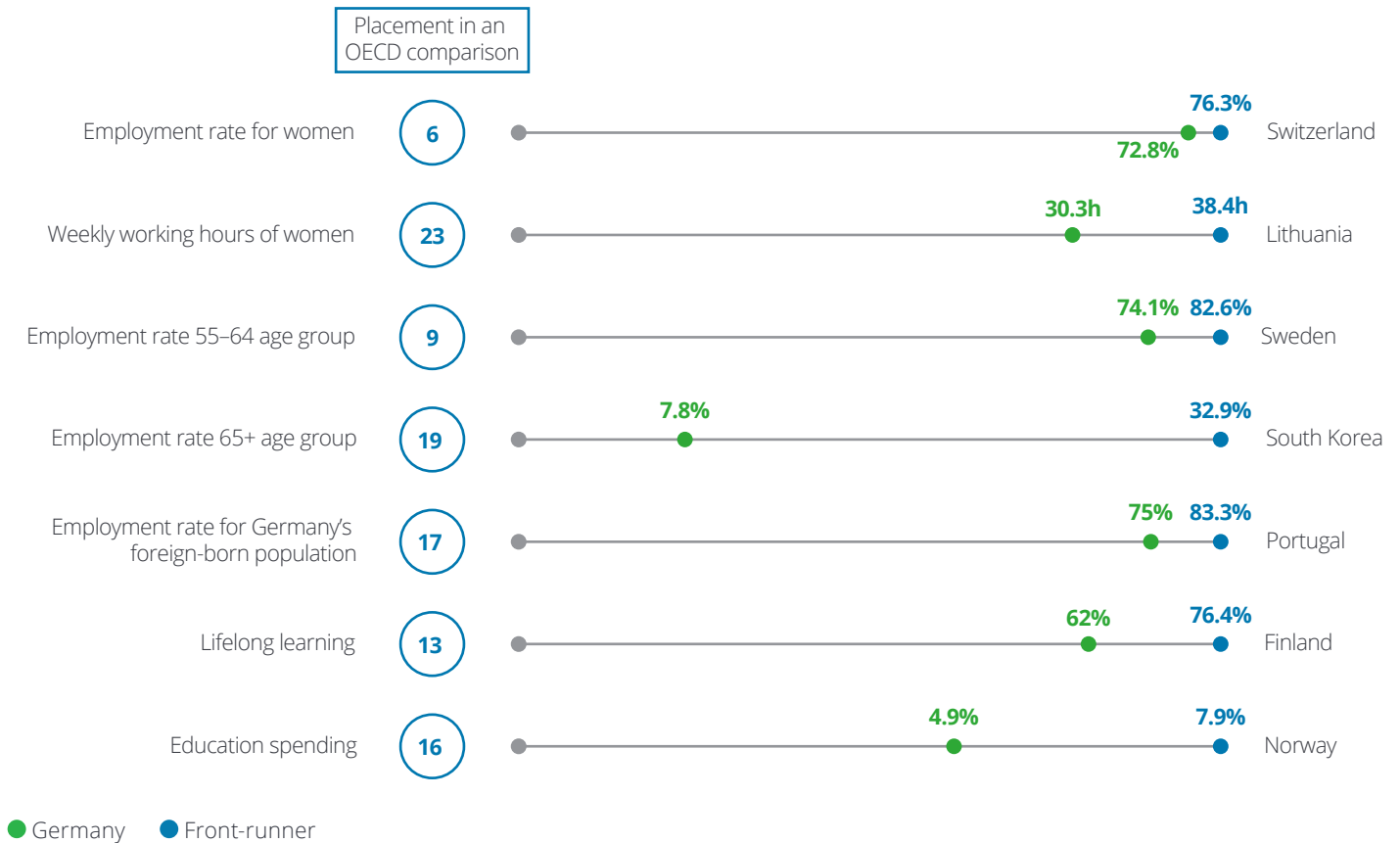
Education spending

A high-performance education system is the engine for creative, social, communication as well as digital skills and, in turn, for

future productivity levels in Germany. With public spending on education at 4.9 percent of GDP, Germany is in the lower mid-range of the OECD in an international comparison – Norway is the top performer in this area at 7.9 percent, followed closely by Denmark and Sweden.

Possible growth effects to 2030

Expanding labor force participation and lifelong learning initiatives have great potential to substantially increase economic growth by 2030. If Germany succeeds in closing the gap to the top group by a quarter in each of the individual areas, GDP growth will be an average of 0.5 percentage points higher each year until 2030 – 1.7 instead of 1.2 percent. Based on the Breakthrough Scenario, if we close the gap to the top group by half, annual GDP growth will be an average of almost 1.1 percentage points higher by 2030.

Fig. 11 – Germany in comparison (Labor Market & Skills | Benchmarking)

Sources: OECD, Deloitte.

Note: Lifelong learning refers to the percentage of employees taking part in in-company training programs. Education spending as a share of GDP.

Higher labor market participation among women in particular and an increase in their average weekly hours will have a major growth effect. This is mainly attributable to the high part-time employment rate among women and the large share of college-educated women working part-time. An overall increase in the employment rate of women, the foreign-born population and older people would substantially raise the number of workers available to the labor market and potentially mitigate the demographically-driven decline. This could add up to 2.5 million employees to the labor supply in the Breakthrough Scenario.

Based on the challenges and the benchmarking, the main action items are as follows:

Increase labor force participation and employment rates among all demographic groups.

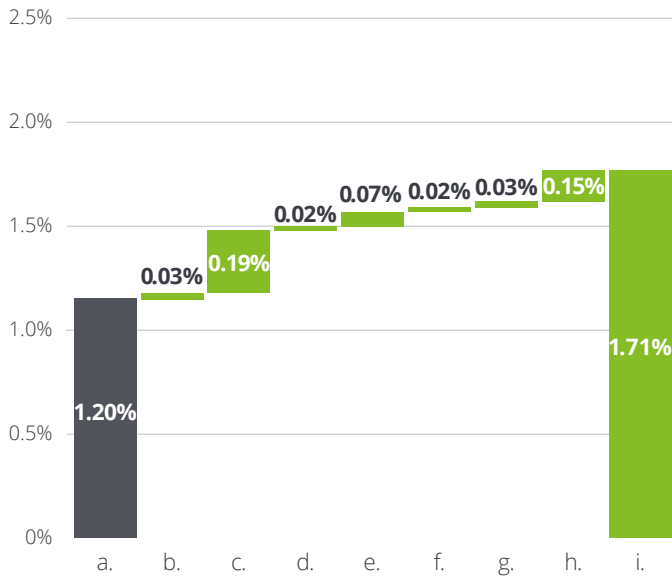
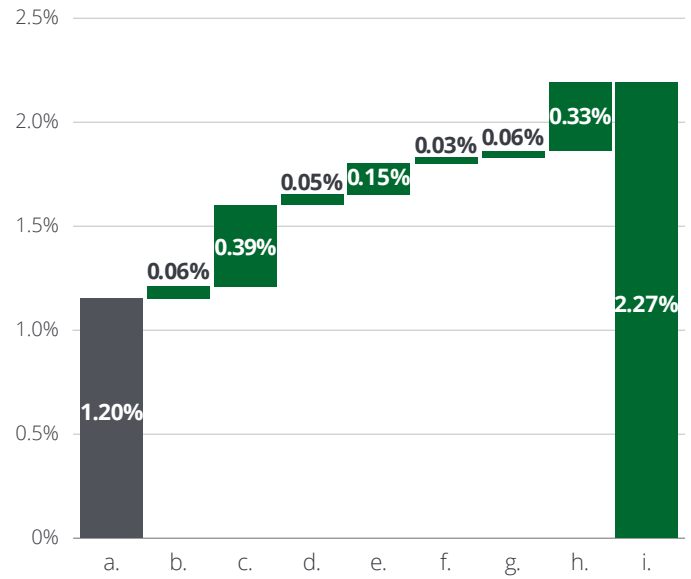
- **Systematically expand all-day child-care options:** to enable women to better balance full-time employment and family life
- **Make the retirement age more flexible:** to increase labor force participation among older workers, similar to the approaches in the Netherlands, Denmark and Sweden
- **Speed up the work permit process for non-European professionals and wage-earners:** faster processes and clearer standards for the recognition of non-European qualifications to facilitate access to the labor market for foreign professionals and to reduce barriers for employers

Make the labor market more flexible in all aspects.

- **Introduce more flexible work models:** give employees the option to work from home or remotely as well as more flexible working hours to increase labor force participation among women in particular.
- **Make information easier to access for foreign workers:** improve job placement for foreign professionals by consolidating information and standardizing the application process.
- **Promote gig economy jobs for older people:** offer flexible and project-based employment for older people of retirement age to increase employment and leverage knowledge and expertise.

Adopt targeted upskilling strategies for lifelong learning.

- **Adapt curriculums to future-relevant topics and increase education spending:** include more digital literacy, creative skills and start-up expertise in education and training programs, and increase education spending to the level of the leading OECD countries.
- **Introduce new educational and training initiatives:** develop new systems of learning that enable people to up/reskill through customizable, modular educational offerings.

Fig. 12 – Average growth effects per year in percent (2022–2030) | Labor Market & Skills**Acceleration Scenario****Breakthrough Scenario**

- a. Baseline Scenario
- b. Employment rate for women
- c. Weekly working hours of women
- d. Employment rate 55–64 age group

- e. Employment rate 65+ age group
- f. Employment rate for Germany's foreign-born population
- g. Education spending

- h. Lifelong learning
- i. Total

4. Digital Economy

Making Germany more digitally competitive through investments in expanding broadband and in software and databases will boost productivity – as well as growth rates.

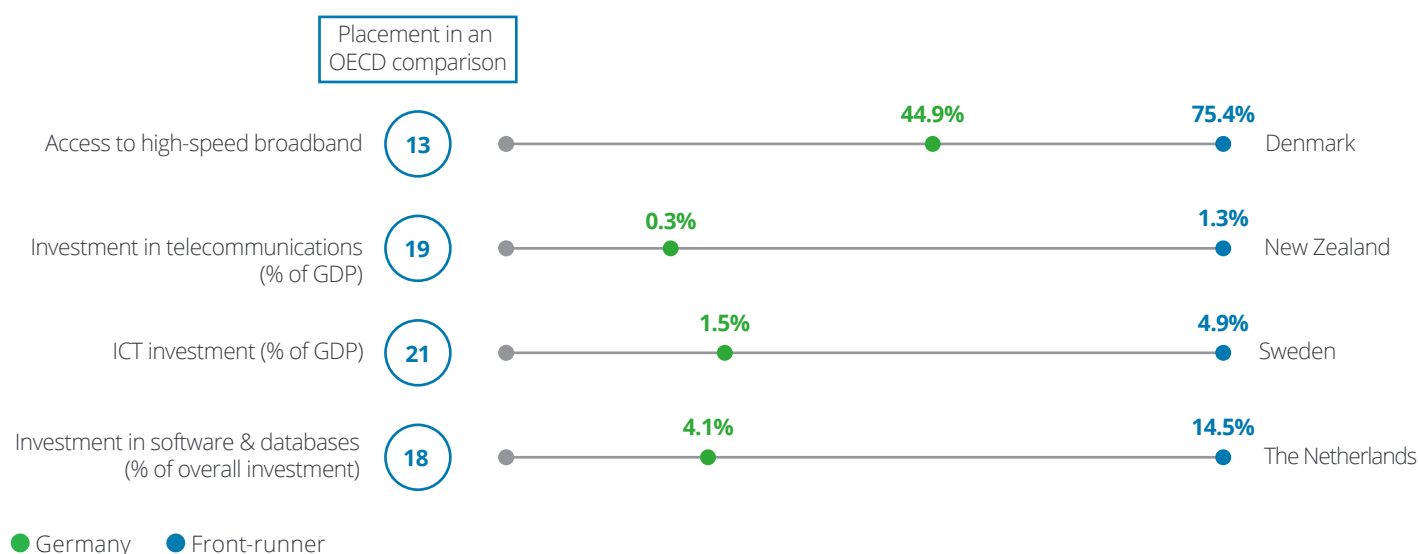
When it comes to the digital economy, the political policies that will make Germany more competitive revolve mainly around investments in digital infrastructure and the capital stock of software and databases in business. Taken together, these are the two factors that will enable the digital economy in Germany to develop to its full potential. They are essential if Germany is to become a leading player in the development and application of artificial intelligence and other advanced digital technologies. A breakthrough in these areas has the potential to increase growth by up to half of the current projected rate.

Germany is in the mid-range of the OECD countries in the key area of digital infrastructure, i.e., access to high-speed broadband internet, but nowhere near the top. Three-quarters of companies have access to broadband in front-runner Denmark, while that figure is less than half in Germany.

In other segments of the digital economy, the comparison is even less favorable for Germany. Investment in telecommunications is barely one quarter of that in leading countries such as New Zealand. The same is true for investment in information and communication technologies: Front-runner

Sweden invests just under 5 percent of GDP, compared with only 1.5 percent in Germany. Knowledge-based capital investment in software and databases are key drivers of next-generation business models and innovation in the digital economy, and as such, they have a direct impact on competitiveness and productivity. Germany is in the lower mid-range in this area compared with other OECD countries. Investments in software and databases relative to overall investment in Germany are about one-quarter of what they are in the Netherlands, the leading OECD country in this context.

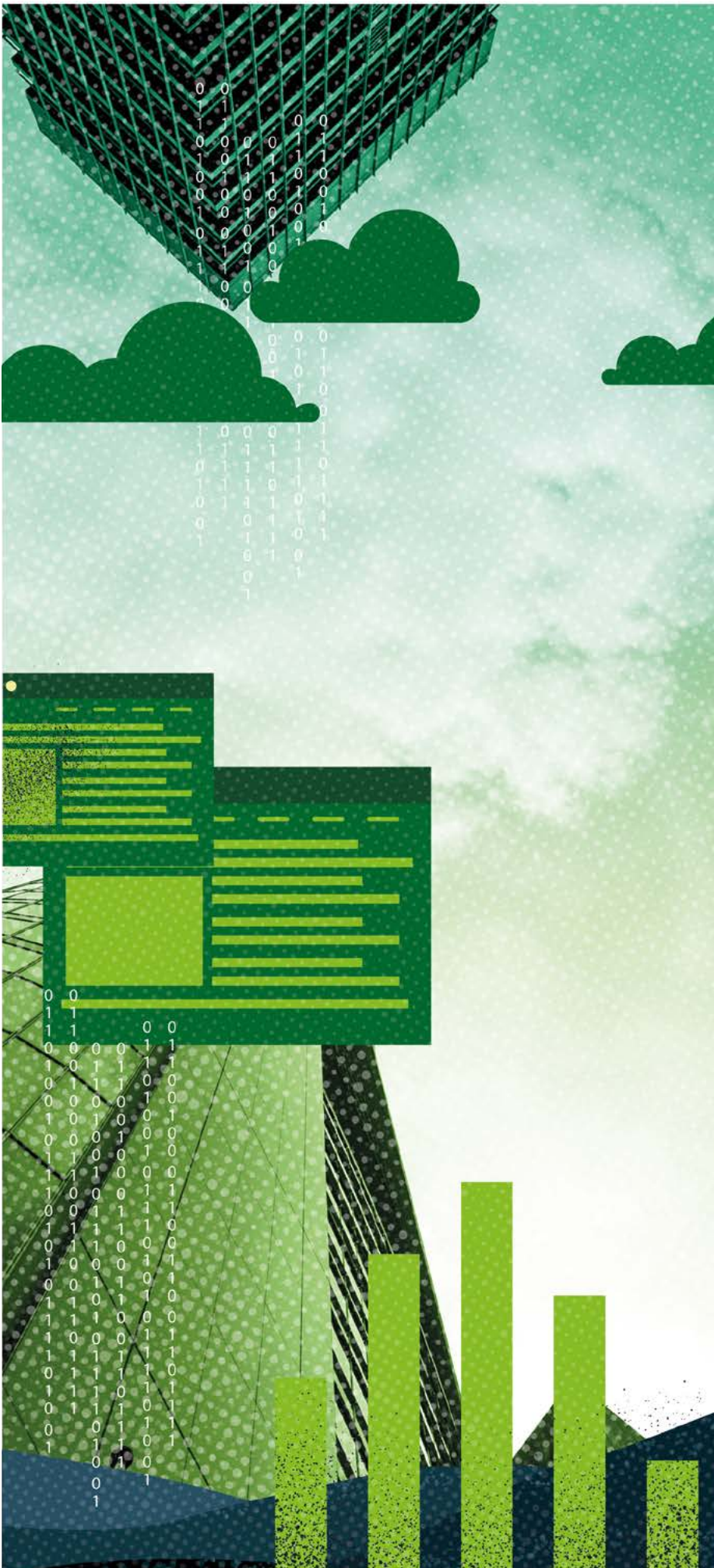
Fig. 13 – Germany in comparison (Digital economy | Benchmarking)



Sources: OECD, Oxford Economics, Deloitte.

Note: Fast internet refers to the share of companies using high-speed broadband (>100 mbit/s). Investment in software and databases as a share of overall investment. Investment in telecommunications relates to infrastructure investments in this area. ICT investment includes investment in hardware, communication devices as well as software.



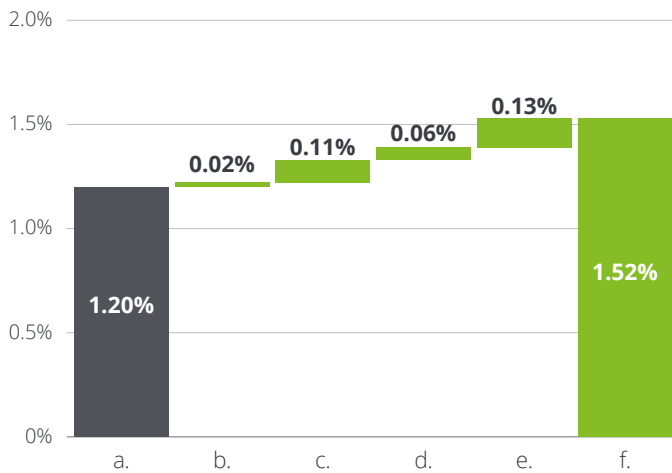
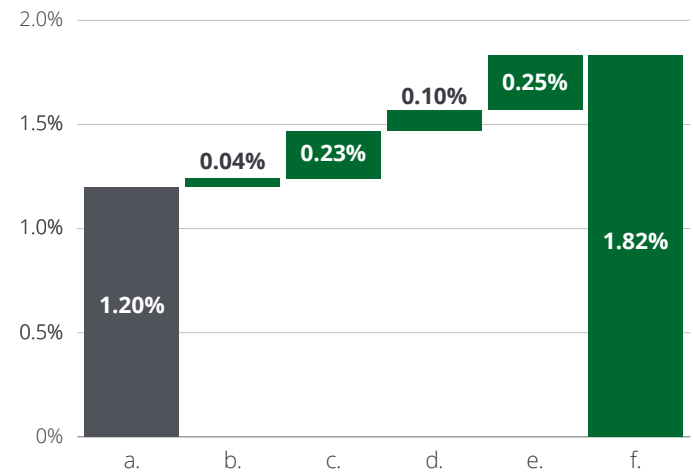


Growth Effects to 2030

There is massive potential to stimulate productivity and therefore growth by improving digital infrastructure and digital investment. Given the low baseline, investments in software and databases are particularly promising when it comes to increasing productivity in German enterprises.¹¹

Investment in digital infrastructure by expanding high-speed internet also has the potential to generate sustained economic growth by 2030. Not only because we could then complete certain tasks much faster, e.g., analyzing large volumes of data, but also because companies with faster internet connections are more likely to implement additional digital tools.

All in all, knowledge-based investment in software and databases as well as in high-speed internet can increase growth by 0.24 percentage points per year in the Acceleration Scenario, thanks to their strong impact on productivity. In the Breakthrough Scenario, the effect would be around twice as high. It is not so much the direct impact of the investments that would drive growth, but rather the indirect effects on productivity.

Fig. 14 – Average growth effects per year in percent (2022–2030) | Digital Economy**Acceleration Scenario****Breakthrough Scenario**

- a. Baseline Scenario
 b. Investment in telecommunications
 c. Access to high-speed broadband
 d. ICT investment
 e. Investment in software & databases
 f. Total

The same is true here: If Germany can close the gap to the front-runners by a quarter in terms of digital infrastructure and investment, GDP growth will increase by an average of 0.3 percentage points per year by 2030 in the Acceleration Scenario. If we narrow the gap by one half in the Breakthrough Scenario, the growth effects are almost double at 0.6 percentage points per year.

Key policy levers to mainstream the digital economy include the following:

Rethinking data policy

- **Make open data accessible:** promote a European-wide data economy by making data easy to use, by incentivizing data exchange and access, and by establishing Germany and Europe-wide data platforms, e.g., in the areas of mobility, transport and geodata.

- **Clear European standards on cyber-security:** develop standards in cyber-security for key technologies such as cloud or artificial intelligence to make German and European players more competitive on the global stage.

Driving a digitalization update

- **Expand 5G infrastructure nationwide and push 6G research:** network expansion and further development to improve the use and creation of novel business models for the data-driven technologies of the future.
- **Advance European infrastructure initiatives:** push digital infrastructure initiatives such as Gaia-X to increase European data sovereignty.

- **Expand digital transformation among SMEs:** support the digital transformation of small to medium-sized enterprises through investment incentives such as subsidized loans and grants.
- **Drive digitalization in the public sector:** simplify and automate administrative workflows, using AI where applicable to speed up processes, particularly when it comes to interacting with citizens and businesses.

5. Innovation and Start-ups

Making venture capital easier to access and removing regulatory barriers can significantly speed up the pace of innovation and growth.

The most critical factor for an economy's growth potential are the dynamics of the corporate sector. Innovation and productivity growth happen at the enterprise level, but policymakers have various levers at their disposal to make business more dynamic and entrepreneurial. Some of these initiatives are more facilitative, while others are designed to reduce the regulatory burden, freeing up corporate resources and giving companies the space they need to innovate.

Innovative business ideas and technologies often enter the market through start-ups. To bring new ideas to market and enable new enterprise to grow, venture capital is the most important factor in the uncertain initial phases. The dominant forms of financing in Germany, by contrast, are

equity capital and loans, both not necessarily suitable for high-risk start-ups. The state can promote technological progress by subsidizing research and development, but it can also stunt entrepreneurship with too much bureaucracy and red tape.

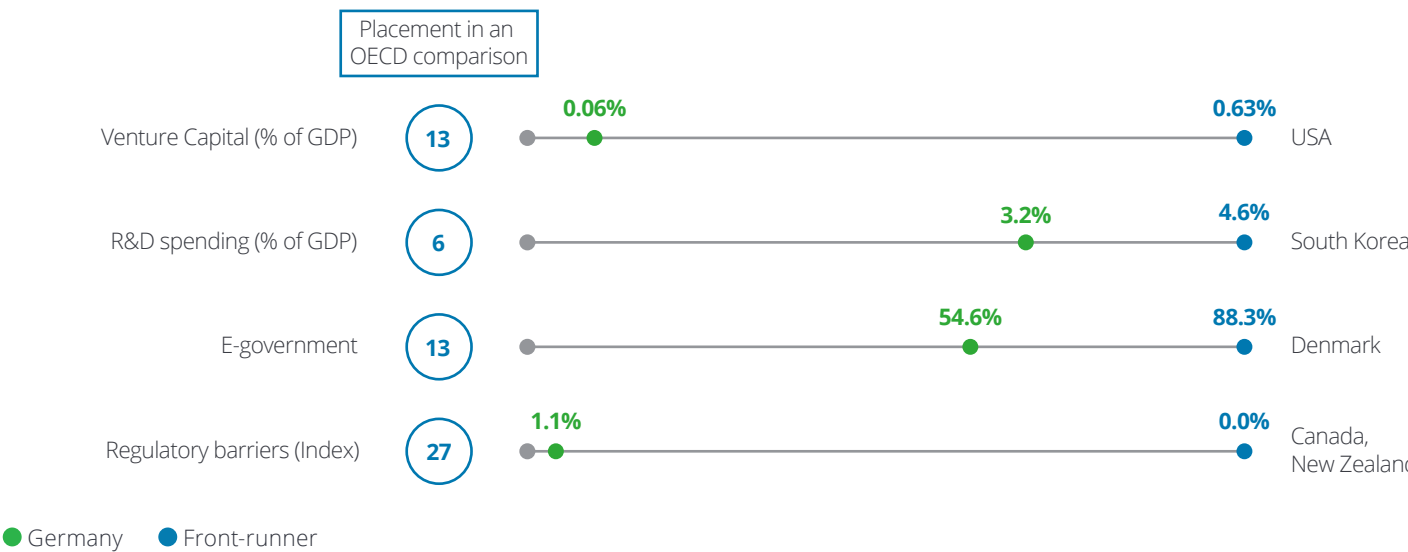
Promoting innovation and start-ups can dramatically accelerate growth. Easier access to venture capital and the removal of regulatory barriers are the biggest levers here. Overall, a stronger focus on innovation and start-ups would have a growth effect that increases trend growth from 1.2 to almost 1.7.

Trends in the area of venture capital have been mostly positive over the past few years. During the period from 2014 to 2019, the share of GDP that went to venture cap-

ital investment rose sharply by 19 percent per year, faster than the OECD average. Germany, despite this increase, is still very far behind in the OECD comparison when it comes to the volume of venture capital invested. Relative to economic output, this volume is only half that of northern European countries such as Finland or Estonia; US is the front-runner with a volume ten times higher than Germany.

The trend line in research and development has also been positive in recent years, accounting for 3.2 percent of GDP and more than doubling over the past 15 years. That is not only above the European Union's target rate of 3 percent, but also above the OECD average. However, the leading technology countries spend significantly more money on research and devel-

Fig. 15 – Germany in comparison (Innovation & start-ups | Benchmarking)



Sources: OECD, Deloitte.

Note: E-government measures the proportion of the population that uses the internet to interact with the public sector. Regulatory barriers are based on an index calculated by the OECD of the regulations for limited liability companies and partnerships – the higher the index, the greater the regulatory burden.

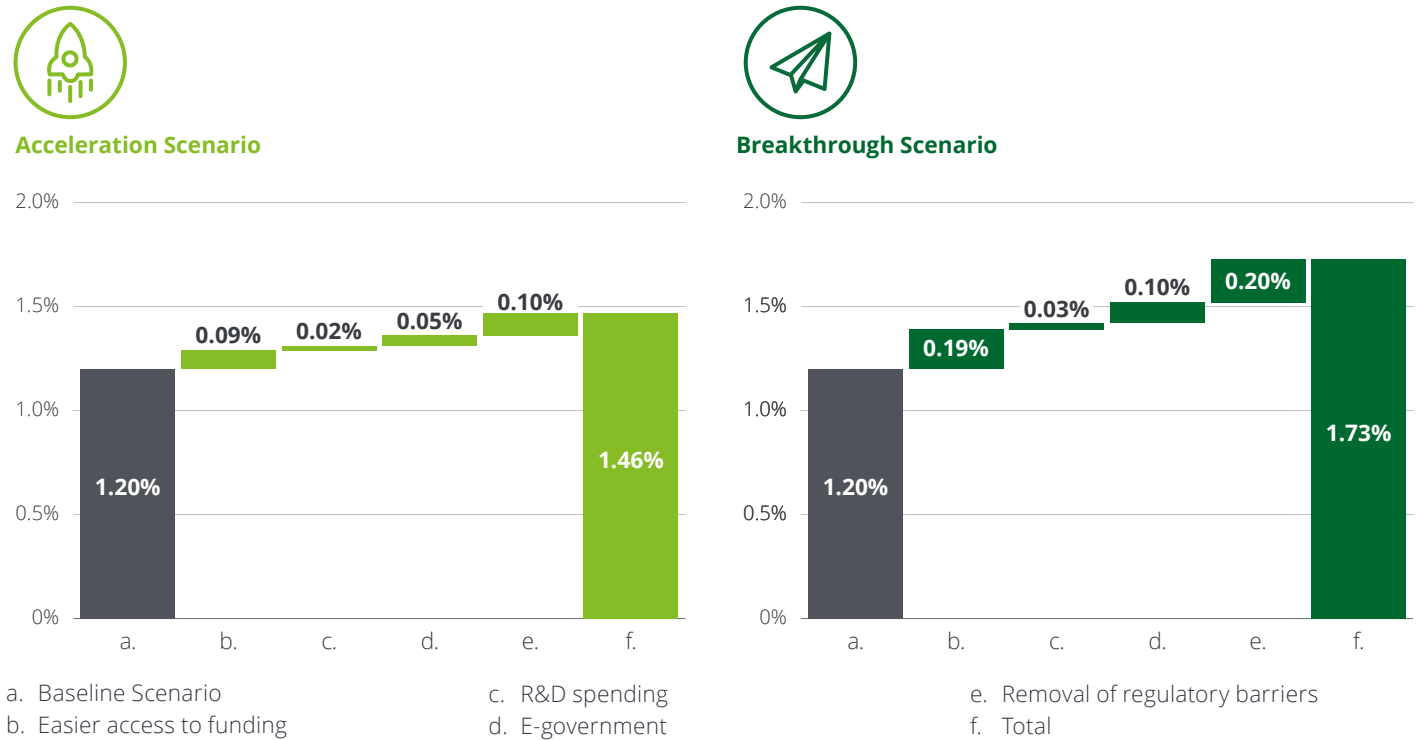
opment. The front-runner by far, South Korea, is spending an additional 30 percent more on R&D.

In terms of reducing regulatory barriers, Germany lags far behind the top group and comes in last place relative to all OECD countries. The administrative hurdles for corporations and partnerships are among the highest in the OECD. Germany has a lot of catching up to do, particularly when it comes to reducing burdensome licensing procedures, documentation requirements and high barriers to market entry.¹² If Germany succeeds in removing at least some of the regulatory barriers, we can become more competitive and more dynamic. This would, in turn, have a positive impact on productivity and thus contribute to growth.

Germany still performs far below the OECD average in the area of e-government, according to the OECD's Digital Government Index. E-government gives citizens and companies easy-to-use, around-the-clock public services and supports administrative workflows. When it comes to making data exchange more transparent and administration less costly, expanding e-government plays an enormous role. The resulting efficiency and productivity improvements can be substantial. If, for example, Germany only digitalized the most frequently accessed administrative services, companies could save around 1 billion euros per year in administrative expenses.¹³

Bolstering innovation and start-ups can dramatically accelerate growth – raising trend growth from 1.2 to 1.7 percent.



Fig. 16 – Average growth effects per year in percent (2022–2030) | Innovation & Start-ups**Growth Effects to 2030**

All in all, a more dynamic corporate sector can dramatically accelerate growth. Among the four measures we analyzed for this study, better access to venture capital and fewer regulatory barriers would have the greatest impact and account for the lion's share of growth. Venture capital has such a pronounced growth effect because the current gap to the front-runners is so wide and the potential for improvement is considerable.

The Acceleration Scenario would raise the growth rate by 1.2 to almost 1.5 percentage points per year. The Breakthrough Scenario raises the annual growth rate to 1.73 percentage points.

Key economic policies that could potentially pave the way for start-ups and innovation include the following:

Improving access to early-stage and growth financing.

- **Enable access to scale-up financing:** expand financing options for start-ups, particularly in the later stages of growth to prevent them from moving abroad.
- **Increase regulatory flexibility for institutional investors:** review the capital investment regulations to encourage institutional investors and pension funds to invest in venture capital.

Reduce regulatory and bureaucratic barriers.

- **Regularly review the effectiveness of regulations and evaluate the costs vs. the benefits:** mandate cost-benefit assessments when new regulations are introduced and require regulatory monitoring to determine whether they achieve the intended objectives and to what degree they are burdensome for companies.

Target innovation through research and development.

- **Incentivize the establishment and expansion of ecosystems:** encourage companies to commit to comprehensive networking as well as knowledge and technology transfer between business, science, government and society to strengthen innovation in new technologies and create regional technology hubs.
- **Establish strategic foresight processes:** Set up systematic, ongoing and independent analyses of the opportunities and application potential of new technologies to prioritize and make the most of locational advantages, similar to the approaches in Finland, Sweden or Singapore.



Industry and Business Outlook for 2030

The three main challenges of the 2020s – demographics, digital competitiveness and sustainability – naturally have a knock-on effect on industry. The biggest business sectors in Germany are facing massive challenges and, in some cases, transformational change. The automotive industry is only one very prominent example.

The challenges and trends vary from sector to sector, though there are some industry clusters as well as some commonalities when it comes to competitiveness drivers and action items for companies in the 2020s.



Broader Issues

The advent of the data economy

Collecting, exchanging and leveraging data is becoming more and more relevant across all sectors. Applications range from the potential of data analytics and the ability to predict disease in the healthcare sector to data sharing between supply chain partners to enable a circular economy. At the same time, we need to address cyber-attacks, hacking and the many other digital risks that threaten the data economy.

The foundation underpinning German competitiveness in the data economy still has room for improvement in some areas. The large number of students studying STEM subjects coupled with leading universities in technical disciplines puts Germany in a good starting position. However, the restrictive handling of data in Germany and Europe is not exactly conducive to building a dynamic data economy.

Start-ups tend to gravitate towards countries such as the US, Israel or China, where they have higher data availability and larger data pools to enable novel data-driven business models. Research institutes and start-ups rely on big data in many cases; for example, the fact that the DNA data of every Icelander is stored in one database enables researchers to make advances in medical genetics. Access to data is essential – to bolster Europe's technological sovereignty, to develop key cyber technologies and to encourage government and enterprise to work together and pave the way for the data economy of the future.

Mainstreaming ESG and sustainability

When it comes to ESG and sustainability, companies and entire industries are facing two key challenges in the years to come. The first challenge is to adapt to a rapidly changing regulatory environment in which sustainability metrics play an increasingly

important role. This process is driven by greater environmental awareness on the one hand, but also by tougher and very specific requirements at the EU level under the Green Deal, which has the circular economy as one of its pillars.¹⁴ In the financial industry, this is evident in the EU taxonomy for sustainable investments; the automotive industry is undergoing a transition to electric mobility and the chemical industry is subject to regulations on the reduction of CO₂ emissions and bans on certain chemicals. In all sectors and industries, we expect the circular economy, i.e., the reusability of products and raw materials, to become an increasingly important factor.

The second challenge facing companies is finding the right strategy for the transition to sustainability and ESG. This includes dealing with changes in the market, for example the management of so-called stranded assets that will lose value due to climate change, but also managing CO₂ emissions in the individual enterprise and across the supply chain as a whole. According to Deloitte's CFO Survey,¹⁵ 60 percent of the major corporations in the survey have introduced binding CO₂ reduction targets, a majority of them by 2030. Choosing the most effective strategy for achieving sustainability goals is one of the most critical issues of the current decade.

Technology, ecosystems and novel business models

Digital transformation as an enabler for new business models was one of the most important trends of recent years and promises to become increasingly relevant in years to come. This is due in part to the advances made in digital technology and in part to changing customer demands.

Technological progress requires most sectors, from the financial industry to industrial manufacturing, to build new eco-

systems, i.e., to collaborate closely across company boundaries, particularly with technology companies and start-ups. Companies have to decide which ecosystem they want to join or whether they want to build their own.

Ecosystems are not necessarily built around digital technologies in particular. They are likely to play a more decisive role in competitiveness in other technological fields as well. To develop new materials in the chemicals industry or in industrial manufacturing, for example, companies and universities will have to form alliances across traditional boundaries.

This trend will accelerate in response to changing customer demands as well, as more and more products are offered as a service: the everything-as-a-service paradigm. Much like car and bike sharing, customers can also rent other consumer goods, from tennis shoes and apparel to equipment. Companies that used to identify as manufacturers will suddenly become service providers – with all of the strategic and financial implications that implies.

Managing the talent shortage

One major effect of the rapid digital transformation is the wave of automation that will impact the labor market and bring profound structural change. Of course, this does not mean that machines will make human labor obsolete. German labor market models show that automation through machine learning, robotics, robotics process automation and similar technologies will be able to replace roughly one-third of the total person hours on average in the 1,000 most common occupations by 2030. At the same time, however, the demographic shifts and structural changes taking place in the economy will fundamentally alter the job market. We will see a sharp increase in the demand for medical

and nursing jobs as well as in the demand for technology specialists. Overall, net demand is actually expected to rise by as many as 1.2 million people.¹⁶

With fewer employees on the market, talent will become an even more critical factor for companies in the future. Securing young talent and upskilling the existing workforce will be high on the agenda. Making your company more attractive – and increasing Germany's appeal as a destination for skilled workers from abroad – will become a strategic competitive advantage.

The evolution of new business models and the shortage of skilled workers are closely correlated. To move companies towards digital business models, we need digital specialists, above all STEM graduates. The talent shortage is already stunting growth in the software industry today, preventing Germany from living up to its potential in terms of value creation. The shortage will not be limited to the digital industries in the future, but will impact all sectors undergoing a digital transformation, from banking and industrial manufacturing to the chemical industry. Without the right talent, the transformation is bound to fail – which is why companies need to make access to the global talent pool a top priority.

Industry Outlook

In the following, we provide an overview of the core challenges in Germany's key sectors. The sectors are assigned to the following groups based on commonalities: infrastructure-oriented, consumer-oriented, export-oriented and the financial sector.

Export-oriented sectors

The export-oriented sectors automotive, chemical and industrial manufacturing are Germany's leading industries. However, the critical success factors in each case are changing, and they face massive challenges in terms of adjusting to the carbon-neutral transition or novel digital business models. As a result, issues like the data economy, technology and ecosystems, ESG and sustainability as well as the talent shortage are all equally important. The tech sector is central to the data economy, to digital advances and to the development of novel business models. Access to highly-qualified talent and the ability to attract and retain them will become critical success factors for companies in this sector, making the looming shortages a significant risk.

Tab. 1 – Export-oriented sectors

	Automotive industry	Industrial manufacturing
Trends and challenges	• The automotive industry is currently undergoing the biggest, most complex transformation in history. The transition to electromobility and digitalization poses serious challenges for automotive OEMs and suppliers. • This transformation requires skilled talent from areas of expertise previously unfamiliar to the industry – as well as an up/reskilling strategy for qualified workers from areas where demand is falling. • The four major CASA trends (connected, autonomous, shared and alternative) also offer huge potential. Thanks to the everything-as-a-service paradigm, the novel business models that are emerging are particularly attractive for traditional businesses in decline.	• Much like the automotive industry, the paradigm shift in this sector is bringing huge structural change. The industry is also shifting its focus from the product to the customer. • Whether the industry succeeds in maintaining or improving its competitive edge depends on its ability to drive innovation with existing technologies and solve its supply chain challenges. • Germany will continue to lead the way in this sector thanks to its technical expertise and its ability to create more customer value through new products and digital transformation. • Digitalization will continue to drive new business models from the rental-based asset-as-a-service model to predictive maintenance.
Action items	• Invest in (further) education and up/reskilling initiatives to foster the skills that will be in demand in the automotive industry's future workforce. • Invest in research and development as well as providing and protecting venture capital. • Adapt the product development process to consolidate software and hardware requirements.	• Invest in STEM education and training initiatives as well as talent development. • Shift to more long-term subsidies and loans to provide more jobs and job security and to allow for larger, more high-risk investments.

	Chemical industry	Tech sector
Trends and challenges	- The chemical industry is undergoing massive transformation based on three main trends: – 1. Zero carbon – reducing emissions – 2. Toxic-free – regulations will fundamentally change 15–20 percent of the chemical portfolio. – 3. Circular economy – building a shared sustainable ecosystem - The industry also has to complete and, above all, scale its digital transformation. - These transformations are taking place in a low-growth environment in the EU plagued by high taxation and poor, expensive and insecure supply of raw materials and energy.	Growth continues to soar in the German tech sector. Major gains are expected in software and B2B services in particular. - The tech sector has a big competitive edge as a so-called enabler, particularly in collaboration with other sectors from automotive to the biotech, fintech, insuretech and healthcare sectors. - Three tech segments are particularly relevant in this context: – 1. Internet of Things and 5G mobile infrastructure – 2. Analytics and artificial intelligence – 3. Everything-as-a-service business models.
Action items	Invest strongly in renewable and affordable sources of energy as well as bio-based and renewable sources of raw materials. Make an effort to maintain and further expand Germany's technology leadership, the most impactful driver of productivity growth. This includes developing technologies designed for low-carbon energy sources and circular raw materials. - Work to integrate the chemical sector into other industries along the value chain and into the data economy to create a strategic alliance within Europe - Create a legal framework that embraces: technology and value creation.	- In response to the strong demand for skilled workers, increase education spending as a way of compensating for the huge skills shortage and building expertise on the user side. - Provide targeted support for SMEs in terms of digitalization and business model transformation. - Foster cross-sector collaboration to develop new business models in areas of convergence.

Consumer-oriented sectors

In the consumer-oriented sectors, including the healthcare and retail industries, issues like the data economy, technology and novel business models are key. Big data

analytics can revolutionize the prevention and treatment of patients or enable retailers to gain deeper insight into consumers. Building ecosystems and introducing new technologies are the preconditions for

this. Further development of automated processes has the potential to substantially increase productivity in both sectors.

Tab. 2 – Consumer-oriented sectors

	Healthcare/Lifesciences	Retail
Trends and challenges	- Germany is a pioneer in medical technology, due in large part to its commitment to basic research and education as well as its research and business clusters, against a background of soaring global demand for products in this sector. Data availability, mining and analytics to improve treatment outcomes and cut costs are essential factors when it comes to maintaining and expanding Germany's competitiveness in the healthcare sector. - Due to the pandemic, telemedicine applications have become a permanent fixture in the market. They play a decisive role in optimizing treatments while also lowering costs. Medical technology and the pharmaceutical companies are becoming increasingly dependent on foreign healthcare providers and distributors, the latest key players in the sector.	- The transition to e-commerce has brought about fundamental change in various segments, including relatively late adopters such as food retail. Competitiveness in this area is heavily dependent on the quality of the products. New platforms are likely to emerge in addition to major players such as Amazon. Networks and alliances as well as add-on services are becoming increasingly important. Supermarkets are a prime example, which can offer a networking or innovation platform in collaboration with restaurants, banks or logistics infrastructure. - Changing customer demand is moving supply chains away from a cost-efficiency focus more toward flexibility and nearshoring, which is likely to raise prices.
Action items	Expand the digital infrastructure within the healthcare sector, such as electronic health records or digital data exchange systems. Continue to expand interoperability and data standards among the different players in the healthcare ecosystem, focused on creating transparency about the benefits for the patients and the entire healthcare system.	Introduce clear, easy-to-understand and uniform standards to safeguard data protection and make data transmission more secure. Harness the potential of automation in online retail and drive digitalization across the retail sector. - Exploit opportunity in the area of sustainable products and second-hand merchandise, local food products to avoid long-distance shipping, private-label brands and products from the circular economy.

Enablers

So-called enablers support other sectors and downstream industries to provide their respective services and products, thereby impacting the competitiveness of the economy as a whole. In the energy and

telecommunications industries, the enabler provides the infrastructure. Given its outsized role in climate policy, the energy sector is undergoing a massive transformation, while the telecommunications sector acts as a backbone for digitalization and

the data economy. Both sectors are heavily dependent on regulations. The public sector has its own transformation to deal with, as it positions public services for the future.

Tab. 3 – Enablers/infrastructure-oriented sectors

	Energy (oil, gas, renewables)	Telecommunications	Public sector
Trends and challenges	• Enormous investments will be required to dismantle energy Infrastructure associated with fossil fuels, such as power plants, natural gas and pipelines, and for the construction of new supply infrastructure. • In future, the majority of these investments will come from infrastructure investors, resulting in a greater separation between plant owners and operators. • It will be impossible to guarantee future supply with the existing infrastructure, making the issue of affordability the main topic of debate. • We will see more spin-offs and segmentation among individual supply chain players (power generators, transport/grid, distribution).	• The fiber-optic network expansion in private residences is continuing apace and the volume of data being transmitted has gone up, but there are obstacles in some cases due to a lack of demand and prohibitive costs. • Competition is shifting from network expansion to telecommunications infrastructure services as companies divest non-core services in so-called telco carve-outs. The ability to guarantee network connectivity and offer interface-capable platforms will be key competitive factors in this area. • Telecommunications infrastructure will continue to consume an enormous amount of energy in the future. Finding environmentally-friendly energy supply is currently a huge challenge.	• Demographic change and the number of baby boomers entering retirement will dramatically impact the shortage of skilled staff in the public sector by 2030. • Even before the pandemic hit, the digitalization gap in the public sector was obvious and pressure to drive the digital transformation has only increased since then. Citizens and companies expect public services to be more personalized and more citizen-centric, which means the public sector needs to upgrade its technological infrastructure, automate more workflows and launch a dedicated restructuring process. • The most important factors here are the utilization and exchange of open data and the development of new applications and business models for public services. • Given the risks in the digital space, cybersecurity and cybersecurity ecosystems are becoming increasingly important, enabling joint action against cyberattacks. Law enforcement and government agencies have a special role to play here. • Maintaining public trust in government and institutions will become an essential task in the years to come. This includes building confidence among citizens so that they can rely on government institutions, systems and processes.
Action items	• Develop a clear, realistic decarbonization agenda and a fixed framework that energy suppliers can rely on in decades to come. • Secure adequate and sustainable long-term financing for the transformation.	• Secure an economically viable expansion of the broadband network with appropriate regulation and subsidies. • Reconsider the disposal and recycling process for end-of-life equipment and e-waste toward a more circular economy.	• Scale the digital infrastructure as quickly as possible, enable public servants to expand their digital expertise, and increase public trust in the government's digital systems and services • Promote knowledge management and a robust human resources strategy to mitigate the impact of demographic change. • Make governance and workflows in the public sector more agile, more adaptable and more flexible • Create more transparency and take targeted action against disinformation campaigns.



Finance, insurance and banking industries

These massive transformations also promise to have a major impact on the financial sector. Low interest rates are putting traditional business models under threat, the regulatory framework has become more complex since the financial crisis and demographic trends are changing customer demands, while new competitors are entering the scene in the form of digital pure players such as insurtech and fintech. New ecosystems, digital transformation and ESG metrics integrated into in-house workflows and services are huge challenges in the financial sector as well. Access to digital talent will be essential.

Tab. 4 – Insurance and banking sector

	Insurance sector	Banking sector
Trends and challenges	- Demographic change and low interest rates are changing the demand for insurance. Life insurance and private pension policies are no longer attractive for many, particularly among young people. The roll-out of high-tech solutions, e.g., in terms of state-of-the-art IT systems and cloud computing, has been relatively slow in the insurance industry compared to other sectors. To remain competitive in the future, insurance companies, particularly in the financial services sector, will have to take on new roles. A new so-called access-service model is emerging as a collaboration between producers, customers, loan providers and insurers. - The highly-regulated and complex consumer protection system in Germany is increasing regulatory expenses. Despite introducing outsourcing arrangements and novel systems, companies have been unable to reduce operating costs enough to offset the regulatory expenses, which has forced companies in the sector to raise prices.	- The traditional banking business model with a branch network and commission-driven, interest income-dependent services is currently being replaced by a performance-oriented business model. Banks are finding the associated restructuring process extremely challenging. - Cost pressure is driving consolidation in all main areas of Germany's banking system (private banks, public-sector banks and cooperative banks) and among European banks. - Many banks are currently trying to establish their sustainability and ESG positioning and to develop a comprehensive strategy in this regard. - Through and with emerging fintechs in the digital space, a new ecosystem and new alliances are forming, providing the basis for numerous novel services and business models in the areas of AI and data analytics (platformification of banks).
Action items	Make an urgent effort to modernize IT systems that are in some cases more than 30 years old in order to be able to innovate, to compete on the global stage and to introduce cloud applications. Standardize technological and legal (in particular data protection) regulations for these new technologies at the EU level. - As part of the transformation process, invest in growth segments such as cloud-based property insurance and novel corporate pension plans. There are also business opportunities for companies that develop new systems and software as well as in insurance brokerage and investment insurance.	- Establish a stronger transparency compliance and banking oversight framework to secure a stable financial system. - Recruit specialists in the areas of cyber, digitalization and innovation in addition to skilled staff with expertise in capital markets (post-Brexit effect). - Push for more automation and digitalization of workflows and leverage data to create value in an effort to remain competitive. - Work to sharpen the corporate profile, establishing a defined mission and a clear focus on specific markets.



Appendix

To estimate the growth effects of the most promising economic policy measures, our study went through a three-step process.

- 1. Literature and benchmarking:** extensive analysis of the macroeconomic literature to establish Germany's position in an international comparison based on the chosen indicators
- 2. Development of scenarios:** definition of two scenarios on the basis of the benchmarking exercise
- 3. Growth effect of the measures:** modelling of the growth effects on the basis of the Global Economic Model developed by Oxford Economics.



1. Literature and benchmarking



2. Scenario development



3. Growth effects of the measures

1. Literature and benchmarking

To benchmark Germany as a location for business, we analyzed 15 variables in the three main areas of labor market & skills, the digital economy and innovation & start-ups in an international comparison. We selected these indicators based on a comprehensive analysis of the macroeconomic literature, focusing on the areas with the greatest potential to increase economic growth over the long term. Due to a lack of data in certain OECD member states, we limited the benchmarking to 28 of the 38 OECD economies in this study.

The OECD also provides the data for a majority of the indicators. We analyzed Germany's position in the international comparison and calculated the gap to the front-runner for each indicator.

Tab. 5 – Countries included in the international comparison to benchmark Germany as a location for business

Australia	Belgium	Denmark	Estonia
Finland	France	Germany	Greece
Ireland	Italy	Japan	South Korea
Latvia	Lithuania	The Netherlands	New Zealand
Norway	Austria	Portugal	Slovak Republic
Slovenia	Spain	Sweden	Switzerland
Czech Republic	United Kingdom	USA	Canada

Tab. 6 – Indicators

Area	Indicator	Source
Labor Market & Skills	Education spending (% of GDP)	Worldbank
	Employment rate for women (in %)	OECD
	Weekly working hours of women (in hours)	OECD
	Employment rate for the 55 to 64 age group (in %)	OECD
	Employment rate for people over 65 (in %)	OECD
	Employment rate of foreign-born population (in %)	OECD
	Lifelong learning	OECD
The Digital Economy	Investment in telecommunications (% of GDP)	OECD
	ICT investment (% of GDP)	OECD
	Investment in software and databases - (% of overall private investment)	EU KLEMS, DIW
	Access to high-speed broadband	OECD
Innovation & Start-ups	Funding for start-ups	OECD
	E-government	OECD
	Reduction of regulatory barriers	OECD
	R&D spending (% of GDP)	OECD

2. Scenario development

To estimate the growth effects of the individual measures, we simulated the scenarios we developed in-house using the Global Economic Model of Oxford Economics. This is a well-established model with a comprehensive, coherent structure designed to extrapolate and develop quantitative, macroeconomic scenarios.¹⁷ It tracks correlations within the global economy using an empirically and theoretically robust system comprising almost 30,000 equations. For Germany, it maps roughly 700 different macroeconomic variables through which the German economy is integrated into global developments on trade, currency exchange, capital markets, interest rates and commodity prices. Capital stock, demographics, labor force participation rates and other supply-side factors affecting productivity trends will determine the long-term equilibrium.

Baseline scenario

We developed the baseline scenario using baseline estimates from Oxford Economics. However, we adjusted the demographic trends to 2030 using the second variant of the German Federal Statistical Office's population projection, which assumes moderate growth in the three central variables, i.e., birth rate, life expectancy and migration.¹⁸

When we look at the growth projections for the coming years, it appears that the war in Ukraine will delay the post-pandemic recovery we anticipated for 2022 until 2023 or 2024. After that, we can expect growth rates to decrease significantly due mainly to population aging and low productivity growth.

However, due to the dynamic situation, current forecasts are subject to great uncertainty. The last update of the baseline scenario dates from April 2022.

Scenario modelling

For the two scenarios, we conducted a simulation assuming the German economy narrowed the gap between it and the front-runner by either a quarter or by half in each of the indicators we analyzed. Our calculations were based on the assumption that the measures in question would be implemented gradually over the next few years and therefore narrow the gap evenly year after year until finally achieving the target level in 2030. We used currently available data for the respective indicators to calculate the gap to the front-runner in each case.

3. Growth effects of the measures

After preparing the data and calculating the scenarios, we estimated the growth effects of the individual measures on the basis of the Oxford model. We simulated the effect on growth potential based on the change in productivity for some variables using OECD¹⁹ and DIW²⁰ findings.

The following table outlines the target levels and simulated growth effects of the individual measures.

Tab. 7 – Growth effects

Area	Indicators	Scenario 1 (Narrowing the gap to the front-runner by a quarter)	Scenario 2 (Narrowing the gap to the front-runner by half)	Growth effect (Increase in average annual GDP growth)
Labor Market & Skills	Increase education spending	5.7%	6.4%	Scenario 1: +0.03% Scenario 2: +0.06%
	Increase the employment rate for women	73.7%	74.6%	Scenario 1: +0.03% Scenario 2: +0.06%
	Increase the weekly work hours of women	32.3h	34.3h	Scenario 1: +0.19% Scenario 2: +0.39%
	Increase the employment rate of people over 65	14.1%	20.3%	Scenario 1: +0.07% Scenario 2: +0.15%
	Increase the employment rate of the 55–64 age group	76.2%	78.3%	Scenario 1: +0.02% Scenario 2: +0.05%
	Increase the employment rate of Germany's foreign-born population	77.1%	79.2%	Scenario 1: +0.02% Scenario 2: +0.03%
	Invest in lifelong learning	Productivity +1.6%	Productivity +3.3%	Scenario 1: +0.15% Scenario 2: +0.33%
Digital Economy	Increase investment in telecommunications	0.52%	0.76%	Scenario 1: +0.02% Scenario 2: +0.04%
	Increase ICT investments	2.4%	3.2%	Scenario 1: +0.06% Scenario 2: +0.10%
	Increase private investment in software and databases	Productivity +1.4%	Productivity +2.5%	Scenario 1: +0.13% Scenario 2: +0.25%
	Improve access to high-speed broadband	Productivity +1.2%	Productivity +2.4%	Scenario 1: +0.11% Scenario 2: +0.23%
Innovation & Start-ups	Improve access to funding for start-ups	Productivity +1.1%	Productivity +2.2%	Scenario 1: +0.09% Scenario 2: +0.19%
	Expand e-government	Productivity +0.6%	Productivity +1.2%	Scenario 1: +0.05% Scenario 2: +0.10%
	Reduce regulatory barriers	Productivity +1.1%	Productivity +2.3%	Scenario 1: +0.10% Scenario 2: +0.20%
	Increase R&D spending (3.2% of GDP)	3.5%	3.9%	Scenario 1: +0.02% Scenario 2: +0.03%

Sources

01. Please see the appendix for more information on the technical assumptions in our model.
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