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# Lifting Poland's ambition

On the cusp of a new era?



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# Contents

5

---

Foreword

6

---

Executive summary

8

---

Chapter 1:  
Are we on the cusp of a new era?

20

---

Chapter 2:  
The Polish perspective

46

---

Chapter 3:  
Considering Poland's path ahead

58

---

Chapter 4:  
Tasks for Poland

63

---

Acknowledgements

64

---

Endnotes

# Foreword

Over the past 30 years Poland has recorded some of the world's highest economic growth rates and tripled the value of its economy.

To mark this milestone and look towards the future, McKinsey & Company Poland, in cooperation with Forbes, prepared the report "Lifting Poland's ambition: On the cusp of a new era?" The report aims to define Poland's ambitions and key growth engines going forward, while considering the impact that both global and local trends will have on its future development. The report proceeds in four parts:

The first chapter analyzes the major global trends that will shape the world economy going forward.

The second section analyzes how major global trends are impacting Poland's economic and social situation.

In the third chapter, the report presents a set of recommendations for Poland to follow to ensure its continued economic success. Each of these three sections consider five key dimensions of economic growth: demographic processes, technology platforms, resource and energy systems, capital resources and world order.

The fourth and final section synthesizes the recommendations into five priority tasks for implementation that will be critical for Poland's future success.

This report demonstrates McKinsey & Company's ongoing commitment to and involvement in the economic

and social development of Poland. It builds on themes presented in earlier McKinsey reports, including "Poland 2030: A chance to join the economic big league," the 2015 report, "Poland 2025: Europe's new growth engine," as well as industry reports such as "Carbon-Neutral Poland 2050: Turning a challenge into an opportunity," published in 2020, 2022's "Digital Challengers on the next frontier in Central and Eastern Europe," and the 2022 McKinsey Global Institute report, "On the cusp of a new era?"

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The work on the report was led by Rafał Domański, partner, Rafał Kozłowski, senior expert, Tomasz Marciniak, managing partner of McKinsey & Company in Poland, Jurica Novak, managing partner of McKinsey & Company in Central and Eastern Europe, Dawid Rychlik, partner and Gustaw Szarek, partner. The team included consultants Natalia Andryszak, Dariusz Kałyńczak, Justyna Witkowska, Krzysztof Zdobyłak, as well as Natalie Vogt, the head of communications in Central Europe, and Małgorzata Leśniewska from the visual graphics team.



# Executive summary

The events of the past three years appear to be more than just the start of a new economic cycle. The unnerving combination of events such as the global coronavirus pandemic that began in 2020, Russia's 2022 invasion of Ukraine, and geopolitical tensions fueling energy deficiencies, fierce inflation, and economic downturns, could signify the end of one era and the beginning of another.

To many, these events feel like a cluster of earthquakes that is reshaping our world. Although we cannot predict the future, similar “earthquakes” have struck before—including the immediate aftermath of World War II (1945–46), the oil crisis (1971–73), and following the collapse of the Soviet Union, when countries in Central and Eastern Europe were regaining independence (1989–92). All of these events gave rise to more positive eras: the Postwar Boom (1945–71), the Era of Contention (1971–89), and the Era of Markets (1989–2019).

To better understand the direction the world is now headed, we consider five key dimensions of economic and social development: the world order, demographic processes, technology platforms, resource and energy systems, and capital resources:

1. From a geopolitical standpoint, the world is moving towards a multipolar, regional, and polarized world.
2. In terms of global demography, the average population age and the burden of noncommunicable

diseases are both rising, while social contracts are being revised.

3. Technologies now permeate the globe, with the role of transversal technologies such as artificial intelligence (AI) in particular, becoming more prominent.
4. After decades of environmental neglect, multiple countries are now prioritizing climate protection and increasing investments into replacing fossil fuels with renewable energy sources. This will lead to a competition for the resource required to develop green technologies.
5. Following a period of hyper-growth, fast-paced economic growth is normalizing, while growing debt increases countries' financial burden. While the 20th century was dominated by The Organisation for Economic Co-Operation and Development (OECD) the 21st may be dominated by Asia.

Poland is an undisputed winner of the previous era. Since the era's onset, Poland has tripled its economy with one of the fastest growth rates in the world. To continue on this growth trajectory Poland needs to face both global and country-specific challenges.

In terms of the **world order**, Poland is strongly connected to one pole of the multipolar world, demonstrated by its alliance commitments (including those to NATO) and certain directions of trade. On the other hand, Poland's international

reputation, which ranks as one of the lowest compared to that of other European Union (EU) states, may pose a risk to Poland's ability to leverage the nearshoring trend and the movement of production from the Far East to Europe.

In terms of **demographic processes**, Poland's population recently peaked, reaching 41 million people in 2023. Going forward, however, the challenges will be: the expected decline of the working-age population from 27 million in 2023 to 20 million in 2050, an increased burden on Poland's healthcare system due to the rise of patients suffering from noncommunicable diseases, as well as the relatively low-quality of higher education.

Although **technological progress** has been one of the drivers of Poland's economic growth, Poland has not yet reached the point of technological saturation. In addition, investment in innovation and the materialization thereof, as measured by the number of patents per capita, is much lower than in the rest of Europe. Despite delayed development of transversal technologies, Poland has the potential to enhance its position among some of these, such as clean energy, bioengineering and bio-medical technologies, as well as next generation software.

Regarding **resource and energy systems**, Poland's share of energy from carbon-emitting sources in the

energy mix dropped from 97 percent in the early 1990s to 79 percent in 2022, which is still more than double the EU average of 37 percent. The development of renewable energy sources (RES) requires Poland to enhance its energy storage capacity, in particular durable solutions (storage over 72 hours) that are not yet being developed in the country. Like the rest of Europe, Poland lacks an abundance of mineral deposits that are crucial for green technology production. Another challenge is infrastructure, namely transport infrastructure and the highly loaded power grid, which requires significant modernization and extension.

In terms of **capital resources**, Poland has experienced some of Europe's fastest growth in gross domestic product (GDP) and currently ranks as the sixth largest economy in the European Union. However, the share of low-productivity sectors, such as agriculture and construction, accounts for as much as 25 percent of GDP, versus less than 19 percent in the EU. Moreover, investment in Poland amounts to 18 percent of GDP, which is 3 percent lower than the EU average and 9 percentage points. The savings of Polish people amount to 3 percent of GDP, while the EU average is above 6 percent.

Whether Poland lifts its ambition and continues its above average economic development depends on decisions made today. To this end, we propose five critical steps that Poland can take:

1. Increase economic productivity by strategically developing and implementing innovations in selected transversal technologies and state-of-the-art digital solutions—to a value of 75 €/h in 2050.
2. Increase investment in Poland, by introducing funding mechanisms that will allocate funds to priority projects and encourage more risk-taking among business entities—by 21 percent of GDP by 2030.
3. Provide a stable, sustainable and accessible energy system by developing and using innovative technologies—achieving and maintaining energy prices for enterprises amongst the five lowest in the EU.
4. Provide a strong talent pool for the labor market through continuous education, improving the skills required for the jobs of the future, and attracting talented people with key skills—growing the number of professionally active people by 5 million by 2030.
5. Strengthen the country's reputation as a magnet for investment and talent, and build social awareness to increase support for actions aimed at addressing key challenges ahead—to include actions to lift Poland's ranking in the Worldwide Governance Indicators to among the top 10 in the EU.

# 1



**Are we on the cusp  
of a new era?**





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The events of the past three years, appear to be more than just the start of a new economic cycle. The unnerving combination of events such as the coronavirus pandemic that began in 2020, Russia's 2022 invasion of Ukraine, and additional geopolitical tensions, have resulted in energy deficiencies, raging inflation, and economic downturns. One might compare these occurrences to seismic shifts that may very well change the shape of the world as we know it. Similar to real life earthquakes, each

of these events significantly reshaped the global landscape.

While we cannot predict the future, recent episodes of similar global uncertainty, such as the immediate aftermath of World War II (1945–46), the fuel crisis (1971–73), and the period immediately following the collapse of the Soviet Union when countries in Central and Eastern Europe regained independence (1989–92)—all gave rise to more positive eras: the Postwar Boom (1945–71), the Era of Contention (1971–89), and the Era of Markets (1989–2019).<sup>1</sup>

To inform our scenario for the future of Poland's economy, we first take a broad view of these three former eras along five key dimensions of economic and social development: the world order, demographic processes, technology platforms, resource and energy systems, and capital resources:

1. **World order:** the institutions, frameworks, and rules that shape international affairs.

2. **Demographic forces:** population characteristics and trends, and socioeconomic contours.

3. **Technology platforms:** the foundation enabling development and innovation.
4. **Resource and energy systems:** the mechanisms for transporting and converting energy and materials for use.

5. **Capitalization:** drivers of global supply and demand, and trajectories of finance and wealth.

We look at the economic outcomes collectively delivered by each domain. Through this lens, each era can be seen to have its own distinctive landscape upon which varied but similarly remarkable evolutions took place (Exhibit 1).

Exhibit 1  
Three eras of development by domain

	Postwar Boom, 1945–71	Era of Contention, 1971–89	Era of Markets, 1989–2019
World order	Decolonizing world transitions to two competing blocs and doctrine of mutually assured destruction	Cold war détente, non-Western countries arise economically; fiat money	Globalized world built on factor-cost arbitrage and cooperative economic rules
Demographic forces	Exploding population; radical inequality between “first” and “third” worlds	Fertility drops globally, below replacement rate in West; life expectancy increases further	Global convergence to small, urban family with better health and education
Technology platforms	Golden age of engineering; world becomes moving, mechanized, and megawattted	Rise of consumer electronics and foundations of digital tech established	Digital emanation: connected and enabled
Resource and energy systems	Petroleum boom supports rapid energy expansion	Severe supply crisis in oil, diversified energy, including nuclear	Fossil fuel—abundant world with global access but climate damage
Capitalization	Rapid first-world growth in shift to peace; industrializing, rebuilding, and deleveraging	China enters top-gear growth and West grapples with stagflation	Massive debt expansion with low inflation; supply–demand shock as billions enter global market economy



# Course of previous eras

## The Postwar Boom (1945–71)

The years surrounding the end of World War II (1945–46) ushered in a new world order after the horrors of global conflict. The United Nations (UN), the International Monetary Fund, and the World Bank were established, and the United States (US) dollar became the de facto global reserve currency pegged to gold. The organization of economies and societies shifted from wartime to peacetime reconstruction: for example, the Marshall Plan mobilized funds to rebuild Europe. Meanwhile, Joseph Stalin negotiated the division of Central and Eastern Europe from Western Europe and raced to develop nuclear capabilities. The foundations for the first era were set.

**In the world order**, the globe transitioned to two competing blocs. In the Western bloc, which included the United States and Western Europe, pan-Western institutions such as the North Atlantic Treaty Organization (NATO) and the European Economic Community (the predecessor of the European Union), were created. The bipolar order led to a period of heightened geopolitical tensions.

**In demographic forces**, modern (sub) urban life, enabled by cars, extended across the developed world, resulting in a step change in population growth, with most countries experiencing a baby boom. Globally, between 1950 and 1971, child mortality rates fell by 44 percent and life expectancy increased by nine years. But there was still considerable scope for progress in a predominantly poor, rural world.

**In technology platforms**, innovations that had been developed before and during the war became the foundation for a golden age of engineering. The electrification of

manufacturing enabled the mass production of affordable consumer durables. Fast, easy transportation became the Western norm. The jet engine, modern steelmaking with basic oxygen furnaces, semiconductors and integrated circuits, lasers, the shipping container, and the television emerged.

**In resource and energy systems**, the foundations of a global carbon-based energy system were established. The petroleum boom enabled a rapid rise in energy use: per capita global oil consumption quadrupled between 1946 and 1971. Synthetic fertilizers underpinned decades of growth in agricultural productivity.

**In capitalization**, the rebuilding and development of Europe and Japan from the ravages of war enabled robust supply and demand growth. Around the world, governments deleveraged wartime debts as their economies expanded.

The Postwar Boom delivered a golden age of productivity growth, driven largely by the spread of inventions of previous decades whose dissemination had been hampered by war. However, more than half of the growth in gross domestic product (GDP) came from the Organisation for Economic and Co-Operation and Development (OECD) countries, while regions then known as ‘the Third World’ (developing countries in Asia, Africa, and Latin America) grew more slowly.

This golden age could not last forever. Subterranean tensions were culminating in the earthquake of the 1970s. Dwindling US gold reserves, combined with European dissatisfaction with a postwar monetary system benefiting the United States, exposed tensions in the global monetary

The average life expectancy during the Postwar Boom era grew by

**9 years**

system. Decolonization's emphasis on self-determination was at odds with carbon-hungry economies that relied on resources extracted from poorer, producing nations with little sovereignty

over their natural endowments. By 1970, the one-off changes and innovations that had driven progress throughout the era seemed to have declined in intensity and frequency in the West.

## The Era of Contention (1971–89)

The early 1970s bore witness to seismic shifts as new actors arose in the global order. In 1973, the Organization of Petroleum Exporting Countries (OPEC), led by Arab nations, imposed an oil embargo on the US-allied bloc and reduced their production, triggering an oil shock that hobbled large and heavily oil-dependent Western economies. As developed economies experienced a negative oil supply shock, inflationary recession, and a drop in productivity, the world entered a phase of rising geopolitical tensions and resource competition. The gold standard ended, and the age of fiat money began.

**In the world order**, changing US economic power was coupled with the rise of non-Western economies, such as Japan, and China's opening to the outside world.

**In demographic forces**, the widespread adoption of the contraceptive pill led to historic alterations in family and social structures. Female economic participation grew in the West while fertility rates started dropping below the replacement rate. Rising levels of female education contributed to improving basic public healthcare, leading to the continued fall in child mortality and increase in average life expectancy of another eight years.

**In technology platforms**, consumer electronics became ubiquitous in the West and Japan. The advent of network technology and communication protocols, the widespread use of transistors, and the first commercial

production of a microprocessor laid the foundations for the computer age. However, the seeds of global connectivity would not fully germinate for another generation.

**In resource and energy systems**, the world responded to the global oil shock by diversifying geographically energy sources, boosting non-OPEC oil production, and investing in energy efficiency. Simultaneously, improvements in agricultural productivity led to increasing global food supply while increasing the amount of labor available off the farm.

**In capitalization**, the West experienced a period of stagflation as inflation hit double digits, and many economies suffered from recession and high unemployment. Economic growth in the West sputtered. Productivity growth among the G-7 countries more than halved. However, GDP growth in East Asia started on a long upward trajectory, a trend that would fundamentally change the world.

The foundations for a more deregulated market-based economy had been laid in the West, exemplified by the policies of Reagan and Thatcher. The Soviet Union's rival model was slowly imploding while Mikhail Gorbachev was introducing *Uskorenienie*, *Perestroika*, and *Glasnost*, a set of ideas to accelerate, restructure, and introduce transparency of the Union of Soviet Socialist Republics (USSR's) economy. The groundwork for a new digital age was set.

The average life expectancy during the the Era of Contention grew by

**8 years**

## The Era of Markets (1989–2019)

Between 1989 and 1991, waves of revolution that originated in Poland and continued through the rest of Central and Eastern Europe eventually broke up the Soviet Union and reshuffled Europe's geopolitical deck. In 1992, the Maastricht Treaty signaled the beginning of the European Union (EU) and a leap forward in Europe's economic and political integration. China, after halting progress, fully committed to market reforms. In the technological sphere, the World Wide Web was born in 1989, creating the scaffold for a digital revolution.

**In the world order**, the prominent feature was global integration. Global supply chains spread rapidly, built on factor-cost arbitrage and cooperative economic rules. These were supported by the newly formed World Trade Organization (WTO), which fostered multilateral reductions in trade barriers. Europe integrated further with the creation of an economic union and eventually the monetary union. The dissolution of the Soviet Union had reshaped the bipolar world into a unipolar one, centered on an unchallenged United States. Globally, deaths caused by military conflict fell to their lowest levels in recent history.

**In demographic forces**, urbanization became a dominating force, as an additional two billion people moved into cities worldwide, and city dwellers now outnumber those living in rural areas. Increased education levels and declining poverty levels impacted falling global fertility rates, resulting in smaller family sizes and greater prosperity in many regions. During this era, the average person gained an additional nine years of life. From a broad perspective, the world became more equal in this era as developing economies narrowed the income and wealth gaps with their

advanced counterparts. However, within advanced economies, wealth and income inequality gaps have widened. Such trends have sown societal discord in the West, undermining the social contracts and powering the rise of polarized politics and non-mainstream electoral success.

**In technology platforms**, mobile phones and the Internet spread rapidly around the world. By 2019, 67 percent of the world's population had a mobile phone, and 54 percent had access to the Internet. At the start of the Era of Markets, both numbers had been close to zero.

**In resource and energy systems**, during this era, annual global consumption of oil and coal nearly doubled while gas consumption more than doubled. At the same time, there was growing global awareness of the negative impacts of climate change. A race to salvage global habitability began, and the Paris Agreement laid out a path to reducing climate damage.

**In capitalization**, one feature was particularly salient—China's economic development. Propelled by prosperity and urbanization, hundreds of millions of people in China left agricultural employment to join the modern labor force. This factor, combined with growing demand from the country's burgeoning and increasingly urbanized middle class, led to a restructuring of global supply chains. In this era, China's development supported an economic shift in global growth away from high-income countries. Meanwhile, in advanced economies, the productivity boom of the late 1990s began tapering off in the 2010s. Low- and middle-income countries became, for the first time, responsible for the majority of global GDP growth. More generally, this era also featured stable, low interest rates and inflation.

The average life expectancy during the Era of Markets grew by

**9 years**

The world experienced a record buildup in household, non-financial corporate, and government debt. At the end of this third era, the world was very clearly globalized, urban, and, in aggregate, very prosperous. As with earlier eras, however, tensions, imbalances, and complexities were mounting. The COVID-19 pandemic accelerated the digitization of the economy and the increased significance of the government, however it also left a legacy of higher debt, while also accelerating the digitization of the economy and public spheres. Russia's invasion of Ukraine exposed the dependency of the global economy on a limited group of food and energy suppliers. The returning specter of

inflation and the associated rapid monetary tightening are redolent of a different age. Huge improvements in living standards have drawn billions of people into the modern energy system, but the environment is suffering. The financial system that enabled global investment, underpinned by the global reserve fiat currency, and turbocharged money expansion, has created potential vulnerabilities in record leverage on the liabilities side and record valuations on the assets side. The current disruptions may seem sudden and unpredictable, but similarly to the shifts observed in the past, result from tensions building up over an extended period of time. Tensions the world will need to address in this new, impending era.

Exhibit 2  
**Potential direction of travel by domain**



# Imagining the next era

The shape of the next global economic era—and the decisions that governments, businesses, institutions, and individuals will take to mold the new terrain—are uncertain in the current context. Decision-makers are wondering whether we are about to take a step back into the Era of Contention, noting similarities such as: the energy crisis, a new era of monetary politics, rising geopolitical tensions, competition for resources and the slow-down of productivity growth in the Western hemisphere.

However the world today remains much more globalized and policymakers are constrained by the need to reduce greenhouse gas emissions.

By analyzing current circumstances along the five major dimensions of social and economic development described above, we can identify potential trajectories or trends that could characterize the coming era (Exhibit 2), with the caveat that within each domain are unresolved questions—perhaps many of them. Very different outcomes are still on the table.

## World order

**The unipolar world order marking the end of the most recent era has become more multipolar and proactive.** As an illustration, the gap between the share of global material capability<sup>2</sup> held by US-aligned powers and China is fewer than ten percentage points, smaller than the gap between US-aligned powers and the Soviet Union during the Cold War. These trends have accelerated in recent years. In February 2022, China's GDP overtook that of the EU; at the end of March 2022, India passed the United Kingdom to become the world's fifth-largest economy by GDP. At the same time, peace in Europe—and the global economy—was rocked by Russia's invasion of Ukraine. While Western-led condemnation was swift, China, India, and 33 other states abstained from a UN resolution to condemn Russia. Finally, the COVID-19 pandemic delivered the largest global economic shock since World War II and prompted an overall expansion of the state just about everywhere, at least for the period of

the pandemic, as public intervention and leadership came roaring back.

**Increasing multipolarity may support a trend toward realignment into regionally and ideologically aligned groups.** Global integration as measured by flows of trade, people, capital, and intangibles continues. In trade, for example, as many regional trade agreements were ratified in 2021 as during the previous five years combined. The Regional Comprehensive Economic Partnership, a free trade agreement among Asia-Pacific nations, came into force in January 2022, creating the world's largest trading bloc. In geopolitics, partly because of the Ukraine war, Finland and Sweden's accession to NATO is undergoing ratification, marking the largest addition to NATO's material capability since 2004. However, years of relative moderation in internal and international politics may give way to more political polarization, both internally and between blocs.

**Since Russia's annexation of Crimea in 2014, the number of active sanctions—a marker of tension between states—has hit an all-time high.** All this occurred against a backdrop of increasing tensions between people and institutions, particularly in the West. The rise of polarization in US politics has been well documented. Citizens' protests are on the rise. Meanwhile, many liberal democracies are experiencing increasing internal

tensions amidst the emergence of groups with alternative ideologies.

#### **Unresolved questions**

- What might the multipolarity of the world look like in practice? Will the economy remain global in nature, and will we find new, workable mechanisms to cooperate beyond the economy?
- How effectively will global and local institutions and leadership adapt to, and shape, this different world order?

## **Demographic forces**

**The world will become older and increasingly urbanized.** Declining fertility rates and rising life expectancies make for an increasingly older global population. It is highly probable that the number of children under the age of 5 will never again be higher than it is today. By the early 2030s, the continent is expected to have a larger working-age population and, on average, younger population than China or India. Meanwhile, the global population will continue to urbanize. All future population growth is projected to occur in urban centers, while rural populations decline. And yet again this growth is projected to be more dynamic for countries outside the West. Europe and North America are projected to gain 13 large cities by 2035,<sup>3</sup> while Africa and Asia are expected to gain about 50 and 100, respectively.

**An aging world brings a shift from communicable diseases to often chronic, noncommunicable diseases (NCDs).** While rates of death and disability due to NCDs in developing countries have been falling, the absolute size of the NCD

burden has been surging—a change for which developing countries are often ill-equipped. The combination of the NCD burden and rising old-age dependency ratios is likely to increase demands on the welfare state across the development spectrum, putting further upward pressure on health expenditure and pensions.

#### **Inequality within countries may increasingly strain the social fabric.**

Within countries, the ratio of the top 10 percent measured by income and the bottom 50 percent is at the highest level since its peak at the start of the 20th century. In Europe, citizens' trust in government is at stable lows. The link between rising inequality and falling trust in institutions may not be causal. Nonetheless, a narrative is increasingly circulating that the economic benefits of society are captured by elites, enabled by reinforcing institutions.

#### **Unresolved questions**

- How will countries, institutions, and individuals manage the transition to an older society?
- How will capital and institutions respond to rising inequality?

## Technology platforms

**Key drivers of previous eras, such as exponentially increasing computing power and the spread of digital technologies, may slow in coming years.** At the same time, new dimensions of semiconductor innovation may extend advances in computing power. A deceleration in hardware innovation may lead to greater emphasis on software development. In the Era of Markets, the adoption of cellphones and the Internet far surpassed that of fixed-line phones and personal computers. However, a saturation point may be near. While smartphones will become the norm even in the least developed countries, global volume growth will end as demand falls in the West; indeed, smartphone shipments have been in decline globally since 2018.

**A set of transversal technologies, including applied AI, may shape the next era.** New and emerging transversal technologies, such as applied AI, bioengineering, and immersive-reality technologies, are attracting tens and hundreds of billions of dollars of annual investment, often with double-digit investment growth rates. These technologies may counteract the slowdown suggested above. For example, developments in quantum computing may spur the next big S-curve of development. Accelerating the preexisting trend, the pandemic propelled even faster adoption of AI and automation. Focusing on AI in particular, the wide range of potential applications has led some to claim

it will underpin a Fourth Industrial Revolution. AI innovation, as measured by AI-based patent applications, grew at a rate of more than 75 percent a year between 2015 and 2022.

**Technology may move to the forefront of geopolitical competition and power.** As technology permeates virtually every sector of the economy, it is increasingly determining competitive dynamics. In times of growing geopolitical uncertainty, strategic autonomy over critical technologies such as AI is a critical factor in all major economies. For example, there are concerns about the security implications of globalized hardware flows as well as the selective block on exporting the world's most sophisticated chip-making machines, produced by a single company in the Netherlands. There is competition for influence in global standard-setting bodies, such as China's ambition to take a more leading role through the China Standards 2035 strategy. And cyberattacks as a tool of state power have increased. Between 2020 and 2022, 320 state-sponsored cyberattacks were publicly reported, nearly as many as in the full decade prior.

### Unresolved questions

- What impact will the next wave of technologies have on work and social order?
- How will technology, institutions, and geopolitics interact?

## Resource and energy systems

**Spending on fossil fuels will shift to spending on replacing them, but overall investment may struggle to keep pace with growing energy needs.** The current pace of renewable energy infrastructure investment is too slow for the goals of the Paris Agreement to be met, but if those goals

are not to be achieved, then current investment in fossil fuel infrastructure is too low to make up the shortfall. A combination of underinvestment and catch-up investment in both renewable and fossil fuel energy infrastructure could produce a prolonged period of higher prices.

**Resilience, feasibility, and affordability concerns may challenge the velocity of the transition to net zero.**

Energy security will become a key consideration in countries' energy mix. In the short term, securing supply in the face of the energy shock triggered by Russia's invasion of Ukraine may trump the goal of net-zero carbon emissions by 2050. Meanwhile, demand for currently irreplaceable steel, cement, ammonia, and plastics—together accounting for 25 percent of fossil fuel–related emissions—will continue to grow. Of course, for those who can exploit the trends and implement solutions to these gnarly problems, a big business prize awaits.

**Critical resources for the future economy, including minerals and food, may become increasingly important in economics and geopolitics.**

Some estimate that to enable 50 percent fleet replacement with electric vehicles by 2050, consistent with a net-zero scenario, global production of lithium and cobalt would have to increase approximately 20-fold, and nickel 30-fold, while sources and processing capabilities for many key minerals are highly

concentrated in just a few countries. The concentration of and demand for critical minerals may only heighten competition between global powers. Beyond minerals, key grain crops are perhaps surprisingly concentrated in just a few breadbasket regions. The top ten grains exporters accounted for about 70 percent of global exports in 2019. Moreover, key fertilizers are highly concentrated in just a few producer countries. In the case of potassium chloride, which accounts for most potash fertilizer, about 80 percent of exports originate in Canada, Russia, and Belarus. This leaves importing countries vulnerable to disruption. The issue of global food security was climbing the global agenda because of early evidence of the impact of climate change, and disrupted supplies in Europe, following Russia's invasion of Ukraine, have only served to accentuate vulnerabilities.

**Unresolved questions**

- How will the world navigate an affordable, resilient, and feasible path to climate stability?
- What dynamics will play out between those who have critical resources and those who do not?

## Capitalization

**Economic growth rates may**

**normalize.** One billion people lived in economies enjoying hypergrowth in recent decades. In the next era, it is unlikely that there will be more top-gear catch-up growth from large economies because the world has converged to the same productivity curve. Although China's GDP overtook that of the EU in early 2022, the economy moved out of top gear for growth for the first time in almost 40 years.<sup>4</sup>

Meanwhile, productivity growth has continued to slow in advanced economies, falling to its lowest level in the postwar period. Lower growth and productivity may contribute to a global economic slowdown, and the end of the large, positive supply shock in global production may make inflation even harder to rein in.

**Growing leverage and credit may evolve into balance sheet stress.**

Economies could be under pressure



to deleverage historically high levels of debt. The postwar deleveraging approach, namely to “outgrow” the debt, may be more challenging in the context of low productivity growth. On the global balance sheet, asset values relative to income are nearly 50 percent higher than long-run averages. This rise is underpinned by real estate, which accounts for two-thirds of global net worth.

In some economies, inflation had already hit 40-year highs by the end of 2020, triggering a rise in nominal interest rates alongside historically high debt levels—raising the specter, once again, of an inflationary recession, but this time with radically higher leverage in both the public and private sectors. And there are signals that the current economic climate is destabilizing emerging markets, which are especially vulnerable to changing global economic conditions.

**The OECD century is giving way to the Asian century.** This shift is driven by a confluence of factors across domains, but its significance may be felt most in how it shapes the drivers of supply and demand, finance, and wealth, in the next era. This confluence of factors includes the evolution of a multipolar world order with China as a major power, a demographic shift toward Asia, and East and Southeast Asia’s rising economic clout: Southern Asia was the world’s fastest-growing region in GDP in 2015–19. While a global economic power shift toward Asia appears likely to continue, the future Asian models for economic success, and whether and how they will differ from the Western paradigm, are less clear.

#### **Unresolved questions**

- Will we find the next productivity engine to drive growth?
- Will the rise and rise of the global balance sheet be reversed?

# How will the upcoming era unfold for Poland? And what Polish decision-makers do to seize upcoming opportunities and overcome challenges?

# 2



## The Polish perspective



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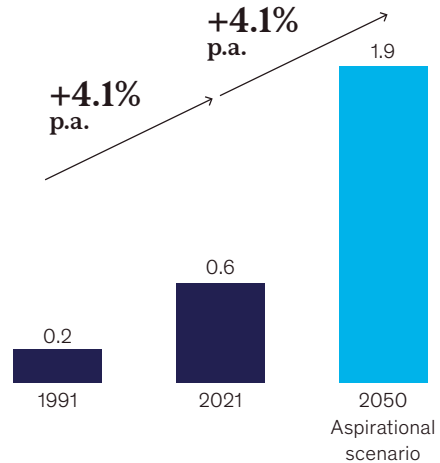
Poland has emerged as a prominent beneficiary of the Era of Markets. Since 1991, the value of Poland's economy tripled as the country achieved some of the highest average annual economic growth rates in Europe, at 4.1 percent annually. As a result of this extraordinary leap, Poland now ranks as the eighth biggest economy among EU-30 states.<sup>5</sup> Living standards now visibly proximate the average level across Europe, with the output gap per capita calculated in purchasing power parity

(PPP) relative to the EU-30 shrinking from 63 percent to 19 percent.

If Poland maintains this high economic growth, it could again triple the value of its economy by 2050, overtaking the Netherlands, Switzerland and Spain, just shy of the EU podium.<sup>6</sup> Realizing this ambition would be demanding, and any path to success must begin by considering the impact that current global trends are likely to have on the Polish economy, as well as the opportunities and challenges that they might present.

### Exhibit 3 Gross domestic product

\$ trillion (fixed prices, fixed exchange rate), 1991–2021



Source: OECD

## Demographic forces

### Key takeaways

- By 2050, the number of people of working age in Poland will decrease from the current 27 million to about 20 million, resulting in an estimated 5 million fewer economically active people.
- Poland is a country with a positive migration balance but the scale of population inflow is limited and insufficient to fill the gap in the labor market.
- Poland's healthcare system is focused on treatment rather than disease prevention and healthy aging.
- Primary and secondary education is at a high level, but higher education has not yet adapted its curriculum to train for the jobs of the future.

### From a young to aging world

Like most developed countries, Poland's population is both shrinking and aging. Although Poland is experiencing a peak in its population (the population reached 41 million in 2023 versus 38 million in 1990), this is primarily due to the migration of war refugees from Ukraine. Going forward, UN predictions suggest that the Poland's population will decline by 1 percent a year by 2050, to 35 million.

The aging society parallels a decline in the working population. While current labor resources are ample when compared to the beginning of the market economy era (27 million working-age people<sup>7</sup> in 2023 versus 25 million in 1990 (Exhibit 4)), the declining population will shrink the labor pool to 20 million by 2050. Another factor to consider is Poland's unemployment ratio, which has been lower than the average European rate for over 10 years and in 2022 dropped to one of the lowest levels in the European Union (3 percent in 2022 in Poland versus 6 percent in the EU-27 and as much as 13 percent in some countries).<sup>8</sup> By 2050, more people will exit rather

than enter Poland's labor market (the ratio of the size of a typical cohort aged 15–24 to 60–64 will drop from 1.4 in 1990 to about 0.6 in 2050).<sup>9</sup> The implication is that Poland could soon have an insufficient labor force.

Societal aging exerts significant pressure on the retirement system. Presently, the system is stable, as the ratio of professionally inactive elderly people to the working population is relatively low (in 2021 it was 0.27 in Poland versus 0.33 in EU). Based on UN forecasts, however, that ratio could almost double and increase the risk of retirement system inefficiencies (Exhibit 5).

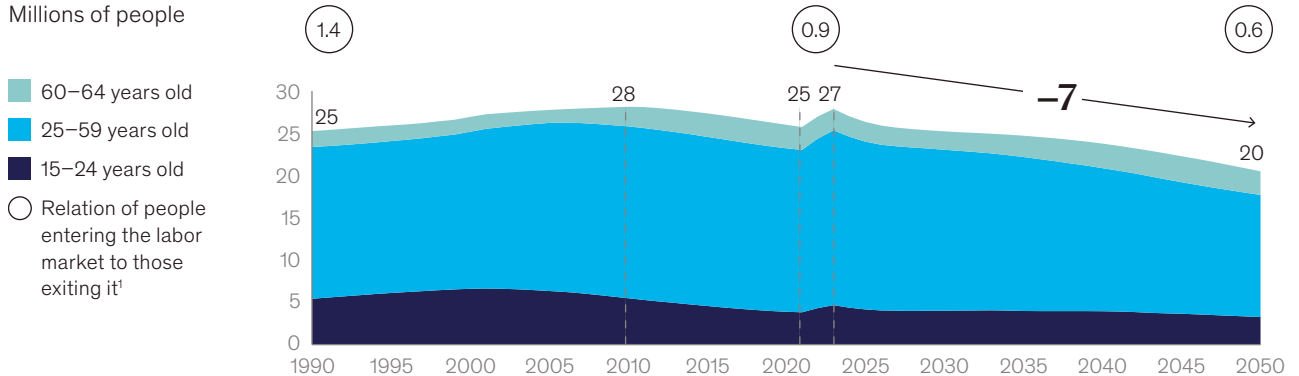
Since the dawn of the market era, Poland has attempted to catch up with, and sometimes even overtake, European activity rates. The potential for increasing professional activity of Poles in the 25–54 age group is limited, as Poland's professional activity is already levelling with that of Norway, one of the leaders in the OECD (Exhibit 6).

The potential for further activation is particularly noticeable among young

#### Exhibit 4

### Working-age population in Poland

Millions of people



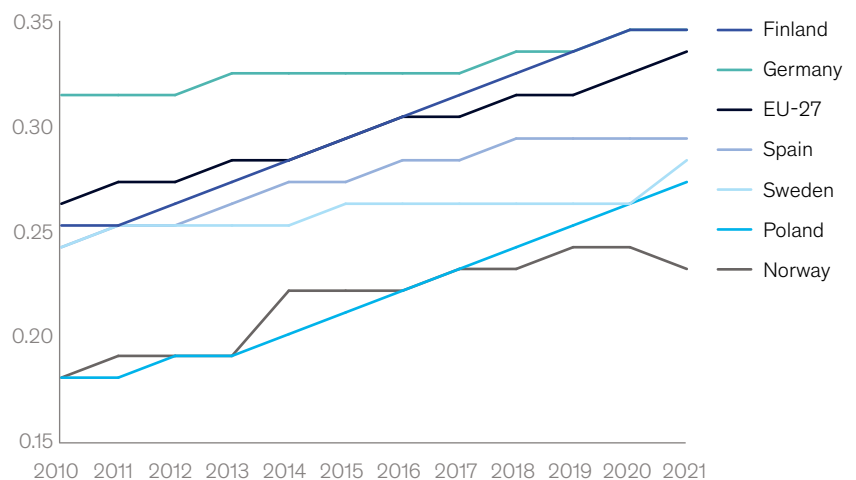
Note: Considering the present retirement age

<sup>1</sup>People entering the labor market—population aged 15–24; people exiting the labor market—population aged 60–64

Source: United Nations, McKinsey analysis

#### Exhibit 5

### Ratio of professionally inactive seniors aged 65+ to the working-age population, (x:1)



Source: Eurostat

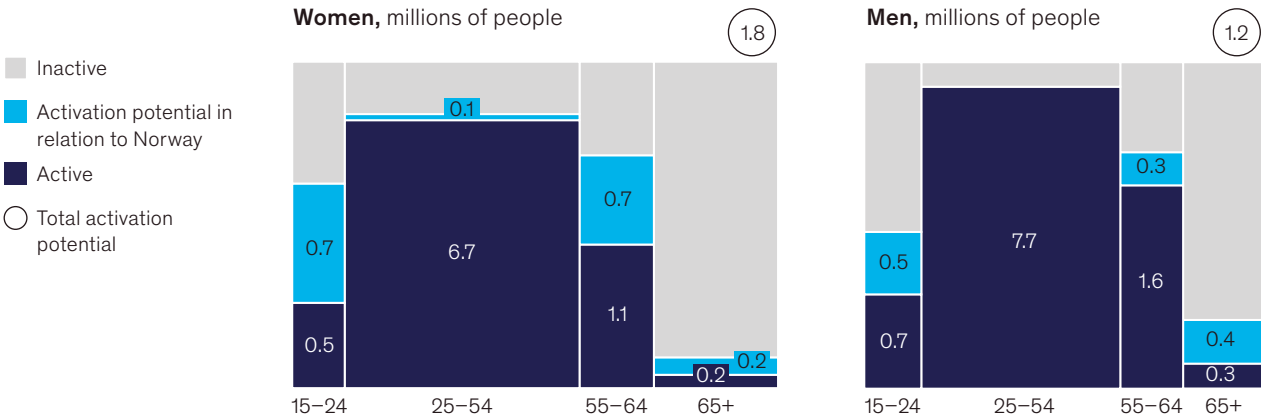
adults (15–24 years of age), whose professional activity, in Norway, is nearly double of that of young adults in Poland, and people aged 55 and older.

One of the repercussions of societal aging is that going forward, those aged 65 years and up make take up or continue professional activity. The average life expectancy in Poland at the beginning of the 1990s was 71 years. Today it is 78 years and, importantly, most of this increase is lived in good

health (Poles live longer and are healthier).<sup>10</sup> This means that today a 65-year-old has a high probability of being in the same health as a 55-year-old several decades ago.<sup>11</sup> Their extended life expectancy means that Poles are likely to be in good health longer after retiring, assuming that the retirement age does not change. This is particularly visible among women, whose life expectancy after retiring is one of the highest in Europe: at

Exhibit 6

## Professional activation in Poland via the best practices

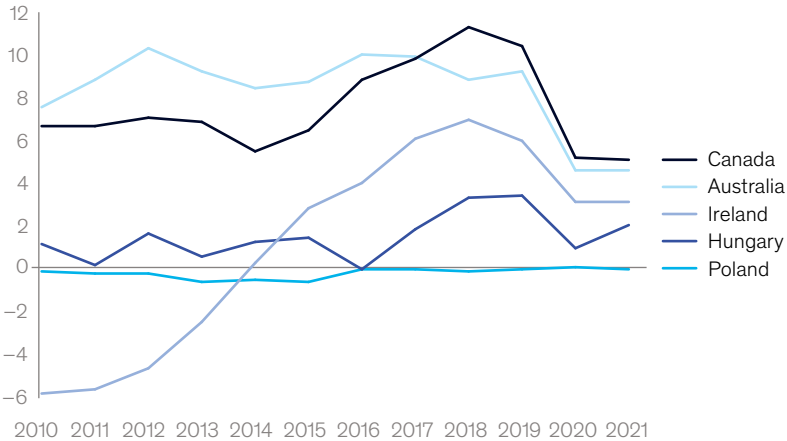


Source: OECD, McKinsey analysis

Exhibit 7

## Migration balance

Number of migrants per 1,000 people



Source: United Nations; Eurostat

21 years, it ranks just below Austria and France, both of which plan to raise the retirement age. In Bulgaria and Hungary, female life expectancy after retiring is just 11 and 14 years, respectively.<sup>12</sup> The situation of Polish men is the reverse: their life expectancy after retiring is one of the lowest in Europe and amounts to eight years, as opposed to 17 years in France.

The need to provide care is a key factor limiting the professional activity

of Poles: in 2020, over 50 percent of professionally inactive Poles could not take up employment due to obligations to care for children or disabled adults, or to fulfil other family/personal duties.<sup>13</sup> Poland records one of the higher values in the EU (especially among Polish women) and has been growing since the beginning of the market era. This, combined with the fact that professional activity in Poland is already high, means that those citizens who do not have to care for someone

have already been activated, while those who provide such care remain excluded from the labor market.

Another way to ensure a sufficient labor force in Poland is to maintain a positive migration balance. Every year since 2016 there were more people coming to Poland than leaving it (Exhibit 7),<sup>14</sup> and the sources of new migrants are diversifying. Beyond those coming to Poland from Ukraine and Belarus,<sup>15</sup> tens of thousands of migrants come to Poland from, for example, Nepal, India, Uzbekistan, and the Philippines. Every year since 2018, the number of migrants from countries other than Ukraine and Belarus has grown by almost 40 percent (CAGR 2018–2022). The migration balance remains, however, below the EU average (0.1 per 1000 people for Poland versus 2.4 for the EU).

### From communicable to noncommunicable diseases

While Poles are living longer and in better health than they were 30 years ago, they are still getting ill. However, the nature of the diseases they suffer as well as the disease burden have changed (disease burden is expressed

in Disability-Adjusted Life Years, or DALYs, a factor measured in years of life adjusted by disability, or years lived not in full health). Since the 1990s, increasing numbers of Poles suffer from noncommunicable diseases (in 2019, 84 percent of the disease burden in Poland was attributable to noncommunicable diseases, versus 78 percent in 1990s).<sup>16</sup> This trend has major implications for Poland's healthcare system. For example:

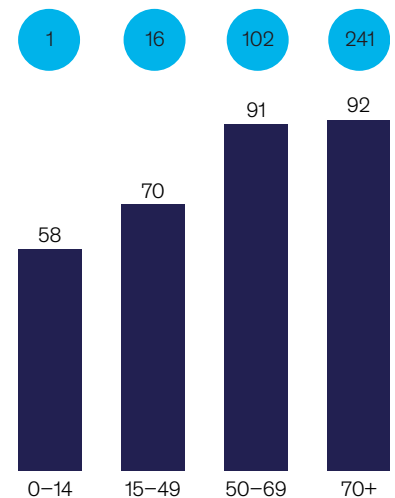
- Noncommunicable diseases (NCDs) require different medical treatments than communicable diseases, but there are fewer tested and effective treatment methods for NCDs.
- NCDs diseases often cannot be fully cured, and treatment, which can be lengthy and costly, only minimizes the effects of the disease.
- The disease burden from communicable diseases could be halved (61 percent for communicable diseases vs. 35 percent for noncommunicable diseases).<sup>17</sup>
- Noncommunicable diseases are the main cause of death among all age groups (Exhibit 8).

Exhibit 8

### Share of deaths in Poland caused by noncommunicable diseases in the total number of deaths in age groups

2020, %

● Number of deaths, thousand



Source: World Health Organization



The rise in noncommunicable diseases poses a challenge for the Polish health system. In 2019, noncommunicable diseases such as coronary artery disease, cancer, vascular brain diseases, and pneumonia were most common among deaths that could have been prevented with optimum healthcare.<sup>18</sup> The World Health Organisation recommends minimizing the burden of treating noncommunicable diseases by centering healthcare systems around prevention and promotion of a healthy lifestyle. In contrast, Poland's current healthcare system is structured around stationary and out-patient care. Spending for long-term care, which is fundamental to managing noncommunicable diseases, amounted to less than 1 percent of Polish GDP in 2020. In contrast, Norway, the European leader in this regard, spent over 4 percent of GDP for long-term care.<sup>19</sup>

### **From deepening social inequalities to a new social contract**

Notwithstanding the rise in NCDs Poles' quality of life as measured by the Human Development Index has improved considerably in the past 30 years. Poland moved six places up the HDI ranking between 1990 and 2020<sup>20</sup> alongside improvements in accommodation, finances, employment, education level, environmental condition, and health and safety (Exhibit 9). Poles feel those changes and are more satisfied with their lives: about 75 percent of Poles declared that they were satisfied with life in 2022 as opposed to 53 percent in 1994.<sup>21</sup>

Three conditions—work, finances, and education—deserve special attention.

Poles indicate that the potential exists for improvements regarding their work life. In 2021 Poles worked 40 hours per week on average in their main profession, just below the 42 hour averages in Romania, Greece, and Serbia.<sup>22</sup> In the rest of the EU, the average was 36 hours.

Poles are also dissatisfied with their financial situation, despite significant improvements in the Era of Markets. For example:

- Income inequality in Poland, as measured by the Gini coefficient, is relatively low compared to much of Europe (the Gini coefficient in Poland is the same as in Sweden, Austria, and Denmark).<sup>23</sup> Importantly, wage inequality between women and men declined from 20 percent in 1991 to 9 percent in 2020, which is below the OECD's average.<sup>24</sup>
- During the past 15 years, Poland noted a decrease in the ratio of domestic income of the first and last decile of Poles by 3 percent, while some European states, such as Bulgaria, recorded an increase (Exhibit 10).<sup>25</sup>
- The number of Poles living below the poverty line has decreased (18 percent in 2010 versus 15 percent in 2021). This is a better result than the EU average of 17 percent, but still higher than the 9 percent in the Czech Republic. In recent years, Poles under 18 years of age have experienced the most improvement: in 2010 nearly 23 percent of youth in this age group lived below the poverty line, versus 15 percent in 2021. The poverty rates for those aged 65 years and above, however, deteriorated (14 percent in 2010 compared to almost 18 percent in 2021).<sup>26</sup>



## Exhibit 9

# Quality of life in Poland

## General life satisfaction



**75%**

of Poles are satisfied  
(versus 39 percent in 1990)

**8.1/10** satisfied with personal relationships

**7.3/10** satisfied with work

**6.3/10** satisfied with financial situation

## What has changed?

Changes of individual indices in 1990–2022  
(newest available data)

### Education

Increasingly better PISA results  
(mathematics: 474 versus 516)

**4x** more people with  
higher education

### Environment

**50% ↓**

reduction in  
air pollution

### Accommodation

**+10%**

number of rooms  
per person

### Rankings and indices

**↑** HDI

Promotion  
6 places up

### Finance

**50%** fewer income  
inequalities

**20%** fewer people live below  
the poverty line

### Inequalities

**60%**

smaller gender-driven  
wage gap

### Safety

**43% ↓** decrease in the  
number of murders

Reduction of thefts by a half

**↓** Gini coefficient

Drop by 4 points  
(decrease in income  
inequality)

### Employment

**70% ↓** decrease in  
unemployment

**3% ↑** increase in professional  
activity

### Health

**5 years ↑**

increase in life  
expectancy

### Well-being

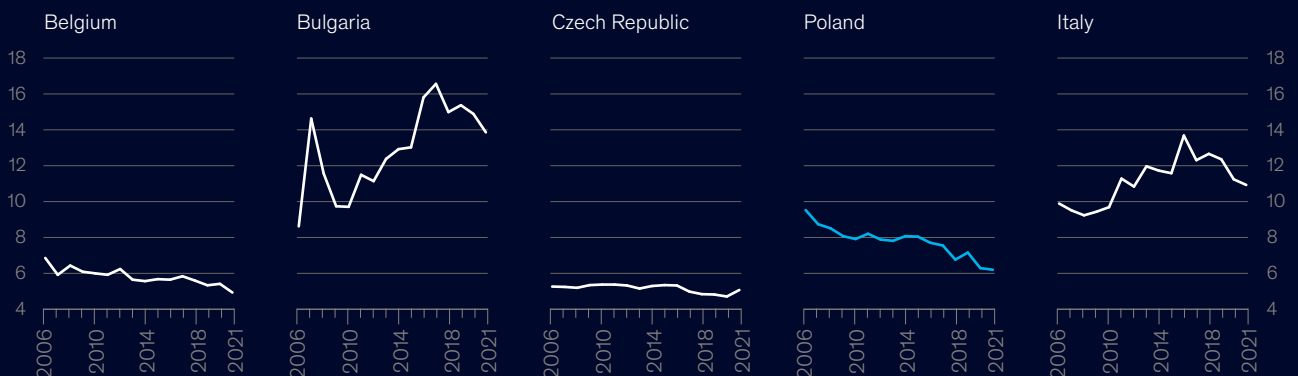
**8th → 4th**

"Promotion" from the 8th to  
the 4th place in the number  
of hours worked

## Exhibit 10

# Income distribution

The ratio of income of the 10th decile to the income of the 1st decile of households



Source: Eurostat, McKinsey analysis

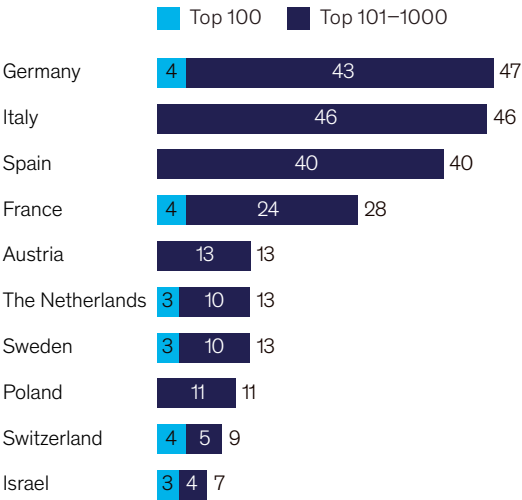
In terms of education, Poland has consistently delivered better PISA test results (the last survey was conducted in 2018) for all categories and genders: girls achieve results similar to boys and gender differences are among the lowest.<sup>27</sup> That said, some areas of higher education are lagging. Only eleven Polish higher education institutions earned a spot in the top 1,000 and none of them made it to the top 100. In comparison, the Netherlands, Sweden, and Austria have a similar number of higher education institutions in the top 1,000 despite their much smaller country size. Moreover, some of their universities are even featured in the top 100.

Poles spend an almost equal number of years on education as their OECD peers—18 years on average.<sup>28</sup> However, the course of that education is different: 25 percent of Polish citizens are

awarded a master's degree, while 8 percent receive a bachelor's degree. In the United States, Israel, Germany, and the Czech Republic those proportions are reversed: twice as many students finish their education with a bachelor's degree versus a master's. In addition, those countries offer short-cycle tertiary education, which basically does not exist in Poland.

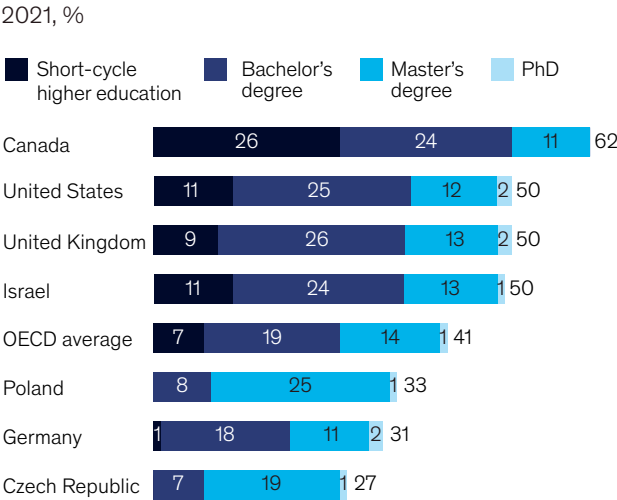
Higher education in Poland also does not fully meet increasing market demand for Science, Technology, Engineering, and Mathematics (STEM) graduates. Poland educates fewer than half the number of scientists as Germany, and this number is decreasing year by year. Deficiencies are particularly visible in the field of natural sciences, mathematics, and statistics, in which Poland educates only 3 percent of all graduates (versus 10 percent in the United States).<sup>29</sup>

Exhibit 11  
**Number of higher education institutions in global rankings**



Source: Academic Ranking of World Universities

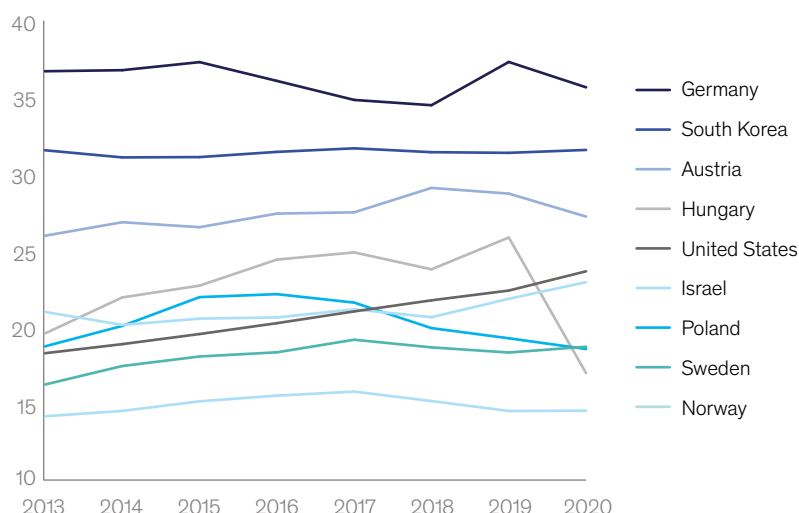
Exhibit 12  
**Higher education of people aged 24–64, by category**



Source: OECD

## Exhibit 13 STEM graduates

Percentage of all bachelor's degree graduates



Source: OECD

## Technology platforms

### Key takeaways

- Poland is well-positioned to develop innovations in some transversal technologies, although, like the European Union, it lags the United States and Asia.
- Expenditures on research and development (R&D) in relation to GDP in Poland are 1.6 times lower than the European average, and the venture capital market is five times smaller than the European average in relation to GDP.
- The number of patents in relation to the number of citizens in Poland is almost eight times lower than in Germany.
- Poles are, on average, less digitally competent than Europeans (43 percent digitally competent in Poland vs. 54 percent in the EU).

### From penetration to technological saturation

Technological progress is fundamental to maintaining high economic growth in Poland. It is crucial to have developed, broad-range infrastructure, for example, high-speed Internet and a well-educated population with appropriate digital competence (digital fluency).

In terms infrastructure, Poland recorded a significant increase in Internet access since the 1990s (85 percent Internet penetration in 2021 versus almost zero penetration in 1991). This level approximates the European average (87 percent for EU-30 in 2021), which is still far behind the leaders of that ranking (99 percent penetration for Norway and Denmark in 2021).<sup>30</sup> The situation is similar for high-speed

Internet, to which only 70 percent of Polish households have access. Again, this result corresponds to the European average (70 percent for the EU in 2021), with potential for improvement (EU leaders have much greater penetration, such as in Denmark, where it was 95 percent in 2021) (Exhibit 14).<sup>31</sup>

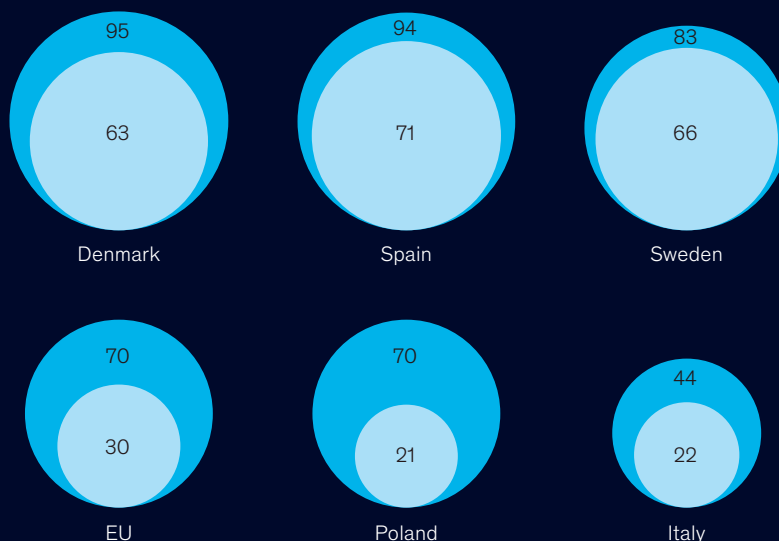
The level of digital competence among Poles is lower than in the EU. In 2021, 43 percent of citizens had at least basic digital competence, while the EU average was 54 percent. (Exhibit 15), ranking Poland among the lowest in Europe. In Finland, Norway, and Switzerland, digital competence reached 79 percent. Digital competence in Poland varies significantly by age group, with just 10 percent seniors (65 years of age and up) having at least basic digital competence in 2021 (Exhibit 16).<sup>32</sup>

# Exhibit 14

## High-speed internet coverage

% of households

2017 2021

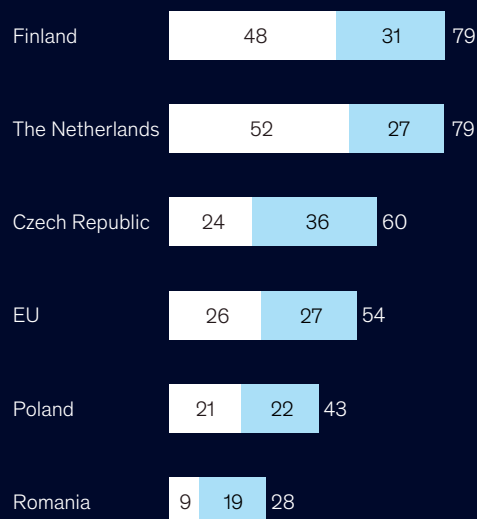


# Exhibit 15

## People with at least basic digital competence

2021, % of population

Basic Advanced

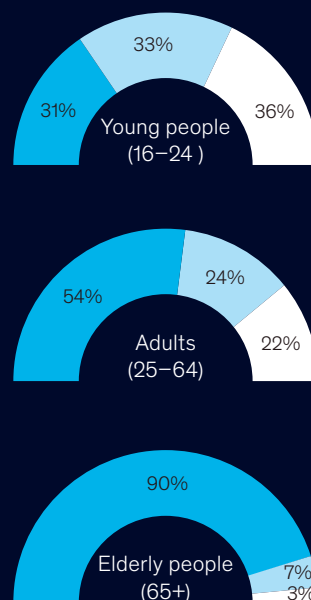


# Exhibit 16

## Digital competence of Poles varies by age groups

2021, %

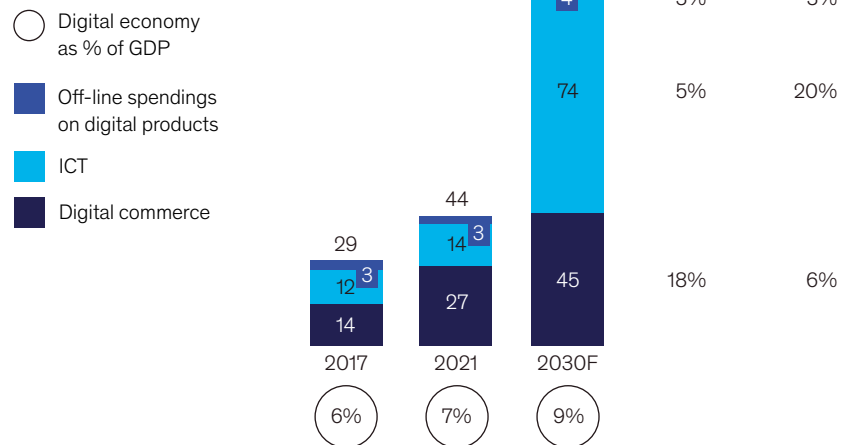
Low or none Basic Advanced



Source: Eurostat

## Exhibit 17 Digital economy in Poland

2017–30, € billion



Source: Euromonitor; IDC; World Bank; McKinsey Global Payments Map; McKinsey analysis

Poland has not yet reached technological saturation, although penetration is advanced and the digital economy is developing dynamically. According to McKinsey’s analysis in the report, “Digital Challengers on the next frontier in CEE,” the digital economy accounted for as much as 7 percent of the Polish GDP in 2021, with e-trade driving much of the growth. McKinsey forecasts that the digital economy will account for as much as 9 percent of the Polish GDP in 2030, growing at a rate of 12 percent per year (Exhibit 17).<sup>33</sup>

### From a digital world to transversal technologies

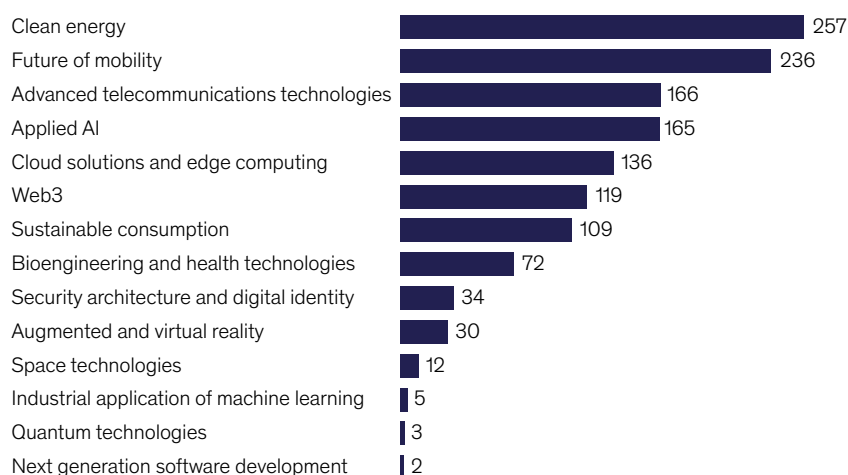
As technology advances, it is penetrating all sectors of the economy, and transversal technologies that cut across impact multiple industries and sectors are becoming even more pervasive. In its report entitled

“Technology Trends Outlook 2022,” the McKinsey Technology Council identified 14 transversal technologies<sup>34</sup> that attract billions of dollars in investment a year, often with double-digit growth rates (Exhibit 18).

Companies based in Asia and the United States are leading the global transition from the digital world to transversal technologies. The ten biggest companies investing in quantum computers are in the United States or China.<sup>35</sup> In Poland, instead of participating in the creation of innovations in transversal technologies, companies have been focusing on the implementation and production of solutions developed abroad, and are just beginning to respond to transversal technologies. Going forward, it is crucial to understand what role Poland will play in this arena—will it be following trends or setting them.

## Global transversal technology investments

2022, \$ billion



Source: McKinsey Technology Trends Outlook 2022; Eurostat; GUS; Germany Trade & Invest; McKinsey analysis based on data from z lens.org

## From unlimited growth to the race to dominate AI

One reason the United States and China dominate the development of transversal technologies is the increasingly strategic role those technologies play in geopolitics. Given its size and relatively low level of innovation to date, Poland is not capable of competing in the race to dominate in technologies like AI.

To build an innovative economy, it is necessary to take risk and spend funds on the development of innovative technologies as well as a talent pool aimed toward innovation. R&D expenses in Poland in relation to the GDP are about 40 percent below the EU-30 average (1.4 percent in 2020 versus 2.3 percent on average for the EU-30, and as high as 3.4-3.5 percent for Sweden and Belgium (Exhibit 19).<sup>36</sup> However, Poland began to bridge the gap in

2016 by increasing R&D spending by 13 percent a year, which is among the fastest rise in the European Union.<sup>37</sup>

Venture capital investment, which is investment in early-stage enterprises that are critical to technological advancement, is relatively low in Poland (Exhibit 19). Although the scale of this investment has increased in Poland in recent years, its share as a percent of GDP ranks as the second lowest in the EU-30 (0.02 percent in Poland as opposed to 0.30 percent in leaders like Estonia and Finland).<sup>38</sup> Relatively low levels of venture capital hinders innovative product development, international expansion, and later start-up scaling.

Poland has as much potential for technological innovation as their EU counterparts. In Poland, eight out of 1,000 employed people work in research and development

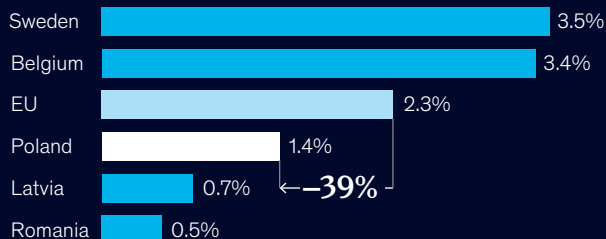
while in the European Union it is, on average, nine out of 1,000 employed people.<sup>39</sup> In Scandinavian countries, as many as 16 out of 1,000 employed people work in R&D.

That said, Poland has not yet actualized their R&D potential. In 2021, Poland filed almost 4,000 patent applications, which is 16 times less than the leader of this ranking, Germany (Exhibit 21).<sup>40</sup> The number of patent applications as calculated per million residents also paints a bleak picture. Poland has filed patent applications 8 times less than Germany and 11 times less than Switzerland, the European leader. Furthermore, the share of European patents in Poland (14 percent) is low compared to other EU countries, where the share ranges from 30 percent to even more than 70 percent.<sup>41</sup> The above means that most patent applications filed by Polish applicants receive protection only within Poland.

Exhibit 19

**R&D expenditure**

2020, % of GDP



Source: OECD

**Venture capital investments**

2021, % of GDP

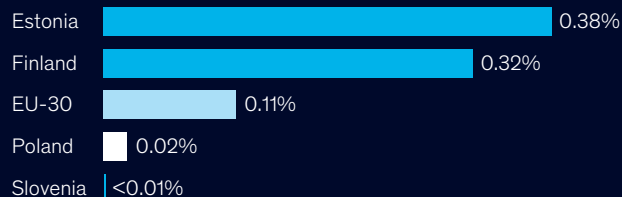


Exhibit 20

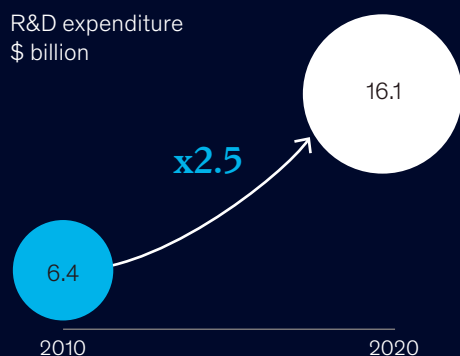
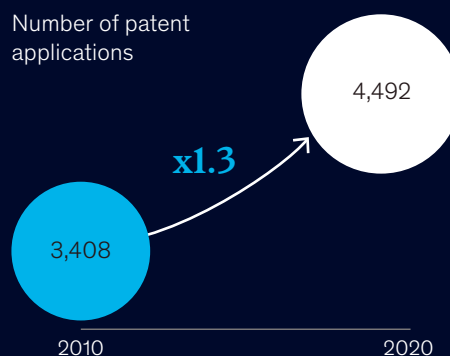
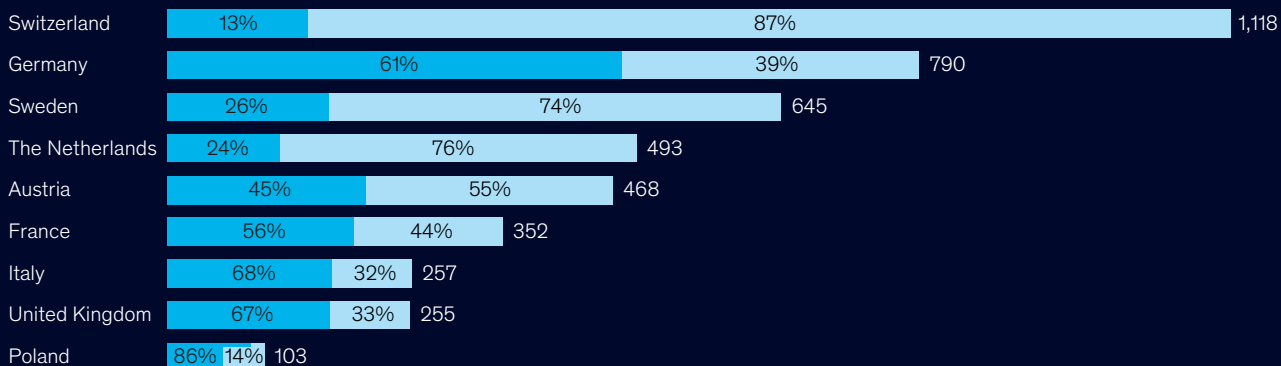
**R&D expenditure versus the number of innovations in Poland**R&D expenditure  
\$ billionNumber of patent  
applications

Exhibit 21

**Number of patent applications per million residents**

2021

■ Polish Office
 ■ EU Intellectual Property Office


Source: World Intellectual Property Organisation

## Resource and energy systems

### From large spending on fossil fuels to large spending on replacing fossil fuels

In 2020, Poland was the fifth biggest emitter of greenhouse gases per capita in the European Union,<sup>42</sup> behind Ireland, the Czech Republic, Estonia, and the Netherlands. About 68 percent of 358 metric tons of carbon dioxide equivalent (MtCO<sub>2</sub>e)<sup>43</sup> emitted in Poland comes from electricity and thermal energy production.<sup>44</sup> Other sectors responsible for a large portion of emissions (among others, transport, industry, agriculture) will undergo electrification, leading to their decarbonization. Access to clean sources of electrical energy production is key to the energy transition.

The share of renewable energy sources (RES) in the production of electricity in Poland is growing: it totaled about 21 percent in 2022, roughly 4 percentage points more than in the previous year.<sup>45</sup> This increase was mostly driven by the development of solar energy. Installed power increased from 3.9 gigawatts (GW) in 2020 to 7.7 and 12.2 GW in 2021 and 2022, respectively,<sup>46</sup> largely owing to technical development and reduction in costs of solar panels. Wind energy potential also helped to grow RES, with installed power rising from 6.3 GW in 2020 to 7.1 GW and 8.3 GW in 2021 and 2022, respectively.

Although Poland's share of energy from emission sources<sup>47</sup> in the energy mix dropped from 97 percent recorded at the beginning of the Era of Markets to 79 percent in 2022, it is still more than double the EU average of 37 percent (Exhibit 22). Nonetheless, forecasts suggest that despite the significant development of RES, Poland will be a net importer of electrical energy by about 2040.

Poland can enhance its energy independence by building long-term storage for surplus electrical energy in hydrogen. Even though Poland

is currently Europe's third largest producer of hydrogen gas, most production involves fossil energy sources (so-called grey hydrogen). On the other hand, Poland's share in Europe's production of green (carbon-free) hydrogen, which is completely carbon free,<sup>48</sup> is below 0.1 percent.<sup>49</sup>

Poland could also speed the energy transition by adjusting the transmission and distribution grid to meet the new energy generation model. Dispersed sources such as wind and solar energy account for increasingly greater portions of the energy mix, while power from concentrated sources is decreasing. According to the schedule presented by Polskie Sieci Elektroenergetyczne,<sup>50</sup> power generated by fossil fuel plants will drop by over one-third (ca. 10.5 GW) by 2030, and by more than two-thirds (ca. 20.5 GW) by 2040.

Factors such as the inability to connect dispersed energy sources to the grid mean that Poland experiences more power shortages than its Western European peers. Poland experiences power shortages averaging 221 minutes in power per consumer per year, whereas in Germany and Denmark, shortages last for 18 and 24 minutes, respectively.<sup>51</sup> The number of refusals to connect private entities to the state electricity grid in 2017–2021 increased more than 70 times, totaling 3,571 in 2021, mostly due to technical and economic reasons<sup>52</sup> (Exhibit 24).

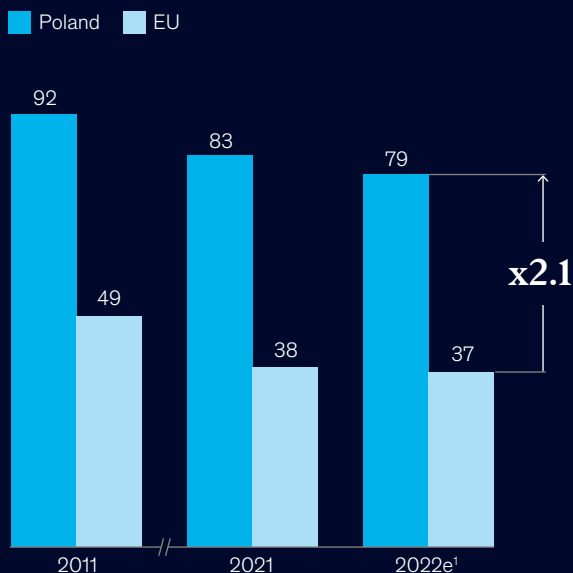
Poland is developing wind farms in the Baltic Sea and there is planned construction of a nuclear power plant on the coast. Adapting the transmission and distribution grid to accommodate power produced at these sources will be an important challenge for Poland to overcome given their distance to energy consumption points, which are predominantly located in the central and southern



Exhibit 22

## Share of emission sources in electricity production

% of consumed energy



Note: Emission sources are sources other than renewable energy sources and nuclear energy

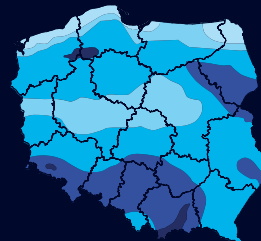
<sup>1</sup>McKinsey estimates

Source: Eurostat, 2021; Agencja Rynku Energii, bp Statistical Review of World Energy, ed. 71, McKinsey analysis

Exhibit 23

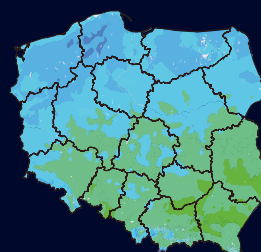
## Conditions for the development of the land-based wind energy sector

Not very favorable Not very favorable Very favorable



## Conditions for the development of the land-based solar energy sector

Not very favorable Not very favorable Very favorable



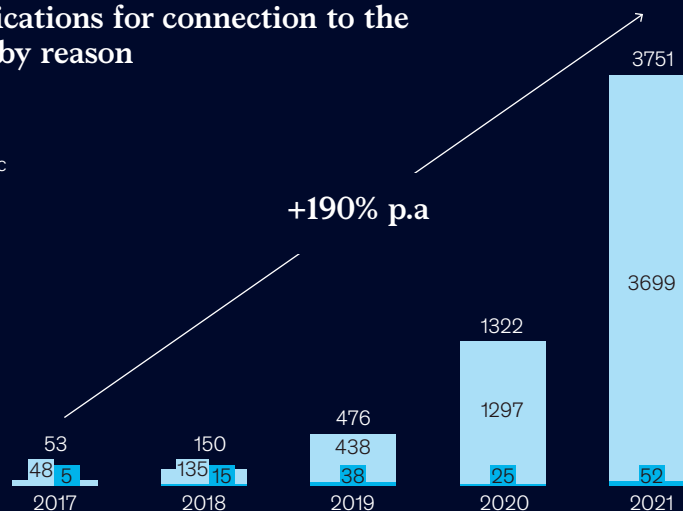
Source: Meteorology Centre IMGW; World Bank, Solargis, 2020

Exhibit 24

## Number of rejected applications for connection to the national grid, presented by reason

Reason for rejection

Technical, or technical and economic  
Economic



Source: Energy Regulatory Office, 2021; McKinsey analysis

part of the country. Currently, planned spending on the electric power network is five to 10 times smaller in Poland than in countries with high system stability, such as Denmark or Germany. In addition, the fact that the energy transition in Poland is coordinated by many parallel institutions could hinder its swift implementation.

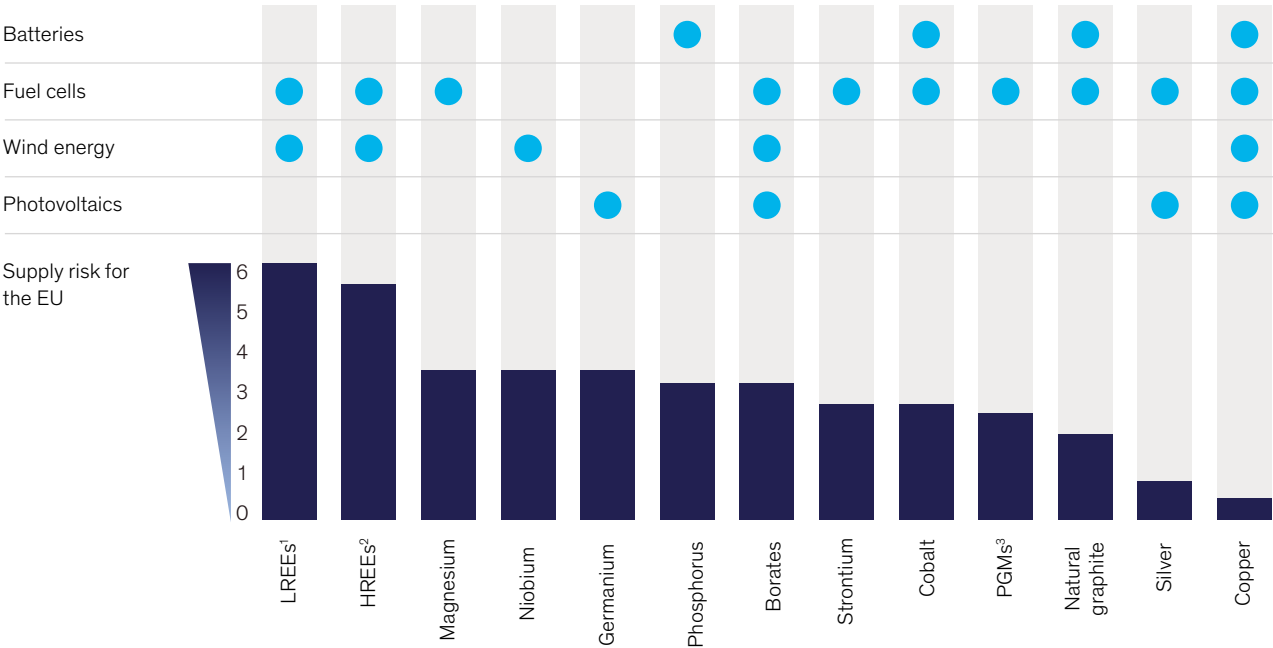
### From resource abundance to competing for resources

Among mineral resource producers, Poland ranks 32nd in the world and sixth in Europe, covering 0.3 percent of the global production.<sup>53</sup> Poland has high reserves of two natural resources significant to electrification,

silver and copper, which account for 5 percent and 2 percent, respectively, of global supply. In recent years, the cost of mining copper increased from about 14,000 zlotys per ton in 2020 to over 23,000 zlotys per ton in 2022<sup>54</sup> due to, among other things, the need to mine from harder-to-access and water-logged sources.

Like its European Union counterparts, Poland depends on imports of other critical raw materials<sup>55</sup> that are necessary for the development of modern technologies, including those related to energy transition, as said resources are mostly mined and processed in Asia, South America, and Africa (Exhibit 25).

Exhibit 25  
The risk of supply of raw materials and their use in selected technologies



Note: The application of selected critical EU raw materials and minerals produced in Poland (silver, copper) in the context of renewable energy sector technology. The complete list of critical raw materials with a description of the methodology is included in the "European Commission, Study on the EU's list of Critical Raw Materials (2020)"  
<sup>1</sup>Light Rare Earth Elements    <sup>2</sup>Heavy Rare Earth Elements    <sup>3</sup>Platinum Group Metals  
Source: "European Commission, Study on the EU's list of Critical Raw Materials (2020);" McKinsey analysis

## From environmental neglect to climate prioritization

According to McKinsey Global Institute, Poland is the third most susceptible country to the negative effects of energy transition in the EU-30 group (Exhibit 26).<sup>56</sup> It is estimated that about 40 percent of Poland's GDP, capital, and jobs involve sectors that will undergo the most significant transformation due to the high emission performance of their products, activities, or supply chains.

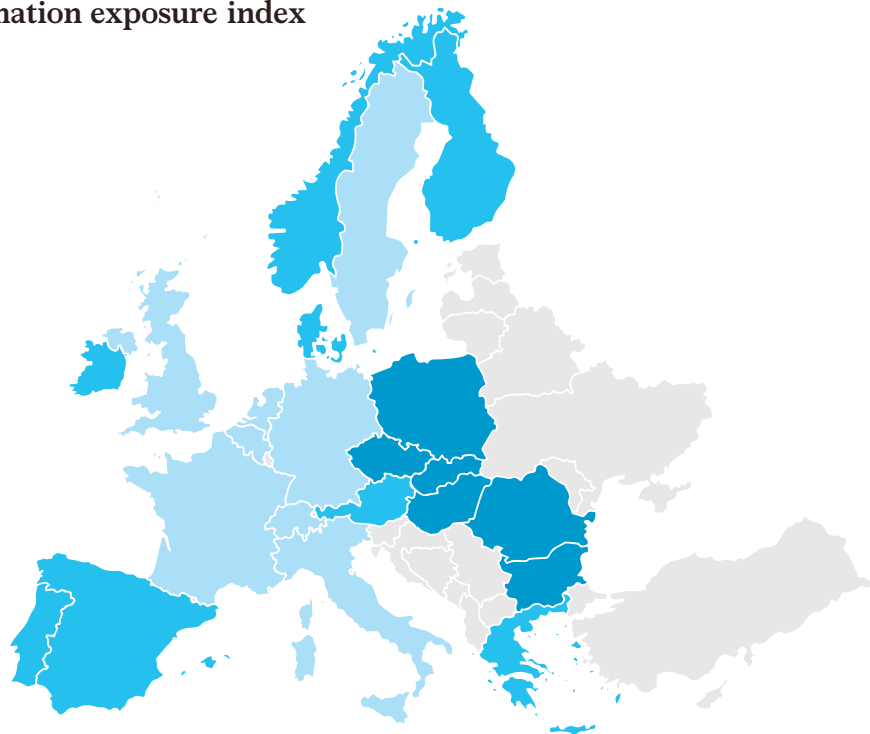
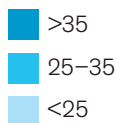
Regardless of how long it will take, Poland's transition towards an emission-neutral economy seems inevitable. Nearly three-quarters (69 percent) of Poles consider climate

change to be a significant risk to the country, which is 14 percentage points more than in 2015 and 9 percentage points less than the European average. The European Union is also taking more ambitious steps to lower carbon emissions. In 2020, the EU proposed a 55 percent carbon emissions reduction by 2030 compared to 1990 levels; in 2014, the goal was a 40 percent reduction. The EU also raised the goal for the share of renewable energy sources in the energy mix. The Renewable Energy Directive (RED II) Initiative aimed for RES to comprise 32 percent of the energy mix by 2030, but discussions to increase this target to 45 percent as part of the RED III Initiative are pending. These regulations are

Exhibit 26

### Energy sector transformation exposure index

0 = the lowest, 100 = the highest



Note: To determine the energy transition exposure index, the contribution of sectors most susceptible to the energy transition in the domestic gross product, capital and in the labor market were taken into account. The complete description of the methodology is provided in McKinsey's report "The net-zero transition—What it would cost, what it could bring". EU-30 states with available data were included.

Source: McKinsey Global Institute, 2022 r.

likely to impact economies outside Europe. For example, the Carbon Border Adjustment Mechanism (CBAM) directive, which is intended to impose additional fees on imported products with a high carbon footprint, will increase the competitiveness of EU economies, Poland included.

Energy transition is important for Poland, not only to improve the quality

of its environment and meeting its climate commitments, but also to keep the economy competitive. Increasingly, global businesses consider stable access to cheap, green energy when making decisions on investing in new manufacturing areas. Companies across a range of sectors, such as Apple, Porsche and Wieland Electric, aim to make their supply chains climate-neutral by 2030.



## Transport infrastructure

An extensive and modern transport infrastructure is a cornerstone of effective economic development and international trade. Poland ranks fourth in the EU in terms of volume transported via all means of transport,<sup>57</sup> sitting at the intersection of trade routes that connect to the Baltic states, Nordic countries, and Eastern and Western Europe.

Transport volume in Poland increased by about 17 percent in the last decade, which was the fastest growth among the five most transited countries in the EU. (In the EU overall, volume increased by slightly more than 1 percent on average.) The main growth driver for Polish freight transport was road transport (90 percent) and sea transport (14 percent). Rail cargo transport decreased by 4 percent.

Poland ranks 16th among the EU-30 states<sup>58</sup> in terms of motorway network density. This directly translates to freight traffic volume, which is over twice as high in Poland (898 mil. t/km) as in the second most burdened European country (by comparison, freight traffic volume in the Czech Republic is 372 mil. t/km).

In terms of rail transport, Poland has the seventh most dense network in

Europe and the seventh most intensive cargo transport. However, cargo transport by rail is trending downward, probably due to the quality of the infrastructure, which impacts the average speed of cargo transportation. In recent years, that speed was about 25 km/h. Considering halts at stations, for some routes that speed fell below 10 km/h. In contrast, at the Rhine-the Alps transport corridor connecting (among others) Amsterdam with Genoa, cargo trains move at a speed ranging between 45 to 70 km/h, depending on the section.

Polish seaports rank 10th in the EU in terms of freight traffic volume, and the volume has been growing at an average rate of 5 percent per annum over the last decade (the fastest rate in the European Union).

In terms of air freight transport, Poland ranks as 13th in the European Union and the average growth is a relatively high 8 percent (only Latvia's is higher, at 9 percent). Although Poland is the largest air freight transport center of in Central and Eastern Europe, the annual volume of cargo transport in Poland is over 38 times smaller than in Germany, the EU leader.

# Capitalization

## Key takeaways

- The productivity of the Polish economy is one of the lowest in the EU, both due to sectoral productivity gaps of up to 55 percent, and the overrepresentation of low-productivity sectors in GDP.
- Productivity growth in the Polish economy has slowed in recent years, with the rate averaging 4.2 percent in the last ten years, versus 5.7 percent the decade prior.
- Sectors with low overall productivity are overrepresented in the Polish economy, accounting for over 25 percent of Polish GDP, versus 19 percent in the EU overall.
- The level of investment in relation to GDP in Poland is 18 percent, which is 3 percent lower than the EU-30 average.
- The Polish economy is one of the least indebted in Europe. Total public and private debt totals 173 percent of GDP, versus an average in the EU-30 of 288 percent.

## Towards growth normalization

While Poland has recorded some of the highest economic growth rates in Europe in recent decades, maintaining a rate of growth of about 2 percentage points over the European average.<sup>59</sup> However, growth is decelerating. Long-term OECD forecasts expect further growth ‘normalization,’ with Poland’s economic growth rate expected to dip below the EU average in several years (Exhibit 27) due to the following factors:

- Demographic trends leading to a decrease in the number of professionally active people and an increase in the share of elderly people in the societal structure.
- Convergence, or the equalization of the development level of the

Polish economy with that of more developed countries.

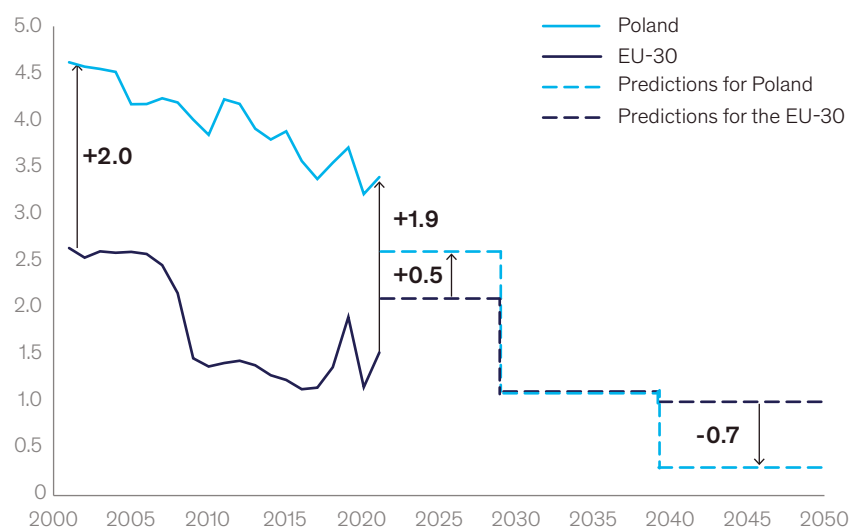
- Slower productivity growth and persistent productivity gaps in all sectors of the Polish economy.
- Low investment levels, which translate into small amounts of accumulated capital.

The productivity of the Polish economy<sup>60</sup> is one of the lowest in the European Union. The energy sector shows the biggest productivity gap at a level of 55 percent, which directly impacts the productivity of other sectors, as energy is the driving force of the economy. The energy sector aside, the biggest productivity gaps (above 40 percent) are recorded in industrial production and agriculture, which employ almost 30 percent of the Polish labor force (Exhibit 28).<sup>61</sup>

Exhibit 27

## Economic growth of Poland and the EU-30 states

%, ten-year rolling average, fixed prices, fixed exchange rate, 2000–2050



Source: OECD

Exhibit 28

Sectoral productivity gaps in the Polish economy compared to the EU average

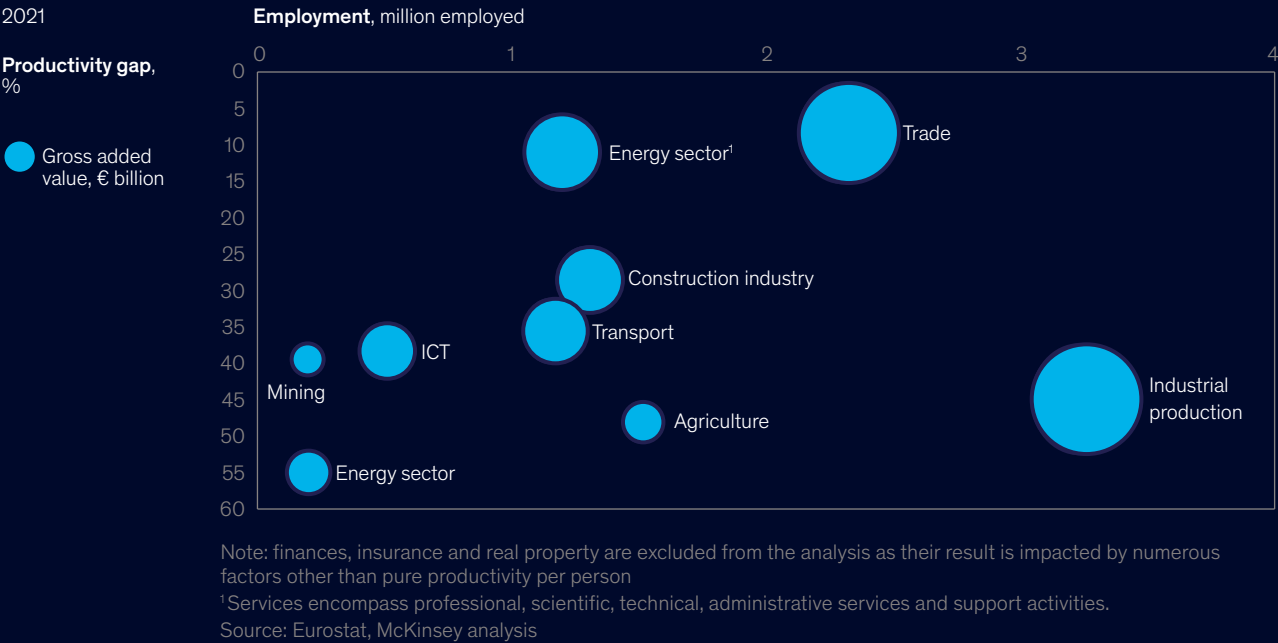
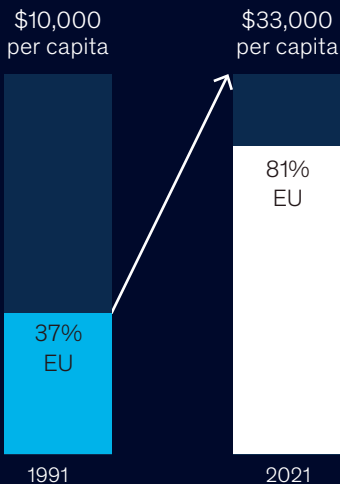


Exhibit 29

Comparison of GDP per capita in Poland and the EU

Fixed prices (PPP), base year OECD

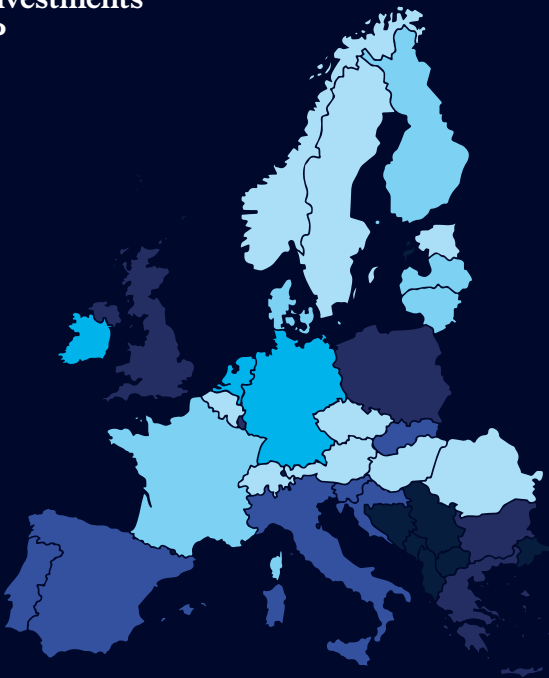
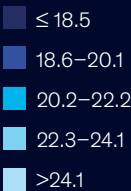


Source: OECD

Exhibit 30

Share of investments in the GDP

2021, %



Note: Gross fixed capital formation—investments excluding inventory change  
Source: OECD; McKinsey analysis

Aside from productivity gaps in particular sectors, Poland's sectoral structure contributes to the low productivity. High value-added sectors, such as information and communication technologies, comprise a smaller portion of the economy, on average, than in the broader EU economy. Meanwhile, less productive sectors, like agriculture, trade, and construction, have bigger shares.

For example, in 2021 agriculture accounted for 2.6 percent of Polish GDP, while for the European economy that share was 1.8 percent.<sup>62</sup> Poland has the fourth largest cropland area in the European Union, but the crop volume per capita is the second lowest in Europe. The share of large fields in Polish farming is about 3 percent, while in Germany or France that rate is 32 percent and 46 percent respectively.<sup>63</sup>

If Poland's productivity per hectare and person equaled Germany's, 1.2 million people working in agriculture could take up employment in other sectors of the economy, while the value of agricultural production would increase by over 40 percent.<sup>64</sup>

Domestic demand and growing investment played key roles in Poland's extraordinary economic growth. However, although the share

of investment in the GDP rose from 12 percent in 1991 to 18 percent in 2021,<sup>65</sup> it is still one of the lowest ratios in Europe.<sup>66</sup> By comparison, in the Czech Republic the share of investment to GDP is 27 percent, which was the second highest in the EU-30 states in 2021 (Exhibit 30). Over the course of the past 3 decades Czech Republic has annually invested 9 percentage points of capital to GDP more than Poland.

The investment gap between Poland and the rest of the EU is most visible in the private sector, especially among enterprises. In 2021, Poland ranked among the lowest in the EU in terms of investments in the enterprise sector relative to GDP. Investments were 3 percentage points lower than the European average (10 percent of the GDP for Poland vs. 13 percent for EU-30 in 2021) and 10 percentage points below ranking leaders Estonia and Switzerland.<sup>67</sup>

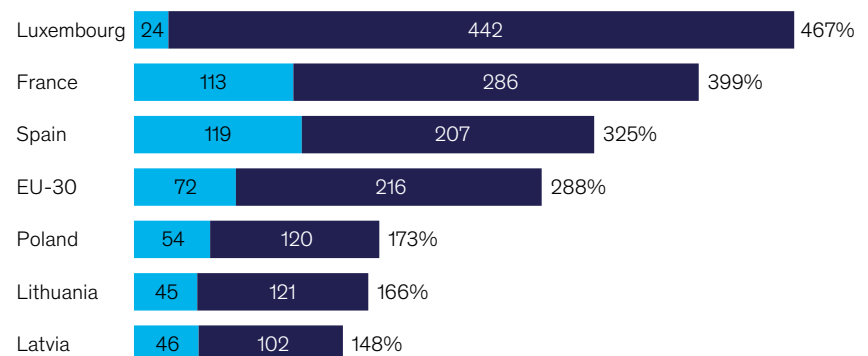
## Towards a greater financial burden

A key reason for such low investment in enterprise is the low accumulation of funds. In the past decade, the savings rate of households in Poland averaged 3 percent, versus 6.4 percent on average for the EU-30.<sup>68</sup> Another issue is that Polish enterprises'

Exhibit 31  
**Total economy debt**

2021, % of GDP

■ Public  
■ Private



Source: IMF

use of debt instruments to finance investment projects is limited, which seems to decrease Poland's investment potential. This is reflected in, among others, enterprises' indebtedness in relation to GDP, which is the third lowest value in Europe, higher only than Greece and Latvia<sup>69</sup>.

Poland's banking sector has untapped potential to generate loans and increase the availability of investment capital. In 2022, Polish banks were able to loan an additional 400 billion zlotys. The unused credit potential in the banking sector grew during the last decade and only started to decrease owing to the post-pandemic economic recovery.<sup>70</sup>

Low private debt combined with moderate (relative to the rest of Europe) debt of the public sector in relation to the GDP puts Poland in a beneficial balance sheet situation (Exhibit 31). The low indebtedness level means that Poland is less susceptible to the predicted increase in the financial burden of economies and spends less on debt service.<sup>71</sup> This is important

as Polish debt is among the most expensive in Europe, as indicated by, for example, the effective interest rate of public debt, which in 2021 amounted to 2.1 percent—the fifth highest among European countries.<sup>72</sup>

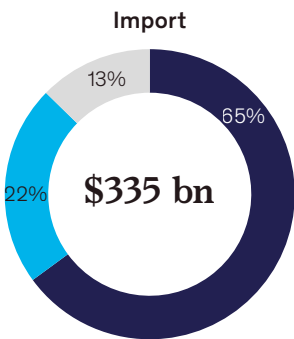
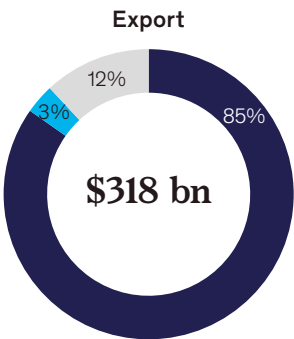
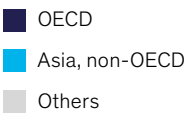
### From the age of OECD to the age of Asia

In the multipolar world, the Polish economy is visibly oriented towards the OECD. Import data indicate that Poland has mostly imported goods from Asia that are of little critical importance to the Polish economy. In 2021, Asian countries that are not members of the OECD accounted for 22 percent of Poland's total imports, 15 percent of which was attributable to China. Most Polish exports (85 percent of the \$318 billion value in 2021) went to the OECD countries (Exhibit 32).<sup>73</sup>

Similarly, as much as 84 percent of direct foreign investment (DFI) capital in 2021 came to Poland from OECD countries, while Asian non-OECD countries accounted for only 3 percent.<sup>74</sup>

Exhibit 32  
**Poland's trade partners**

Only goods, 2021, \$ billion



Source: UN Comtrade, 2021; McKinsey analysis



# World order

## Key takeaways

- Poland ranks among the bottom ten European Union countries in the credibility and perception categories of the Worldwide Governance Indicators.
- Poland is the world's largest provider of aid to Ukraine in relation to GDP, with support worth 2.2 percent of GDP to date.
- Poland exceeds its obligations towards NATO, spending 2.4 percent of GDP on defense, versus the 2 percent target.

In 2022, just as the world was beginning to emerge from two years of the COVID-19 pandemic, which caused months-long lockdowns and interruptions to global supply chains, Russia attacked Ukraine. This attack not only triggered a humanitarian crisis behind the eastern border of Poland, it also increased uncertainties in the region by destabilizing prices on energy markets and causing an influx of refugees to the European Union, mostly to Poland.

Poland, like its European Union and United States allies, unambiguously condemned Russian aggression and has led the military and humanitarian support offered to Ukraine. Considering the costs related to accepting refugees, Polish support is about 2.2 percent of the GDP and is the largest from among all the countries in the world.<sup>75</sup>

## Poland is strengthening ties with one pole of the multipolar world

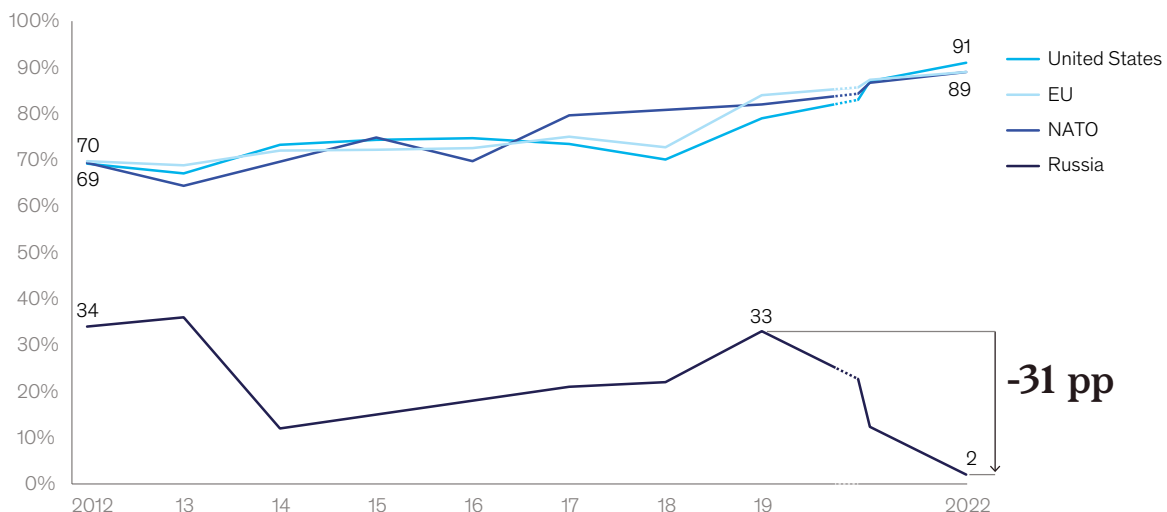
Russia's attack served to strengthen Poles' alliance with the West. As presented in Exhibit 33, in 2022 positive perception of the United States, European Union, and NATO is declared by 90 percent of respondents in Poland, while in 2012 none of those measures exceeded 70 percent. At the same time, only 2 percent of Poles claim to have a positive perception of Russia as opposed to 34 percent 10 years earlier.

Poland's strengthening attachment to the Western block is also reflected in its national defense expenditure. For example, Poland's defense spending is 2.4 percent of GDP, exceeding the NATO target of at least 2 percent of the GDP and constituting the third highest ratio among NATO members (after Greece

Exhibit 33

## Poles' perception of the EU, United States, NATO, and Russia

% of respondents with positive perceptions



Note: The survey was not conducted in years for which no markers are placed on the abscissae.

Source: Pew research centre, 2022; McKinsey analysis

and the United States)<sup>76</sup> Furthermore, as mentioned in the section on capital resources, Poland's main trade partners are countries allied with the European Union and the United States.

## From globalization to regionalization

In recent years, the trend in global trade has been nearshoring, which is the physical shortening of supply chains by moving production closer to the selling markets. In Poland, this trend is reflected in an increasing influx of direct investment from Western European countries. McKinsey's research, Supply Chain Risk Pulse from 2022, showed that over half of CEOs consider the regionalization of production to be a valid direction for their business, while only 25 percent of CEOs expressed such views in 2020. Nearshoring is expected to continue as contracts with manufacturers from far-away countries expire.

Poland could also benefit from further integration with Central and Eastern Europe by, among other things, pursuing the Three Seas Initiative,

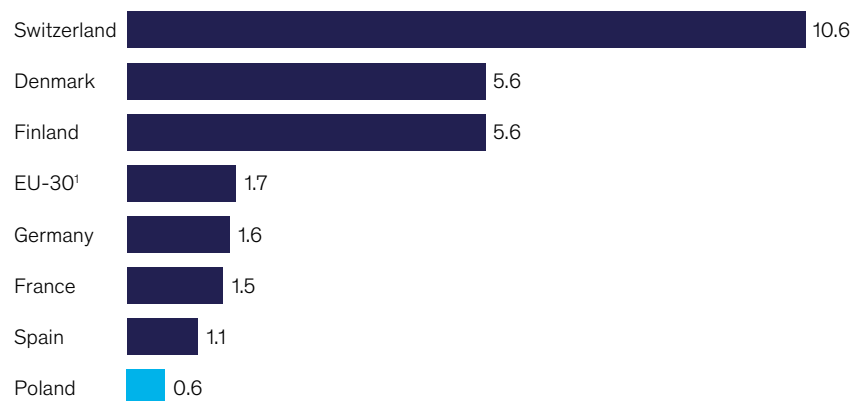
which aims to develop integrated infrastructure along the Baltic, Adriatic, and Black Seas. Within this initiative, 80 out of 91 projects intended to contribute to the development of the transport facilities, energy infrastructure, and digital infrastructure were made priorities.<sup>77</sup> To date, more than half of these projects have not made it beyond the planning stage. In addition, over 35 percent of project funding is not yet secured, and the already obtained funds come mostly from public sources, despite any ambitions to significantly involve private capital.

One of Poland's key challenges is the dearth of large companies that could play the role of regional champion. From among 971 enterprises listed on European stock exchanges and worth over one billion American dollars, 22, or 2 percent, were from Poland.<sup>78</sup> As presented in Exhibit 34, Switzerland, Denmark, and Germany have, respectively, 10.6, 5.6 and 1.6 companies with capitalization exceeding 1 billion dollars per million residents, versus just 0.6 in Poland after Poland, ranking 15th in Europe.

Exhibit 34

## Density of big companies in the EU-30 states

Number of companies with market capitalisation of over \$1 bn per million residents



Note: Countries with population below 1 million were excluded, as of Jan 13, 2023

<sup>1</sup>Including countries for which data is available

Source: Companiesmarketcap.com; McKinsey analysis



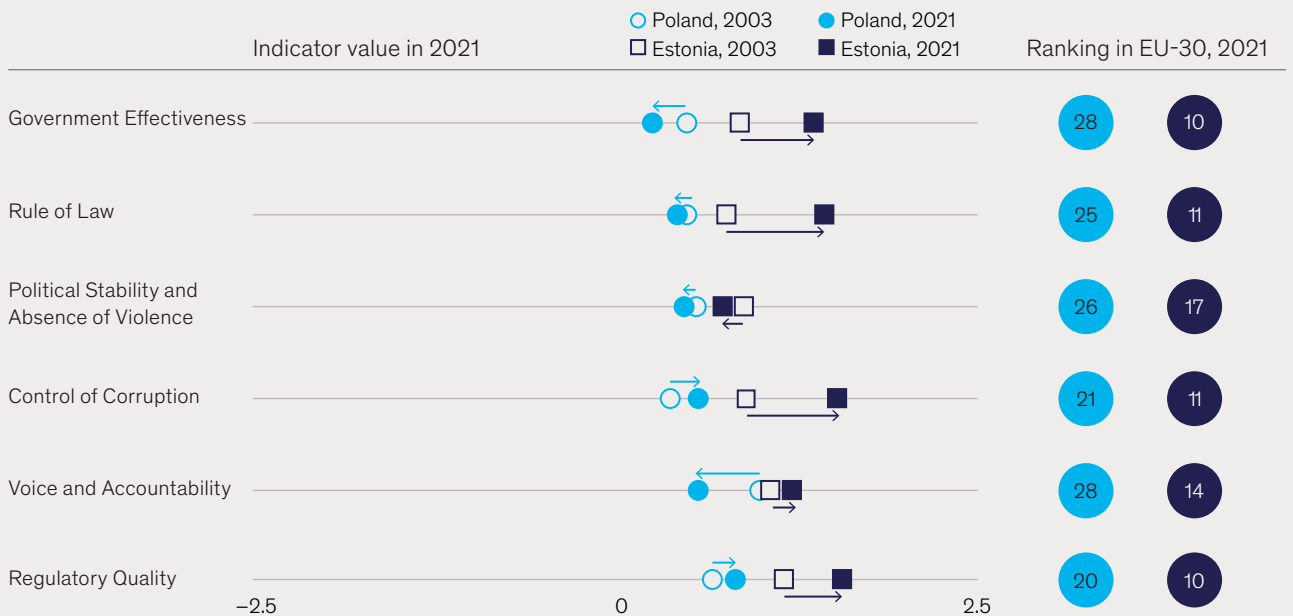
## Branding and perception of Poland abroad

Poland could also benefit from an improved international image. For all six dimensions of governance measured by the World Bank's World Governance Indicators, Poland ranks in the bottom ten among the EU-30 states (Exhibit 35).<sup>79</sup> What's more, Poland's rankings across four

dimensions have dropped since it joined the EU. Poland receives particularly low markings in areas concerning the freedom of speech and media, independence of public institutions, and regulatory quality, all of which impact its attractiveness for investors.

Exhibit 35

### World Governance Indicators



Source: Worldwide Governance Indicators, 2021, World Bank; McKinsey analysis

# 3



## Considering Poland's path ahead





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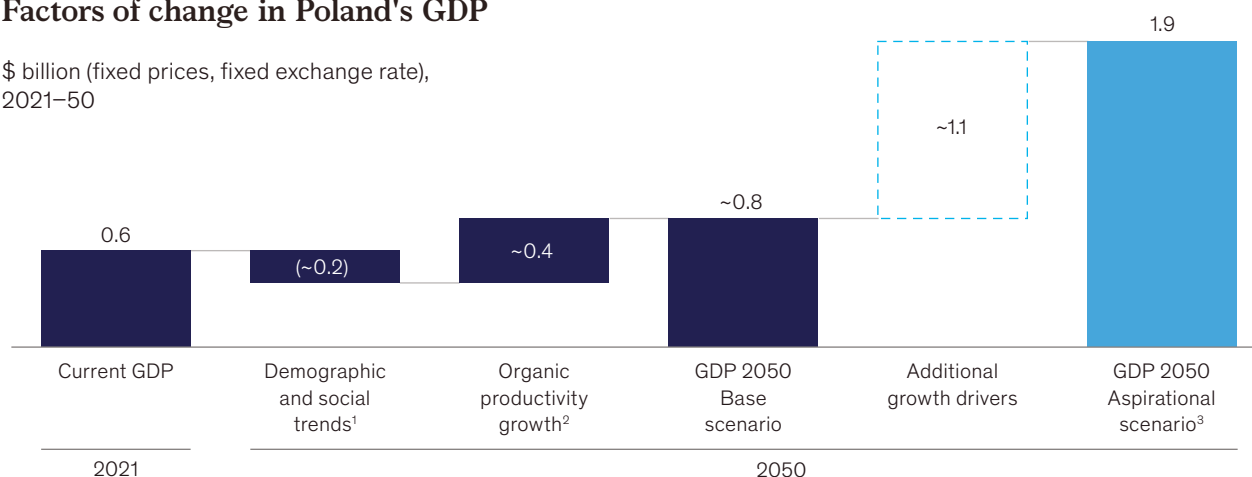
Poland aspires to maintain high economic growth and achieve a GDP worth almost 2 trillion dollars by 2050. It will be a significant challenge, especially considering the decline in Poland's economic growth as forecasted by the OECD. In addition, if demographic and social trends persist and productivity grows organically as in the past, Poland will be one trillion dollars of GDP short of reaching its goal in 2050 (Exhibit 36).

Poland should define additional growth drivers to realize its ambition. It will be a

very demanding task, as even reaching the average European productivity and activating the labor force at the level of Norway, the leader in this regard, would not make it possible for Poland to repeat the success it had in the previous era. That is not to say that the goal is unattainable: the key to maintaining high growth will be building and maintaining competitive advantages in both European and global markets. Potential drivers of growth to consider are presented below.

## Factors of change in Poland's GDP

\$ billion (fixed prices, fixed exchange rate),  
2021–50



<sup>1</sup>Decrease in the labor force as predicted by the UN, and the reduction in the average number of working hours to the EU level

<sup>2</sup>Assuming that the productivity growth ratio is maintained at the average level from 2011–21

<sup>3</sup>Requires that the average GDP growth rate is maintained at the level of 4.1% until 2050

Source: OECD, Eurostat, McKinsey analysis

## Demographic forces

### From a young to aging world

**Poland should activate the population aged 55 and above as well as young adults.** To minimize the problem of potential labor force shortage, Poland should first focus on the potential of workers aged 55 and up. The number of professionally active people in this cohort is relatively low (especially when compared to the leader, Norway, and especially with respect to women); in addition, this cohort will expand due to the aging population. Poland could activate older people mostly by:

- Increasing awareness of the need to hire seniors, for example by establishing an institution responsible for seniors.
- Implementing mechanisms to encourage employers to retain and employ older employees.
- Promoting flexible working conditions and increasing emphasis on financial incentives related to work on retirement.

- Educating seniors to help them stay up to date with labor market needs (to include opportunities for re-qualification, training, and digital education).

Regarding young people, support should be provided at the beginning of their career (described in more detail in the section entitled “From deepening social inequalities to a new social contract.”)

These actions should allow Poland to activate about 3 million citizens (Exhibit 5 in Chapter 2), helping to fill the gap left by the shrinking number of economically active people (over 5 million).

**Foreign talent must be attracted, retained, integrated, and assimilated.** Increasing the significance of immigration for Poland is key to countering a shrinking labor force. An effective Polish immigration strategy should:

- Raise social awareness of the need to attract talent from abroad (explain why immigration is important for the Polish economy and, at the same time, safe for Poles)
  - Build a strong brand for Poland to attract immigrants.
  - Develop clear and understandable immigration rules, including a digital process easily accessible to potential candidates.
  - Ensure that immigrants have proper support in settling in Poland.
- The migration strategy could initially concentrate on young talent, especially on international students. To encourage their arrival, Poland could:
- Simplify entry requirements, such as for students from geographic areas that are culturally close or for students pursuing careers in sectors that Poland considers crucial, such as those in STEM.
  - Facilitate work for foreign students during their studies.
  - Help talented graduates stay in Poland.
- Enhancing prophylactic activities that ensure a higher quality of life while lowering the burden of noncommunicable diseases, to include better disease monitoring and influencing social behavior to mitigate the risk of noncommunicable diseases (such as by encouraging quitting smoking or taking up physical activity).
  - Supporting long-term care mechanisms, to include long-term patient monitoring through, for example, systematic collection and exchange of data on their health condition.
  - Implementing innovation and technologies in the medical field to create new options for battling noncommunicable diseases (such as telemedicine and digital therapeutics).

## From deepening social inequalities to forging a new social contract

**Poland should aim to improve satisfaction among Polish residents, especially with regards to work and financial security** given potential

disruptions in work-life balance due to fast economic growth. A new social contract must be defined to allow for greater work-life balance and life satisfaction, even at the price of slower economic growth..

To increase residents' satisfaction with life, Poland should:

- Put greater emphasis on working time flexibility and respect for employees' private lives.
- Guarantee that employees feel treated justly at work and engage them in making decisions on company matters

## From communicable to noncommunicable diseases

**Poland should develop and implement a “healthy aging” strategy.”<sup>80</sup>**

Considering the increasing burden of noncommunicable diseases and population aging, the Polish healthcare system should concentrate on:

### #ImmigrationMatters

Canada has created a portal for its citizens that talks about the benefits of immigration.

### DiGA

Germany has allowed doctors to prescribe health apps in a similar way to prescribing drugs and reimburse them to patients.

### The Centre for Senior Policy (SSP)

Resource centre dedicated to the stimulation and development of policies concerning older workers in the workplace.

### School in the Cloud

A teaching model used in Poland, wherein students learn via a special online educational platform without having to leave the house.

- Put greater emphasis on creating opportunities for continuous education and development.

In addition, an important part of the new social contract should be stability and financial security, hence Poland should:

- Ensure proper financial and non-financial support for citizens in case of emergencies, such as changing jobs.
- Establish and promote savings mechanisms that encourage citizens to build a financial cushion.

Poland should develop an education system that will meet the requirements of the future labor market. To achieve this, Poland should:

- Maintain the current high level of primary and secondary education.
- Intensify professional career guidance to help talented students,

especially those from low-income families, complete their studies.

- Support students in selecting industries of the future.
- Encourage students to gain professional experience earlier, for example by improving the perception of short-term cycle studies (bachelor title) as education sufficient to take up employment.
- Promote learning of practical skills by supporting the cooperation between higher education institutions and the business sector.
- Increase the use of transversal technologies in education.

Providing appropriate support to young people from the onset of their careers can increase their happiness and satisfaction in later life. And through this, make the new social contract the reality.

## Technology platforms

### From a digital world to transversal technologies

**Poland should strategically prioritize innovation in selected transversal technologies to enhance its competitive advantage.** The first

step in this direction should be the development of a comprehensive technological development strategy that encompasses the following:

- Selection of prioritized transversal technologies appropriate to the Polish economy's potential.
- Implementation of other transversal technologies and possibly producing them in Poland.
- Inclusion of as many stakeholders as possible in strategy development.

- Provisions for regular review of the strategy to ensure it is contributing to enhancing Poland's competitive advantage.

The selection of transversal technologies could be based on Poland's existing technology innovations, its human innovation potential, as well as the market potential for specific technologies within Poland. For example, priority could be given to technologies usable in sectors that account for a large share of Polish GDP, or that could help bridge the productivity gap.

Among the transversal technologies that Poland might leverage to become an innovation leader, the following should be considered:



- Clean energy technologies: Poland has demonstrated its potential to innovate in this area by the relatively high private spending on research and development in the energy sector.<sup>81</sup> In addition, Polish businesses are increasingly interested in clean energy solutions as they take steps to meet EU-driven decarbonization targets.
- Bioengineering and health technologies: biotechnology's share in Poland's research and development spending is relatively high: in 2021 it amounted to 3.7 percent<sup>82</sup> (versus 3.4 percent in Germany).<sup>83</sup> Going forward, society aging will increase the demand for innovative solutions in medicine. Moreover, the scale of spending on healthcare will facilitate the acquisition of clients for developed technologies, and the interest of venture capital investors will provide access to financing.
- Next generation software development: Poland already has human capital for innovation in this area. In 2020, almost 300,000 people worked in programming and IT consultancy—the fifth highest number in the European Union.<sup>84</sup> These technologies will be particularly important to uplifting Poland's shared services centers.
- Applied AI:<sup>85</sup> AI is a transversal technology with the highest innovation level. While international leaders in the field have already emerged, Poland does have the potential to innovate in this field, as demonstrated by the number of AI-related Polish publications.<sup>86</sup> Therefore, Poland should concentrate on building its position in one of the sub-fields of

AI. Innovators could develop and test new solutions leveraging the country's large industrial base.

Strategic support for the selected transversal technologies should be based on:

- Directing capital towards such technologies and establishing regulatory or financial incentives for their development.
- The promotion of selected technologies, using the success of Polish innovators.
- Meeting international investors' expectations proactively.

## From unlimited growth to the AI domination race

**Poland should encourage the broadening of an innovation culture while also encouraging the venture capital market to support start-ups.** Innovation can be encouraged by, among other steps:

- Promoting the success achieved to date in the start-up area in Poland and abroad.
- Building foundations encouraging risk-taking and experimentation.
- Creating opportunities for networking and mentoring.

It is important to include a range of stakeholders in the development of an innovation culture, for example by supporting not just start-ups, but also corporations, small- and medium-sized enterprises, investors, as well the public sector. Large enterprises have potential to play a significant role in the venture capital market, for example by participating in co-investing mechanisms.

## Space technologies

It is worth considering space technologies, wherein Polish start-ups develop innovative technologies that gain international recognition. They concern a variety of products, from rovers to nanosatellites. Despite it being a relatively small industry, Poland's success to-date could be a lever to increase this industry's significance.

## E-residence in Estonia

Poland could also support innovation by taking steps to attract investors. Estonia, for example, has implemented two programs, e-Residency and Digital Nomad, both of which allow people to run a business in Estonia without living there. A total of 30 percent of Estonian start-ups count e-residents among their founders, and 20 percent of Estonian companies registered every year in the past three years were created by holders of such a status.<sup>87</sup>

**Poland should increase and effectively allocate its R&D spending and support the commercialization of scientific activity.** To this end, Poland should:

- Create incentives for the private sector to spend more on R&D, which could be done through research co-financing mechanisms or granting loans on preferential conditions.
- Consider an increase in public R&D spending and distribute funds to areas in which Poland can create competitive advantage, with emphasis on prioritizing transversal technologies.
- Support the commercialization of research results to maximize their value for the economy, for example by creating training programs related to start-ups for scientists, and monitoring the success ratio of research units with appropriate adjustments of the granted financing.

**Cooperation among key players of the innovation ecosystem,** including research centers, companies, higher education institutions, and investors, should be strengthened to encourage the transfer of knowledge and quicken the process innovation through synergies. To achieve this goal, Poland should:

- Deepen cooperation between universities and the business sector, for example by providing regulatory or financial incentives for R&D joint ventures and establishing research centers co-managed by higher education institutions and the business sector.
- Expand the activity of innovation clusters, or spatially concentrated,

interconnected entities acting within one sector, while promoting intersectoral cooperation by supporting co-location, public and private partnerships; and ensuring that clusters have access to infrastructure, including testing infrastructure.

## From penetration to technological saturation

**Poland should expand its telecommunications infrastructure and provide high-speed Internet throughout the country.** The improvement of high-speed Internet access should be conducted methodically, via a strategy that defines goals in terms of range and quality of the telecommunications infrastructure. The strategy's goals should be achieved using public investment as well as instruments encouraging private suppliers to invest in network expansion.

**Society's level of digital competence could be raised** and sustained through mechanisms that encourage lifelong learning. To improve digital competence, Poland should:

- Increase digital skills training in the curricula and equip schools and higher education institutions with the necessary infrastructure to implement it.
- Offer digital skills training materials to companies, especially small- and medium-sized enterprises, to encourage them to train their employees.
- Provide learning opportunities for seniors, for example by organizing on-site trainings.

## Resource and energy systems

### From large spending on fossil fuels to large spending on replacing fossil fuels

To meet the climate neutrality goals set by the EU and transition to more sustainable energy sources, Poland will also have to meet a rise in energy production demand, in particular electrical energy. To this end, Poland must further:

- Develop its renewable energy sources.
- Reduce emissions in areas that will not undergo electrification.

Emphasis in electricity production should focus on wind energy, both land-based and offshore, as Poland has good geographical conditions for its development, as well as on continuing to expand photovoltaic sources.

Reduction of emissions in other economy sectors should be based on electrification, and the development and application of new, low-carbon manufacturing technologies and products. For example:

- The heating sector requires further improvement in thermal insulation of buildings and the application of more effective and low-carbon heat sources (among others, large-scale heat pumps).
- In transport, the key is to further encourage uptake of electric vehicles and the development of charging infrastructure supplied with green energy.
- Agriculture and industry require development of new production technologies with lower emissions, and development of alternative, climate-neutral products.

**Poland should ensure that its energy sector is stable.** As the energy transition progresses, the capacity of the transmission and

distribution grid should be increased. It should be customized to:

- Connect dispersed energy sources, such as solar panels.
- Meet growing demand for electricity.
- Ensure dependable connection between sources of energy generation and energy consumption.

Beyond supporting Poland's development, stronger integration between the transmission grid and neighboring countries will allow for better balancing of electrical energy in Europe, which should translate to lower emissions in Poland.

**Mechanisms for levelling fluctuating renewable energy production must be developed.** To address short-term fluctuations in RES generation (stemming from the light-dark cycles or weather changes), Poland could apply developed energy storage technologies, such as lithium-ion batteries, and peak, emission-neutral plants, such as CCS-supported gas power plants.<sup>88</sup>

At the same time, Poland should develop capacity to meet demand in colder months. For this purpose, it could use long-term energy storage technologies such as hydrogen systems and develop the capability to generate energy from stable, low-carbon sources such as nuclear power plants.

**Poland should also prioritize the development innovative green technologies.** Potential opportunities include:

- Increasing energy storage, in particular medium- (6–72 h) and long-term (over 72 h) storage whose energy efficiency is currently below 40 percent.
- Capturing carbon dioxide from the atmosphere, considering Polish geological capabilities of CO<sub>2</sub> storage and heavy industry proximity.

## Infrastructure

Poland should use the potential of its railway infrastructure and increase the running speed of trains, both in cargo and passenger transport. It is important for relieving road traffic and ultimately reducing emissions.

Moreover, maritime port and airport capacity should be regularly analyzed to make sure they can satisfy increasing demand.

- Strengthening and developing energy transmission, both in the context of transmitting and distributing electricity, and transporting new energy carriers (such as hydrogen).

## From resource abundance to competing for resources

### The supply of critical resources<sup>89</sup> in Poland must be secured by:

- Optimization of metal production, such as copper and silver, by enhancing automation in mining and applying solutions presently used in coal mining in the world.
- Exploration and deployment of deposits in Poland and abroad.
- Verification of the economic viability of extracting the discovered, yet still undeveloped deposits, as it can change with the increases in metal values on international markets. For example, the price of cobalt, of which Poland has about 156,000 tons in deposits, compared to the global production of about 130,000 tons,<sup>90</sup> has tripled<sup>91</sup> in the past two years.

- Contractual security of import.

Another action that Poland should consider is using its position as one of the largest battery manufacturers in the world by expanding that ecosystem to include recycling. The predicted value of the European battery recycling market will grow at the rate of about 34 percent per annum to reach about \$9.3 billion in 2035.<sup>92</sup>

It is crucial to make sure that the extraction and processing of resources is low carbon, as the biggest raw material buyers more frequently aspire to have a green supply chain.

## From environmental neglect to climate prioritization

**Poland should maintain and increase social awareness of climate change consequences.** Sample solutions that can be implemented to sustain the support for the transition are:

- Holistic inclusion of topics related to the reasons, consequences, and potential actions that prevent climate change in curricula.
- Bottom-up support of initiatives that promote climate awareness.

# Capitalization

## Towards growth normalization

**Poland can increase economic productivity in key sectors via digitalization, automation, and by raising employees' qualifications.**

Increasing productivity will take different forms depending on the specifics of a given sector:

- In industry, digitalization and automation will be the main levers for productivity growth.

- In agriculture, it will be important to strengthen the cooperation between farms to achieve returns to scale.
- In the energy sector, it will be crucial to assure that the system remains stable in terms of cost effectiveness as it transitions. This is a priority as energy impacts the productivity of other sectors.

On the other hand, raising employees' qualifications is important for all

sectors and should be centered around digital competence.

Aside from increasing productivity, Poland can also:

- Support enterprises in moving up the value chain from the role of subcontractor to that of a value creator, which is reflected by holding a patent and/or a design of a product.
- Encourage companies to move their business to more productive and advanced intersectoral specializations.

If key sectors in Poland reached the average productivity rates of their counterparts across EU, they would increase the added value to the Polish economy by 290 billion Euro, or one-third larger than its current size.<sup>93</sup>

**Poland should proactively increase the share of sectors with high productivity in the economy structure.** To achieve that, Poland should focus on:

- Reallocating domestic capital through regulatory or financial sector incentives.
- Creating career transition opportunities for employees.
- Attracting direct foreign investment to R&D.

Reorientation towards knowledge-based DFI will be crucial for Poland, especially given the possible drop in Poland's attractiveness for production investment caused by the predicted decrease in labor force availability.

**The investment level should be raised and oriented at decarbonization and digitalization of the economy to build stable competitive advantages for Poland.** This is key for long-term economic growth. Poland should implement financial incentives and co-financing mechanisms to stimulate green and digital investment in the private sector. Moreover, administrative burden should be lifted off investors by revising and simplifying permit-granting and other procedures.

## **Towards increasing financial burden**

**Poland should increase the availability and use of debt financing and capital financing for investment purposes.** To this end, Poland must:

- Encourage greater household savings.
- Consider increasing the use of debt instruments as funding sources for investment projects.

In this case, the optimization of debt service costs requires them to be weighed against the potential benefits of a given investment. Debt cost optimization could be based on, for example:

- Opening to non-European markets for cheaper leveraging opportunities in Asia or in the Middle East.
- Increasing the presence of green financial instruments such as green bonds or green quantitative easing that also send a positive signal to company stakeholders.

## **From globalization to regionalization**

**Poland should attract foreign investment to sectors with high added-value, and that can leverage the geographical shortening of supply chains.** To this end, Poland should focus on factors that companies consider when relocating production. Aside from financial incentives, these include:

- Infrastructure: among other things, this includes access to cheap green energy and proximity to transport hubs, including connections to large-capacity maritime ports.
- The labor market: especially access to an educated work force offering an attractive quality-to-cost ratio.
- The stability of the macroeconomic environment, especially the predictability of exchange rates and agile administration of justice.

**Beyond attracting outside investment, Poland should strive for conditions that encourage Polish companies to become regional champions,** including incentives to stimulate investment in R&D, increased expenditures on new products and services, and prioritization of export. Domestic companies with strong regional reach positively impact the economy, as entire business ecosystems are created around them, involving smaller enterprises at every level of the value chain will join.

**In conjunction with these measures, a strategy should be developed and**

**implemented to improve Poland's international reputation.** That

plan could be implemented with the support of an organization selected or established to coordinate the cooperation among private entities (businesses, culture creators) and public institutions (foreign trade agencies or embassies). It will be necessary to provide appropriate funds for the organization and promotion of the brand abroad. South Korea provides an example of how a country can consciously build its brand (see next page).

**Poland's security should be improved by strengthening regional institutions and developing defense capabilities.** Considering Russia's invasion of Ukraine<sup>94</sup> as well as the increasing polarization between countries, Poland should support the effective functioning of alliances that it is a member of (such as the EU, Three Seas Initiative, NATO) while concurrently developing its defense capabilities. It is important that a larger military budget is accompanied by an increase in the domestic production capacity for modern technologies such as artillery ammunition, as well as promotion of innovation in domestic arms and related industries, including electronics manufacturers, metal processors, software developers. Moreover, mechanisms preventing subversive action (e.g. spreading disinformation or causing anxiety in the society) should be developed.

## Hallyu

At the end of the 1990s, the South Korean government proposed the introduction of “Hallyu,” the Korean Wave. It was intended to propagate Korean culture in the world to improve South Korea’s reputation abroad, as well as export volumes, and so-called soft power, which is the ability to impact choices of other international actors through cultural or economic influence.<sup>95</sup>

Hallyu had three stages:<sup>96</sup>

The first stage of Hallyu involved the promotion of artistic freedom by significantly increasing culture-related expenditures to 1 percent of the national budget, and protection of domestic culture producers by

granting them broadcast time on national television. A prominent success of the First Korean Wave was the popularization of K-dramas in Asia.

In the mid 2000s, Korean Wave 2.0 rolled out. This campaign involved distinguishing South Korea as a “future-oriented, multicultural, and visionary” country. Simultaneously, culture promotion continued with the use of new social media such as YouTube, Facebook, and Twitter, allowing South Korea to promote a K-Pop, a music genre that has gained worldwide popularity.

The current stage, Korean Wave 3.0, aims to extend South Korea’s international brand to cuisine,

computer games, fashion, and cosmetics. To support the variety of created content, and to develop other industries thanks to the progressing Korean Wave, the Ministry of Culture, Sports, and Tourism created a dedicated Hallyu department.

South Korea’s success in brand-building is attributable to the consistent implementation of a planned strategy, and from efficient coordination of cooperation between public institutions and private entities. **The direct economic effect of promoting Korean culture is the export of goods and cultural content estimated to amount to \$12 billion a year.**<sup>97</sup>

Exhibit 37

### Three stages of Korean culture development (Hallyu)

Classification	Korean Wave 1.0 From 1997 until the mid-2000s	Korean Wave 2.0 From mid 1st decade to mid 2020s	Korean Wave 3.0 From the mid-2000s until now
Developed genres	K-drama	K-pop	K-culture, art, pop culture, lifestyle, traditional culture
Region	Asia	Asia, part of Europe, Africa, South and Central America, United States	World
Selected governmental actions	Sixfold increase in spending on culture (to \$84 million in 2001) Supporting the domestic film industry	Defining national identity <sup>99</sup> Increasing subsidies for cultural start-ups	Creation of a Hallyu department in the Ministry of Culture, Sports and Tourism to support the variety of content and strengthen other industries through Hallyu

# 4



## Tasks for Poland





Whether or not the world is on the cusp of a new economic era, Poland stands at a critical juncture in its development—facing both challenges as well as opportunities. The decisions made by Poland today will determine whether it will lift its ambitions and continue its extraordinary economic growth trajectory or become complacent and lose momentum. Poland has taken steps over the past 30 years to create a solid foundation for economic development. But it is now

facing population decline, a potential slowdown in economic growth, and increasing global geopolitical tensions. To continue its upward trajectory, Poland should consider addressing five key tasks, encompassing various aspects of socio-economic life. These five strategic actions build on recommendations made in 2015 and 2019 in joint reports developed by McKinsey in cooperation with Forbes, “5 opportunities for Poland” and “Poland 2030.”<sup>99</sup>

# 5 tasks

## How to build lasting competitive advantages for Poland

### 1 **Productivity**

Increase the productivity of the Polish economy by strategically developing and implementing innovations in selected transversal technologies, and by supporting Polish enterprises to move up in value chains.

### 2 **Investments**

Increase investments in Poland, introduce mechanisms for allocating funds to priority projects, and encourage greater risk-taking among business entities.

### 3 **Energy transformation**

Guarantee a reliable, sustainable, and affordable energy system through energy transformation, including the development and use of innovative technologies.

### 4 **Labor market potential**

Develop and sustain a strong talent pool for the labor market through continuous education and expanding training in job skills aimed at the professions of the future and attracting talent with these skills.

### 5 **Poland's reliability and social acceptance**

Strengthen Poland's reputation as an attractive location for investment and talent, and shape social awareness that will ensure broad support for actions taken in the face of key challenges.

### Productivity

# 75 €/h

in 2050

Poland should prioritize technological development. In today's world, technology penetrates all sectors of the economy and determines their productivity. Digitalization and automation will unlock further opportunities for productivity growth, but bare implementation of that technology is not sufficient to build stable competitive advantages. It is necessary for Poland to foster home-grown innovative solutions. In this respect, Poland, as well as Europe, lag behind the United States and China, meanwhile the global race is approaching the final stretch. Technological innovation must be prioritized via support for R&D and productivity, especially in the field of transversal technologies. Innovative Polish companies will be positioned to move up value chains and potentially become regional leaders, and reorient the economy to higher productivity sectors.

### Investment

# 21%

share of investments  
in the GDP by 2030

Investment is necessary to lay the foundations for the further economic development of Poland. At present, capital accumulation is low and the investment potential is not fully used. Poland should not only turn the available funds into investment, but also increase their value to satisfy any additional capital needs. Mechanisms should be implemented to incentivize private and public sectors to intensify their investment activities, and to equip these sectors with tools to develop high-quality investment projects with strategic meaning for the Polish economy.

### Energy transformation

Achieving and maintaining

# Top 5

position among lowest  
energy prices for  
enterprises within the EU

The energy sector is a strategic area that drives all the other economy sectors. Affordable, safe, and sustainable energy is the foundation for building competitive advantage. Poland's energy transition requires systemic actions, not just to protect the planet, but also because any further delays in energy transition will negatively impact the competitiveness of the Polish economy. If the current structure of the electric power system is maintained, it could negatively impact the size and continuity of energy sales in Poland.

### Labor market potential

# +5 mln

professionally active  
people by 2050

To meet its economic ambitions, Poland must sustain and support a strong talent pool while directing talent towards areas vital to the economy. This task is urgent, as the present scale of activation and attraction of talent is insufficient to maintain the historical rate of economic growth. In addition, Poland should strengthen continuous education opportunities and improve employee job skills and their ability to flexibly meet changing labor market needs.

### Poland's reliability and social acceptance

# Top 10

in the EU in World  
Governance  
Indicator by 2030

Poland can increase the chances for success of the above-mentioned tasks by taking steps to build its brand, both at home and abroad. This calls for a clearly defined and executed brand building strategy, reflecting Poland's key strengths. Favorable perception and international credibility are essential to attract investment, innovation, and talent. In addition, ensuring public awareness of, support for, and involvement in the development plan will help to ensure its sustainability. To this end, Poland should continue to prioritize the satisfaction and well-being of its citizens by providing high-quality education, financial security, work-life balance, and healthy aging. Moreover offloading care-giving responsibilities from people in the working-age population will help release untapped potential in the workforce. The higher the satisfaction levels of Polish people, the easier the task of growing Poland's reputation and credibility abroad. Results in these areas will produce positive, synergistic effects with all other tasks laid out above.



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