The rise of Digital Challengers

How digitization can become the next growth engine for Central and Eastern Europe

Perspective on Poland
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This year, McKinsey & Company’s Polish office celebrates the 25th anniversary of its founding. Over the last quarter of a century, we have become the largest strategic consultancy in Poland, and today employ more than 1,500 people. We serve as a trusted adviser to Poland’s largest companies and key public institutions. We are proud to have shared the transformation and growth journey with industry leaders in banking and insurance, consumer goods, energy, oil, telecommunications, mining, and many other sectors. In total we have carried out more than 850 projects for our Polish clients.

Three key dates changed the face of McKinsey in Poland. In 2010 we opened our Polish Knowledge Center in Wrocław, which now employs more than 200 outstanding knowledge professionals. One year later, we established the EMEA Shared Services Center in Poznań, where more than a thousand colleagues work today.

Since 2017 the Warsaw office has been home to the McKinsey Digital Lab. Our developers, IT experts, and business consultants support companies undergoing comprehensive digital transformation. This includes making improvements in customer experience, the rapid implementation of business applications, Big Data solutions and analyses, the Internet of Things, artificial intelligence and blockchain technology. We are able to support our clients at every stage of their digital transformation – from strategy development to full implementation.

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We are a global management consulting firm that serves a broad mix of private, public, and social sector institutions. We help our clients make significant and lasting improvements to their performance and realize their most important goals. We have built on nearly a century of experience and added a wide range of new skills and capabilities to create a firm that is uniquely equipped to this task. For example, our colleagues in McKinsey Digital & Analytics work together with clients to drive technology-enabled transformations. By combining the latest innovations with deep industry, functional, and technological expertise, we help clients capture value from data and succeed in the digital age. We are home to thousands of the world’s most talented professionals across the fields of digital, analytics, and design. Our cross-functional teams enable clients to reinvent themselves through technology. From optimizing core technology and automating operations to building entirely new digital businesses, we work side-by-side with our clients to prepare them to survive and thrive in a rapidly changing world.

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About the Digital Challengers research

This report is part of a wider research into the potential of the digital economy in Central and Eastern Europe. In our November 2018 report, “The rise of Digital Challengers: How digitization can become the next growth engine for Central and Eastern Europe” we cover the regional perspective, joined by additional country reports for Czech Republic, Hungary, Poland, Romania, and Slovakia.
This report constitutes a perspective on Poland as part of a wider research analyzing the opportunities presented by the digital economy in Central and Eastern Europe (CEE). Using new research of our own and an examination of published sources, we define the economic potential from accelerated digitization in the country. We consider Poland, alongside nine other markets in the region (Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, Romania, Slovakia and Slovenia), as a “Digital Challenger” demonstrating strong potential for growth in the “digital economy”, emulating the group of relatively small, highly digitized countries we refer to as “Digital Frontrunners”, namely Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, the Netherlands, Norway and Sweden.

Discussion about the opportunities and challenges of digitization has been ongoing for many years. We aim to provide a unique perspective: a comprehensive, fact-based analysis that, for the first time, attempts to quantify the size and growth rates of digital economy in Poland as well as the CEE region and provide realistic scenarios for the economic impact of digitization through 2025. This approach enables us to understand in a quantifiable and comparable way how the digital economy is evolving across countries and against the most relevant benchmarks. We provide primary insights on the level of digitization in individual sectors across Poland and the CEE region (Chapter 1). Building on previous research conducted for Poland, a core part of the study is our investigation of the impact of digital transformation on the labor market (Chapter 2). Our discussion here covers both the shifts in society caused by the new technology and the increasingly accessible nature of the labor market as a result of the digital transformation. Following this, we turn to consider a comprehensive, yet prioritized list of digitization enablers for Poland, including the relative strengths of the country and key areas on which to focus going forward (Chapter 3). Our insights in this chapter are based on quantitative analysis and discussions with numerous market experts.

In the final chapters of our study, we look at the vital role of collaboration in CEE, emphasizing the importance of capturing regional scale effects, tackling common challenges and sharing best practices in matters related to stimulating digitization across the region (Chapter 4), and examine the implications for policy makers, companies and individuals (Chapter 5). This final section contains a list of actions for these stakeholders to capture the digital opportunity.

The ideas we present build on those outlined in our previous reports Digital Europe: Pushing the frontier, capturing the benefits; A future that works: Automation, employment, and productivity; as well as Digital Poland and Shoulder to shoulder with robots: Tapping the potential of automation in Poland. We would like to take this opportunity to thank the authors of these publications as well as the McKinsey Global Institute – in particular Jacques Bughin, Senior Partner in Brussels, and James Manyika, Senior Partner in San Francisco, for their expertise, insights, inspiration and guidance.

The work on this report was led by Jurica Novak, McKinsey’s Managing Partner in Central Europe, Marcin Purta, Managing Partner in Poland, Tomasz Marciniak, Partner, and Karol Ignatowicz, Local Partner.

These individuals worked together with a team comprising the Consultants Kasper Yearwood, Kacper Rozenbaum and Arkadiusz Zarowski, Communications Experts Joanna Iszkowska and Milena Tkaczyk, the Graphic Designer Małgorzata Leśniewska and many others.

At the same time, we would also like to thank the many area experts from the public, private, and social sectors who provided insights, source data and helped advance our thinking. In particular, we would like to acknowledge the collaboration with Google on this research, including contribution of analytical inputs and insights leveraged in this report.
Poland as a Digital Challenger

For Poland, the potential economic and developmental benefits of digitization can reach up to €64 billion in additional gross domestic product (GDP) by 2025. This would lead to increased global competitiveness and prosperity for the country’s 38 million people and allow Poland to join the most digitally advanced economies in Europe.

**SIMILARLY TO OTHER CEE MARKETS, THE CURRENT GROWTH ENGINES OF POLAND ARE LOSING MOMENTUM**

Over the past 30 years, Poland has experienced rapid development (GDP per capita grew by 123 percent between 1996 and 2017), fueled by traditional industries, dynamic exports, investments from abroad, a growing workforce than labor-cost advantages, as well as funding from the European Union. However, many of these drivers are beginning to lose their momentum. Significantly undercapitalized compared with more advanced European economies, Poland is also experiencing a shrinking and increasingly more expensive workforce, with unemployment at record low levels (4.9 percent in 2017). There is a need for unlocking new sources of productivity growth in the country. If Poland hopes to continue on its path to increased general societal prosperity, it needs to redefine its growth strategy.

**DIGITIZATION COULD BE THE NEXT DRIVER OF SUSTAINED GROWTH FOR POLAND, WITH €64 BILLION OF INCREMENTAL GDP BY 2025 AT STAKE**

Our analysis shows that accelerating digitization and converging toward a tech-driven economy have a big potential to unlock the new growth engine that Poland urgently requires. In 2016, the digital economy in Poland already accounted for 6.2 percent of GDP, the equivalent of €26 billion. Accelerating digitization in the country to close the gap to Northern European countries could see this base expand by up to €64 billion by 2025. In this aspirational scenario, the digital economy in Poland would grow to represent 15 percent by 2025. This could mean an extra percentage point on GDP growth each year over the period, a 30 percent uplift on the projected baseline growth for the country. Alternatively, a “business as usual” scenario forgoing this acceleration opportunity would see the digital economy in Poland expand by €22 billion to reach a 9 percent share of GDP by 2025.

In this scenario, Poland would remain a long way from the “digital frontier” represented by countries in Northern Europe.

**POLAND IS WELL POSITIONED TO CAPTURE THE DIGITAL OPPORTUNITY**

In this report we consider Poland to be one of ten Digital Challenger markets based in Central and Eastern Europe. These countries exhibit lower digitization rates than the so-called Digital Frontrunners (Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, the Netherlands, Norway, and Sweden) or EU Big 5 markets (France, Germany, Italy, Spain, and United Kingdom). However, Poland has strong foundations on which to accelerate its digitization. The size of the digital economy in Poland (at 6.2 percent of GDP in 2016) is trailing the CEE average of 6.5 percent, with a clear gap to Digital Frontrunner markets such as Sweden (9.0 percent). However, it is relatively close in size to the EU Big 5 average of 6.9 percent and has also recently gained significant momentum: between 2012 and 2016, the digital economy in Poland grew by 7.0 percent a year, twice as fast as in the EU Big 5. Additionally, good fundamentals in primary and secondary education quality (Poland scores on a par with Digital Frontrunners in OECD’s PISA rankings), a large STEM and ICT graduate talent pool (Poland is responsible for 50% of the region’s graduates in these fields), high-quality digital infrastructure, as well as a legacy technology lock-in that is milder than in Western and Northern European countries lend support to Poland’s Digital Challenger status. Relative to other CEE markets, the country exhibits higher digitization rates in the financial services as well as transportation and warehousing sectors. In many digitization-enabling areas, however, Poland performs close to or even below the CEE average, indicating room for improvement. This especially holds true in areas such as the startup ecosystem (with a significantly smaller number of startups per capital), participation rates in adult learning among the general population, as well as the adoption of digital tools by companies for cross-border e-commerce.

**THE GOVERNMENT, BUSINESS LEADERS, AND INDIVIDUALS ALL NEED TO ACT FOR A SUCCESSFUL TRANSITION**

To achieve the aspirational digitization scenario, Poland will have to count on all stakeholders. Companies will need to understand and embrace the opportunities in digitization, increasing their adoption of digital tools contributing to improved productivity, as well as enabling them to reach new customers and expand into global markets. Today, companies in Poland lag their Digital Frontrunner peers not only in terms of the adoption of these tools, but also, for instance, in the degree to which they provided training to develop or upgrade ICT skills of their personnel. The public sector also could integrate technologies increasing efficiency as well as improving the services provided for both companies and citizens. While Poland has already made a number of first steps in the area of government digitization, the uptake of online services among the general population remains lower than both the CEE and Digital Frontrunner average. For individuals, investing in lifelong learning for upskilling and reskilling will be key to take advantage of new labor market opportunities. Policy makers are called upon to promote the adoption of technology in both the public and private sectors. They can also support workers through reskilling and upskilling programs (especially given Poland’s low adult participation rate in education and training, trailing both the CEE and Digital Frontrunner average, and improve the ecosystem for startups and the opportunities for digital innovation.

**COLLABORATION WITH OTHER CEE COUNTRIES AS DIGITAL CHALLENGERS IS KEY**

The countries of CEE, Poland included, can capture the full potential of digitization only by cooperating closely with each other. Four reasons underpin the benefits of acting together:

- **Scale effects:** As the CEE region, Digital Challengers represent €1.4 trillion in GDP – almost three times the size of the Polish economy. Enabling Polish enterprises to seamlessly tap into this potential can reap significant benefits. Promoting digital solutions across the region can help reduce the cost of cross-border trade.

- **Common challenges:** Poland faces the same challenges as many other CEE markets, importantly the “brain drain” and need to reskill the workforce in the long term. Joint efforts across the region can help in finding and implementing the most effective solutions.

- **Similar starting points:** Poland, like other CEE markets, exhibits high levels of market openness and similar levels of digitization, besides cultural and historic commonalities. This adds relevance to their shared experiences on what has worked well in digital investments and regulatory policy.

- **Best practices:** Poland has developed different strengths related to the digital economy than other CEE markets. Sharing best practices can accelerate digitization. Leveraging the strengths of neighboring countries could limit the risk of harmful competition and allow for the creation of centers of excellence. Also, this could encourage regional coordination and planning. Instead of developing solutions in isolation, Poland could speed up the development of its digital economy by replicating successful strategies already tested elsewhere.

In the future, Poland along with other Digital Challengers could work together on digital projects and policy solutions across the region – all with the aim of facilitating digital transformation. Also, a pan-CEE coalition could help to ensure that the digital interests of the region’s countries are heard at the European level.

**THE TIME TO ACT IS NOW – OTHERWISE POLAND MAY MISS THE DIGITAL OPPORTUNITY**

We believe that for Poland to benefit fully from the digital transformation, the time to act is now. Poland is booming economically, but history shows that booms do not last forever, with multiple signs already indicating future limitations to traditional growth drivers. Also, technology is poised to fundamentally transform the Polish labor market: Our analysis shows that up to 49 percent of workplace activities in the country today could be automated by 2030 using technology that already exists. This creates both a productivity increase opportunity and challenges related to transitioning the labor market to new job pools. Immediate action is needed to address these. Finally, we know that with current global rates of the digital game are crystallizing. Effectively navigating the digital transformation ahead requires a clear digital agenda.
Polska jako Cyfrowy Challenger

Dzięki potencjelowi rozwojowemu i ekonomicznie cyfrowej transformacji PKB Polski może być wyższy aż o 6 miliardy euro (ok. 275 mld złotych) do 2025 roku. Umożliwiłoby to Polsce zwiększenie konkurencyjności na globalnych rynkach, poprawę sytuacji ekonomicznej 38% krajów Europy Środkowo-Wschodniej, a nawet zawsze do grodu najbardziej zaawansowanych cyber gospodarstw w Europie.

1. DOTYCZĄCE WYKREŚŁONYCH MOTYWÓW WZROSTU POLSKIEJ GOSPODARŚKИ SLABINA


2. CYFRYZACJA JAKO NOWY MOWIE WZROSTU GOSPODARŚKИ POLSKI MOŻE PRZYNIEŚĆ ZWIĘKSZENIE PKB O 64 MILIARDY Euro (OK. 275 MILIONZWOŁOTYCH) DO 2025 ROKU

Według naszych analiz przyspieszenie cyfryzacji i oparte na technologiach nowych źródeł zysku, które już dobrze wcielone w życia obecna która Polska ma już zrealizowany, niezbędne są działania wszystkich podmiotów na rynku pracy powodowanych przez automatyzację i rosnące działanie nowych technologii. Jednak powszechnie wiadomo, że efekty przekształceń, które wiecznym powód powodują zwiększenie dobrostanu (ang. centers of excellence). Mogłoby to na tyle z szerokości powodów powodować.

Efekty skali – wielkość PKB dzięsieniu omawianych krajów Europy Środkowo-Wschodniej wynosi 1,4 biliona euro, czyli blisko trzykrotnie więcej niż wielkość gospodarstwa Polski. Umocnienie polskim firmom nieorganizacyjnego wyniku wykorzystania tego potencjału może przynieść znaczące korzyści, m.in. obniżenie kosztów handlu transgranicznego.

### INTRODUCTION

**Poland and Digital Challengers at a glance**

From the perspective of economy and digitization, three broad groups of countries have emerged in Europe over the last three decades. The first group is formed by relatively small, open economies with very high digitization rates. This so-called Digital Frontrunners group comprises Northern European and Benelux countries: Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, the Netherlands, Norway, and Sweden. The second group is composed of the five biggest economies in the EU (so-called EU Big 5) – France, Germany, Italy, Spain, and United Kingdom. Compared with the first group, these countries typically exhibit much lower market openness, relying more on their large internal markets, combined with lower, albeit still high, digitization rates. Finally, there are ten countries of Central Eastern Europe – Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia.

Poland has recorded significant economic growth since the 1990s. Gross domestic product (GDP) per capita grew by 123 percent between 1996 and 2017. The main growth drivers in this period were traditional industries, dynamic exports, investments from abroad, labor-cost advantages, and the inflow of EU funds. But now these drivers are beginning to lose their momentum. The Polish economy is generally undercapitalized relative to more advanced European economies: the ratio of capital, measured as net assets per employee, is more than 60 percent lower here than in the five largest economies in the European Union (the “EU Big 5” of France, Germany, Italy, Spain, and the United Kingdom). Workforce costs are rising, and there are limited labor reserves left to plug into the economy, with unemployment in Poland at record low levels: 4.9 percent in 2017, compared with 7.6 percent in the European Union. Additionally, the working hours in Poland are already above the EU average. Moreover, productivity lags behind Western Europe, and the inflow of EU funds to Poland is likely to weaken after 2020. As a result, Poland needs a new engine to continue its economic growth.
The term “digitization” is widely used by economists. Yet its precise meaning is a topic of much discussion, particularly when it comes to measuring its impact on economies. Consequently, uncertainty reigns about the scale of the digital economy in Poland and CEE. In this report on Poland, similarly to its CEE edition, we try to strike a balance between the various definitions of digitization when looking at the digital economy. We define it as the sum of three components:

The value of the information and communications technology (ICT) sector, measured as the spending of government and companies across all sectors on hardware, software, and telecommunications solutions.

The value of the e-commerce market, measured as online purchases of goods and services by consumers.

The value of offline consumer spending on digital equipment.

As discussed in The rise of Digital Challengers (CEE perspective) report, we have chosen this definition for two main reasons. First, it is relatively comprehensive—broader than just the ICT sector, yet more concrete than, say, “all activities related to digital data.” Second, reliable data is available for each of the three areas it covers, so its total value can be easily calculated (see methodology appendix). This enables us to use a bottom-up modeling approach, drawing on data collected at the national level.

According to our analysis, the digital economy in Poland accounted for 6.2 percent of total GDP in 2016. This is close to both the CEE and EU Big 5 averages, while clearly lagging Digital Frontrunners markets such as Sweden. In per capita terms, the differences are more pronounced. The digital GDP per capita in Poland is just over one-fifth the size of the Digital Frontrunner average, and one-sixth that of Sweden. Importantly, however, historical dynamics indicate a faster growth pace for the digital economy in Poland than in the EU Big 5. Poland is even catching up to Digital Frontrunner markets in this respect. While this is a positive indicator, room for improvement clearly remains. Despite starting from a higher level, Sweden was able to grow its digital economy by 9.9 percent a year between 2012 and 2016, for example. With enough extra effort, Poland could accelerate the pace of growth of its digital economy and catch up to or even overtake some of the more digitally advanced economies.
Sector-level digitization in Poland

Before identifying potential levers for achieving accelerated growth in Poland, we should look at the manner in which digitization has already taken place around the world. An examination of global trends indicates that there is no standard route to achieving high rates of digitization. Most markets, including Digital Frontrunners, have digitized unevenly, with large variations between different sectors and individual companies. To understand which sectors drive digitization at a “macro” level, we need a multidimensional view. The McKinsey Global Institute (MGI) Industry Digitization Index offers such a perspective, assessing digitization at the level of individual sectors. It uses eight indicators to capture different ways in which companies are digitizing. All results at sector level are weighted for the economic size of the sector and compared with the global digital frontier, namely, the ICT sector in the United States.

MGI INDUSTRY DIGITIZATION INDEX

Digital-asset spending

- Hardware spending: Share of total expenditure spent on ICT hardware (e.g., computers, servers)
- Software and IT services spending: Share of total expenditure spent on software and IT services (e.g., enterprise resource planning software)
- Telecommunications spending: Share of total expenditure spent on telecommunications (e.g., broadband access, mobile data services)

Digital-asset spending per worker

- Hardware spending on workers: ICT hardware (e.g., computers, servers) expenditure per full-time-equivalent employee (FTE)
- Software and IT services spending per worker: Software (e.g., enterprise software licenses) and IT services expenditure per FTE
- Telecommunications spending per worker: Telecommunications (e.g., broadband access, mobile data services) expenditure per FTE

Digital-capital deepening

- Hardware assets per worker: ICT hardware assets (e.g., servers, computers) per FTE
- Software assets per worker: Software assets (e.g., workers’ software licenses) per FTE

Comparing Poland with Sweden (a Digital Frontrunner representative), the biggest gaps in terms of digitization are found for utilities, manufacturing, government, professional, and business services. The finance and insurance sector and for transportation and warehousing.
Digitization can be the next driver of sustained growth in Poland

Looking ahead, we see two potential trajectories for further digitization in Poland.

In the first, a “business as usual” scenario, the country maintains its historical growth rate for the digital economy. The digital economy expands by €22 billion to reach 9 percent of GDP by 2025. The gap to Digital Frontrunners (measured as the digital economy’s share of GDP) remains almost unchanged, and the gap to the most dynamic markets, such as Sweden, increases.

The second scenario is an “aspirational” perspective. Here, we estimate the value at stake from Poland closing the gap to Digital Frontrunners. This would see its digital economy growing by €64 billion to reach 15 percent of GDP by 2025, translating into an extra one percentage point, a GDP growth each year, or a one-third increase in the projected growth rate. The additional €42 billion, on top of the €22 billion impact of maintaining the historical growth rate, is made up of the following amounts:

- €34 billion from increased productivity from closing the gap to Digital Frontrunners in the digitization of public and private sectors
- €8 billion from extra growth in e-commerce and consumer offline spending on digital equipment

The first of these amounts (closing sectoral digitization gaps to Digital Frontrunners) comes from Poland increasing its ICT spending levels (as a share of sector GDP) to match Digital Frontrunner markets. Achieving this would require acceleration of the digital transformation, especially in the sectors that lag furthest behind, their Digital Frontrunner benchmarks and at the same time account for a significant share of the Polish economy. This includes asset-heavy sectors such as manufacturing, public sectors such as healthcare and education, and deconcentrated industries such as agriculture. The second amount comes from faster growth in e-commerce and offline consumer spending on digital equipment (for more details, see the methodology appendix).

Capturing this potential will depend on all stakeholders embracing digital technology in the coming years. For companies, it will mean taking advantage of solutions enabling growing sales through digital channels, including boosting their export capabilities. For both public and private organizations, it will mean improving operating efficiency by integrating automation and streamlining solutions. For individuals, it will mean investing in developing the skills needed in the digital economy.
CHAPTER 2: IMPACT ON POLAND’S LABOR MARKET

The potential for work automation in Poland

Increases in GDP in Poland over the past decade were associated with employment growth and rising productivity. While the latter of these was by far the bigger contributor, growth of the working population was still responsible for around 30 percent of GDP growth between 2005 and 2017. However, a growing consensus exists that Poland has now reached peak employment level. Negative demographic trends such as declining birthrates, emigration, and aging could hinder the future development of the region. Assuming flat employment projections and productivity growth rates at historical levels, this could put at risk up to 32 percent of the GDP growth rate by 2030.

One of the sources of productivity acceleration in the future may come in the form of automation technologies. We have explored this potential at length in a 2018 report published with Forbes, ‘Shoulder to shoulder with robots: Tapping the potential of automation in Poland’, where we estimate that up to 49 percent of workplace activities today in Poland – the equivalent of about 7.3 million jobs – could potentially be automated by 2030 using technology that already exists today. This is close to the potential for the entire region, which we have estimated at 49–51 percent.

Without an acceleration in productivity growth, demographic trends might cut GDP growth in Poland by 32%.

Simulated long-term impact of employment growth on GDP, compound annual growth rate, %

History of productivity growth

Simulated growth, 2018–2030

NOTE: Projection assuming historical productivity growth and projected changes in employment growth. SOURCE: MGI; McKinsey analysis

While few occupations are fully automatable, 60% of all occupations have at least 30% technically automatable activities.

### SHARE OF OCCUPATION TYPES WITH GIVEN AUTOMATION POTENTIAL, % of 820 occupation types

<table>
<thead>
<tr>
<th>Automation potential</th>
<th>% of occupation types</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;0%</td>
<td>100%</td>
</tr>
<tr>
<td>&gt;10%</td>
<td>99%</td>
</tr>
<tr>
<td>&gt;20%</td>
<td>98%</td>
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<td>&gt;30%</td>
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<td>92%</td>
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<tr>
<td>&gt;90%</td>
<td>91%</td>
</tr>
<tr>
<td>&gt;100%</td>
<td>90%</td>
</tr>
</tbody>
</table>

### TOTAL AUTOMATION POTENTIAL IN EQUIVALENT NUMBER OF JOBS

<table>
<thead>
<tr>
<th>Industry</th>
<th>Automation potential, %</th>
<th>FTE million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>64</td>
<td>1.9</td>
</tr>
<tr>
<td>Trade (retail and wholesale)</td>
<td>56</td>
<td>1.1</td>
</tr>
<tr>
<td>Agriculture</td>
<td>52</td>
<td>1.0</td>
</tr>
<tr>
<td>Public administration</td>
<td>40</td>
<td>0.7</td>
</tr>
<tr>
<td>Transportation</td>
<td>36</td>
<td>0.6</td>
</tr>
<tr>
<td>Construction</td>
<td>32</td>
<td>0.5</td>
</tr>
<tr>
<td>Healthcare</td>
<td>33</td>
<td>0.3</td>
</tr>
<tr>
<td>Education</td>
<td>26</td>
<td>0.3</td>
</tr>
<tr>
<td>Accommodation and food</td>
<td>49</td>
<td>0.2</td>
</tr>
<tr>
<td>Professional services</td>
<td>35</td>
<td>0.2</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>36</td>
<td>0.1</td>
</tr>
</tbody>
</table>

SOURCE: McKinsey Global Institute analysis
CH 2: IMPACT ON POLAND’S LABOR MARKET

Opportunities and challenges of work automation

AUTOMATION CAN HELP DE-BOTTLENECK INDUSTRIES WITH BIG LABOR SHORTAGES

Automation brings new opportunities as well as concerns. Technology adoption can be a significant productivity contributor, leading to stronger economic development. In the labor market, this could manifest itself by enabling employees to focus on more value-adding activities; for example, doctors and nurses could spend more time with patients rather than on performing administrative tasks. Additionally, industries with the highest job vacancy rates could benefit from automation as the problem of the inadequate labor supply is mitigated. In recent years, relatively low unemployment rates and a growing number of job vacancies in Poland have created a favorable labor market situation for employees, and challenges for employers. Sectors such as accommodation, manufacturing, transportation, agriculture, and construction – all areas with a high potential for automation – have in recent years faced the biggest labor shortages. Digitization and the implementation of technology could help companies in these sectors overcome workforce-related barriers and achieve growth.

Industries with the highest job vacancy rates could benefit from automation, unlocking economic growth stifled by inadequate labor supply.

<table>
<thead>
<tr>
<th>Industries with highest job vacancy rates in Poland</th>
<th>Job vacancy rate, Q4 2017, %</th>
<th>Automation potential, % of worked hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>2.3</td>
<td>32</td>
</tr>
<tr>
<td>Information and communication</td>
<td>2.0</td>
<td>36</td>
</tr>
<tr>
<td>Transportation and storage</td>
<td>1.5</td>
<td>45</td>
</tr>
<tr>
<td>Accommodation and food service</td>
<td>1.3</td>
<td>49</td>
</tr>
<tr>
<td>Professional services</td>
<td>1.2</td>
<td>64</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1.1</td>
<td>64</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>0.8</td>
<td>36</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>0.8</td>
<td>50</td>
</tr>
</tbody>
</table>

*SOURCE: Eurostat; McKinsey Global Institute analysis*

SKILL SHIFTS AND THE POTENTIAL FOR A LABOR MARKET MISMATCH

Skill shifts have accompanied the introduction of new technology in the workplace since at least the Industrial Revolution. The adoption of digital technology, automation, and artificial intelligence will mark an acceleration over the shifts of even the recent past.

The McKinsey Global Institute has developed a model for the skill shifts that will likely take place in the workplace. Looking at Western European countries, most of which have a similar or slightly lower automation potential compared to Poland, the strongest growth in demand will occur for technological skills, which constitute the smallest skill category today in terms of hours worked. Demand is expected to rise by around 50 percent here, representing 17 percent of hours worked in 2030.

Demand will grow for both basic and advanced technological skills. Occupations requiring advanced technological skills include big data scientists, IT professionals, programmers, engineers, technology designers, advanced-technology maintenance workers, and scientific researchers. The McKinsey Global Institute model suggests that time spent on these skills will grow rapidly as companies realize their automation potential. Advanced technological skills will be critical for digitizing the economy in Poland, but people with these skills will still be a minority. At the same time, all employees will need to develop basic digital skills, as workers will be required to use online applications or other technological tools in their day-to-day work.

When looking at the current level of digital-skill proficiency in Poland, however, we can see a clear gap relative to citizens in Digital Frontrunner markets. This includes basic skills, as well as advanced digital skills. Importantly, the older the age group, the bigger the gap, especially when it comes to advanced skills. This indicates a strong need for promoting life-long learning among the citizens of Poland, which we explore in Chapter 3 as a key enabler for digitization in the country.

People in Poland are less likely to exhibit advanced digital skills than in Digital Frontrunner countries across all age groups

<table>
<thead>
<tr>
<th>Age group</th>
<th>Digital Frontrunners</th>
<th>Poland</th>
<th>Relative gap to Digital Frontrunners</th>
</tr>
</thead>
<tbody>
<tr>
<td>16–24</td>
<td>21%</td>
<td>11%</td>
<td>50%</td>
</tr>
<tr>
<td>25–34</td>
<td>41%</td>
<td>31%</td>
<td>28%</td>
</tr>
<tr>
<td>35–44</td>
<td>55%</td>
<td>44%</td>
<td>11%</td>
</tr>
<tr>
<td>45–54</td>
<td>73%</td>
<td>68%</td>
<td>7%</td>
</tr>
<tr>
<td>55–65</td>
<td>70%</td>
<td>60%</td>
<td>10%</td>
</tr>
<tr>
<td>65–74</td>
<td>84%</td>
<td>76%</td>
<td>8%</td>
</tr>
</tbody>
</table>

*NOTE: Advanced digital skills: example metrics investigated include analysis and data collection using digital tools, the use of online tools such as banking or e-commerce, use of online communication, etc.*

*SOURCE: Eurostat; McKinsey analysis*
The rise Digital Challengers

CHAPTER 2: IMPACT ON POLAND’S LABOR MARKET

Opportunities and challenges of work automation

POLAND’S BIGGEST SECTORS ARE THE ONES WITH THE LARGEST LIKELIHOOD FOR A FUTURE LABOR MARKET MISMATCH

Progressing digitization of the economy will accelerate the demand for people who understand how to work with technology and are able to innovate in the workplace. The need for new digital talent will be particularly great in sectors where the potential for automation is high and the current penetration of technology is low. These industries may experience the biggest “workforce mismatch” in the future.

We distinguish four groups of sectors in Poland with differing levels of need with regard to digitization:

- **Big sectors with the greatest likely need for workforce reskilling.** The biggest labor pools in Poland are found in manufacturing, agriculture, and trade. These sectors also display a mismatch, with low current digitization rates and high future automation potential. Given that these sectors are responsible for almost 50 percent of the labor population in Poland, this creates a strong exposure for the region’s labor market stability, and should constitute a priority area for reskilling efforts in the future.

- **Smaller sectors with a great likely need for reskilling.** Utilities, mining, transportation, and accommodation are the sectors in Poland displaying a similar mismatch in terms of low current digitization rates and high future automation potential. While these sectors also will have to significantly update their skill base, they are significantly smaller in terms of their share in the total labor population of Poland.

- **Poland’s most digitized sectors showing relatively lower potential for automation.** Telecommunications and financial and insurance services were the first to undergo digital transformation and are now the leaders of technology adoption in Poland. They have already started attracting the digital talent they need and we estimate that their further automation potential is relatively low.

- **Sectors with low digitization and low automation potential must prepare for an evolution.** Sectors such as education, healthcare, and arts and entertainment are not facing a drastic change in the form of a high automation potential. Nevertheless, given their low starting point in terms of digitization, they should prepare to adopt more technology and not underestimate the effort required.

Sectors with low current digitization rates and high automation potential in Poland are likely to experience the greatest need for workforce reskilling in the future.

In The rise of Digital Challengers (CEE perspective) report, we have also explored the ways in which digitization will affect individuals beyond the potential for automation. Among the many potential benefits that technology brings to individuals in their daily lives, the rise of platforms enabling flexible working solutions may also contribute to an increased activation of the work force. Similarly as in other CEE markets, despite a high job vacancy rate, the economic activity level in Poland falls behind benchmarks. Assuming benchmark activity levels of one of the most active labor markets in Europe – Sweden – Poland has around 3.3 million people forming untapped labor reserves. In the whole population of Poland there are 15 percent fewer active people than in Sweden. The highest gap can be observed among young (36 percent) and elderly (47 percent) people. The participation of women of maternal as well as middle age also falls short by 13 to 16 percent.

Supporting new marketplaces for independent work, which empower people to find new forms of flexible employment, can be one way of increasing the activity rates in Poland and the wider CEE region.

Poland labor reserves compared with activity rate of Sweden, million people, 2017

![Graph showing labor reserves in Poland compared to Sweden](image-url)
CHAPTER 3: KEY ENABLERS OF DIGITIZATION IN POLAND

Key foundations for Poland’s Digital Challenger status

The digitization of a country or region is ultimately the outcome of many processes and factors. Here we look at key areas of importance for digital transformation and identify which of these should be prioritized for action by Poland. Our investigation covers all dimensions, from talent and innovation to infrastructure and governance. For each of these dimensions, we have tested multiple hypotheses, looking at the experience of Digital Frontrunners and comparing it with the performance of Digital Challengers and Poland. By calculating scores for key performance indicators (KPIs) in these areas and combining this data with qualitative assessments by experts, we are able to identify areas where Poland already performs close to or on a par with Digital Frontrunners. These areas can be thought of as the foundation for growing the digital economy further in the country.

### Good overall digital infrastructure quality and coverage

Poland exhibits digital infrastructure quality and coverage close to the CEE and Digital Frontrunner average.

### Competitive advantages at a macroeconomic level

Poland offers high-growth economy with relatively low labor costs.

#### Poland

- Average GDP growth, 2015-17, %: +3.1
- Average hourly labor cost, 2017, €: 29.04
- EU Big 5: +1.4
- Digital Frontrunners: +1.5
- Digital Challengers: +3.7
- Poland: -3.6

### An already emerging, vibrant digital ecosystem (selected areas)

Examples include Booksy, Brainly, software. Other notable success stories include LiveChat is a global provider already begun expanding globally. DocPlanner is an online health care platform enabling patients to find physicians and book appointments online, which has already begun expanding globally. LiveChat is a global provider already begun expanding globally. DocPlanner is an online health care platform enabling patients to find physicians and book appointments online, which has already begun expanding globally. LiveChat is a global provider already begun expanding globally. DocPlanner is an online health care platform enabling patients to find physicians and book appointments online, which has already begun expanding globally. LiveChat is a global provider already begun expanding globally. DocPlanner is an online health care platform enabling patients to find physicians and book appointments online, which has already begun expanding globally. 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Key enablers for further digitization in Poland

Several areas remain where Poland has to make improvements in order to fully tap its digital potential. We identify multiple “key enablers” for digitization where closing the gap to Digital Frontrunners would have a major positive impact on the digital economy of Poland, along four dimensions:

- Soft infrastructure, including the adoption of digital tools and skills among the Polish general population, Poland based enterprises, and the public sector
- Talent, including stimulating the growth of the ICT specialist population and lifelong learning among Poland’s population
- Innovation in the form of fostering the country’s entrepreneurship culture
- Legal, political, and business environment in the context of supporting growth in the digital economy

Increase the adoption of digital tools by Poland’s small, medium, and large enterprises

With the help of digital tools, businesses can enhance their performance through boosting their revenue growth capabilities, as well as increasing their efficiency through better resource allocation. We look at five ways in which companies can achieve such benefits, benchmarking Poland against Digital Challengers as well as Digital Frontrunners.

In terms of leveraging digital tools to connect with customers in real time, we see gaps across all enterprises in Poland in the share of companies leveraging the internet for online advertising, including the use of social media for branding and marketing.

In terms of adjusting their business models to leverage digital tools for revenue growth, small and medium-size enterprises (SMEs), as well as large ones, trail Digital Frontrunners in Poland. We see a significantly smaller share of enterprises in the country engaging in online sales, as well as cross-border e-commerce.

Gaps can also be seen in proxy metrics measuring the degree to which businesses streamline and automate their processes in Poland.

Finally, a significantly smaller share of both SMEs and large enterprises in Poland leverage cloud computing tools or digital solutions for analyzing big data.

The rise of Digital Challengers
Increase the adoption of digital skills and take-up of internet services by Poland's general population

We consider the widespread adoption of digital skills among the general population a key enabler for digitization in Poland. It is an area where Digital Frontrunners excel, with clear gaps for Poland to close.

**Basic digital skills**

- % of population aged 16–74 (2017) ...
  - ... with at least basic digital skills
    - Digital Challengers, average
    - Digital Frontrunners, average
    - Poland
  - ... using the Internet in the last 12 months
    - Digital Challengers, average
    - Digital Frontrunners, average
    - Poland
  - ... looking online for information about goods and services
    - Digital Challengers, average
    - Digital Frontrunners, average
    - Poland
  - ... sending/receiving email
    - Digital Challengers, average
    - Digital Frontrunners, average
    - Poland

Poland differs significantly from Digital Frontrunners (DF) in terms of basic digital skills, with a gap of around 34 percent. The vast majority of the population in Poland uses the internet. However, internet penetration, at 78 percent is still clearly below the DF benchmark.

Gaps are also visible in other proxy metrics for basic digital skills, such as using the internet as a source of information about goods and services (29 percent less) or sending and receiving email (31 percent less).

**Advanced digital skills**

- % of population aged 16–74 (2017) ...
  - ... with above basic digital skills
  - ... who have written a computer program
  - ... who have uploaded self-created content to any website to be shared

Looking at advanced digital skills, the gap to Digital Frontrunners is even larger. The share of people with above basic digital skills is almost twice as large for Digital Frontrunners as in Poland. Looking at proxy metrics, such as the share of individuals having written a computer program or having software skills for content manipulation, all indicate that this is an area for improvement.

Take-up of internet services is also clearly lower in Poland compared to Digital Frontrunners – closing this gap in terms of demand and supply of products and services available online will be an important driver for the growth of e-commerce in the region.

**Take-up of internet services perspective**

- % of population aged 16–74 (2017) ...
  - ... who have used online banking
  - ... who have used online travel and accommodation services
  - ... participating in online social or professional networks
  - ... who have used health and care services provided online

Eurostat; Digital Economy and Society Index, 2017
Develop, implement, and promote e-government solutions in Poland’s public sector

Digitizing public services has various benefits for citizens, businesses, and the government itself. Digital government services can significantly reduce the administrative burden on citizens and firms. It also increases transparency about decisions and thus reduces the risk of corruption.

E-GOVERNMENT PENETRATION AND UPTAKE

On average, Digital Frontrunners lead the way in both penetration of digitization in the public sector and uptake of public digital services by society. Close to 80 percent of the population in these countries access public services online.

Among Digital Challengers, Poland is below average in terms of both penetration and uptake. Latvia is well above.

Slovenia, the Czech Republic and Slovakia, are in the middle of the spectrum, while Romania and Bulgaria have the furthest to go, with uptake rates below 25 percent.

SHARE OF ICT SPECIALISTS

A large gap exists between Poland and Digital Frontrunners in terms of the share of the population employed in the ICT sector. Poland also performs below the CEE average in this area.

This difference is mainly driven by significant underrepresentation of ICT specialists in the older population in the country.

SOURCE: Eurostat; Digital Economy and Society Index, 2017; UNESCO Institute for Statistics
Increase the provision of training to develop/upgrade digital skills of employees by Polish enterprises

With the progressive adoption of automation technologies, most industries will experience a growing shift in their demand for skills in Poland. Higher cognitive skills, social and emotional skills, and technology skills are the categories that will grow in importance. The labor market will have to adjust to meet this demand. In this context, reskilling efforts, including the promotion of lifelong learning and formal employee training provision by companies, will be key.

ADULT PARTICIPATION RATE IN EDUCATION AND TRAINING IN LAST 12 MONTHS 2016, % of 25- to 64-year-olds

The degree to which the population in Poland embraces training for adults is below the CEE average.

With the exception of Hungary, all Digital Challengers have lower adult learning participation rates than Digital Frontrunners.

The rise Digital Challengers

FIRMS PROVIDING TRAINING TO DEVELOP EMPLOYEES’ ICT SKILLS 2017, % of firms

When it comes to enterprises providing training in ICT skills for their employees, the gap is even bigger.

More than twice as many firms, relatively, in Digital Frontrunner countries provide training to employees to develop their ICT skills, compared to Poland.

The rise Digital Challengers

Improve Poland’s ICT regulatory environment to ensure investment attractiveness

The digitization of trade can be expected to magnify the importance of formal and informal institutional factors for comparative advantage. The ability of countries to enforce contracts, and to ensure data privacy and pro-ICT regulations will grow in importance. Robust protection of intellectual-property (IP) rights will be particularly important, since technology patents often represent a large portion of assets for technology enterprises, a source of their competitive strength.

Investigating the friendliness of the regulatory regime toward ICT in Poland and CEE, we see gaps to Digital Frontrunners. On average, laws related to the use of ICTs (e.g., electronic commerce, digital signatures, consumer protection) are considered to be less well developed, with Poland below the CEE average. In terms of a clear implementation plan for utilizing ICTs to their country’s overall competitiveness (importance of ICTs to government vision), Poland also lags Digital Frontrunners. The same can be said of government purchasing decisions fostering innovation, as well as the promotion of the use of information and communications technologies. Finally, the protection of intellectual property also is deemed weaker in Poland than in Digital Frontrunner markets.

The rise Digital Challengers
Foster entrepreneurship in Poland to stimulate the startup ecosystem

Here we look at the state of the ecosystem for startups in Poland compared to Digital Frontrunners. Our focus is on five areas: the entrepreneurial talent base, the startup community, early-stage startups, growth-phase startups, and enterprises having achieved significant scale. Digital Challengers have a large entrepreneurial talent pool, but their entrepreneurial environment and capabilities could be improved, and there are gaps in funding.

**EARLY-STAGE STARTUPS**

Global Entrepreneurship Index Number of startups per million citizens, 2018

Gap in VC investment as share of GDP, by stage (relative gaps between Poland and the CEE region to the EU average at each stage)

**STARTUP FUNDING IN CEE, 2017**

Gap in VC investment as share of GDP, by stage (relative gaps between Poland and the CEE region to the EU average at each stage)

Beyond the aspect of entrepreneurship, financing is also a factor. Controlling for GDP size, VC investments in Poland are significantly behind Digital Frontrunners.

**EXAMPLES OF HOW DIGITAL STARTUPS CAN REACH SIGNIFICANT SCALE: COMPARISON WITH TRADITIONAL INDUSTRY FIRMS**

Annual revenue, € million

**ANALYSIS: WHAT IS THE IMPACT OF STARTUPS ON THE ECONOMY**

Startups contribute to the economy in three ways: they increase innovation, enable the development of large-scale enterprises, and they create jobs. Innovation is a major long-term driver of economic growth. For historical reasons, Digital Challengers have fewer large-scale private enterprises than Digital Frontrunners. However, this gap is closing, thanks to digitization.

**Note:** Young SMEs: companies with less than 250 employees and operating for no longer than 5 years

SOURCE: Euростат; Global Entrepreneurship and Development Institute; FundersandFirms; Dealroom; Angel.co; Invest Europe; Pitchbook

Digitzation enables

European startups are oriented toward international markets. On average, they generate 55 percent of their revenue outside their domestic markets. Digitization allows startups to replicate digital assets and reach a global consumer base (see examples on the left of two fast-growing startups from CEE that have become global in scale). Although only 34 of the 1,000 fastest-growing firms in Europe are from Digital Challenger countries, 90 percent of them are digital natives (based on the Financial Times’ 1000 Europe’s Fastest Growing Companies 2018 ranking).
**CHAPTER 4: COLLABORATION WITH OTHER CEE COUNTRIES IS KEY**

**SCALE EFFECTS**
Together, Digital Challengers represent €1.4 trillion in GDP, making them the equivalent of the twelfth-largest economy in the world.

**COMMON CHALLENGES**
The region’s countries share some of the same challenges, including “brain drain,” the need to improve and standardize ICT-related solutions, and a long-term need to reskill the workforce.

**SIMILAR STARTING POINTS**
The countries of CEE have high levels of market openness and similar levels of digitization.

**BEST PRACTICES**
Each CEE country has developed digitally in different areas, so sharing best practices can accelerate digitalization.

Leveraging the strengths of neighboring countries could limit the risk of harmful competition and allow for the creation of centers of excellence. Also, this could encourage regional coordination and planning: instead of developing solutions in isolation, Poland could speed up the development of its digital economy by replicating successful strategies already tested elsewhere. See also our *The Rise of Digital Challengers (CEE perspective)* report, where we quote multiple success stories related to stimulating the digital economy across the CEE region.

**COMMON CHALLENGES**
The region’s countries share some of the same challenges, including “brain drain,” the need to improve and standardize ICT-related solutions, and a long-term need to reskill the workforce.

Brain drain is a common issue for most CEE markets. Compared with Digital Frontrunners, Poland exhibits a two and a half times higher emigration rate among individuals with higher education.

**Four arguments for the benefit of collaboration between Digital Challengers**

A. **SCALE EFFECTS**
Together, Digital Challengers represent €1.4 trillion in GDP, making them the equivalent of the twelfth-largest economy in the world.

B. **SIMILAR STARTING POINTS**
The countries of CEE have high levels of market openness and similar levels of digitization.

C. **BEST PRACTICES**
Each CEE country has developed digitally in different areas, so sharing best practices can accelerate digitalization.

D. **COMMON CHALLENGES**
The region’s countries share some of the same challenges, including “brain drain,” the need to improve and standardize ICT-related solutions, and a long-term need to reskill the workforce.

**Trade, 2017, % of GDP**

<table>
<thead>
<tr>
<th>EU Big 5</th>
<th>Digital Fronrunners</th>
<th>Digital Challengers</th>
<th>Poland</th>
</tr>
</thead>
<tbody>
<tr>
<td>67</td>
<td>128</td>
<td>137</td>
<td>103</td>
</tr>
</tbody>
</table>

NOTE: Digital Fronrunner figure not including Luxembourg (strong outlier with a 424 percent result).

SOURCE: World Bank

**Emigration rate, % of total population living in another EU country**

<table>
<thead>
<tr>
<th>% of population with higher education living in another EU country</th>
<th>Digital Challengers</th>
<th>Poland</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>11%</td>
<td>13%</td>
</tr>
</tbody>
</table>

NOTE: Other common challenges explored in our CEE report *The rise of Digital Challengers: How digitalization can become the next growth engine for Central and Eastern Europe.*

SOURCE: OECD
CHAPTER 5: IMPLICATIONS FOR POLICY MAKERS, BUSINESS LEADERS, AND INDIVIDUALS IN POLAND

Build skill sets for the future

KEY FACTS ABOUT POLAND

- Poland has a large future need for workforce reskilling: up to 49 percent of workplace activities could potentially be automated by 2030, using technology that already exists.
- Poland’s general population lags Digital Frontrunners in basic and advanced digital skills – the older the age group, the bigger the gap.
- Despite a large STEM graduate talent pool, the share of ICT specialists in the Polish labor force (2.6 percent) lags both the CEE and Digital Frontrunner average (2.9 percent and 4.8 percent, respectively).
- The adult participation rate in training in Poland (26 percent of people aged 25–64), is significantly lower than the CEE and Digital Frontrunner average (36 percent and 54 percent, respectively).
- The emigration rate for well-educated members of the population in Poland is more than double the average for Digital Frontrunners.

Implications for policy makers

- Develop a wide-ranging reskilling strategy
- Update youth education for the future
- Promote lifelong learning and mid-career training
- Actively counteract talent leakage
- Leverage independent work platforms

Diagnose the state of the current workforce, and forecast the necessary shift in skill sets for the future, e.g., develop a labor market model, identify sector shifts, understand the gap between current and future skills.

Search for relevant solutions and benchmarks, e.g., look at the experiences of other markets such as Canada, Denmark, Singapore.

Commit to the program and measure the effectiveness of actions, e.g., measure changes in employment rates and wages, hold educators responsible for the outcomes of reskilling programs.

Ensure standard digital infrastructure, integrate digital tools and resources in schools (e.g., online courses, virtual reality, gamification), and equip teachers with the necessary skills.

Update the curricula of pre-university schools, e.g., increase focus on skills such as programming, entrepreneurship and initiative-taking, leadership and managing others, communication skills. “Zwolnieni z Teorii” is a good example of a related initiative of this kind in Poland.

Promote specialization in STEM subjects to build an ICT talent base, focusing especially on enabling women to study technology in order to close the gender gap. Widely recognized programs of this kind in Poland include “IT for SHE” or “Dziewczyny na Politechniki”.

Cooperate with the private sector to create practical education programs and support apprenticeships.

Create an ecosystem that helps adults reskill and upskill: build motivation to learn among adults, offer practical training and/or incentives, provide support during the transition period, and assist in job-seeking.

Support new types of education credentials, e.g., digital programs.

Increase accessibility of education by improving people’s English-language skills, enabling them to access global knowledge resources.

Keep ICT specialists from leaving the country, e.g., encourage universities to collaborate with the private sector to provide high-quality internships as part of degree programs or immediately after graduation, stimulate the startup ecosystem to attract local talent to seek tech-related jobs locally.

Attract ICT specialists who have left back to the country, e.g., provide scholarships for young people studying abroad in exchange for a commitment to come back and work in the home country.

Attract additional ICT specialists from around the globe, e.g., work with the private sector to determine the demand for highly skilled workers and simplify the migration process for such individuals.

Carry out research to understand the size and growth of the gig and independent-work economy.

Consider updating policies supporting the gig economy and worker protection initiatives.
CHAPTER 5: IMPLICATIONS FOR POLICY MAKERS, BUSINESS LEADERS, AND INDIVIDUALS IN POLAND

Support technology adoption

KEY FACTS ABOUT POLAND

Poland trails Digital Frontrunners in the European Commission’s Government Digitization Index which, among others, measures the availability of key e-government solutions, such as electronic identification (eID), digital documentation, electronic authentication changes, and digital post in communication with citizens and businesses.

At the same time, take-up of e-government services is particularly low, with less than one out of every three citizens aged 16–74 accessing public services online, compared with three out of four Digital Frontrunner citizens.

The adoption of digital tools and skills by companies in Poland is much lower than in Digital Frontrunners. Only 13 percent of companies in Poland exhibit a very high or high adoption rate for digital tools, compared with the CEE average of 16 percent and Digital Frontrunner average of 35 percent.

Implications for policy makers

- Ensure strong support from the government to drive digitization, e.g., set up a dedicated task force/ministry charged with tackling regulatory barriers to new business models and stimulating growth of the digital economy.
- Speed up the development of online public services, e.g., promote integrated online public-service platforms and online signatures. Examples of progress in Poland in this area include the creation of ePuap, the nationwide platform for communication of citizens with public administrations.
- Support the adoption of online public services, e.g., launch educational campaigns, promote online solutions during offline interactions, decrease adoption barriers by creating simple user interfaces.
- Develop digital skills among public-sector employees.
- Digitize back-end government processes, focusing on the most labor-intensive and expensive processes first.
- Unleash big data capabilities by standardizing government data and opening it up (for instance, in the form of virtual data repositories) to third-party collaborators (researchers, businesses, startups, etc.) so they can build applications on top of it.
- Invest in Internet of Things (IoT) infrastructure in the public sector, e.g., support smart city and human health solutions strongly leveraging public data and resources.

Promote the benefits of digital transformation, focusing on SMEs and major sectors that lag a long way behind. Local initiatives of such kind in Poland include the setting up of the “Platform of the future industry” (Platforma Przemysłu Przyszłości) foundation in 2018.

Create incentives for companies, especially SMEs, to use digital tools, e.g., make business-to-government interactions digital by default.

Leverage external funding, e.g., from the EU, to finance the most promising initiatives supporting the development of the digital economy.
**CHAPTER 5: IMPLICATIONS FOR POLICY MAKERS, BUSINESS LEADERS, AND INDIVIDUALS IN POLAND**

**Improve the ecosystem for startups**

**KEY FACTS ABOUT POLAND**

- While Poland exhibits higher entrepreneurship levels than the CEE average (see Chapter 3), it is still trailing Digital Frontrunner markets.

- The number of startups per million citizens in Poland, at 27, is less than half the average of 58 for the CEE region – and far behind the Digital Frontrunner average of 215.

- As a share of GDP, venture capital investments in Poland are one-fifth of the average investment levels in the European Union.

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**Implications for policy makers**

- **Embed entrepreneurship in formal education, especially in STEM subjects.**
- **Link entrepreneurial education to startups, accelerators, incubators, and business angels.**
- **Expand the entrepreneurial talent pool by attracting talent from outside the region.**

**Improve the entrepreneurial talent pool**

- Position startup hubs high on municipal governments’ agendas, and actively communicate the importance of startups.
- Create physical startup clusters where they can cooperate at scale, e.g., Station F in Paris, Blk 71 in Singapore.
- Support the creation of testing grounds for new business models, e.g., implement regulatory sandboxes enabling entrepreneurs to try out their innovations in real market conditions. Poland has taken the first steps toward the creation of a regulatory sandbox for financial technology (so called “fin-techs”) players, initiating a virtual regulatory sandbox pilot in 2018.

**Increase access to capital**

- Simplify business angel investing, e.g., with standardized, easily available forms and corporations with low capital requirements.
- Provide additional incentives for business angels and serial entrepreneurs, e.g., tax breaks.
- Simplify procedures for obtaining and reporting public/European Union fund.
CHAPTER 5: IMPLICATIONS FOR POLICY MAKERS, BUSINESS LEADERS AND INDIVIDUALS IN POLAND

Strengthen cross-border digital collaboration

KEY FACTS ABOUT POLAND

Poland can only capture the full potential of digitization by cooperating closely with other CEE economies. Four reasons underpin the benefits of acting together:

- **Similar starting points**: Poland, like other CEE markets, exhibits high levels of market openness and similar levels of digitization, besides cultural and historic commonalities.
- **Scale effects**: As the CEE region, Digital Challengers represent €1.4 trillion in GDP – almost three times the size of the Polish economy.
- **Common challenges**: Poland faces the same challenges as many other CEE markets, importantly the “brain drain” and need to reskill the workforce in the long-term.
- **Best practices**: Poland has developed digitally in different areas compared to other CEE markets – sharing best practices can accelerate digitization.

See also our regional perspective report for more details on already-established forms of cooperation between Digital Challenger and Digital Frontrunner markets.

Implications for policy makers

- **Create a strong digital pillar within regional collaboration platforms (e.g., 3SI, V4, 199)**
- **Ensure standardized, flexible digital policy solutions across the region**
- **Implement cross-border projects facilitating the digitization of the region**
- **Cooperate in the management of social change as a result of changes in the labor market**
- **Establish a coalition favoring pro-digital legislative measures at the European level, strengthening the voice of individual countries in EU policy discussions.**
- **Assemble working groups at relevant levels to develop a pipeline of priority collaboration areas, e.g., representatives from digitization ministries at the national level, private-sector leaders.**
- **Facilitate the sharing of best practices and experience in the region – disseminate what has worked well regarding regulatory policy and investment.**
- **Cooperate to abolish barriers to the full functioning of the Digital Single Market such as geo-blocking, unjustified data localization practices, regulatory barriers.**
- **Support the standardization and free flow of cross-border nonpersonal data in the public sector, as well as the technological interoperability of digital infrastructures, e.g., 5G networks.**
- **Establish common security models and cybersecurity standards.**
- **Facilitate cross-border digital infrastructure projects that close the gaps across the region, e.g., fiber optics, 5G technology, strategic e-commerce logistics centers, complementary energy infrastructures.**
- **In 2018, as part of the Three Seas Initiative (3SI) Summit, Poland has proposed the creation of a 3SI Digital Highway, including investments in digital infrastructure across the region enabling improved data transfers and bridging the gaps in the communication infrastructure.**
- **Establish common platforms for cross-border public-sector services, including cross-border integration of eID systems, increasing their effectiveness and reducing administrative burdens for enterprises.**
- **An example of cross-border collaboration in this space is the Nordic Council’s efforts to integrate electronic authentication systems.**
- **Strengthen cross-border industry cooperation over research and education supporting joint technology initiatives such as autonomous transportation, smart cities, human health solutions.**
- **An example of cross-border collaboration here is the Franco-German alliance in artificial intelligence.**
- **In 2018, during the 2018 Economic Forum in Krynica, government representatives of Poland and Lithuania have signed a contract according to which the planned “Via Baltica” road infrastructure section will become an “intelligent route” on which the 5G and autonomous car technologies will be tested.**
- **Improve cross-border freedom of movement, skills accreditation, and worker safeguard procedures.**
- **Join forces to tackle talent pool issues such as the brain drain and the need for more ICT and digital skills at all educational levels, e.g., initiate a joint promotional effort marketing the region as a digital hub to attract talent and investments.**
Key facts about Poland

Polish enterprises trail Digital Frontrunner peers in terms of digitization, looking at the share of enterprises (selected examples):

- Using social media for branding and marketing (SME gap: -50 percent, large enterprise gap: -26 percent)
- Selling online (SME gap: -81 percent, large enterprise gap: -23 percent)
- Participating in cross-border e-commerce sales within the European Union (SME gap: -58 percent, large enterprise gap: -63 percent)
- Analyzing big data (SME gap: -54 percent, large enterprise gap: -51 percent)
- Using software solutions such as Customer Relationship Management systems (SME gap: -39 percent, large enterprise gap: -3 percent)

In terms of providing formal employee training for ICT skill development, the share of companies conducting such activities (at 12 percent) is significantly lower than the Digital Frontrunner average (at 29 percent).

Implications for business leaders

- In the digital economy, adapt your business model to meet the demands of the digital economy, e.g., unbundle and tailor your product or turn it into a service.
- Anticipate and, if necessary, prepare for digital disruption to demand for your product, e.g., unbundle and tailor your product or turn it into a service.
- Anticipate and, if necessary, prepare for how digital disruption will change supply in your market, e.g., analyze the possibility of new online players and anticipate changes in the value-chain structure caused by automation.
- Investigate the potential for forming strategic alliances with innovative organizations and enterprises changing the face of the market (e.g., startups) to create new competences in your organization.
- Leverage social media and online advertising to connect with customers in real time, in a targeted and measurable way.
- Use the Internet to increase your revenue growth capabilities by utilizing e-commerce, e.g., build an online presence for your organization, develop your own e-commerce platform, or make use of a multi-vendor e-commerce platform.
- Streamline and automate internal operations where possible, implementing for, e.g., e-invoicing suitable for automated processing, resource management software tools, focusing on the most labor-intensive, expensive processes first.
- Leverage the power of big data and cloud computing for improved decision making and process optimization.
- Build cybersecurity capabilities to ensure competitive dynamics and customer trust.
- Put more focus on assessing candidates’ skills, e.g., through open competitions, games, hackathons.
- Develop a talent pipeline to shift from reactive to proactive recruiting, e.g., offer workshops and apprenticeships to help candidates build the desired skills.
- Leverage contractors or freelancers to fill talent gaps, using digital platforms to optimize the search effort.
- Enable reskilling and upskilling opportunities, e.g., provide practical in-house training, offer financial support, create opportunities for formal and informal knowledge sharing.
- Start the change from the top, fostering understanding and conviction among employees on the benefits of digital: ensure that leadership and middle management act as role models in terms of their use of digital tools.
- Support employees in developing their skills and knowledge, e.g., encourage employees to cultivate their curiosity about creating opportunities in combining emerging technologies with innovative services, implement reinforcement mechanisms.
- Prioritize agility and learning over forecasting and planning.
- Form strong digital collaborations within trade associations, focusing particularly on SMEs.
CHAPTER 6: RECAP OF KEY MESSAGES FOR THE CEE REGION

1. THE GROWTH ENGINE OF CENTRAL AND EASTERN EUROPE IS LOSING MOMENTUM

- Productivity lags behind Europe
- CEE has historically low unemployment and working hours above EU average
- Economy in CEE is undercapitalized and the gap is closing very slowly

<table>
<thead>
<tr>
<th>CEE Digital Challengers</th>
<th>EU Big 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity, GDP per hour worked, 2017, €</td>
<td>31</td>
</tr>
<tr>
<td>Unemployment, 2017, %</td>
<td>6.5</td>
</tr>
<tr>
<td>Hours worked per year per employee, 2017</td>
<td>1,791</td>
</tr>
<tr>
<td>Capital stock per employee, 2016, € million</td>
<td>130</td>
</tr>
<tr>
<td>Gross capital formation, 2012–16, average growth rate, %</td>
<td>0.8</td>
</tr>
</tbody>
</table>

2. DIGITIZATION CAN BE THE ANSWER TO THIS CHALLENGE

- Realizing the aspirational scenario would translate into an extra 1 percentage point on GDP growth each year through 2025 in CEE

<table>
<thead>
<tr>
<th>Digital economy in 2016, € billion</th>
<th>Business as usual</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>76 (6% of GDP)</td>
<td>13 (9% of GDP)</td>
<td>276 (16% of GDP)</td>
</tr>
</tbody>
</table>

3. THE COUNTRIES IN CEE ARE UNIQUELY POSITIONED TO CAPTURE THIS OPPORTUNITY

- Despite a lower size of the digital economy, Digital Challengers can build on a strong historical growth momentum
- Digital Challengers have the necessary fundamentals in place for further digitization:
  - Good primary and secondary education
  - A large STEM and ICT graduate talent pool
  - High-quality, affordable digital infrastructure
  - A milder legacy technology lock-in
  - An already-emerging, vibrant digital ecosystem

4. HOW TO CAPTURE THE POTENTIAL?

- ALL STAKEHOLDERS NEED TO ACT FOR A SUCCESSFUL TRANSITION

  - Implications for policy makers
    - Build skills sets for the future, including updating youth education for the future, promoting lifelong learning, and countering brain drain
    - Support technology adoption by the public sector
    - Strengthen regional cross-border digital collaboration
    - Improve the ecosystem for startups

  - Implications for business leaders
    - Adapt your business model to meet the demands of the digital economy
    - Use digital tools for revenue growth, including boosting your export capabilities
    - Use digital tools to improve your bottom line
    - Invest in human capital and prepare talent strategies for the future, including an updated approach to recruiting and actively driving reskilling and upskilling

  - Implications for individuals
    - Prepare for the advent of the digital economy by investing in lifelong learning to improve skills sets and taking advantage of digital tools in all aspects of life

5. COLLABORATION BETWEEN CEE DIGITAL CHALLENGERS IS KEY

- There are four reasons why cooperation is necessary to capture the full potential of digitization in the CEE region:
  - Each CEE country has developed digitally in different areas; sharing best practices can accelerate digitization
  - The countries of CEE have high levels of market openness and similar levels of digitization
  - Together, Digital Challengers represent €1.4 trillion in GDP, making them the equivalent of the 12th largest economy in the world
  - The region’s countries face similar challenges, importantly the “brain drain” and the need to reskill the workforce

6. THE TIME TO ACT IS NOW – OTHERWISE THE REGION MAY MISS THE DIGITAL OPPORTUNITY

- Digital Challengers are enjoying an economic boom; this could give new digital initiatives a head-start
- The Fourth Industrial Revolution will transform the economy and labor market, requiring an immediate response
- The global rules of the digital game are crystallizing; to compete, Digital Challengers need to develop a clear digital agenda

WHY IS DIGITIZATION KEY FOR CEE? HOW TO CAPTURE THE POTENTIAL?

<table>
<thead>
<tr>
<th>Scale effects</th>
<th>Best practices</th>
<th>Similar starting points</th>
<th>Common challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4</td>
<td>1.7</td>
<td>1.7</td>
<td>1791</td>
</tr>
</tbody>
</table>
Methodology appendix

All calculations were performed using real values for GDP, the value of e-commerce and consumer offline spending. We used a fixed exchange rate from 2016 for all years analyzed.

Digitization Index

One of the goals of the Digitization Index is to show the level of digital penetration across sectors by indicating the gap between the "digital frontier" (the most advanced digital sector) and the other parts of the economy. The Digitization Index presents a view across sectors of how corporations invest in ICT (a proxy for ICT spending, calculated as the value of the ICT sector less consumer spending on communication services and equipment) and how they digitize their internal processes. It uses eight indicators to capture different ways in which companies are digitizing. For instance, digital assets include spending on computers, software and telecom equipment and the stock of ICT assets. Workforce, on the other hand, is calculated on a per-worker spending basis. We measure this by aggregating digitization scores across sectors, which is easily comparable between European countries against the United States. To calculate the digitization scores, the Digitization Index is weighted for the economic size of the sector, to measure the distance of each sector from the global digital frontier, namely the ICT sector in the United States. This sector was chosen as the global digital frontier as previous studies show that it is the most digitized sector in the world across comparable groups of metrics.

The digital economy

Definitions on the size of the digital economy vary significantly in terms of their scope. On one end of the spectrum, it is often defined simply as the value of the ICT sector. On the other end of the spectrum, institutions such as the IMF uses studies that define it as all digital activities in all sectors of the economy. In our report we use the latter definition, while ensuring that the digital economy in our definition is quantifiable and comparable between countries.

Impact scenarios

Baseline growth

In the basic scenario for 2025, we assume that the digital economy continues growing at the historical growth rate for 2012-2016.

E-commerce and offline spending

In the acceleration scenario for 2025, we assume fixed growth of e-commerce and consumer offline spending based on the historical weighted-average growth trend for the CEE region between 2012-2016.

Digitization potential in the public and private sectors

We assume that the Digitization Index in CEE will reach the level found in the Digital Frontrunner Sweden. We use Sweden as a benchmark because of its digital maturity and its inspiring digital growth in recent years. To assess the potential impact, we first analyze productivity and digitization levels in CEE. We then calculate the digitization potential in CEE based on the Swedish sectors’ productivity rates, incorporating digitization multipliers. Finally, we estimate the potential productivity growth in the CEE economy caused by traditional ICT growth vs. the productivity baseline for each country.

Internet of Things, Big Data and artificial intelligence use cases

We assess how the Internet of Things (IoT) can create value by analyzing more than 150 IoT use cases across the global economy. Based on our prioritization, we examine the 57 of these use cases that promise to bring the highest value. We use bottom-up modeling to assess the potential benefits that these use cases can generate, including productivity improvements, time savings and improved asset utilization. We also include an approximate economic value for reduced disease, accidents and deaths.

Automation potential

To understand the impact of automation on the labor market, the McKinsey Global Institute analyzed around 800 different occupations and more than 2,000 work activities. Each of the activities was assigned a combination of 18 predefined performance capabilities (for example, fine motor skills, sensory perception, natural language understanding). Its automation potential based on technologies available today was then estimated. By aggregating the automation potential of activities and their share in total working hours, we can estimate the potential for each occupation and industry.

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Endnotes


2. On the one hand, some experts put forward a narrow definition of digital economy limited to online platforms and the activities on these platforms, focusing purely on the Internet and Communication Technologies (ICT) sector. On the other, broader definitions include all activities that use digital data – following this logic, the digital economy could constitute a major part of most industries, ranging from agriculture and arts to research & development. See for example: International Monetary Fund Staff Report, Measuring the Digital Economy, February 2018.


5. This sector was chosen as the global digital frontier (i.e. the most digitized sector) by previous MGI research. For more information, see McKinsey Global Institute, “Digital America: A tale of the haves and have-mores,” December 2015.


7. Productivity growth captured by increase of traditional ICT usage (software, hardware, telecommunications) to the level of Sweden (in terms of its share of sectoral GDP), treated as a Digital Frontrunner benchmark.

8. Based on the Total Economy Database by The Conference Board.

9. McKinsey analysis based on data from the Total Economy Database by The Conference Board – for the purpose of the exercise, assuming historical productivity growth (2.6%).


11. Ibid.


13. Based on difference between hours worked per type of skill in 2016 and forecast hours worked in 2030. Numbers may not sum due to rounding. Western Europe: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom.

14. The FT 1000: the complete list of Europe’s fastest growing companies: https://ig.ft.com/ft-1000/2018/

15. More information available online at: https://artyweb.pl/zabka-zaprezentowala-swoj-sklep-przyszlosci-ktory-powstal-we-wespolnaujacy-z-microsoft/


