

The rise of Digital Challengers

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

Perspective
on Poland



Digital/McKinsey

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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.



Czech Republic



Hungary



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Romania



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Preface

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 challengers 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 Żarowski, 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.

1 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.

2 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 economies 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.

3 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 capita), participation rates in adult learning among the general population, as well as the adoption of digital tools by companies for cross-border e-commerce.

4 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.

5 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.

6 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, now is the time when global rules of the digital game are crystallizing. Effectively navigating the digital transformation ahead requires a clear digital agenda. ■

Polska jako Cyfrowy Challenger

Dzięki potencjałowi rozwojowemu i ekonomicznemu cyfryzacji PKB Polski może być wyższy aż o 64 miliardy euro (ok. 275 mld złotych) do 2025 roku. Umożliwiłoby to Polsce zwiększenie konkurencyjności na globalnych rynkach, poprawę sytuacji ekonomicznej 38 milionów obywateli, a nawet awans do grona najbardziej zaawansowanych cyfrowo gospodarek w Europie.

1 DOTYCHCZASOWE MOTORY WZROSTU POLSKIEJ GOSPODARKI SŁABNĄ

Przez ostatnie trzy dekady Polska notowała wysokie tempo rozwoju (PKB na mieszkańca wzrósł o 123% w latach 1996-2017). Lokomotywami wzrostu były tradycyjne sektory gospodarki, dynamiczny eksport, inwestycje zagraniczne, rosnąca siła robocza przy stosunkowo niskich kosztach pracy oraz środki z Unii Europejskiej. Jednak wiele z tych czynników zaczyna wygasać. Zmagając się m.in. z problemem relatywnego niedostatku kapitału, polska gospodarka stoi również przed wyzwaniami na rynku pracy: przy rekordowo niskim bezrobociu (4,9% w 2017 roku) siła robocza staje się coraz droższa.

Jeśli Polska chce pozostać na ścieżce szybkiego rozwoju gospodarki i wzrostu zamożności społeczeństwa, musi ponownie zdefiniować strategię rozwoju i poszukać nowych źródeł wzrostu.

2 CYFRYZACJA JAKO NOWY MOTOR WZROSTU GOSPODARKI POLSKI MOŻE PRZYNIEŚĆ ZWIĘKSZENIE PKB O 64 MILIARDY EURO (OK. 275 MLD ZŁOTYCH) DO 2025 ROKU

Według naszych analiz przyspieszenie cyfryzacji i oparcie gospodarki na nowych technologiach mogłoby stać się nowym motorem wzrostu, którego Polska tak pilnie potrzebuje. W 2016 roku gospodarka cyfrowa w naszym kraju stanowiła 6,2% PKB, czyli równowartość 26 miliardów euro (ok. 112 miliardów złotych).

Przyspieszenie rozwoju gospodarki cyfrowej może nie tylko przynieść Polsce dodatkowe 64 miliardy euro (ok. 275 miliardów złotych) do 2025 roku, ale też pozwolić całkowicie zniwelować dystans do najbardziej zaawansowanych cyfrowo gospodarek Europy Północnej (czyli tzw. Cyfrowych Liderów – ang. Digital Frontrunners: Belgia, Dania, Estonia, Finlandia, Holandia, Irlandia, Luksemburg, Norwegia i Szwecja). W tym ambitnym scenariuszu odsetek PKB, który generuje gospodarka cyfrowa Polski, wzrósłby z 6,2% aż do 15% PKB w roku 2025. Mogłoby to oznaczać w tym okresie dodatkowy punkt procentowy wzrostu PKB każdego roku, co spowodowałoby aż 30-procentowy przyrost w stosunku do prognozowanej dynamiki rozwoju kraju.

Alternatywny scenariusz, zakładający utrzymanie obecnego kierunku rozwoju, oznaczałoby wzrost gospodarki cyfrowej tylko o 22 miliardy euro (ok. 94 miliardów zł) do 2025 r., co odpowiadałoby jedynie 9% PKB. W tym scenariuszu Polska pozostałaby daleko w tyle za Cyfrowymi Liderami z Europy Północnej.

3 POLSKA MA SILNE PODSTAWY DO DALSZEGO ROZWOJU SVOJEJ GOSPODARKI CYFROWEJ

W niniejszym raporcie wskazujemy, że Polska jest jednym z dziesięciu krajów regionu, które ze względu na swój cyfrowy potencjał uważamy za tzw. Cyfrowych Challengerów (ang. Digital Challengers). Oprócz Polski w skład tej grupy wchodzi: Bułgaria, Czechy, Chorwacja, Litwa, Łotwa, Rumunia, Słowacja, Słowenia i Węgry. Szczegółowe analizy dotyczące potencjału cyfrowego dla całego regionu Europy Środkowo-Wschodniej można znaleźć w publikowanym równolegle raporcie The Rise of Digital Challengers: How digitization can become the next growth engine for Central and Eastern Europe.

Poziom cyfryzacji w krajach tej grupy jest na razie niższy niż u Cyfrowych Liderów z Europy Północnej czy u tzw. Wielkiej Piątki UE (Francja, Hiszpania, Niemcy, Wielka Brytania i Włochy).

Polska ma jednak silne podstawy, aby przyspieszyć cyfryzację swojej gospodarki. Obecnie wielkość cyfrowego segmentu gospodarki (6,2% PKB w 2016 roku) pozostaje nieco poniżej średniej dla regionu (6,5%) oraz znacznie w tyle za Szwecją (9%). Nasz kraj jest jednak stosunkowo blisko Wielkiej Piątki UE (średnio 6,9% PKB).

Co więcej, w ostatnim czasie tempo rozwoju tej części gospodarki w Polsce znacząco przyspieszyło. W latach 2012-2016 gospodarka cyfrowa rosła o 7% rocznie, co było dwukrotnie wyższym wynikiem niż w krajach Wielkiej Piątki UE. Dodatkowo stosunkowo dobra jakość szkolnictwa podstawowego i średniego (podobne wyniki testów PISA co u Cyfrowych Liderów na północy Europy), liczna grupa absolwentów kierunków ścisłych, rozbudowana i nowoczesna infrastruktura cyfrowa, jak również niższy niż w krajach Europy Zachodniej i Północnej stopień uzależnienia przemysłu od technologii poprzednich generacji pozwalają Polsce stawiać sobie bardzo ambitne cele w zakresie rozwijania gospodarki cyfrowej i swojego statusu jako Cyfrowego Challengeera.

Już dziś są w Polsce sektory, np. finansowy i logistyczny, gdzie poziom cyfryzacji jest wyższy niż średnia dla wszystkich badanych krajów Europy Środkowo-Wschodniej. Z drugiej strony, w wielu ważnych obszarach z punktu widzenia stymulowania gospodarki cyfrowej Polska osiąga wyniki albo tylko zbliżone do średniej dla regionu, albo wręcz od niej niższe. Dotyczy to w szczególności obszarów takich jak ekosystem

start-upów (znacznie niższa liczba start-upów na mieszkańca), odsetek dorosłych doksztalających się wśród ogółu społeczeństwa, a także wykorzystywanie narzędzi cyfrowych w sprzedaży e-commerce za granicę.

4 CYFROWA TRANSFORMACJA GOSPODARKI WYMAGA DZIAŁAŃ I WSPÓŁPRACY ADMINISTRACJI PUBLICZNEJ, BIZNESU I OBYWATELI

Aby ambitny scenariusz cyfryzacji w Polsce został zrealizowany, niezbędne są działania wszystkich podmiotów mających wpływ na gospodarkę. Firmy powinny dokładnie przeanalizować, jakie nowe możliwości daje im cyfryzacja gospodarki i jak je wykorzystać, m.in. wdrażając więcej narzędzi cyfrowych. Pozwoli im to dalej zwiększać produktywność, znaleźć nowych klientów i łatwiej prowadzić ekspansję na globalne rynki. Także sektor publiczny mógłby bardziej wykorzystywać technologie, które pozwoliłyby zwiększyć wydajność pracy i jakość usług świadczonych na rzecz firm i obywateli. Z kolei mieszkańcy w kontekście nadchodzących zmian na rynku pracy powodowanych przez automatyzację powinni inwestować w kształcenie ustawiczne, które ułatwi im przekwalifikowanie się i zdobycie nowych umiejętności wymaganych przez pracodawców. Proces ten powinien się odbywać przy jednoczesnym promowaniu przez decydentów wykorzystywania nowych technologii i ich wdrażania. Powinni oni także wspierać programy przekwalifikowywania się i powiększania kompetencji pracowników oraz działań na rzecz wzmocnienia ekosystemu wsparcia dla start-upów.

5 KLUCZEM DO SUKCESU JEST WSPÓŁPRACA KRAJÓW EUROPY ŚRODKOWO-WSCHODNIEJ JAKO CYFROWYCH CHALLENGERÓW

Cyfrowi Challengerzy, czyli kraje Europy Środkowo-Wschodniej, w tym Polska, mogą wykorzystać tę szansę i dogonić Cyfrowych Liderów z Północy tylko wtedy, gdy będą ze sobą ściśle współpracować. Przemawiają za tym cztery główne powody:

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

Wspólne wyzwania – Polska stoi w obliczu wielu tych samych wyzwań, co pozostałe rynki Europy Środkowo-Wschodniej, czyli przede wszystkim drenażu wykwalifikowanej siły roboczej oraz potrzeby przekwalifikowywania pracowników ze względu na nasilającą się automatyzację. Wspólne wysiłki w regionie mogą pomóc znaleźć i wdrożyć najsukcesowniejsze rozwiązania.

Podobne punkty wyjścia – podobieństwa kulturowe i historyczne to niejedyny elementy łączące kraje Europy Środkowo-Wschodniej. Polska, tak jak inne gospodarki regionu, wykazuje wysoki poziom otwartości rynku i zbliżony poziom cyfryzacji. Należy dodać do tego również zbliżone doświadczenia w obszarze inwestycji cyfrowych i polityki regulacyjnej.

Najlepsze praktyki – w niektórych obszarach Polska ma jednak inne atuty niż reszta krajów regionu. Dzielenie się najlepszymi praktykami może przyspieszyć cyfryzację innych gospodarek i wzmocnić ich atrakcyjność dla polskich firm i odbiorców. Dodatkowo wspólne wykorzystanie atutów sąsiadujących ze sobą krajów mogłoby ograniczyć ryzyko szkodliwej konkurencji i umożliwić stworzenie w poszczególnych państwach wyspecjalizowanych centrów doskonałości (ang. centers of excellence). Mogłoby to również zachęcić do większej regionalnej koordynacji i planowania działań. Zamiast opracowywać zawsze własne rozwiązania w oderwaniu od innych, Polska mogłaby przyspieszyć rozwój gospodarki cyfrowej dzięki wykorzystaniu sprawdzonych działań przetestowanych w innych krajach.

W przyszłości Polska, wraz z pozostałymi Cyfrowymi Challengerami z Europy Środkowo-Wschodniej, mogłaby wspólnie prowadzić prace nad projektami cyfrowymi i regulacjami w skali regionu. Co więcej, silna koalicja krajów Europy Środkowo-Wschodniej sprawiłaby, że ich „cyfrowe” interesy wybrzmiałyby znacznie wyraźniej na forum europejskim.

6 NALEŻY DZIAŁAĆ JUŻ TERAZ – W PRZECIWNYM RAZIE POLSKA MOŻE PRZEGAPIĆ CYFROWĄ SZANSĘ

Aby w pełni wykorzystać cyfrową transformację, należy dostrzec unikalną szansę i działać natychmiast. To dobry moment m.in. dlatego, że obecnie polska gospodarka rozwija się bardzo szybko. Jednak powszechnie wiadomo, że okresy dobrej koniunktury nie trwają wiecznie. Już teraz widać pierwsze oznaki tego, że dotychczasowe motory wzrostu zaczynają hamować.

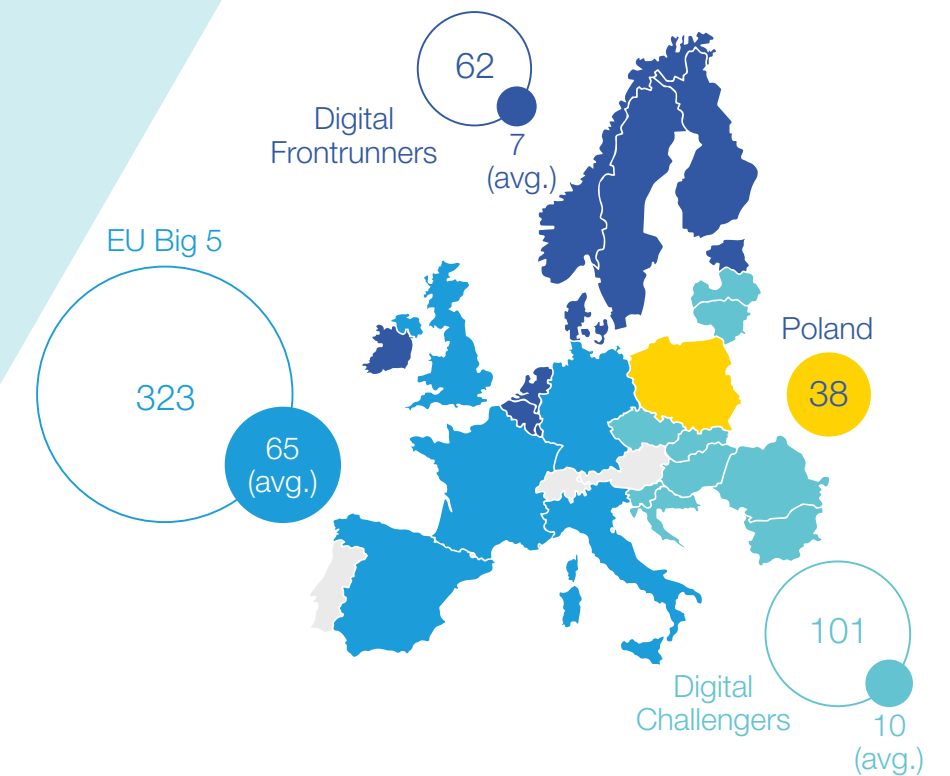
Dodatkowo technologia może gruntownie przekształcić polski rynek pracy – nasza analiza pokazuje, że nawet do 49 proc. czasu pracy w Polsce może zostać zautomatyzowane do 2030 roku przy wykorzystaniu już istniejących technologii. Oznacza to z jednej strony szansę na wzrost produktywności, z drugiej zaś wyzwania związane z dostosowaniem siły roboczej do nowego rynku pracy. Dlatego działania są niezbędne już teraz. Jednak przede wszystkim to właśnie teraz kształtują się nowe zasady globalnej cyfrowej rozgrywki. Aby więc skutecznie przejść transformację cyfrową i wykorzystać jej pełen potencjał, trzeba koniecznie stworzyć jasną i szczegółową strategię działania. ■

Poland and Digital Challengers at a glance

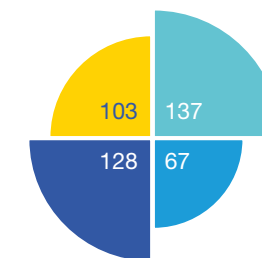
From the perspective of economy and digitization, three broad groups of countries have emerged in Europe over the last three decades. The first group is formed by relatively small, open economies with very high digitization rates. This so-called Digital Frontrunners group comprises Northern European and Benelux countries: Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, the Netherlands, Norway, and Sweden.¹ 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. ■

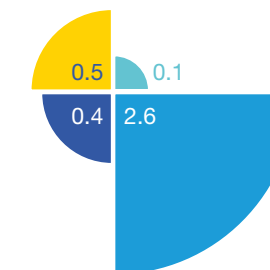
REGIONAL POPULATION IN TOTAL VS. COUNTRY AVERAGE, 2017, MILLIONS



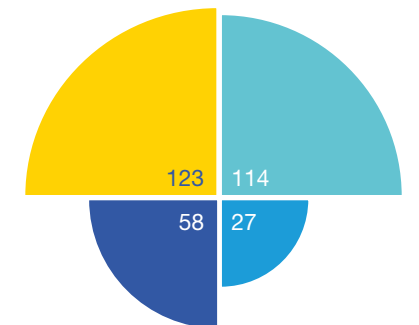
MARKET OPENNESS, 2017, TRADE AS % OF GDP



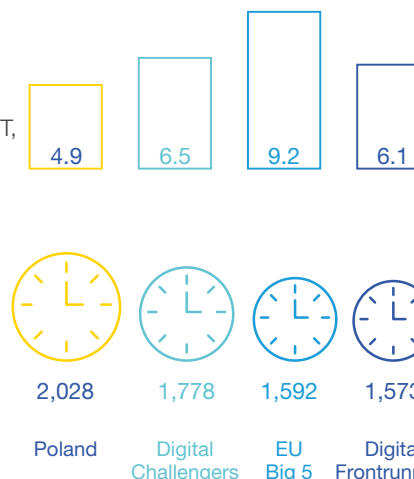
GDP COUNTRY AVERAGE, 2017, € trillion



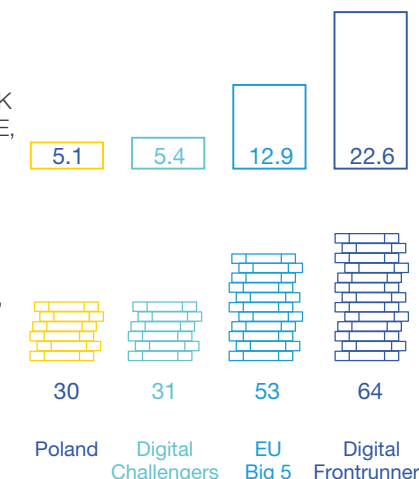
GDP PER CAPITA GROWTH 1996–2017, %



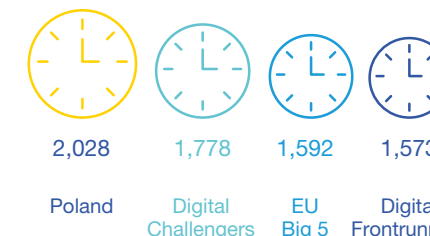
UNEMPLOYMENT, 2017, %



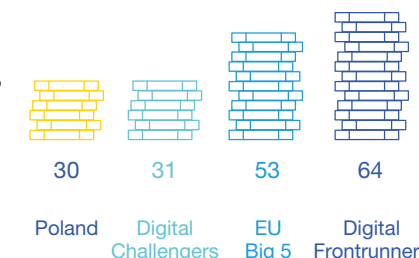
CAPITAL STOCK PER EMPLOYEE, 2016, € million



WORKING HOURS PER YEAR, 2017



PRODUCTIVITY, 2017, GDP per hour worked, €



EU BIG 5: France, Germany, Italy, Spain, United Kingdom
 Digital Frontrunners: Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, the Netherlands, Norway, Sweden
 Digital Challengers: Bulgaria, Czech Republic, Croatia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia

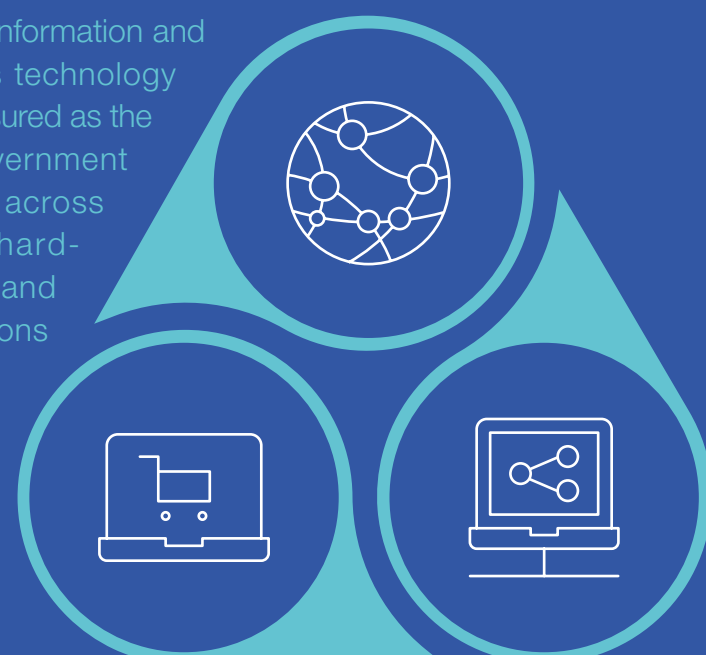
SOURCE: World Bank

Our approach to measuring the digital economy in Poland

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.² 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,³ 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.

The size and growth of the digital economy in Poland

	Share of digital economy, 2016, % of GDP	Digital GDP per capita, 2016, €	Growth of digital economy, 2012–16, %	Growth of non-digital economy 2012–16, %
POLAND	6.2	693	7.0	2.6
DIGITAL CHALLENGERS AVERAGE	6.5	746	6.2	2.6
EU BIG 5 AVERAGE	6.9	2,264	3.1	1.2
DIGITAL FRONTRUNNERS AVERAGE	7.3	3,276	5.9	2.0
SWEDEN	9.0	4,152	9.9	2.2

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.⁴ 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.⁵

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

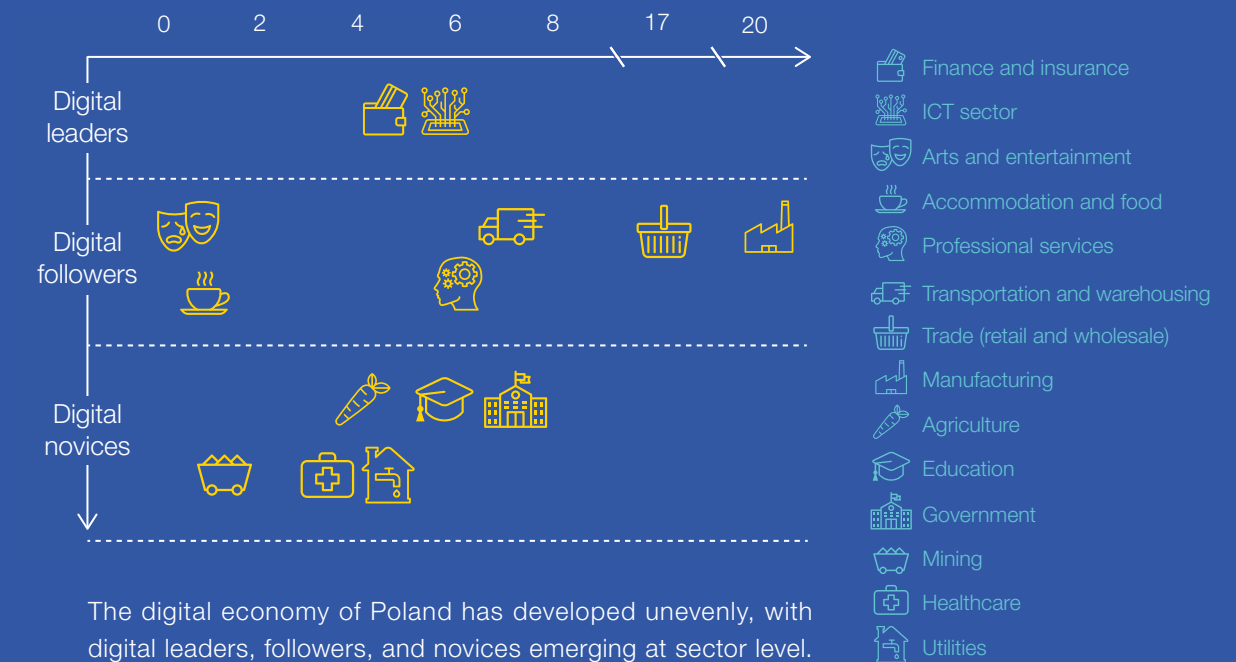
ICT hardware assets (e.g., servers, computers) per FTE

Software assets per worker

Software assets (e.g., workers’ software licenses) per FTE

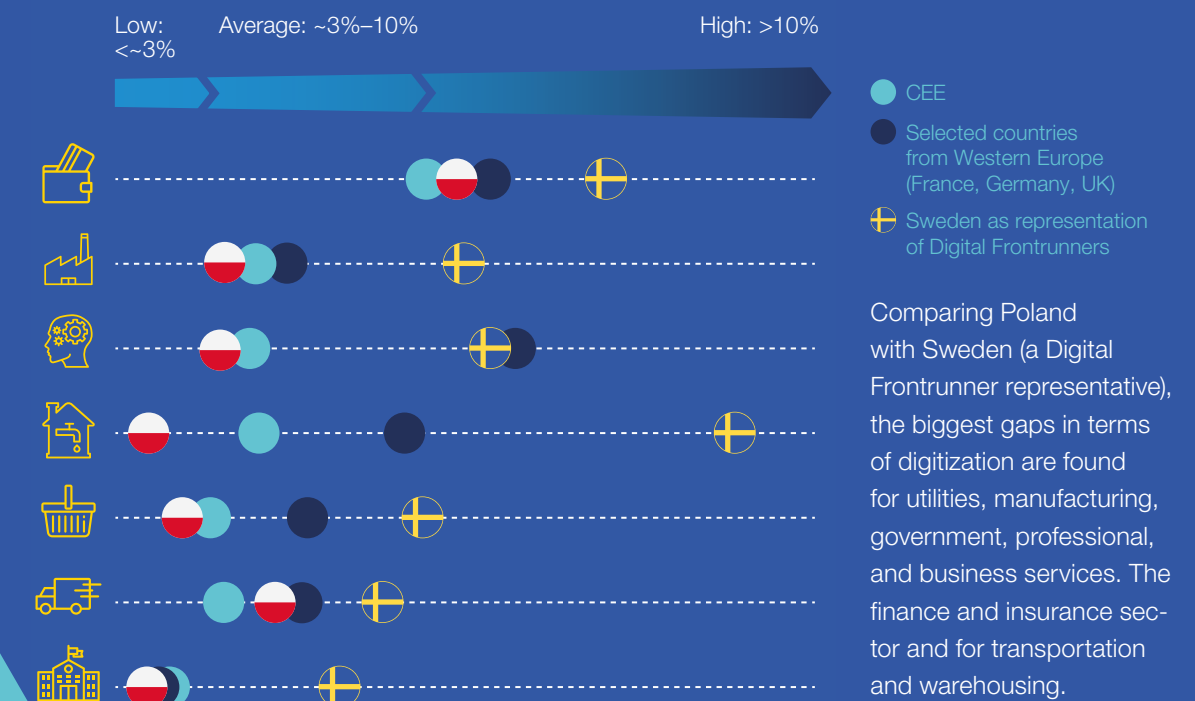
Sector-level digital leaders, followers, and novices in Poland

% of GDP



The digital economy of Poland has developed unevenly, with digital leaders, followers, and novices emerging at sector level. Going forward, the priority for each sector will be to catch up with counterparts in digitally more advanced countries.

Sector digitization in Poland compared with CEE, Western Europe, and Digital Frontrunner benchmarks



SOURCE: McKinsey Global Institute

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,⁶ 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

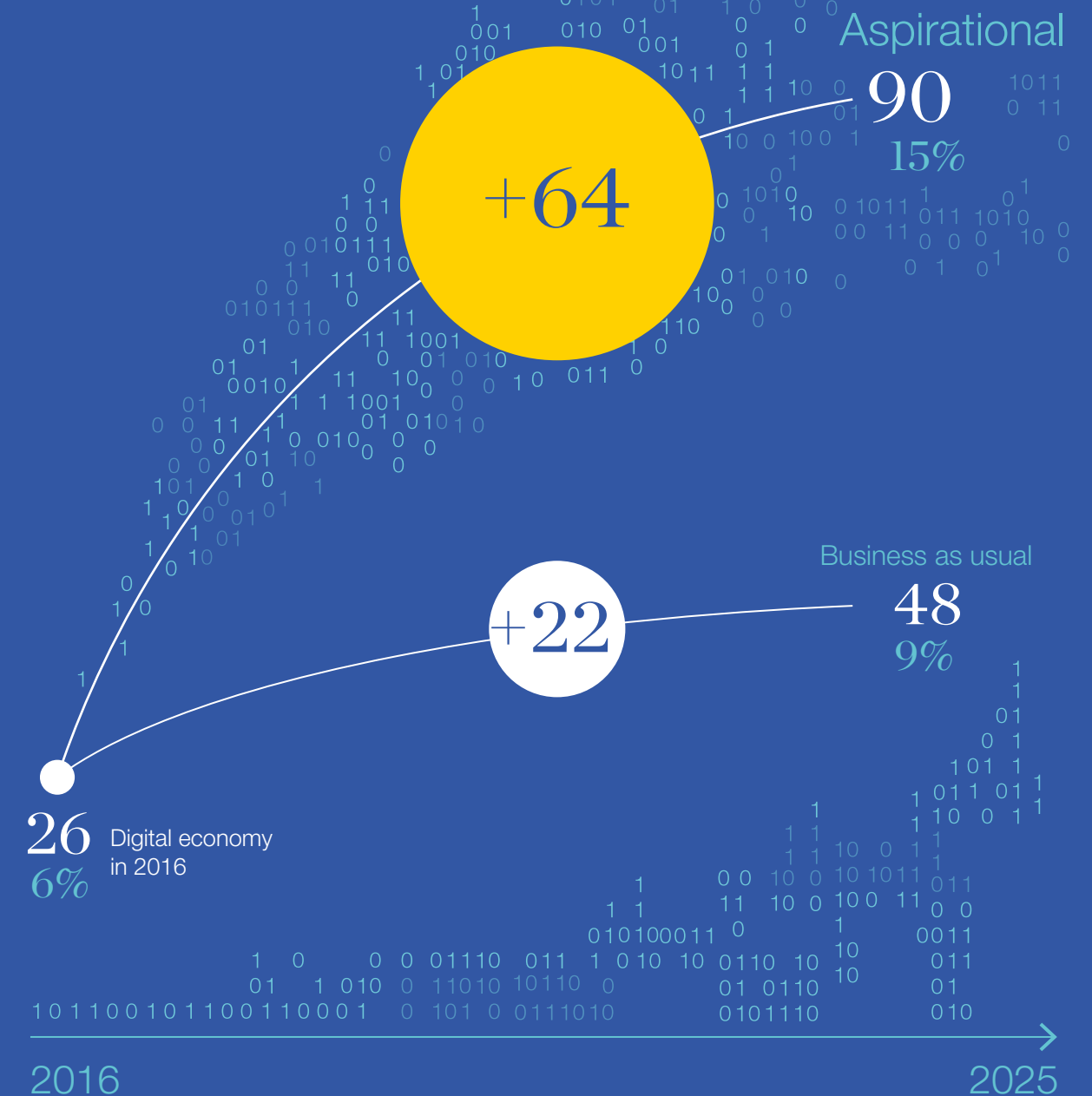
The first of these amounts (closing sectoral digitization gaps to Digital Frontrunners) comes from Poland increasing its ICT spending levels (as a share of sector GDP) to match Digital Frontrunner markets. Achieving this would require acceleration of the digital transformation, especially in the sectors 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. ■

We see two trajectories for Poland to grow its digital economy: a business-as-usual scenario bringing an additional €22 billion of GDP and an aspirational scenario with €64 billion of GDP at stake⁷

€ billion

Share of GDP, %



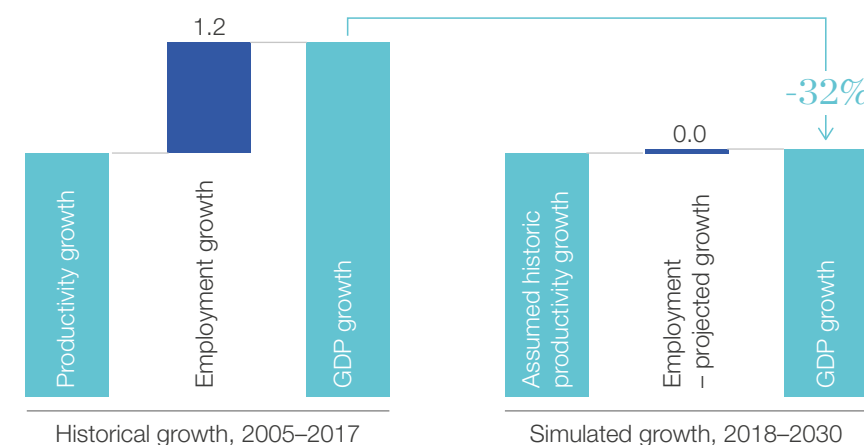
The potential for work automation in Poland

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 2017.⁸ 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 2030.⁹

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*,¹⁰ 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.¹¹ This is close to the potential for the entire region, which we have estimated at 49–51 percent¹².

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, %



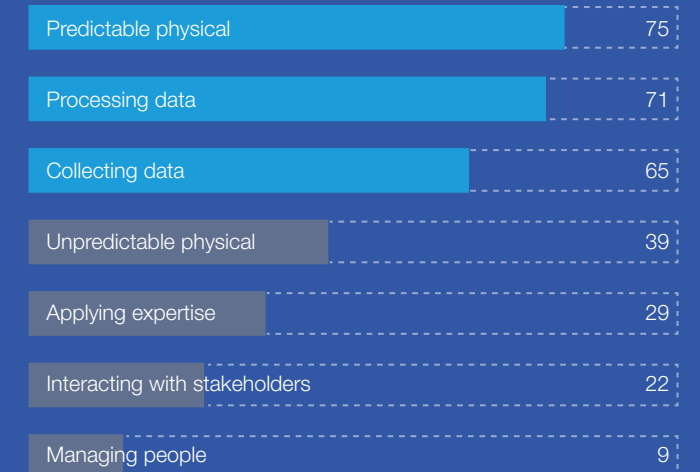
NOTE: Projection assuming historical productivity growth and projected changes in employment growth.
SOURCE: MGI; McKinsey analysis



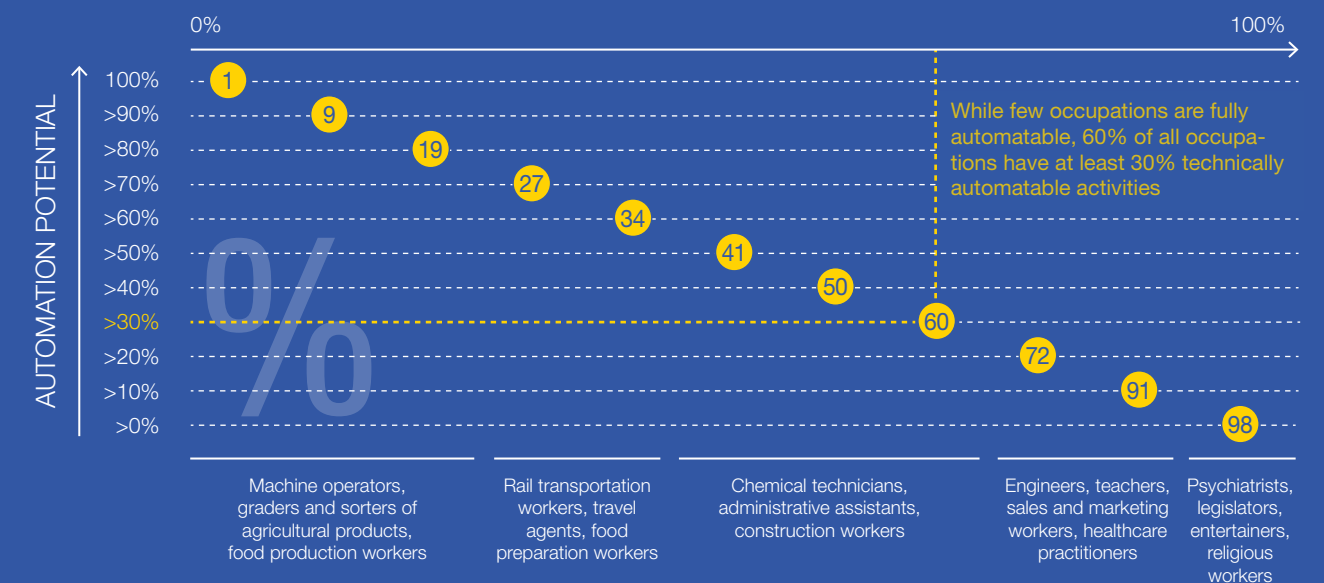
equivalent number of jobs that could be automated in Poland



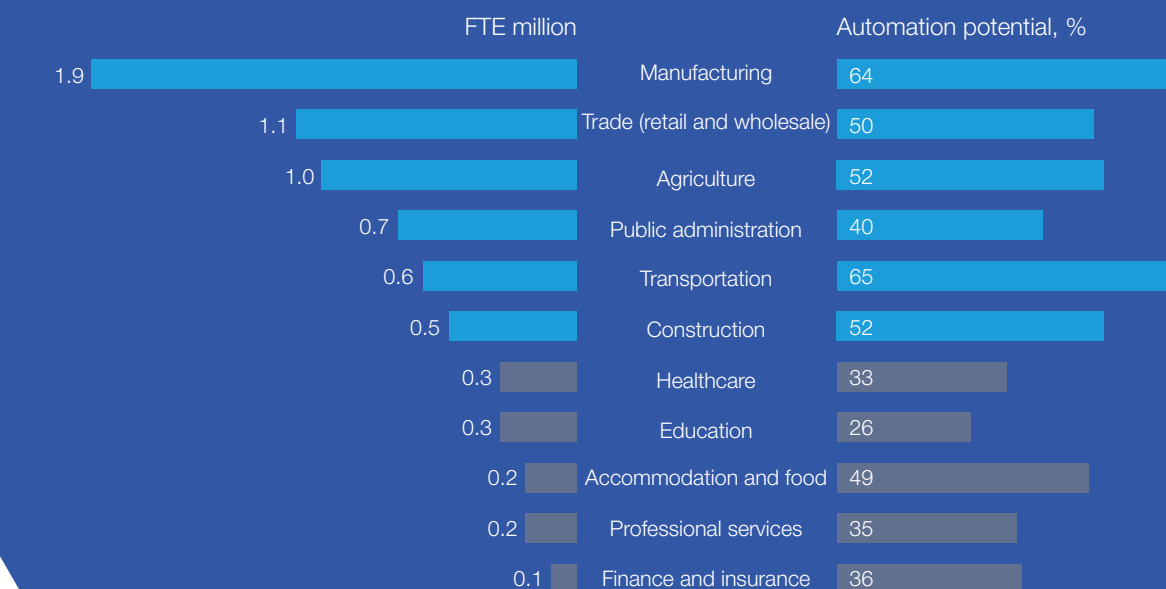
% OF ACTIVITY THAT COULD BE AUTOMATED



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



TOTAL AUTOMATION POTENTIAL IN EQUIVALENT NUMBER OF JOBS



SOURCE: McKinsey Global Institute analysis

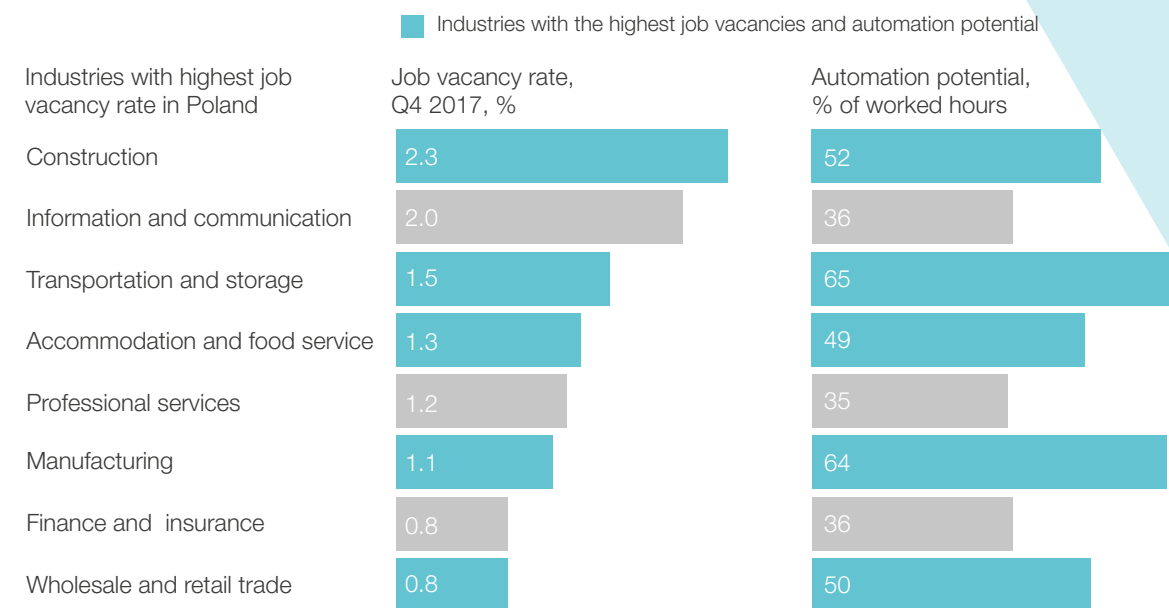
Opportunities and challenges of work automation

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.



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.

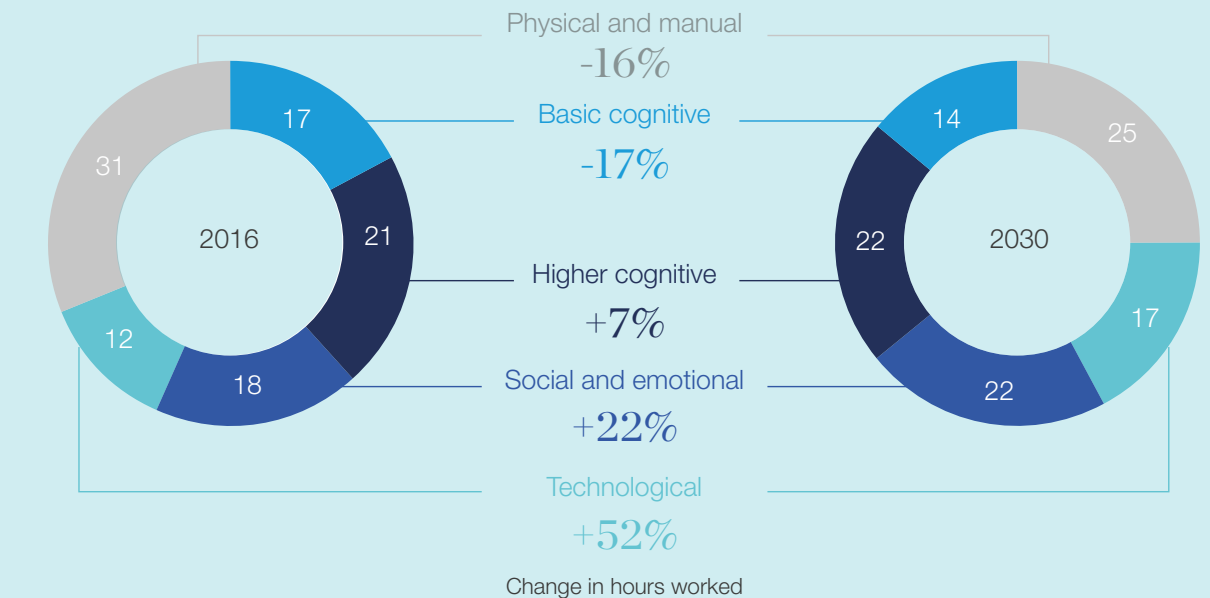
The McKinsey Global Institute has developed a model for the skill shifts that will likely take place in the workplace. Looking at Western European countries, most of which have a similar or slightly lower automation potential compared to Poland, the strongest growth

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

Demand for technological skills could grow by around 50 percent, and for social and emotional skills by around 20 percent.¹³

Skills used, by category, Western Europe, all sectors, 2016–2030, % of total hours worked

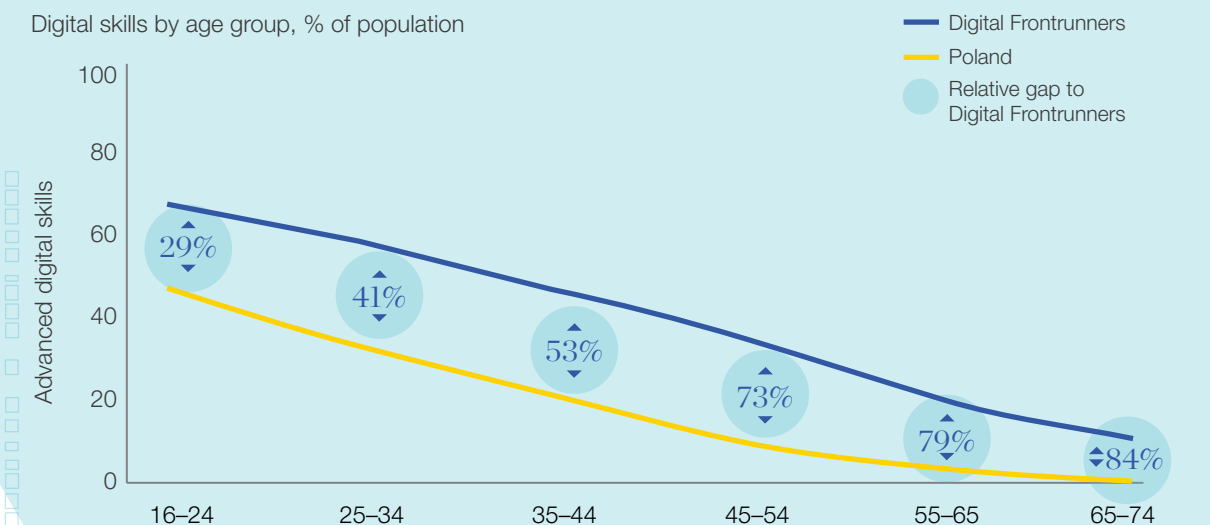


SOURCE: McKinsey Global Institute

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



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

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.

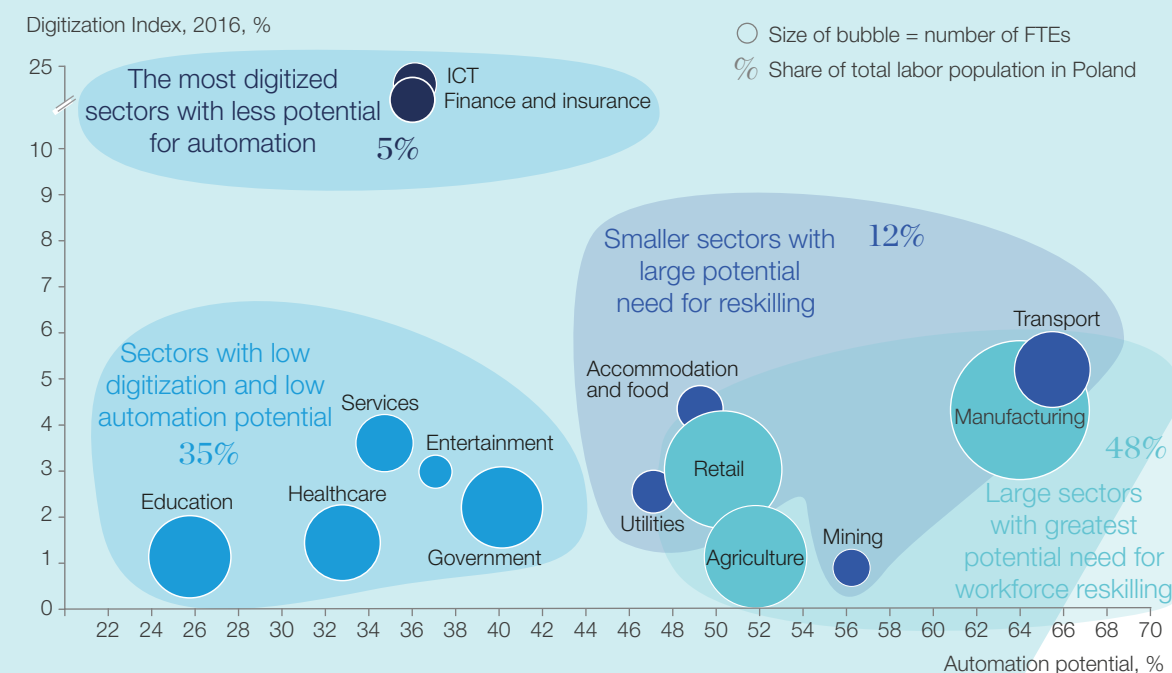
We distinguish four groups of sectors in Poland with differing levels of need with regard to digitization:

- **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.

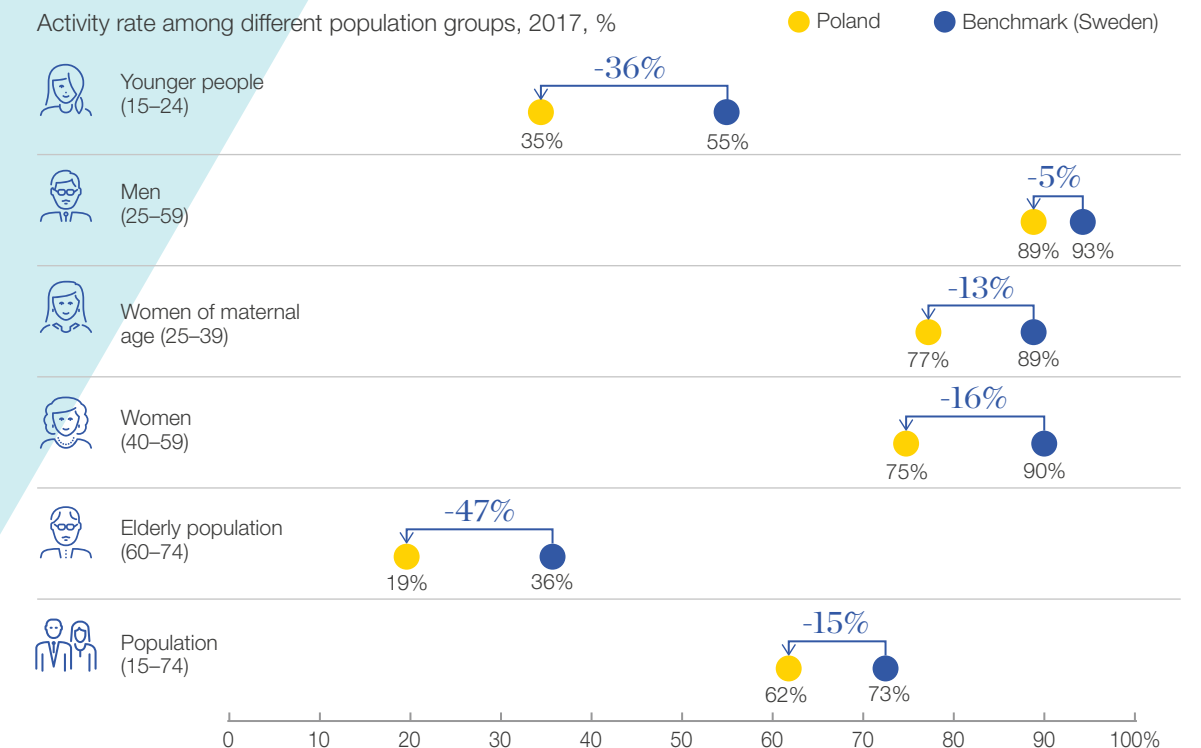
Sectors with low current digitization rates and high automation potential in Poland are likely to experience the greatest need for workforce reskilling in the future.



SOURCE: McKinsey Global Institute; Eurostat; McKinsey analysis

NEW TECHNOLOGY CAN HELP ACTIVATE POLAND'S LABOR FORCE

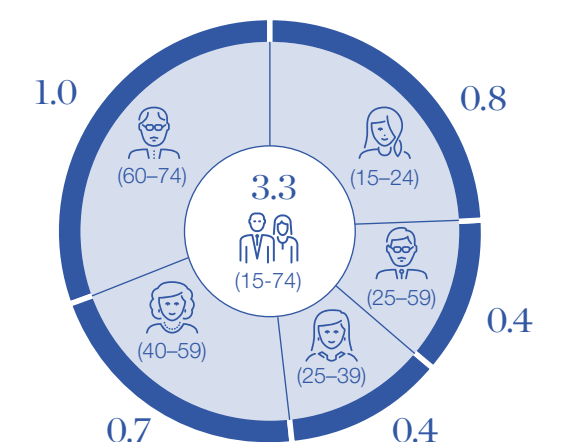
Compared with Digital Frontrunner benchmarks, Poland could have up to 3.3 million people in untapped labor reserves due to lower activity rates



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



NOTE: Activity rate = share of population, both employed and unemployed, that constitutes the labor supply.
SOURCE: Eurostat, McKinsey analysis

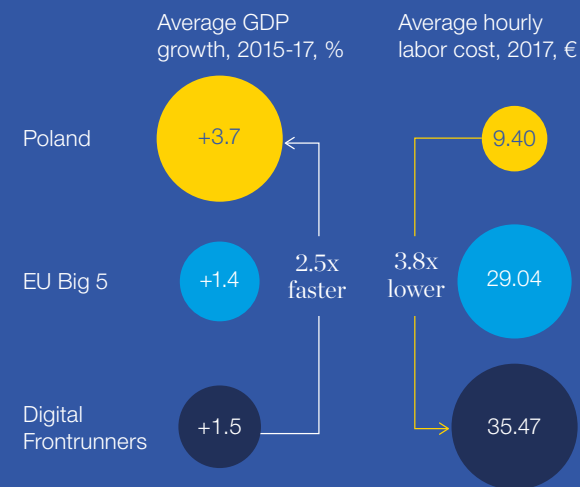
Key foundations for Poland's Digital Challenger status

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.

WE SEE FOUR FOUNDATIONS FOR FURTHER DIGITIZATION IN POLAND

A Competitive advantages at a macroeconomic level

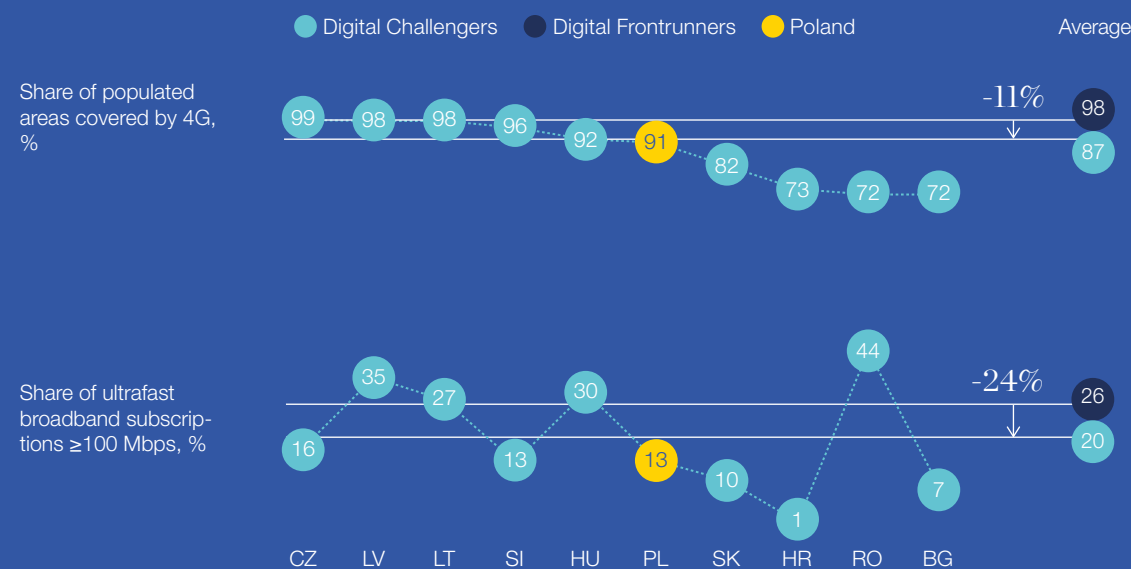
Poland offers high-growth economy with relatively low labor costs



SOURCE: World Bank; Eurostat

B Good overall digital infrastructure quality and coverage

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

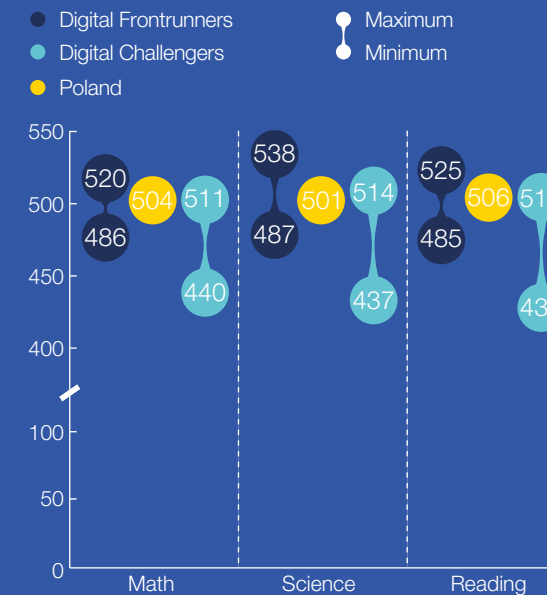


SOURCE: DESI 2018

C A good primary and secondary education foundation

Overall primary- and secondary-education quality gap between Poland and Digital Frontrunner countries is almost nonexistent

PISA (OECD) – range of country scores (2012-2015 average)



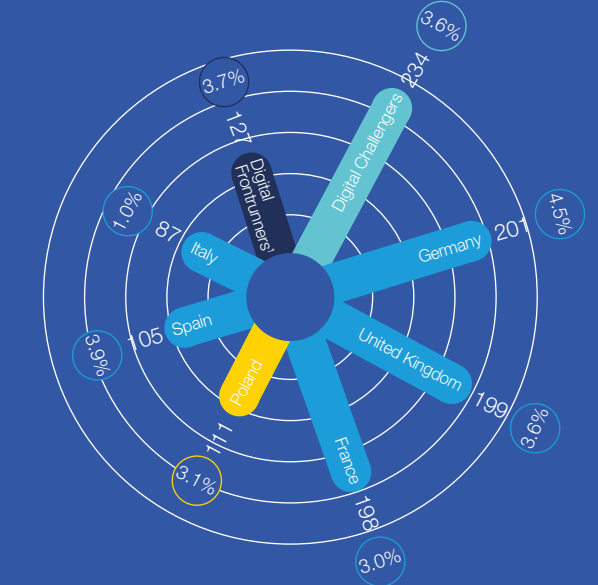
NOTE: PISA – Programme for International Student Assessment

D A large and high-quality graduate talent pool in the areas of ICT (information and communication technology) and STEM (science, technology, engineering and mathematics)

Almost 50% of STEM graduates in CEE come from Poland

Number of STEM graduates, thousands, 2016

○ ICT graduates, % of all graduates



1 For the Netherlands, data taken from 2015.
SOURCE: Eurostat

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

EXAMPLES OF POLAND'S DIGITAL CHAMPIONS

There are many digital success stories in Poland of companies leveraging the digital economy to achieve scale and revolutionize their industries. Allegro, the Polish e-commerce platform, is Europe's fifth-most-visited marketplace. 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 of live support and help-desk software. Other notable success stories include Booksy, Brainly, and Estimate to name a few.

SOFTWARE DEVELOPMENT HOUSES IN POLAND

Several Poland-based software development companies have started becoming regional powerhouses in their respective fields, with many ranked among the fastest-growing companies in Europe.¹⁴ Examples include 10Clouds, CodiLime, Codewise, Miquido, Monterail, Netguru, STX Next.

POLAND'S GAMING INDUSTRY

Poland is at the forefront of the CEE's growing gaming industry. CD Project Red, known in recent years for projects such as The Witcher, is among the top 20 most valuable companies on the Warsaw Stock Exchange. Another Polish company, Huuuge Games, is responsible for titles that are among the top mobile games regionally by download or revenue. Other notable examples include PlayWay, 11 bit studios, Ten Square Games, and Vivid Games.

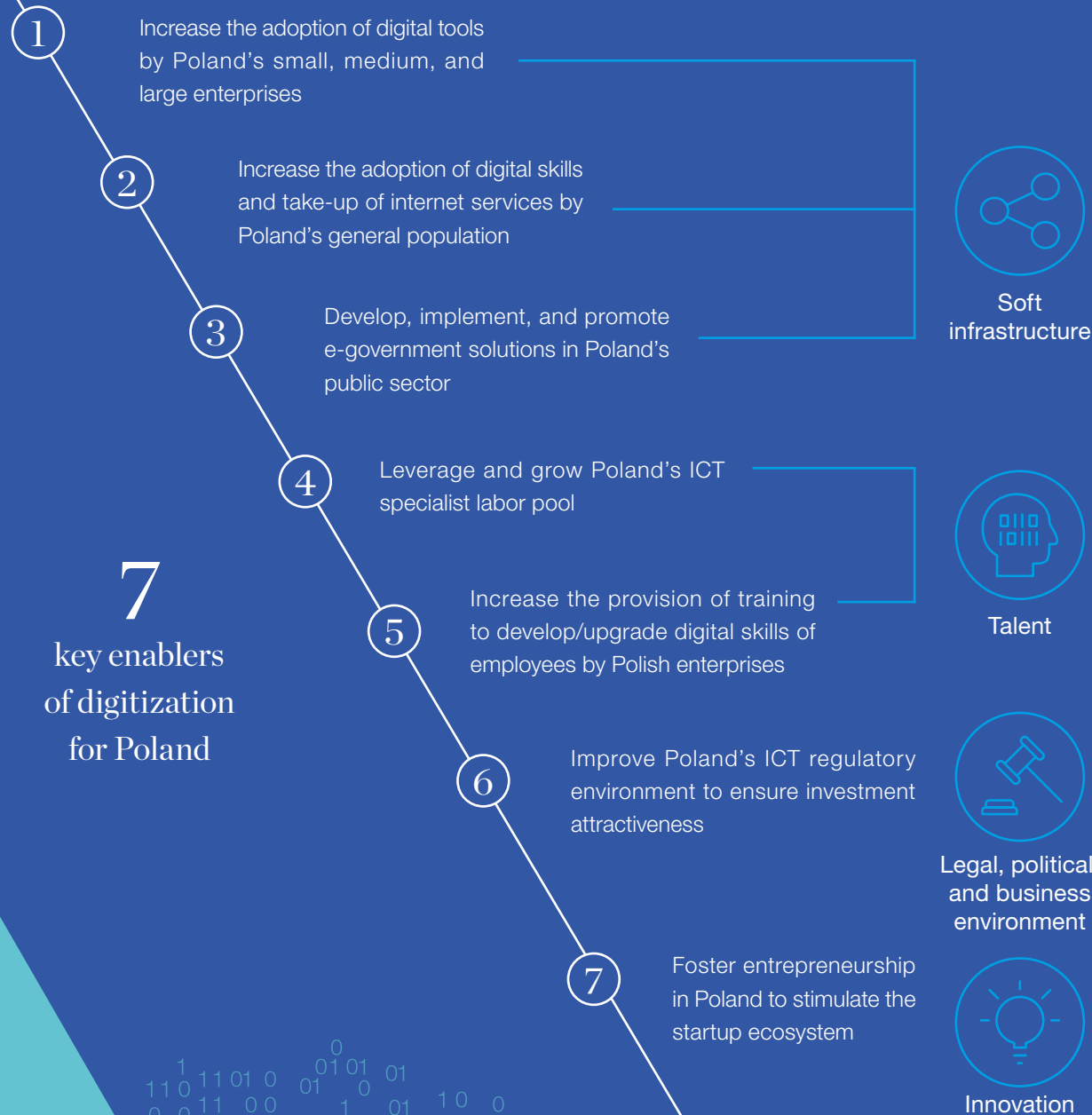
TRADITIONAL INCUMBENTS IN POLAND ADOPTING DIGITAL

Large incumbents from more traditional industries are also following suit. The financial-services sector has been at the forefront, with Poland often considered as the EU's banking laboratory. In 2015, six of the largest banks in the country came together to create BLIK, a mobile payment system enabling smartphone users to make payments at retail outlets and via the internet. PKP Energetyka, the railway electricity distributor, implemented field-force automation technology to manage the execution of maintenance tasks in real time. Żabka, the convenience store chain, has unveiled a "store of tomorrow" concept utilizing AI and automation technologies for improved customer service and operations optimization.¹⁵

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

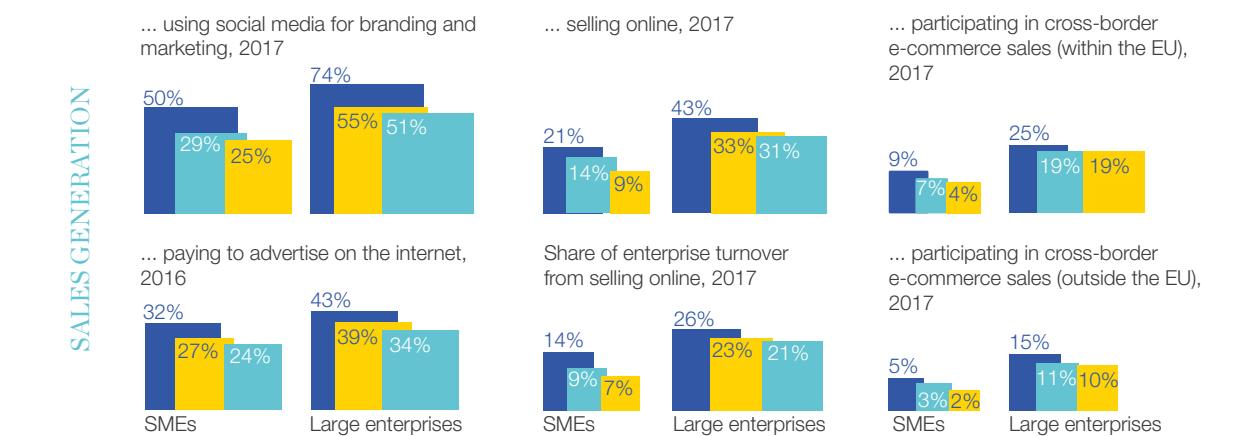


1 DIGITIZATION ENABLER

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

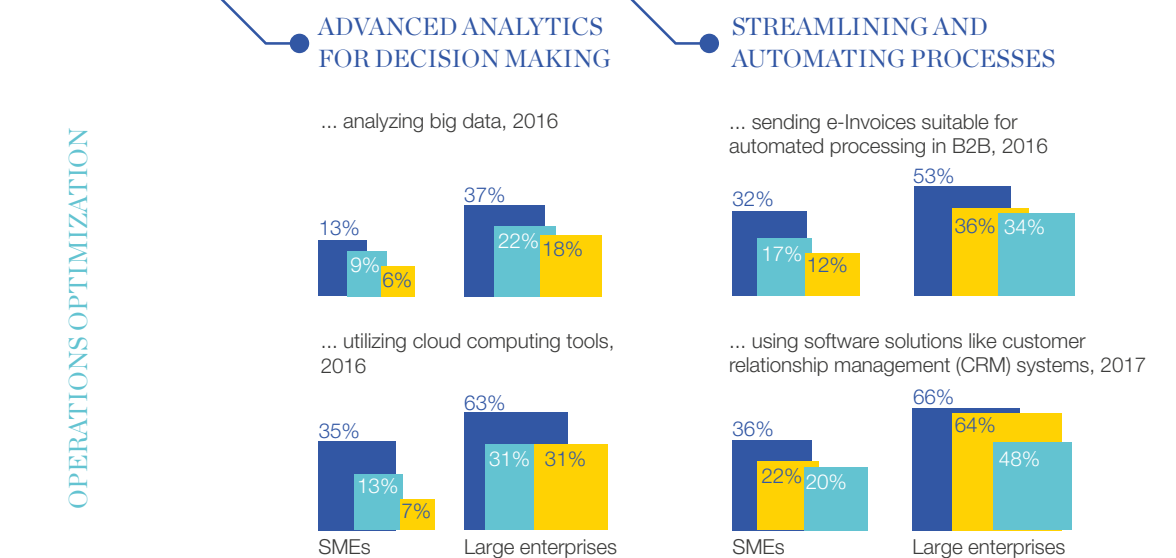
With the help of digital tools, businesses can enhance their performance through boosting their revenue growth capabilities, as well as increasing their efficiency through better resource allocation. We look at five ways in which companies can achieve such benefits, benchmarking Poland against Digital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

REGIONAL AVERAGES, LARGE COMPANIES VS. SMALL AND MEDIUM-SIZE ENTERPRISES (SMEs)
% of companies



CONNECTING IN REAL TIME E-COMMERCE SALES OVERALL INTERNATIONAL E-COMMERCE

Digital-tool adoption – Proxy metrics



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 be also 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.

② DIGITIZATION ENABLER

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

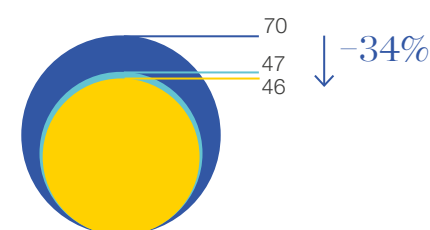
We consider the widespread adoption of digital skills among the general population a key enabler for digitization in Poland. It is an area where Digital Frontrunners excel, with clear gaps for Poland to close.

DIGITAL TOOLS AND SKILLS PERSPECTIVE

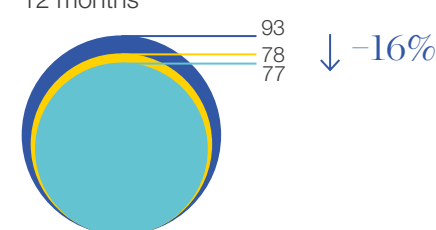
Basic digital skills

% of population aged 16–74 (2017) ...

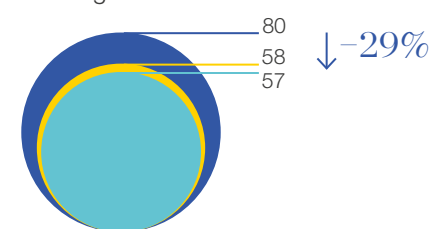
... with at least basic digital skills



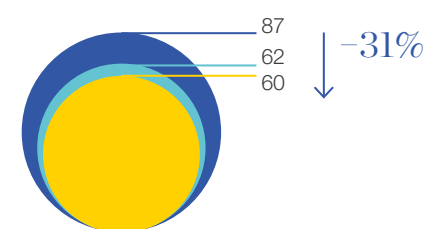
... using the Internet in the last 12 months



... looking online for information about goods and services



... 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.

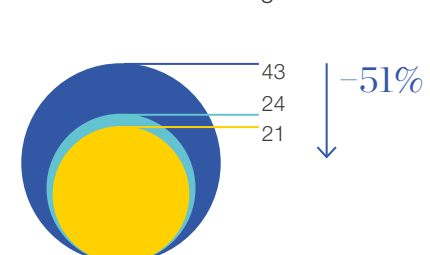
The vast majority of the population in Poland uses the internet. However, internet penetration, at 78 percent is still clearly below the DF benchmark.

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).

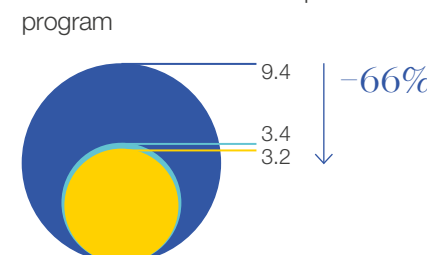
Advanced digital skills

% of population aged 16–74 (2017) ...

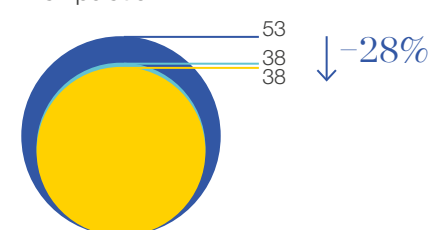
... with above basic digital skills



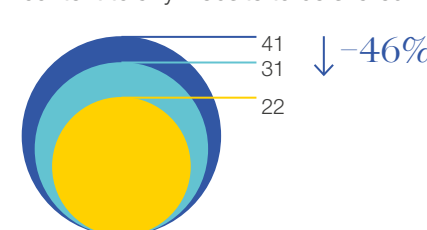
... who have written a computer program



... with software skills for content manipulation



... who have uploaded self-created content to any website to be shared



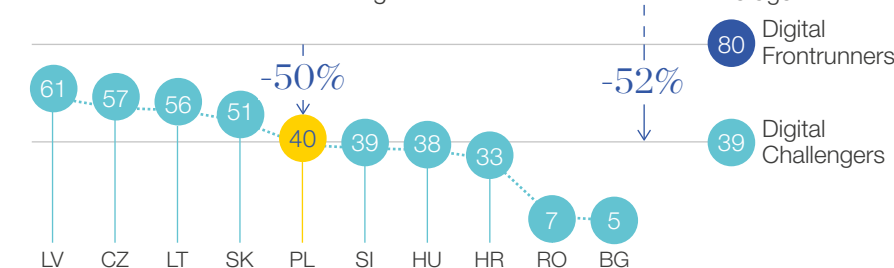
Looking at advanced digital skills, the gap to Digital Frontrunners is even larger. The share of people with above basic digital skills is almost twice as large for Digital Frontrunners as in Poland. Looking at proxy metrics, such as the share of individuals having written a computer program or having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

Eurostat; Digital Economy and Society Index, 2017

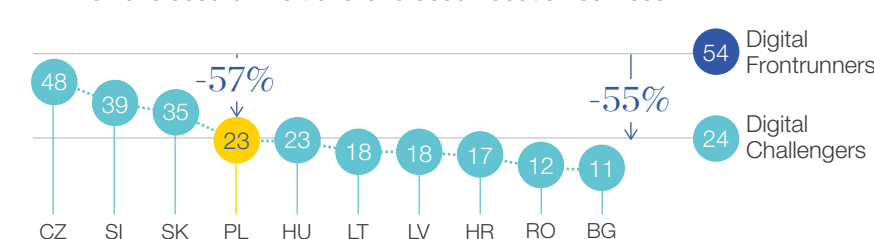
TAKE-UP OF INTERNET SERVICES PERSPECTIVE

% of population aged 16–74 (2017) ...

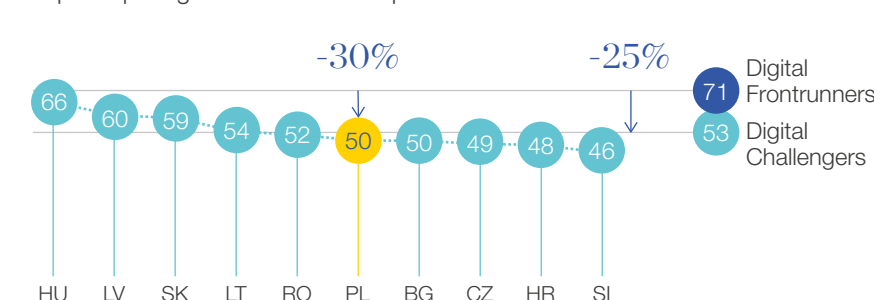
... who have used online banking



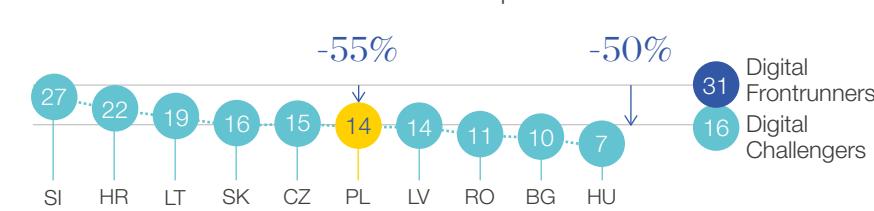
... who have used online travel and accommodation services



... participating in online social or professional networks



... who have used health and care services provided online



Looking at the adoption of various internet services in Poland, gaps to Digital Frontrunners are even bigger than for digital skills. Only half of the respective share of people in Poland, compared to Digital Frontrunners, have used online banking, for instance. Poland performs close to the CEE average, meaning that similar gaps can be seen in other proxy measures, such as the share of people having used online travel and accommodation services (57 percent lower in Poland), participating in online social or professional networks (30 percent lower), or using health and care services provided online (55 percent lower).

Eurostat; Digital Economy and Society Index, 2017

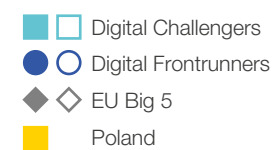
③ DIGITIZATION ENABLER

Develop, implement, and promote e-government solutions in Poland's public sector

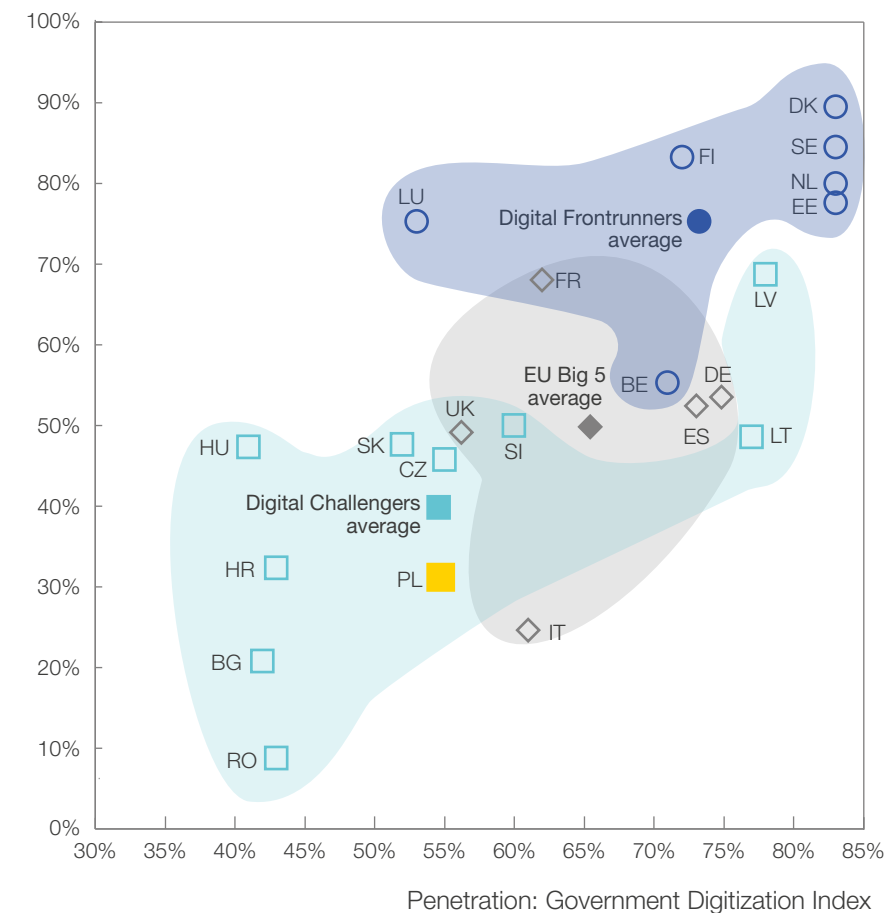
Digitizing public services has various benefits for citizens, businesses, and the government itself.

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



Uptake: Individuals accessing public services online, % of individuals aged 16–74



SOURCE: Eurostat; Digital Economy and Society Index, 2017

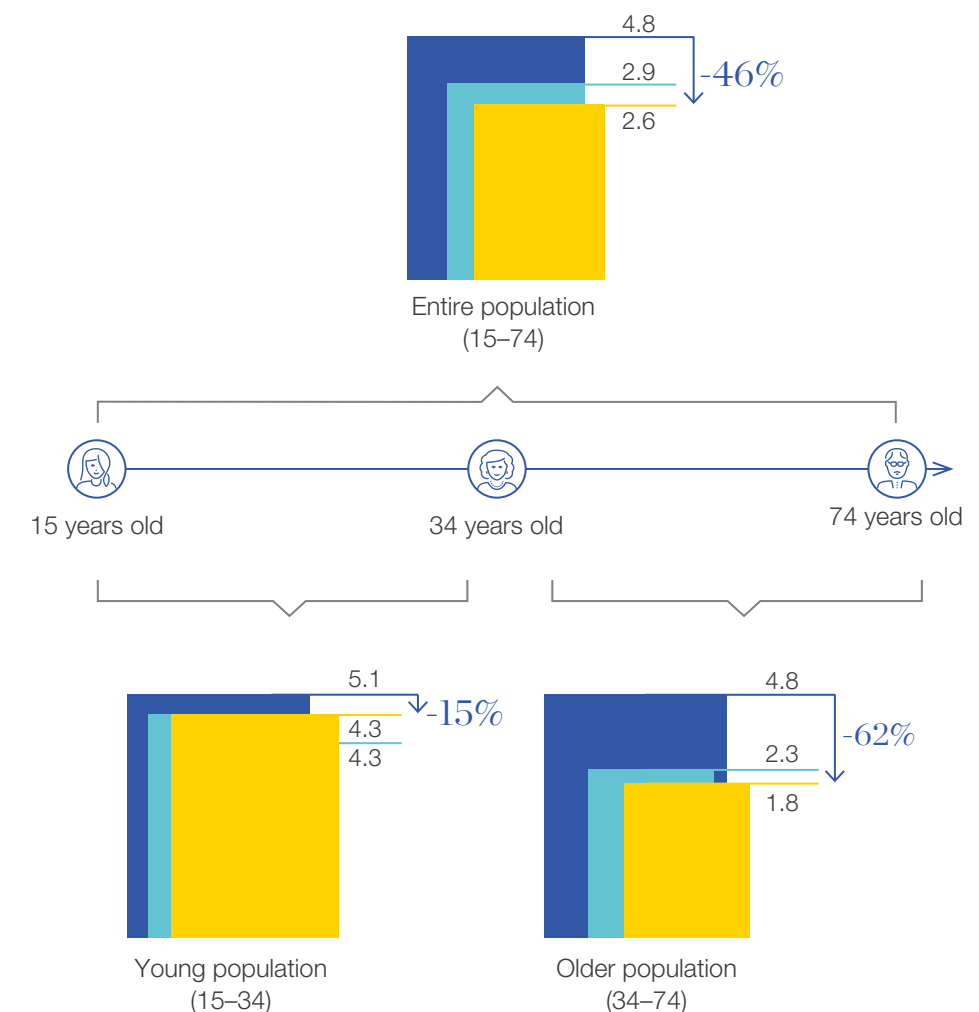
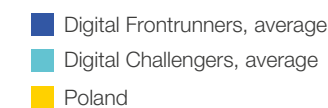
④ DIGITIZATION ENABLER

Leverage and grow Poland's ICT specialist labor pool

Having a large pool of information and communications technology (ICT) specialists enables the digitization of both private and public sectors. ICT specialists are the driving force behind the digitization and automation of back-end processes, developing next-generation customer experience solutions and building data-driven insights. Developers and engineers who are up to date with the latest technology trends also form the technological and creative backbone of startups.

SHARE OF ICT SPECIALISTS

2016, % of employed population, 2016



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

5 DIGITIZATION ENABLER

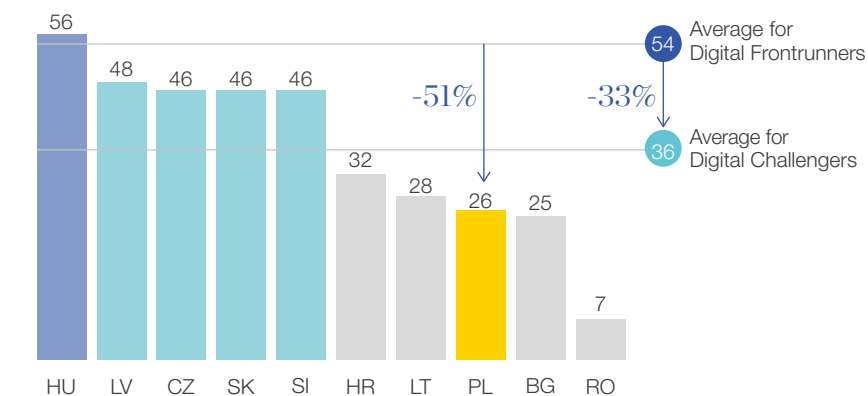
Increase the provision of training to develop/upgrade digital skills of employees by Polish enterprises

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.

■ Outliers above Digital Frontrunners average
■ Markets close to Digital Challengers average
■ Outliers below Digital Challengers average
■ Poland

ADULT PARTICIPATION RATE IN EDUCATION AND TRAINING IN LAST 12 MONTHS

2016, % of 25- to 64-year-olds

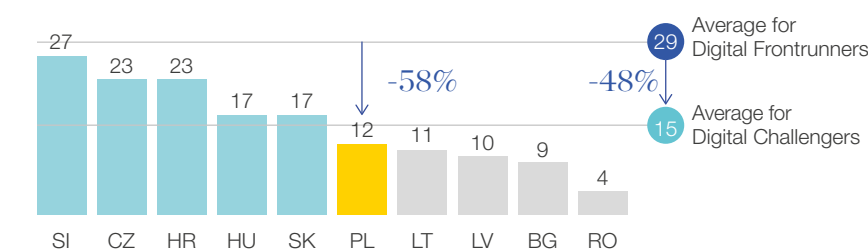


The degree to which the population in Poland embraces training for adults is below the CEE average.

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

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.

SOURCE: Eurostat; Digital Economy and Society Index, 2017

6 DIGITIZATION ENABLER

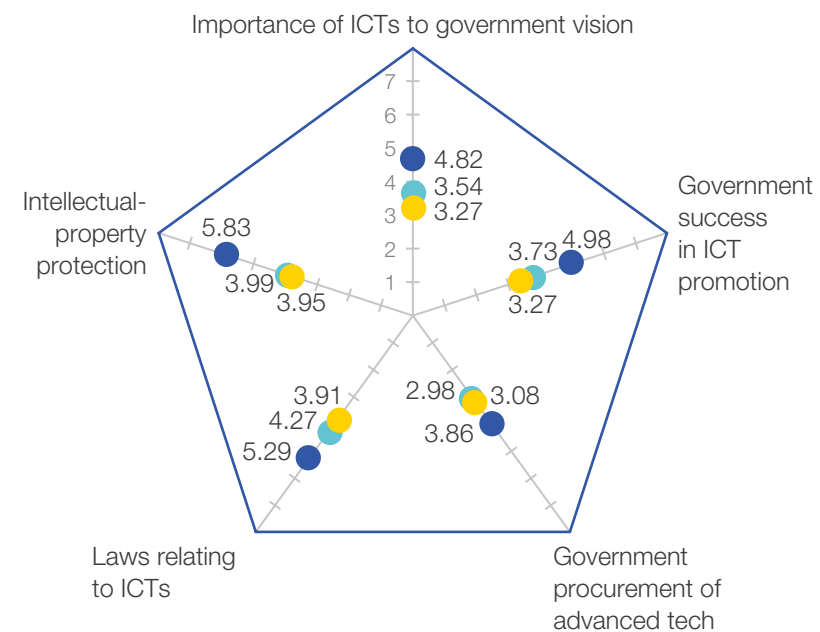
Improve Poland's ICT regulatory environment to ensure investment attractiveness

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.

■ Digital Frontrunners, average ■ Digital Challengers, average ■ Poland

WORLD ECONOMIC FORUM NETWORK READINESS INDEX

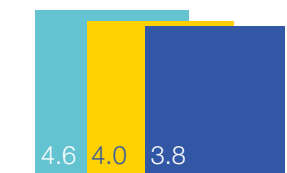
Synthetic score, scale of 1 to 7, where 7 is highest performance



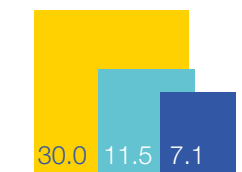
Investigating the friendliness of the regulatory regime toward ICT in Poland and CEE, we see gaps to Digital Frontrunners. On average, laws related to the use of ICTs (e.g., electronic commerce, digital signatures, consumer protection) are considered to be less well developed, with Poland below the CEE 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.

STARTING A BUSINESS

Number of procedures to start a business

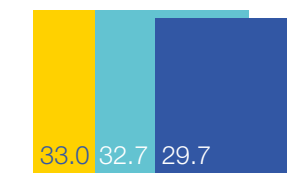


Number of days to start a business

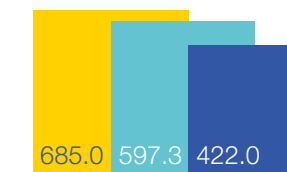


ENFORCING CONTRACTS

Number of procedures to enforce a contract



Number of days to enforce a contract



The overall attractiveness of the business environment in Poland indicates room for improvement compared with Digital Frontrunners. Looking at proxy metrics, such as the number of days and procedures needed to start a business or enforce a contract, Poland underperforms relative to Digital Frontrunners.

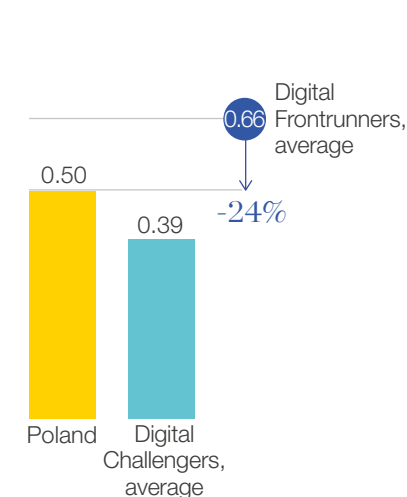
SOURCE: World Economic Forum, Network Readiness Index, 2016

Foster entrepreneurship in Poland to stimulate the startup ecosystem

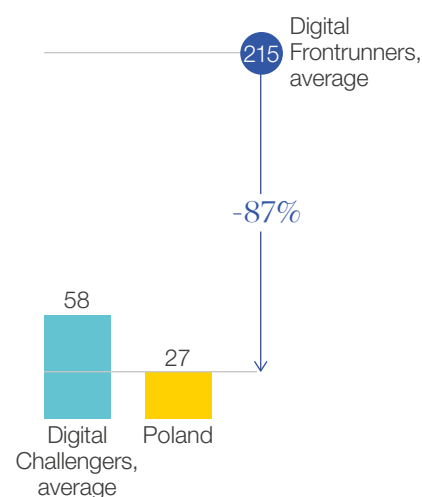
Here we look at the state of the ecosystem for startups in Poland compared to Digital Frontrunners. Our focus is on five areas: the entrepreneurial talent base, the startup community, early-stage startups, growth-phase startups, and enterprises having achieved significant scale. Digital Challengers have 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

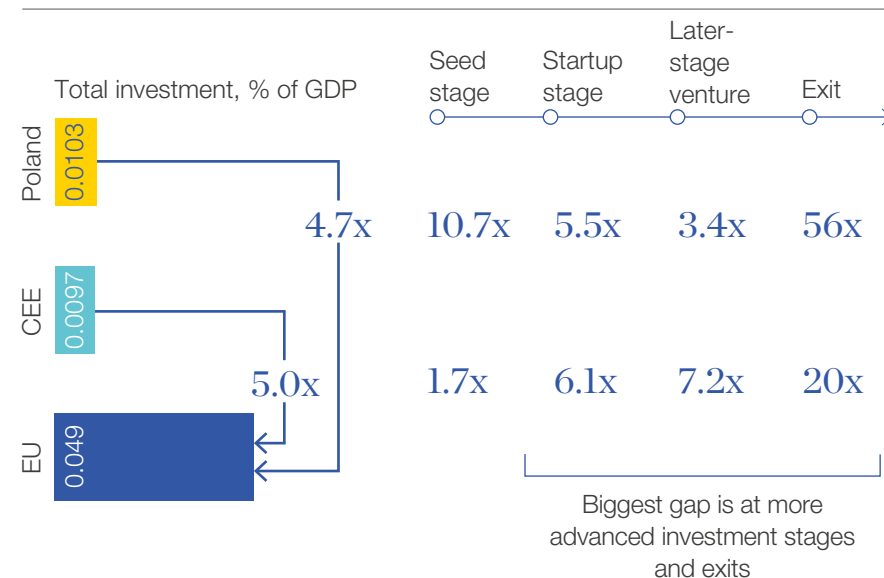


Poland is above the Digital Challenger average in Global Entrepreneurship Index, which ranks countries in terms of entrepreneurial attitudes, abilities and aspirations of the local population. However, Poland is still trails behind Digital Frontrunners in this area.

This can also be seen in the number of startups in the country compared to Digital Frontrunner markets. Poland exhibits only 27 startups per million citizens, compared to 58 in the CEE region on average and 215 among Digital Frontrunner markets.

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)



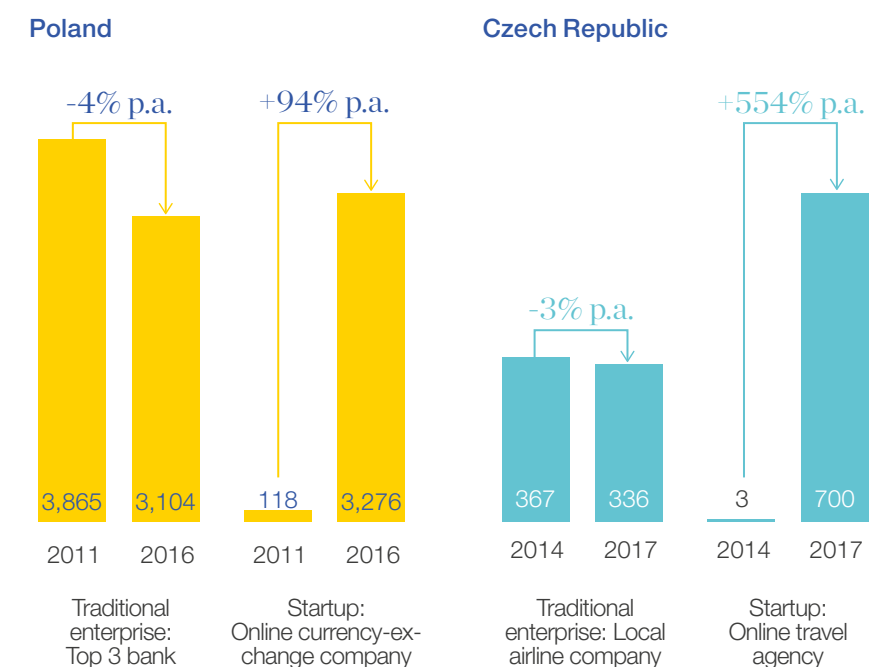
Beyond the aspect of entrepreneurship, financing is also a factor. Controlling for GDP size, VC investments in Poland are significantly behind Digital Frontrunners.

SOURCE: Eurostat; Global Entrepreneurship and Development Institute; Funderbeam; Dealroom; Angel.co; Invest Europe; Pitchbook

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.

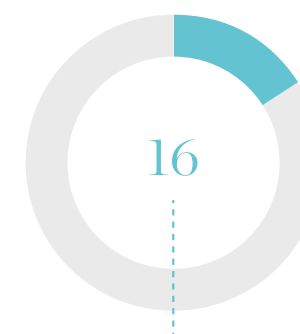
EXAMPLES OF HOW DIGITAL STARTUPS CAN REACH SIGNIFICANT SCALE: COMPARISON WITH TRADITIONAL INDUSTRY FIRMS

Annual revenue, € million

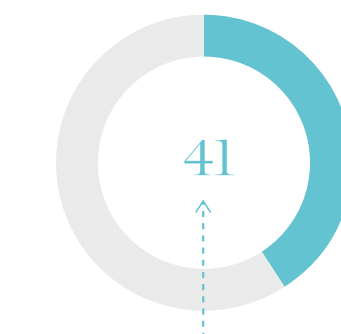


European startups are oriented toward international markets. On average, they generate 55 percent of their revenue outside their domestic markets. Digitization allows startups to replicate digital assets and reach a global consumer base (see examples on the left of two fast-growing startups from CEE 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).

% OF YOUNG SMEs IN TOTAL EMPLOYMENT



% OF YOUNG SMEs IN NEW JOB CREATION



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

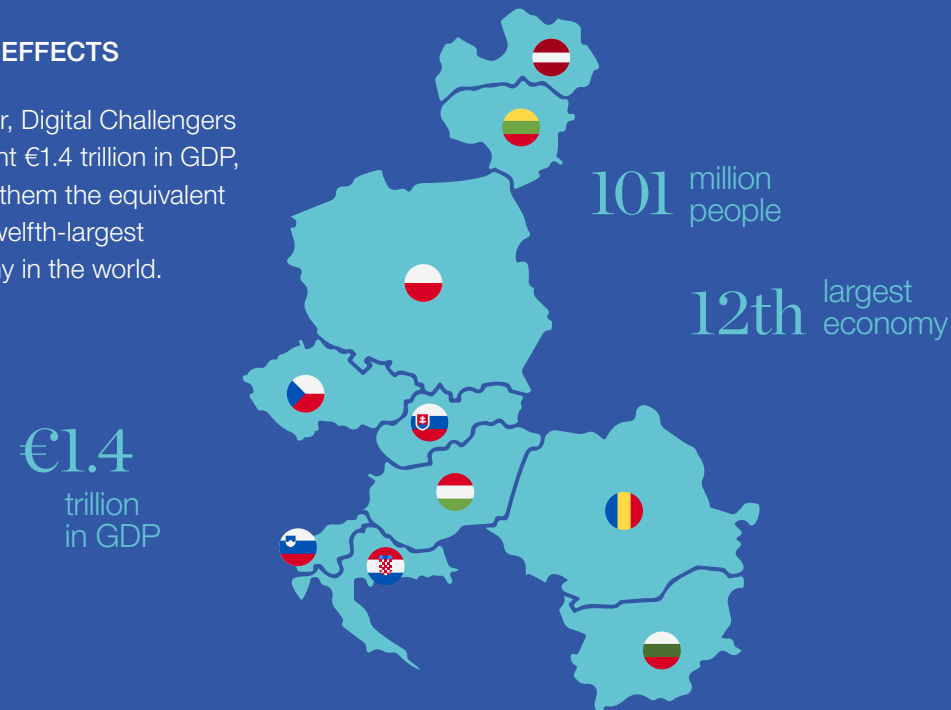
Young small and medium-size enterprises (SMEs) contribute disproportionately to job creation: Across 17 OECD countries, they account for 16 percent of overall employment but create 40 percent of new jobs. Additionally, creating one high-tech job can lead to the creation of more than four additional non-high-tech jobs in the same region.■

SOURCE: European Startup Monitor; European Commission; Financial Times

Four arguments for the benefit of collaboration between Digital Challengers

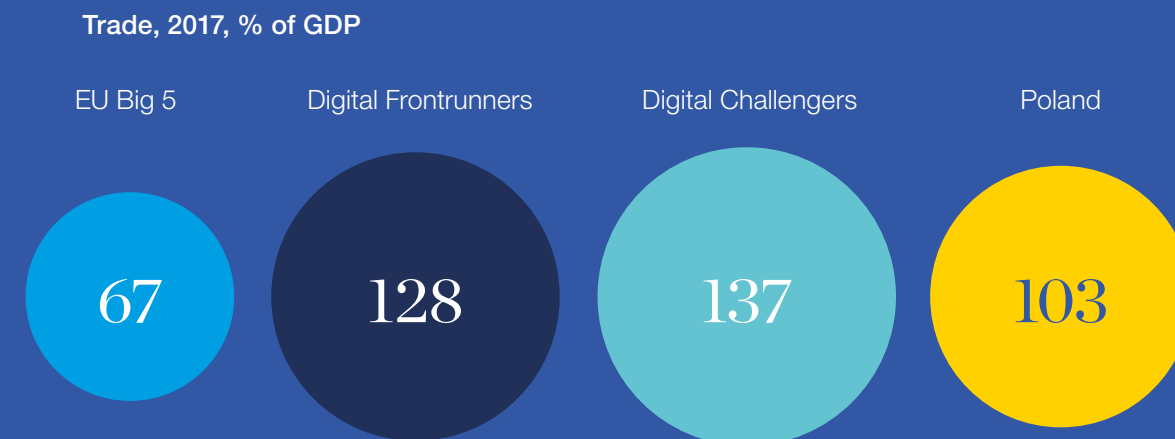
A SCALE EFFECTS

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.



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

SOURCE: World Bank

C BEST PRACTICES

Each CEE country has developed digitally in different areas, so sharing best practices can accelerate digitization.



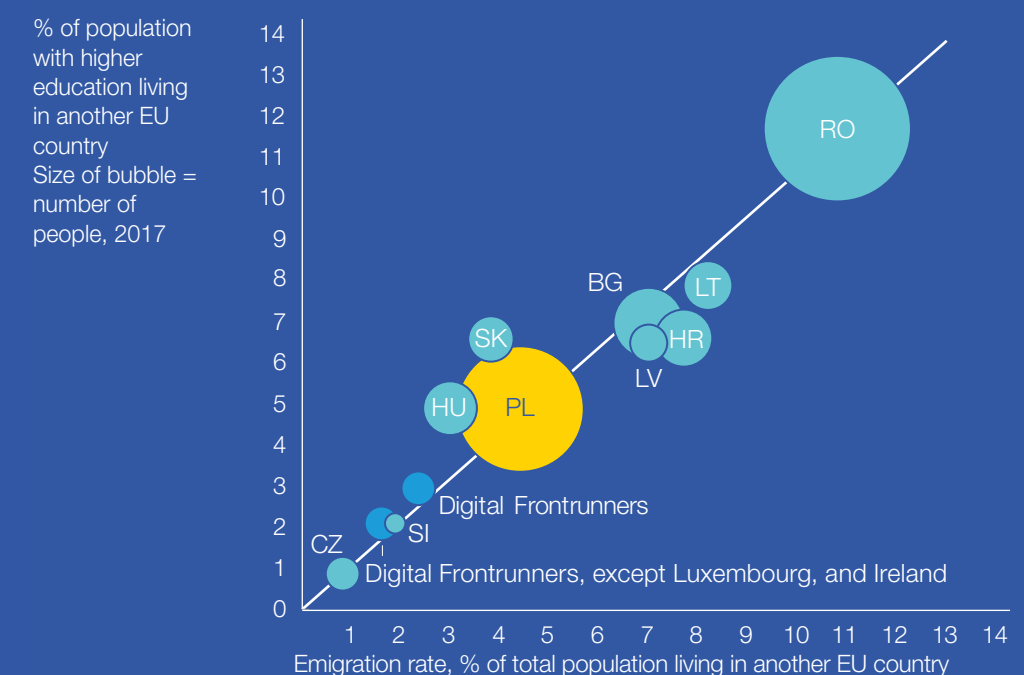
Looking at the various KPIs and case studies we have explored in our CEE report *The rise of Digital Challengers: Digitization as the next growth engine for Central and Eastern Europe*, we see that no single Digital Challenger market outperforms the other countries across all digitization enabling areas. Most markets in the region appear to have digitized differently, developing advantages in certain fields. For instance, we already saw Poland exhibiting digitization rates above the CEE average in the financial services, the transportation, and warehousing sectors. In many digitization enabling areas, however, Poland performs only 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 capita), participation rates in adult learning among the general population, and the adoption of digital tools by companies for cross-border e-commerce. This implies that sharing best practices between countries could be very beneficial.

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.

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.

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.



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

SOURCE: OECD

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

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.

Update youth education for the future

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.

Promote lifelong learning and mid-career training

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.

Actively counteract talent leakage

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.

Leverage independent work platforms

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.

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

Digitize the public sector

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.

Support technology adoption at companies

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.

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.

Implications for policy makers

Improve the entrepreneurial talent pool

- 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.

Strengthen the position of major CEE cities as startup hubs, tailored to local needs

- 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 sand-box 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.

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, B9)

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.

Ensure standardized, flexible digital-policy solutions across the region

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.

Implement cross-border projects facilitating the digitization of the region

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.

Cooperate in the management of social change as a result of changes in the labor market

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.

Actively adopt technology and innovation to close the gap to digital leaders

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

Adapt your business model to meet the demands of the digital economy

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.

Use digital tools for revenue growth, including boosting your export capabilities

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.

Leverage your own or external e-commerce platforms to boost your export capabilities and tap into global demand pools for your products and services.

Use digital tools to optimize your bottom line

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.

Update your approach to recruiting future employees

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.

Create reskilling and upskilling opportunities for current employees

Enable reskilling and upskilling opportunities, e.g., provide practical in-house training, offer financial support, create opportunities for formal and informal knowledge sharing.

Embrace a pro-digital organizational culture

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.

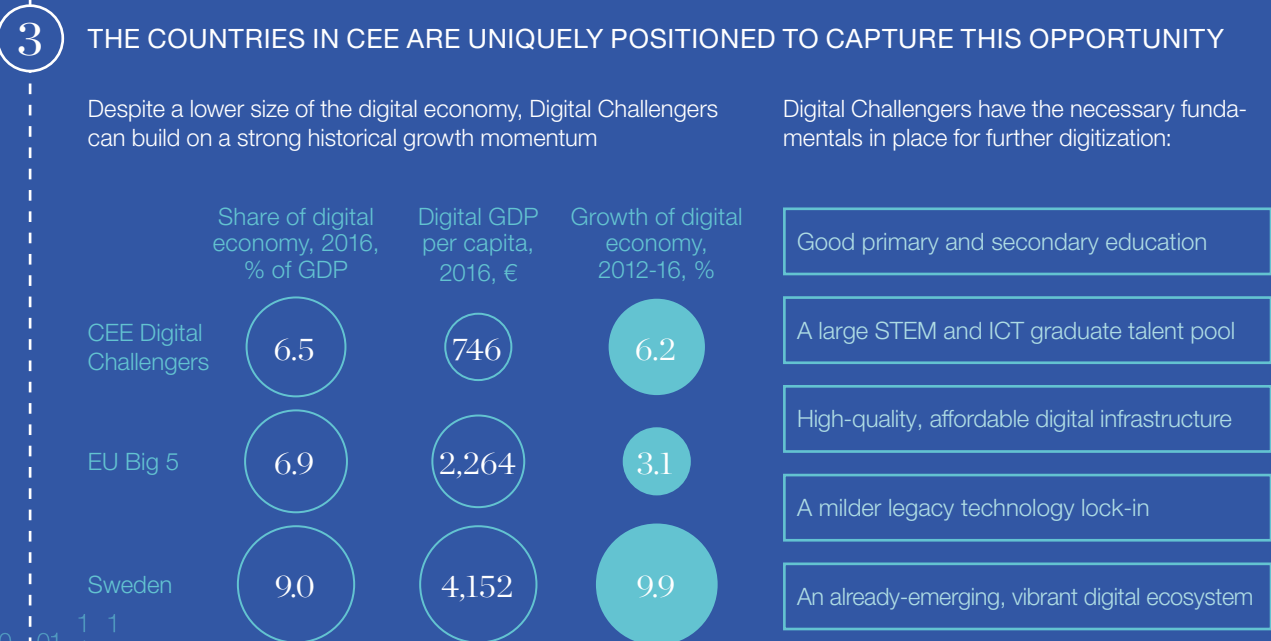
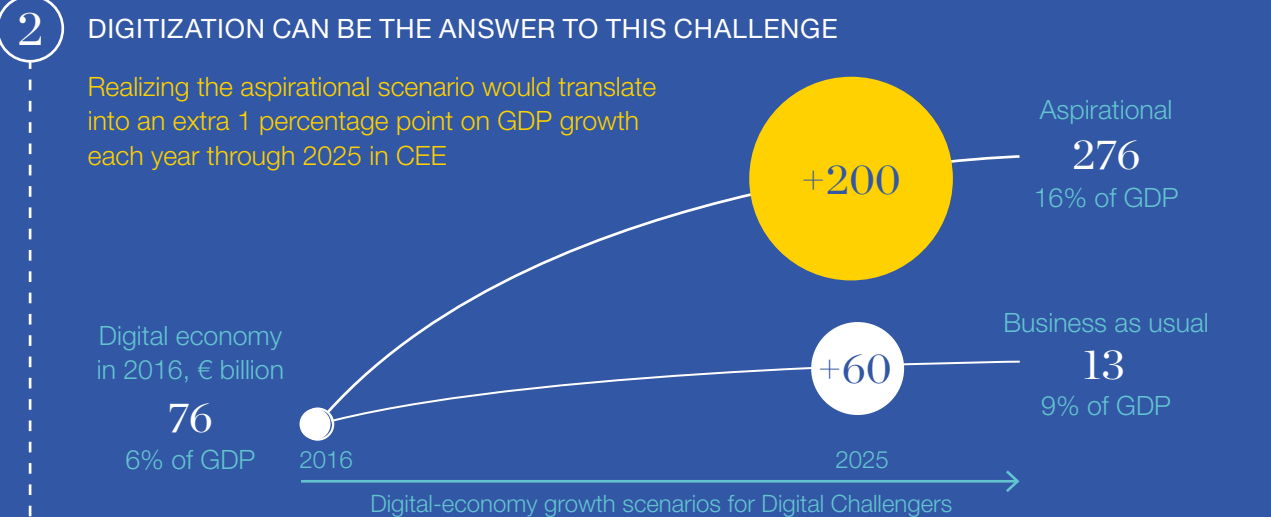
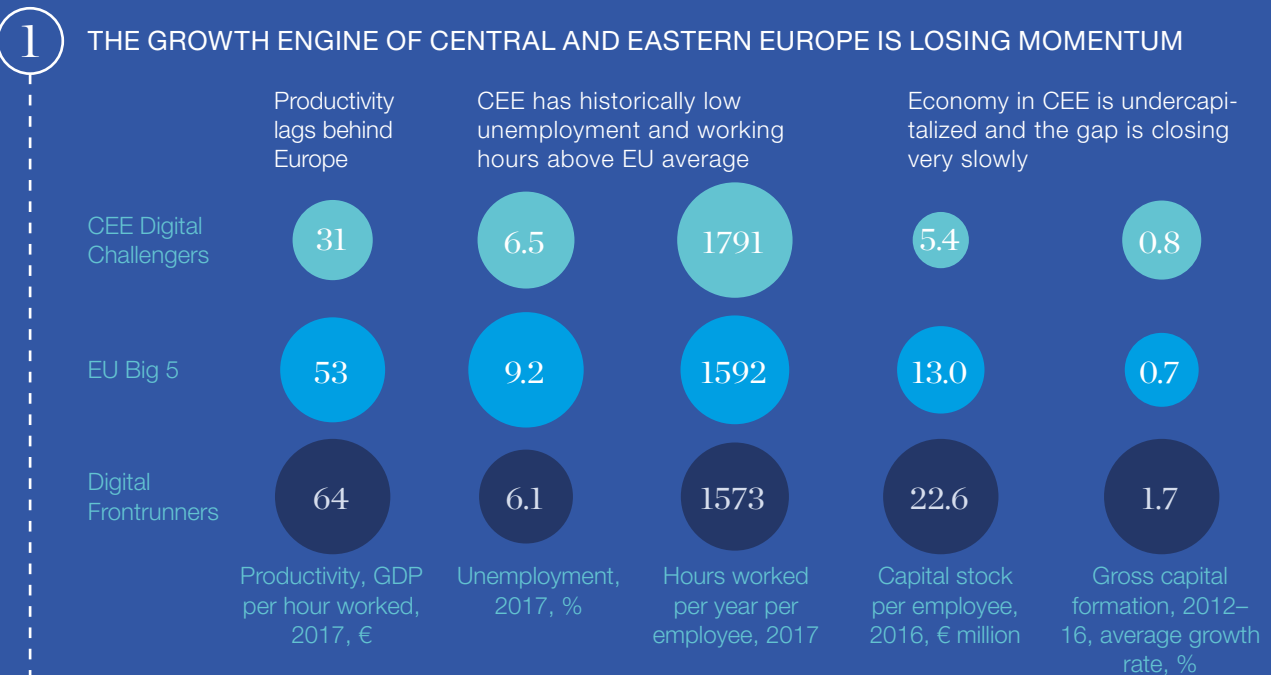
Support employees in developing their skills and knowledge, e.g., encourage employees to cultivate their curiosity about creating opportunities in combining emerging technologies with innovative services, implement reinforcement mechanisms.

Prioritize agility and learning over forecasting and planning.

Form strong digital collaborations within trade associations, focusing particularly on SMEs. ■

WHY IS DIGITIZATION KEY FOR CEE?

HOW TO CAPTURE THE POTENTIAL?

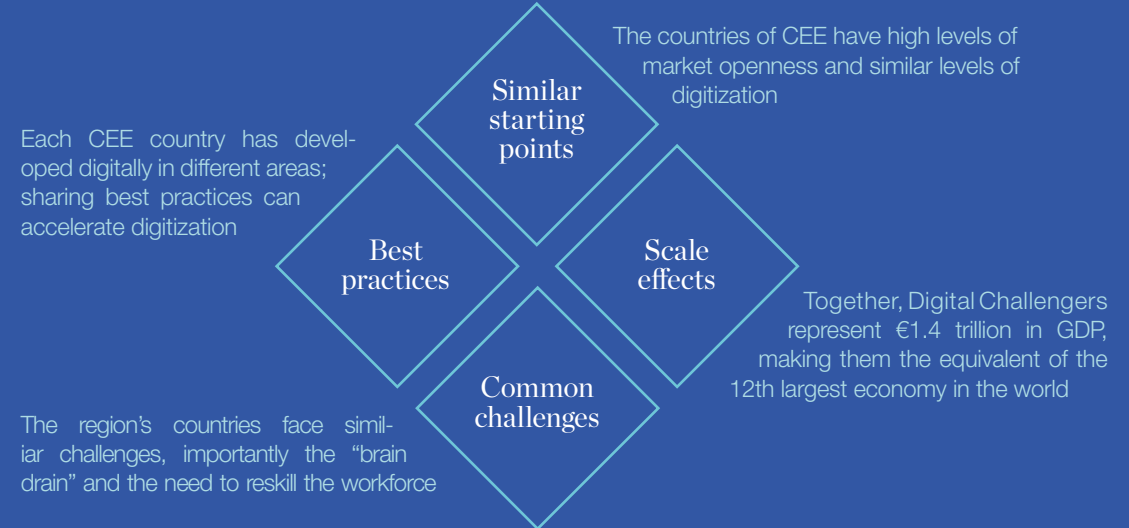


ALL STAKEHOLDERS NEED TO ACT FOR A SUCCESSFUL TRANSITION

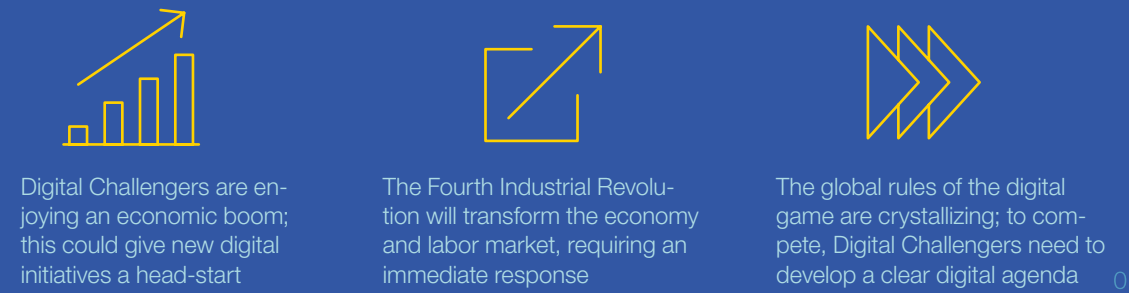


COLLABORATION BETWEEN CEE DIGITAL CHALLENGERS IS KEY

There are four reasons why cooperation is necessary to capture the full potential of digitization in the CEE region:



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



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 MGI research¹⁶ shows 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.¹⁷ On the other end of the spectrum, institutions such as the IMF uses studies¹⁸ 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

1

For more insights, see: McKinsey & Company, *Digitally-enabled automation and artificial intelligence: Shaping the future of work in Europe's digital front-runners*, October 2017.

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

3

McKinsey & Company, *The rise of Digital Challengers: How digitization can become the next growth engine for Central and Eastern Europe*", November 2018

4

McKinsey Global Institute, *Digital America: A tale of the haves and have-mores*, December 2015

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

6

Using data from IHS Economics for baseline GDP growth projections for Hungary

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 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%)

10

McKinsey & Company, *Shoulder to shoulder with robots: Tapping the potential of automation in Poland*, May 2018

11

Ibid.

12

McKinsey & Company, *Digital Economy: The next growth engine for Central Eastern Europe's Digital Challenger markets*, November 2018

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://antyweb.pl/zabka-zaprezentowala-swoj-sklep-przyszlosci-ktory-powstal-we-wspolpracy-z-microsoft/>

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The rise Digital Challengers

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